June 2011 £3.50 ISSN 0141-0857

NOW IN ITS 79th YEAR!

Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

It's Contest Time!

The 28th annual PW 144MHz QRP contest announced

Design Idea

A Phase locked VFO

Rig Control Interface

Enhance your radio experience

Valve & Vintage

Vintage tape recorders

Practical Way

More on crystal oscillators

9 770141 085105 06

WATERS & STANTON

UK's Lowest Prices!

Orderline
01702 206835

Online Catalogue
www.wsplc.com

ICOM NEW IC-9100 ALL-ROUNDER

HF to 23cms Base Transceiver

The IC-9100 has received rave reviews and is THE radio for those who want everything in one box! Add the 23cms module & D-Star board to expand your hobby even more. A real gem & comes with 2 year warranty. **UX-9100** 23cms **£449**. **UT-121** D-Star board **£129.95**. **FL-430/1** Roofing filters **£52.95.**

HF/6m/2m	100W
70cm	75W
23cm (option)	10W

Satellite Mode Operation:
Optional D-Star DV Mode.

£2999 D

ICOM NEW IC-7410 HF - 6m Transceiver

- *100W HF-6m all modes.*
- *Receiver +3-dBm IP3 + 15kHz roofing filter*
- *36kHz DSP IF 32 bit razor ahrp filter*
- *Internal auto ATU included.*
- *USB interface for PC control and audio out*
- *Large LCD with comprehensive display*
- *Integrates speech synthesizer*

Another winning design from Icom, the "expensive" features introduced a few years ago are migrating down to some of the more affordable radios.

£1999.95 D

ID-E880 NEW

2m/70cm 50W Mobile with D-Star & D-Star Repeat Mode. Features GPS compatability, CTCSS & DTCS, Airband Receive.

£439.95 D

IC-T70E NEW

Dual Band 2m/70cm Handy

£154.95 D

IC-E90

Triple band 6m, 2m, 70cms.

£239.95 D

NEW IC-E80D

- *2m/70cm Handheld*
- *D-Star + Repeat Mode*
- *GPS Compatability*
- *CTCSS & DTCS + Airband Receive*
- *1000+ Memories*

FREE software on Icom site

In Stock Now

£319.95 D

IC-E92D

A great dual band handheld woth D-Star fitted. Wide receive

£384.95 D

IC-E2820

Great dualband mobile.

£489.95 D

Fitted with UT-123 D-Star module. **£699.95**

HF Transceivers IC-7600

This HF-6m transceiver is the successor to the IC-756 series. It takes features from the flagship IC-7800 and the more recent IC-7700, putting them into a package that brings the price within reach of many more hams.

£3295 D

IC-7800	Deluxe HF / 50MHz All-Mode 200W Transceiver	**£8995 D**
IC-7700	1.8-54MHz 200W with built-in PSK-31 + keyboard	**£5999 D**
IC-7200	HF & 6m DSP 0.005-3335MHz wideband receive with USB port	**£839 D**
IC-7000	160m-70cm 100W (hf) Mobile, portable or base station	**£1189 D**
IC-718	160m-10m 100W transceiver that brings HF to those on a budget	**£595 D**

Other Radios

IC-910H	**£1295.95 D**	**IC-R6**	**£179.95 C**	**IC-R2500**	**£639.95 C**
IC-2200H	**£219.95 D**	**IC-R20**	**£394.95 C**	**IC-R8500**	**£1399.95 D**
IC-R3	**£399.95 C**	**IC-R1500**	**£499.95 C**	**IC-R9500**	**£10899 D**

YouKits HB-1A-MK3 NEW

In Stock Now!

40m / 20m Model **HB-1A-MK3-40-20**

Completely self-contained ready built 5W CW transceiver with LCD digital readout and great performance - Look at the price!

£199.95

Specification:

Full band coverage	
Tx: CW	Rx: SSB CW & AM
Filters	Crystal for CW & SSB
Keyer	Built-in
Power Out	3W dry cells
	5W 13.8v
Memories	20 Channels
Volts	9 - 14v
Current	Tx 950mA max on
	Rx 55mA
Internal	8 x AA cells
External	13.8v

Tuning steps 100kHz - 10Hz
Size 140 x 95 x 35 (mm)

YAESU Major Shortage!

The production of Yaesu has been badly hit by the earthquake in Japan and there will be a severe shortage of some models, Remaining stock of the FT-950 is going fast!

FT-950 HF - 6m Transceiver - We have the LAST FEW!

HF transceivers are Yaesu's prime products and their use for contest work & DX is testimony to their quality and performance. The FT-950 represents the optimum in performance versus value. Features include:

Mic parametric 3-band EQ and processor, Tx audio monitor, Easy spot CW netting, Full break-in, SSB audio (rx) pitch control, SSB Tx bandwidth up to 3kHz, Front panel speed control, IF notch – shift and width control, Electronic iambic keyer, Contest 5 ch. memory keyer, CW audio filter, CW beacon keyer, VFO A/B with split select, Quick memory storage, Digital noise reduction, CTCSS, Repeater shift, Memory and VFO scanning, Attenuator, Pre-amp, Wide rx 30kHz – 56MHz, Roofing filters 3 / 6 / 15kHz and of course a built-in Auto ATU.

£1199 D

YAESU Two Great Mobiles

FT-2900E

75 Watt 2m mobile with 3W loud audio, CTCSS, DTMF mic and the "WIRES" internet feature.

£139.95 D

FT-7900E

2m/70cms mobile delivers 50/40W with CTCSS, DTMF, "WIRES" internet, 1000 mems and wide rx up to 999MHz.

£239.95 D

FT-2000 LAST FEW!

Another victim of the Japan earthquake is the FT-2000 series. There will be a big gap in deliveries once current stocks are gone, and maybe a price rise? This radio is a superb design used widely by DXpeditions & contest operators. Choose the 100W 160m - 6m 12v model Or the 200W model with 230V AC supply. If you want one, act quickly!

FT-2000	100W 12V	**£1999 D**
FT-2000D	200W + AC PSU	**£2599 D**

The Heavyweight Radio at a Lightweight PRICE!

HF Transceivers

FT-DX5000D	200 Watts of raw power and performance.	**£4795.95 D**
FT-DX5000MP	200 Watts plus additional panoramic display.	**£5295.95 D**
FT-450D *NEW*	As FT-450 plus 300Hz CW Filter & improved controls	**£799.95 D**
FT-450	100W HF - 6m transceiver - great value.	**£639.95 D**
FT-DX9000contest	200W HF - 6m "formula one" contest machine	**£4899.95 D**
FT-DX9000D	Deluxe fully loaded base station	**£8199.95 D**
FT- DX9000MP	Amazing 400W "legal limit" radio	**£8999.95 D**
FT-857D	HF to 2m mobile. portable or base - up to 100W	**£679.95 D**
FT-817ND	1.8-440MHz all mode transceiver	**£529.95 D**

VHF Mobiles & Handhelds

FTM-350E	2m/70cm Mobile Bluetooth GPS APRS	**£479.95 D**
FTM-10SE	50/40W 2m/70cms stereo FM	**£309.95 D**
FT-8800E	Dualband Mobile 50W / 30W	**£329.95 D**
FT-8900R	10/6/2m & 70cm Mobile	**£369.95 D**
VX-3E	2m / 70cm Handheld Wideband receive	**£159.95 D**
VX-7R	Waterproof dualband handy (silver / black)	**£289.95 C**
VX-6E	2m/70cms handy, 5W Wideband Receive	**£238.95 C**
VX-8DE	Triple Band 6/2m/70cm Upgraded APRS	**£369.95 D**
VX-8GE	Dualband 2m/70cm 5W + GPS Antenna	**£359.95 D**
FT-60E	2m/70cms, 5W handy Wideband Receive	**£179.95 C**

< VX-8DE

Flex-1500 SSB CW Transceiver

FlexRadio Systems®
Software Defined Radios

All Modes 5W HF - 6m Transceiver

The **Flex-1500** offers an amazing package with selectivity down to less the **50Hz** and a live **panoramic display.** A **single USB** connection to your PC (or Apple Mac running Boot Camp) will get you on the air in minutes. It is also **"transverter ready"** for VHF - UHF operation. Hear the difference and "see" the signals. "Click" on the signal waveform - you are netted ready to transceive - EASY!!

- *160m - 6m All Modes Transceiver*
- *5 Watts Of Clean RF Power*
- *Selectivity To 25Hz!*
- *Use With Laptop - Easy Portable*
- *USB Connection*

£579.95! D

Flex-3000 100W SSB CW TX

100W All modes with built-in ATU, firewire connection, hand mic and "extras" Disc.

£1299.95 D

Carriage Charges: A=£4, B=£5, C=£8.50, D=£11

Head Office & South
Spa House, 22 Main Road,
Hockley, Essex, SS5 4QS.

Enquiries: 01702 204965
Fax: 01702 205843
Email: sales@wsplc.com
Opening Hours:
Mon-Sat 9am-5.30pm

Scottish Store W&S @
Jaycee, 20 Woodside Way,
Glenrothes, Fife, KY7 5DF.

Phone: 0845 5050128
Fax: 01592 610451
Email: jayceecoms@aol.com
Opening Hours: Sat 9am-4pm
Tue-Fri 9.15am-5pm Closed Monday

Fast Same Day Despatch Service!
Orders Received Before 3pm

Buy Now Pay Later Available!

Get The Latest News First
Follow @wsplc on twitter!

Waters & Stanton 21st Annual

HOCKLEY OPEN DAY

Sunday 29th May 2011 10am - 4pm

New Icom, Kenwood & Yaesu Rigs On Display!

Mega Price Crash On Loads Of Gear, All Under One Roof!
Warehouse Clearance Items! Service Dept Clearout!
In Attendance: bhi / Chelmsford ARS / Essex Repeater Group / Essex CW Club / Fun Bus / Icom / Kenwood / RSGB Book Stall / Yaesu
FREE Food, Drink & Parking! Charity Raffle In Aid Of Marie Curie Cancer Care

Live RadarBox Demo!

New for 2011 Mini Product Lectures!

AOR *We are UK Distributors*

AR-MINI

This amazing little radio covers 100kHz - 1.3GHz AM FM & WFM. 1000 memories, over 30 programmable features inc. CTCSS & DCS. Alphanumeric memories give meaningful channels and there is a built-in bar antenna covering 100kHz - 5MHz. Inc. NiMH pack & charger.FREE software database for PC loading via www.aorja.com.

£159.95 D

AR-8200-MKIII

The famous scanner with the quality performance. 530kHz - 3GHz AM FM FMW & SSB. Inc batts, charger + cigar lead. If you are looking for a truly wide-band great performer this is the best in its class!

£469.95 D

AR-8600MKII Base or Portable

The AR-8600MKII is a base or portable station receiver covering 530kHz - 3GHz. All modes AM FM FMW & SSB with standard rotary tuning. Requires external 12V or optional internal batt pack. A great station accessory for general listening or extra receiver.

£669.95 D

KENWOOD NEW TH-D72E

The very latest handheld from Kenwood is a dual bander with GPS, APRS and TNC capability. The TH-D72 has a built-in SiRF Star III GPS receiver and its antenna, so that you can enjoy various GPS functions with the radio stand-alone. You also can output its GPS data (NMEA-0183) to a PC through the USB port. You can even operate dual receive on the same band.

In Stock Now! £426.95 D

HF Transceivers

TS-2000E £1549.95 D

The TS-2000E is the classic all-band, all-mode base station covering HF - 70cms at up to 100W. Includes dual channel receivers & DX-cluster monitor with built-in TNC.

TS-2000X +23cm **£1799 D**

TS-480HX Ideal for mobile, portable or base station. Gives a massive 200W on HF and 100W on 6m. **£879 D**

TS-480SAT This model gives 100 Watts on all bands up to 6m, but adds a built-in automatic ATU. **£779 D**

Handhelds

TH-F7E	2m/70cm 5W (2-pin Kenwood) SMA **+FREE Clip Mic**	£236.95 D
TH-K2E	2m 5W 4-Key Keypad (2-pin Ken) SMA **+FREE Headset**	£163.95 D
TH-K2ET	2m 5W 16-Key Keypad (2-pin Ken) SMA **+FREE Headset**	£172.95 D
TH-K4E	70cm 5W (2-pin Kenwood) SMA **+FREE Headset**	£163.95 D

VHF Mobiles TM-V71E £289.95 D

2m/70cm Dualband Mobile Transceiver. Features;- *Wideband Receive, Built-In Echolink, Simultaneous 2 Frequency Receive, Removeable Control Head, CTCSS Encode / Decode, 1000+ Memories, Supplied with DTMF Mic.*

TM-271E	2m FM 60W mobile. CTCSS, 200 Memories, DTMF Mic	£165.95 D
TM-D710E	2m/70cms 50/50W mobile. APRS +EchoLink, DTMF Mic	£445.95 D

KENWOOD *The Amazing TS-590S!*

160m - 6m with superb receiver inc. dual roofing filters, Auto ATU, 32 bit f/p DSP & USB PC connection.

This is not an updated TS-570, but a completely new design embodying the very best engineering crafted by Kenwood to compete with the very best.

£1369.95 D

TG-UV2

2m/70cm Dual Bander

QUANSHENG

The TG-UV2 is a dual band 2m/70cm handheld. It covers 136.00 - 173.995 - 400 - 469.995MHz and FM broadcast 88-108MHz. The radio includes 7.2v 2Ah Li-ion battery for extended life.

- *3 Power Levels: 5W / 2.5W / 1W*
- *Steps: 5, 6.25, 10, 12.5, 20, 25, 30, 50 & 100kHz*
- *CTCSS, DCS & 1750Hz Tone*
- *Dual Watch*
- *200 Memories Alpha Numeric*
- *2 Deviation Levels*
- *2 Bandwidths*
- *CTCSS & DCS Scan*
- *Built-In LED Torch*
- *Backlit Screen*
- *PTT or VOX*

NEW

£81.95 D

WiNRADiO WR-G31DDC "Excalibur"

Receiver 9kHz - 49.995MHz

Meet the new industry standard receiver for serious HF work. Just plug into your PC USB port for a new experience in sensitivity and dynamic range. No hardware design can match the way that signals are extracted, demodulated and both visually and audibly reproduced. Serious DXer or casual operator, you will be amazed.

"It out-performed my 100dB HP Spectrum Analyser"

£699.95 D

MFJ Auto Tx / Rx RF Switch

NEW MFJ-1708

Use an optional separate receiver with your transceiver

How often have you wished you could switch in a separate receiver and use it as you wish with your main transceiver. This RF sensed switch lets you use a separate receiver, but switches and earths the Rx antenna on transmit. There is an adjustable delay and you can also hardwire the unit to PTT. An additional relay output can be used for other switching. If the 12V supply is disconnected the unit feeds the transceiver straight through.

£79.95 C

Watson Power Supplies

Power-Max-25-NF

Slightly larger than the Power-Mite and ideal companion for any 100W radio.

£89.95 C

Power-Max-45-NF

38 Amp cont, 45 Amp Peak, Switch Mode PSU with variable voltage, V/A meters, & noise offset.

£129.95 C

Power-Max-65-NF

65 Amp Low Noise PSU. Patented Noise Control that permits you to move any noise away from the operating frequency.

£239.95 D

W-5A	5A Analogue fixed 13.8V	£29.95 C
W-10AM	10A Analogue variable	£59.95 D
W-10SM	10A Switched fixed	£49.95 D
W-25AM	25A Variable PSU	£92.95 C

Carriage Charges: A=£4, B=£5, C=£8.50, D=£11

WATERS & STANTON

Orderline
01702 206835

Online Catalogue
www.wsplc.com

Turn that "Junk" into CASH! That NEW RADIO is now AFFORDABLE!

That's right, you can now take advantage of our new scheme. We will purchase for cash your old ham radio gear - DEAD or ALIVE! If you want to buy a new radio, then we will allow you even more! Look around you at all those items you no longer need or use. Change them into cash and make a big saving on that new radio you have always promised yourself. All you have to do is phone one of our sales staff or e-mail us and tells us what you have to dispose of and what you want to buy. You could be sitting on more cash than you think! Call 01702 203353 or e-mail: sales@wsplc.com. Do it NOW!

Manson EP-925
25 Amp Continuous Variable PSU

£104.95 D

* *Output voltage 3 - 15V DC*
* *Output Current 25A (30A peak)*
* *Malfunction protected*
* *Dual meters for volts & current*
* *Front panel terminals*
* *Supply 230V AC 50Hz*
* *Weight 9.2kg*

DV-Dongle 2 Models!

DV-DONGLE USB to your PC or Mac and work D-Star by accessing internet open D-Star repeaters worldwide. £169.95 C

NEW DV-ACCESS Access Point, similar to above but able to TX/Rx over short distance so that with 2m D-Star radio you can work through your PC. £229.95 C

Miracle Antennas
Miracle-Whip

A tuneable telescopic whip covering 3.5 to 460MHz. Up to 25 Watts PEP, fiited with PL-259 plug. Great for FT-817 & IC-703 or any other QRP radio.

£122.95 C

Diamond
VHF/UHF Antennas

A144S5R	5el 2m 9.1dbi 0.95m L	£49.95 D
A144S10R	10el 2m 11.6dbi 2.13m L	£94.95 D
A430S10R	10el 70cm 13.1dbi 1.19m L	£59.95 D
A430S15R	15el 70cm 14.8dbi 2.25m L	£75.95 D
SB144	Boom for dual 2m Yagis	£26.95 A
SB430	Boom for dual 70cm Yagis	£21.95 A
SS144	Stack transformer 2-way 2m	£94.95 C
SS430	Stack transformer 2-way 70cm	£81.95 C
KB144	Mast stand-off for vert. polarise	£19.95 A
KB430	Mast stand-off for vert. polarise	£17.95 A

Tonna
VHF/UHF Antennas

220505	6m 5 el. 10.1dBi gain 3.45m	£118.95 D
220809	2m 9 el. 13.1dBi gain 3.47m	£79.95 D
220909	70cm 9 el. 13dBi gain 1.24m	£74.95 D
220919	70cm 19 el. 16.2dBi gain 2.82m	£94.95 D
220623	23cm 23 el. 17.9dBi gain 1.75m	£77.95 D
220725	13cm 25 el. 18.3dBi gain 1.45m	£102.95 D

Create
Rotators

These are hunky Japanese rotators that we recommend for reliability & performance.

RC5-1 £569.95 D
RC5-3 £719.95 D

MFJ
Radio Accessories

"The World's Best Auto ATUs Buy with Confidence! Just Press PTT You're TUNED!"

MFJ-998 *AUTO TUNER*

• 1.5kW SSB & CW • Digital & Analogue X-needle VSWR • 1.8 - 30MHz • 20,000 memories • Radio interfaces optional • Built-in antenna selector • Field upgradeable firmware • Auto bypass protection

W&S £664.95 C

MFJ-929 *AUTO TUNER*

1.8-30MHz 200W, LCD readout, 20,000 memories, long wire & coax, radio interface.

A great Auto ATU that needs just a single coax feed and 12V DC. Press the PTT & you are tuned! W&S £214.95 C

MFJ-925	Compact auto tuner	£174.95 D
MFJ-927	200W remote auto atu	£254.95 D
MFJ-928	Basic auto atu	£203.95 D
MFJ-991B	Auto atu 150W	£214.95 D
MFJ-993B	Auto atu 300W	£254.95 D
MFJ-994B	Auto atu 600W	£349.95 D
MFJ-931	Artificial ground	£114.95 C
MFJ-932	Mini loop tuner	£143.95 C
MFJ-934	Artificial ground + ATU	£204.95 C
MFJ-935B	Portable loop system	£204.95 C
MFJ-945E	Mobile atu 300W	£134.95 C
MFJ-962D	1.5kW ATU	£299.95 D

MFJ-962D

MFJ-969	160m - 6m 300W	£219.95 D
MFJ-971	Portable ATU	£122.95 C
MFJ-974B	Balanced ATU	£194.95 D
MFJ-986	3kW differential tuner	£359.95 D

Buddipole
HF Portable Antennas

The most respected portable HF antenna system available. Dipole or vertical system - packs down into a carry pack.

The secret of the system is the hi-q coil assemblies.
www.buddipole.com

W3-BP	Dipole 40-2m 250W	£219.95 D
W3-BP-DELUXE	With mast kit	£419.95 D
W3-BS	Vertical 40-2m	£161.95 D
W3-BS-DELUXE	Vertical + clamps	£194.95 D
W3-CTA	Centre T mast clamp	£8.95 A
W3-DKB	Buddipole Carry Bag	£41.95 C
W3-LBVK	Low band vertical kit	£199.95 D
W3-MBP	Mini Buddipole	£239.95 D
W3-MK	Mounting Kit	£36.95 D
W3-MWA-4	Military whips	£102.95 C
W3-RAK	Rotate arm kit	£39.95 C

AMERITRON AL-811XCE

600W of PEP power from a desk top linear that covers 1.8-30MHz. And offered at a great price.

£899.95 D

Tigertronics
SignaLink Interfaces

New Delivery Expected!

Signalink Sound Card Interfaces do not require the use of a com port to trigger PTT on the rig. SignaLink have internal links which make them compatible with most of the rigs on the market. Radio lead is supplied, state which when ordering. Extra mic leads are available.

SL-USB-4R	4-Pin Round	£89.95 C
SL-USB-13PDI	Icom 13-Pin Din	£94.95 C
SL-USB-13PDK	Kenwood 13-Pin	£94.95 C
SL-USB-8R	8-Pin Round	£89.95 C
SL-USB-RJ11	Modular RJ-11	£89.95 C
SL-USB-RJ45	Modular RJ-45	£89.95 C

Uniden Bearcat

UBC-30XLT

A real bargain whilst stocks last.

Frequency Range: 87.5 - 107.9MHz WFM, 108-136.9875MHz AM, 137 - 173.99MHz FM

The radio has 200 memories, LCD display and can scan at 25 channels per sec.

£62.95 C

Check full spec. of these radios @ www.wsplc.com

UBC-3500XLT

FM FMB WFM AM Frequency:
- 25-512MHz
- 806-960MHz
- 1240-1300MHz.

2500 memories, RF near signal capture, Quick keys, Scan 100 channels per sec., CTCSS & DCS, Alpha numeric tags, Data skip, Auto store, Display contrast adjust, AC adaptor/charger included.

This is the Bearcat Flag Ship radio. It pacts an amazing number of features into a small package. If you are looking for a serious VHF/UHF scanner that covers the entire spectrum and resolves all the popular analogue modes, then this is a serious contender. £209.95 C

Watson
VHF/UHF Antennas

VHF-UHF Verticals

W-30	2m/70cms 3/6dB length 1.15m 150W SO-239	£49.95 C
W-50	2m/70cms 4.5/7.2dB length 1.8m 150W SO-239	£54.95 C
W-300	2m/70cms 6.5/9dB length 3.1m 150W SO-239	£74.95 D
W-2000	6m/2m/70cms 2.15/6.2/8.4dB length 2.5m 150W	£89.95 C

VHF-UHF Mobile Whips

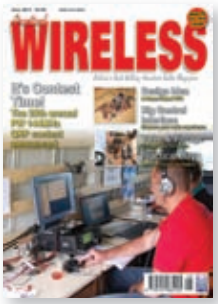
W-2LE	2m 0dBv length 0.48m	£11.95 C
W-285	2m 3.4dBv 1.33m	£14.95 C
W-77LS	2m/70cm 0/2.4dBv 0.43m	£14.95 C
W-770HB	2m/70cm 3/5.5dBv 1.1m	£19.95 C
W-7900	2m/70cm 5/7.5dBv 1.58m	£32.95 C
W-627	6/2/70cm 2/4.5/7.2dBv 1.6m	£34.95 C

MFJ-269

The Antenna Analyser has been refined over the years & the MFJ-993B tells you just about everything you need to know about your antenna system - resonance, impedance, reactance & can even measure coax losses & identify the position of open & short circuits. All in a compact unit that covers 160m to 70cms. Can you afford to be without one? W&S £369.95 C

* *1.8 -170 & 415-450MHz*
* *Frequency Counter*
* *LCD readout*
* *SWR & impedance*
* *N-socket (Ant), BNC (Counter)*
* *AAx10 or ext. 12V DC*
* *Size 103w x 173h x 60d mm*
* *Weight 750g*

Carriage Charges: A=£4, B=£5, C=£8.50, D=£11



Practical Wireless June 2011

contents

Volume 87. Number 6. Issue 1249. On sale 12 May 2011

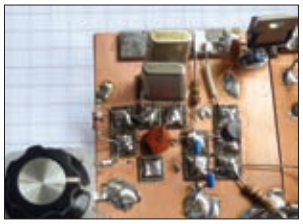
Due to shortage of space in this month's well-filled issue, *What Next?* and several other articles have been held over until next month. My apologies.
Editor.

Front Cover
The keen French team TM7T operating in last year's *PW* 144MHz QRP contest, will you work them again this year? You might – if you join in on the day!

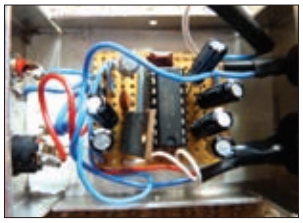
13

16

20



32



42

58

Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979. Printed in England by Holbrooks Printers Ltd., Portsmouth P03 5HX. Distributed by Seymour, 2 East Poultry Avenue, London EC1A 9PT, Tel: 020 7429 4000, 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 £38, EUROPE £47, REST OF WORLD £57, payable to *Practical Wireless*, Subscription Department. PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979. *Practical Wireless* is sold subject to the following conditions, namely that it shall 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 Mail 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 Mail International, c/o Yellowstone International, 2375 Pratt Boulevard, Elk Grove Village, IL 60007-5937. The USPS (United States Postal Service) number for Practical Wireless is: 007075.

Rob Mannion G3XFD/EI5IW's

Keylines

Rob pays tribute to Don Hayter G3JHM – a dedicated Amateur Radio microwaves operator and friend.

In the May *PW* I briefly mentioned that my friend and former broadcasting colleague Don Hayter G3JHM had become a Silent Key. There was only space for a very brief mention of the death of a tremendous Amateur Radio and broadcast engineering 'character'.

Don was someone you just couldn't ignore – love him or totally dislike him (not many people in that category!) G3JHM was 'always there' on the microwave and v.h.f./u.h.f. scene.

I last worked Don on 144MHz just after a *PW* 144MHz QRP Contest when he – as usual – would come on the air to encourage contesters to "drop the QRP power and increase to QRO levels" – Don didn't believe in QRP on v.h.f.!

To say that Don G3JHM wasn't tolerant of other Amateurs' whose approach to the hobby was different to his – is very much of an understatement! However, my friend and former colleague was totally dedicated to his microwave work. Indeed, he sought out one of the highest elevation villages in Hampshire – Four Marks – for his home so he'd do well on v.h.f./u.h.f.

I worked with Don on a number of occasions and the most memorable time was when, in the summer of 1978, we travelled together to Fair Isle, via Sumburgh Airport on mainland Shetland. Little did we know that our straightforward journey to Fair Isle would become a dreadful nightmare on the return leg!

Our especially chartered Logainair Britten-Norman *Islander* aircraft made the approximately 25 miles flight to Fair Isle in less than 20 minutes. After a low pass over the 'runway' to scare the sheep away, our pilot landed and dropped us and our (large!) amount of luggage, food (we had to be self-sufficient) and equipment off before leaving as quickly as he could, promising to collect us a week or so later! That was the last time we saw the aircraft.

While on the Island we had the use of an ancient rusting Austin van. We'd turn left and the (detached) body of the vehicle eventually followed the chassis!

We were based at the old Royal Navy radar station that had been utilised by the IBA, BBC and BT as a u.h.f. and microwave link station. The broadcasters used the Fair Isle station as a link in the chain to get TV and radio programmes to Shetland. Reception was 'off air' from Keelylang Hill in Orkney. We were there to do some antenna height diversity tests to improve the reliability of the incoming u.h.f. signals.

On The Bands

During our 'off duty' time on Fair Isle I had the opportunity to get on h.f. and I 'worked the world'. It seemed everyone wanted to work Fair Isle! – and they did – thanks to SMC in Chandlers Ford near Winchester who loaned me their latest Yaesu transceiver.

Unfortunately, when the time came for us to leave Fair Isle the famous 'Storm Force 10 Fair Isle' shipping weather warnings were being broadcast. So, instead of a short flight – we had an incredibly rough and unpleasant four hour trip on board *The Good Shepherd III* Island ferry (in reality a small fishing boat!). The only person **who wasn't seasick** on the trip was a three year old girl!

Ill and exhausted – at Sumburgh we boarded a turboprop *Dart Herald* for the flight to Gatwick. On board we had our one treat of the trip when the pilot invited us into the cockpit (those were the days!) as we flew over the Midlands and eventually right over Lasham Airfield in Hampshire near our homes, before we descended into Gatwick.

Then disaster struck! All our hold luggage and equipment ended up in Amsterdam Schipol Airport and was missing for several weeks. Unfortunately, Don had very carefully packed a wrapped and sealed half a side of fresh Fair Isle lamb in his main suitcase!

We both laughed about the incident later, but Don told me he'd had to bury the (well matured!) meat and the other suitcase contents in his garden! It was a trip I'll never forget and I was privileged to have worked with Don G3JHM. May he rest in peace.

Rob Mannion G3XFD/EI5IW

Practical Wireless
PW Publishing Limited
Arrowsmith Court
Station Approach
BROADSTONE
Dorset BH18 8PW
Office opening hours: Mon – Thurs, 8.30am – 4.00pm.

Tel: 0845 803 1979
Fax: 01202 659950

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

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

Art Editor
Stephen Hunt
steve@pwpublishing.ltd.uk

Advertising Typesetting/Admin
Peter Eldrett
peter@pwpublishing.ltd.uk

Advertisement Sales
Roger Hall G4TNT
roger@pwpublishing.ltd.uk

Finance Manager
Alan Burgess
alan@pwpublishing.ltd.uk

Book Orders
bookstore@pwpublishing.ltd.uk

PW Publishing Website
www.pwpublishing.ltd.uk

Our 0845 numbers are charged at the BT Standard local Rate. Callers with an appropriate BT inclusive call package can call this number free!

Directors: Stephen Hunt & Roger Hall

Subscription Administration
Webscribe
Practical Wireless Subscriptions
Unit 8 The Old Silk Mill
Brook Street
Tring
Hertfordshire HP23 5EF, UK
pw@webscribe.co.uk
www.mysubcare.com
☎ 01442 820580
Fax: 01442 827912

New Details

Subscriptions
Subscriptions are available at £38 per annum to UK addresses, £47 Europe Airmail and £57 RoW Airmail. See the Subscriptions page for full details.

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

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

Placing An Order
Orders for back numbers, binders and items from our Book Store should be sent to: PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone 0845 803 1979. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone 01202 659950.
The E-mail address is bookstore@pwpublishing.ltd.uk

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

Readers' Letters

Send your letters to:

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

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**

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

Second World War TRD Radio

Dear Rob,

I'm writing in the hope that *PW* readers might help me. I'm researching a most unusual Second World War radio and hope that one of your readers might be able to help with information. This radio was known as the TRD, probably standing for Transmitter Receiver Dabbs, because it was largely designed by **Ron Dabbs**.

The radio was used exclusively by the Special Duties Section of the Auxiliary Units on fixed sites. It had a super-regenerative receiver and an amplitude modulated transmitter, but it was not conventional 'phone a.m.; whatever the modulation technique was – and that is the mystery – it provided a degree of speech security! It operated on about 50MHz producing a few watts of r.f. from 6V accumulators; its size and probable valve line-up are known but not the modulation technique! If anybody has any information about these sets, I would be grateful if they could please get in touch by E-mail via **walfor@globalnet.co.uk** by post, or by 'phone via (**01458**) **241224**. Thanks for your help.

Tim Walford G3PCJ
Upton Bridge Farm
Long Sutton
Somerset TA10 9NJ

Editor's comment: *I'm sure there'll be a number of readers who can help you out Tim! Incidentally. I'm sure that many our our readers will be interested to know that Tim's 'QRP In The Country' event will take place at his farm on July 17th. Both* ***Tex Swann G1TEX*** *and I will be there for a great radio 'day out' in the country. We hope to see you there!*

Operating Amateur Radio As An M3

Dear rob,

I thought it would be a good idea to write to explain my part with Amateur Radio – operating as an M3. Since

£20 Star Letter

Is there room in Primary Science for Radio?

Dear Rob,

In response to your concerns about "an extremely limited school science curriculum" in *PW*, I pose the above question in the light of my recent experience at a primary school in Bolton, Lancashire.

This year I was elected as deputy chairman of **Bolton Wireless Club** and one of my immediate proposals to the committee was to increase our activity in the community and in particular with young people. Upon finding that the British Science Association's Science Week was imminent and that the theme was 'Communication', I set about writing to the science coordinators in two local primary schools who had registered their details with the BSA.

Our free offer was to help pupils realise how dependent we are on radio and how it works. The offer was taken up by **St. James CE Primary** in West Houghton on March 11th and gave us eight days to prepare a full day for Year 5 and 6 pupils beginning with a whole school assembly.

Practical KS2 class activities included: 'The open microphone' – speaking on our two portable club radio stations **G0BWC/P** and **G1ONE/P**. 'The digital revolution' - Cracking the Morse Code with flashlights, keys and Phil Tulga's music programme. 'My mobile phone won't work!' Experiments in blocking electromagnetic waves. 'Look no batteries!' – Making the world's first radio. 'Secret Agents' – Callsigns with phonetics using walkie-talkies.

The section titled 'The International Space Station' was helped by an illustrated talk given by **Ross Wilkinson G6GVI**, just before the ISS made its overhead pass. Children witnessed the sound of live transmission of APRS packets and decoding on the computer.

I'm pleased to report that 120 children recorded experiments, Morse code messages and invented callsigns on specially prepared worksheets (Teachers were given class packs of follow-up information). A further 60 Year 4 pupils were given a guided tour of the facility which was entirely resourced by BWC members.

Excited minds, smiling faces, active fingers, brave microphone use, thoughtful questions, and complimentary reactions from teaching staff summed up a productive day for pupils! We were told that BWC made a professional kick-off to the School's Science Week and that the school normally pays for externally organised activities – which are often of less quality.

It was another great team effort with volunteer BWC members on site and at home on the air in QSO with pupils. It would appear that this school – normally constrained by the National Curriculum – has an open mind about what inspires interest and learning in science. As well as promoting investigative skills in science we crossed other curriculum boundaries including geography, English and music.

I hope, Rob, that this event gives you even more encouragement that in an ever changing education system it is still possible to find opportunities to create an interest in science. During the plenary session, we were flattered by a pupil's question, "How old do you have to be to join Bolton Wireless Club?"

Yours sincerely.

Mark Bryant M0UFC
Chorlton-cum-Hardy
Greater Manchester

Editor's comment: *Thank you for your feed-back Mark! What a truly wonderful and inspiring letter and what magnificent results you've achieved! And although I am not at all in favour of the so-called 'National Curriculum' and its attempts to 'standardise ' education – your initiative shows what can be achieved despite such constraints. Congratulations to everyone who was involved!*

being licenced in July 2007, I have been on the receiving end of a lot of abuse from older Radio Amateurs in the UK, some even writing bad posts on Internet Groups pretending to me, and even telling ***QRZ.com*** I am a known UK Scammer. However, thanks to the **Cornwall Radio Amateur Club**, and most importantly one of their fellow members – **Steven Holland G7VOH**, they have really helped me back into the community and getting back on the bands.

Steven was really kind enough to contact *QRZ.com* and the moderators of **Transmission one**, within a week all posts were removed and I'm enjoying the hobby even more then before. The problem is, I believe, that they don't like Foundation Licence Holders and even suggest we are CB operators. I was a CB Operator before I took my Foundation Exam and only last week re-installed a CB Radio in my shack to speak with others on 27MHz, here in Plymouth, Devon where I have moved from my previous home near Penzance.

I thought I should contact you with this little problem – something that's being going on for the last four years. All the best and keep up with *PW*, it's a great magazine and really inspires me.

Lawrie Richardson M3UHQ
Stoke
Plymouth
Devon

Editor's reply: *Thanks for your note Lawrie. I'm sorry to hear about your problems. Please join me on the* Topical Talk *page for further comment.*

What About 198kHz?

Dear Rob,
I think you'll remember me from the Mayo Rally in Knock – I brought along some *PW* projects from the 1960s and 1970s that I had built when I was serving in the RAF. I've been reading *PW* since I was about 10 – my late Mother used to get the magazine for me from a little newsagent's in Athlone where we lived and my Dad – who worked as a telephone linesman – encouraged me. When I eventually took up an RAF electronics apprenticeship, *PW* went with me and helped in my career. The magazine has much to answer for!

The reason I'm writing is to mention how concerned I am regarding the future of BBC Radio 4 on 198kHz. Everyone seems concerned about DAB radio and the Internet service (which isn't reliable) – but what about the Droitwich 198kHz service? At the moment I can use a simple portable radio on long wave to receive Radio 4. It's available on satellite – but that's not portable.

Here in the the Republic of Ireland the pressure is on to use Band II for RTE services – although we're not going to be forced to have DAB on Band II. I fear that the DAB radio plans in the UK will eventually affect the future of BBC Radio 4 from Droitwich. When I lived in the UK long wave reception from Droitwich was good and even in the north of Scotland when I was based there – thanks to the Westerglen and Burghead transmitters.

As the 198kHz service covers most of Europe including Ireland, I'm hoping that the BBC aren't planning to close the service. Although I've seen several suggestions in newspapers that the BBC don't see a future for the long wave service. For those of us who enjoy radio drama and Radio 4 in general – that's not good news as the Internet isn't reliable enough.

Hopefully we'll see you at the Mayo Rally again some time Rob? The new venue in the Welcome Inn, Castlebar is much more convenient than Knock. I hope to meet you there again. Best wishes.

Michael (Mike) Burke
Loughrea
Galway
Ireland

Editor's comment: *Good to hear from you again Mike and I certainly remember you and your constructional skills! I hope to attend the Mayo Rally again in the future. Please join me on the* Topical Talk *page for further comment on the*

Tribute To Don Hayter G3JHM From Kees Kaper VE5KKZ

Dear Rob,
I first came in contact with Don in 1974 he was a member of the RSGB Microwave Group. I then wrote a letter to Don telling him I was also doing experiments on 10GHz in Holland he responded with a letter back and told me that there were Microwave round table meetings in the UK.

I have very many happy memories of the time in the 1970s that I went to visit Don in Four Marks in Hampshire and brought my first solid state 10GHz receiver with me. Don organised events at the Independent Broadcasting Authority's (IBA) headquarters at Crawley Court near Winchester, where we all came along to get our gear tuned using the IBA Lab Test equipment.

In 1959, Don G3JHM and **Bob Short G3GNR** had their very first 10GHz QSO over a 4km path and


Don Hayter G3JHM.

later over 30km between Worthing and Newhaven in East Sussex. They were using a modified 723A klystron on 10.050GHz with 10mW output powered by two rotary converters (dynamotors) 12V in 250V output) Receiver mixer 1N23 diode via a 10dB coupler .

Don held the world record on 70cm over 1102km in 1962. Later the klystron oscillator was replaced by a gunn diode oscillator they run on only 9V. He was not only on 10GHz but also on 2 and 4 metres and worked a lot of DX until November 2009.

Don got his radio licence and became G3JHM around 1953 together with **Trevor Wilmshurst G3IBY**. Don installed a 2 metre band antenna and mounted it on the chimney. His mother was not happy with that, because the strong winds placed a lot of strain on the antenna and damaged the chimney which then had to be replaced!

Another other friend of Don was **Simon Freeman G3LQR** – he is also a microwave man and we visited Simon in 2009. In 2009 Don and I went to Steyning and he showed me the Grammar School that he there attended in the late 1940s. Trevor G3IBY was at that school too but didn't like the headmaster he was a tyrant.

After Don got his School Certificate he worked for an Estate Agent where his mother worked. But after a year he left to go Brighton Technical College as he didn't like a job that required lying to people!

Don went to work for Plessey in Havant in Electronic Engineering and this is where he met **Roy Cragg**, who later emigrated to Canada. After Plessey closed down in Havant, Don

Brian Tuffill M0FFS's Letter

Dear Rob,
I was particularly interested in the letter from **Brian Tuffill M0FFS** in the May 2011 issue, as I am sight impaired myself, but not Severely Sight Impaired (SSI) at present. His wise comment regarding the Equality Act 2010 is noted. It can be a weapon, but its recognition by any organisation to which it applies, can also be a mark of outstanding merit.

The RSGB will, I'm sure, be giving ongoing consideration to making the present exam system ever more compatible with the needs of sight impaired examinees. Therefore I can only offer a few thoughts which may or may not be of value. I take as a starting point the aspiring radio amateur who would be quite unable to undertake radio construction work due to sight loss, and extend this onwards to the totally blind. I see no reason why this group of disabled people should not become expert operators, reaching high standards of ethics on the bands, and DXing skills which would set a bench mark within the hobby.

So what of the examination system? Perhaps an Amateur Radio Operator Licence, which would ensure the licensee was fully versed in all aspects of amateur radio operation, technical principles of equipment, antennas, propagation, licence conditions, safety, etc., as covered in the present exams. Practical work would be limited to operation, therefore not involving construction, and the exams would not require any calculations.

The only limitation on the Amateur so licensed would be the obligation to use commercially manufactured transmitters. Only quite minor alterations to the syllabus and exam papers would be necessary to meet the needs of the sight disabled.

With instruction manuals presented in audio form or Braille, some extra training of trainers, and suitable arrangements (which are at present available) for assisting examinees to complete the exam papers, I see no reason why SIs and SSIs would have any difficulty in becoming licensed. How they persued the hobby would then depend only on their resourcefulness.

As for the licence being for 'self training, including conducting technical investigations', what could be more appropriate than investigating means of overcoming our sight disabilities in respect of our hobby. As Brian (M0FFS) neatly concludes, '(the exams) should continue to pass out informed, competent and responsible Radio Amateurs who will continue following the underlying principle of Self Education'.

Nick Hockenhull MW0NAB
Summerhill
Narberth
Pembrokeshire
Wales

joined the IBA as a radio propagation Engineer and stayed there until his retirement.

In 1998 Don told me that Roy Cragg was living in British Columbia, Canada. I was also working too for a radio company, not far from where Roy was living, so I was able to visit Roy many times.

In 2003 I got a 'phone call from Don that his wife **Anne** had passed away and I suggested to him that he come over for a visit to Canada and he came in May 2004. We went to the Rocky mountains on the way to see Roy in Clearwater BC. Don was lucky to see all the animals, including like mountain sheep and goats and Elk. Indeed, some of them – including Bears – came as close as three metres away from the car. We showed Don around and drove 4000km in three weeks and he enjoyed himself so much that he came back another four times between 2004 and 2009. Don liked the home cooked meals from Eldean my wife – and also liked his Fuller's London Pride beer (available in Canada).

In 2009 we came to Four marks in May for three weeks and Don showed us around and Don came back to us in August – and although we didn't realise it – it but it was to be the last time. Don had more hobbies beside Amateur Radio he was also a bird watcher and photographer. Also he liked researching family history, working in the garden and growing tomatoes and other vegetables. Don was very intelligent and had a good sense of humour.

When Don was in the nursing home he was so glad to see his son **Andy** and **Sarah** his daughter-in-law and his grand son **Joseph**. He also enjoyed the visits from his friend Trevor G3IBY and his wife **Jeanette**. You will be much missed Don!

Kees Kaper VE5KKZ
Eston
Saskatchewan
Canada

Editor's comment: *Thank you Kees for your kind words and tribute to Don G3JHM. Please see* Keylines *for my own tribute.*

Spectrum Defence Fund

Dear Rob,
Last year the RSGB General Manager made a presentation to the **Torbay Amateur Radio Society** (TARS) about the Spectrum Defence Fund, at which over 30 people attended.

At question time after the talk I suggested that contributing was, in my opinion, a waste of money and would only serve to line the pockets of the legal profession.

I also questioned what the emerging technologies might be that would exacerbate the interference to the radio spectrum, already experienced due in part to broadband internet devices. The RSGB presenter could not be specific, indeed nobody knows the answer to this question, such is the rate of development in this field.

I feel the RSGB campaign is high on sentiment but low on factual data. It is alarmist in its delivery, which bears similarities to its campaign against Ofcom some years previously.

Ofcom have not proved to be the ogre described in that campaign and were responsible for giving Radio Amateurs free licences. They could have decided to raise the licence fee, but they did not.

Most people want computers, broadband and all manner of modern technology, and there is a down side. We all live in an increasing cloud of electronic soup. I feel it is high time that this matter is debated in *PW*, which prides itself in being the UK's only independent Amateur Radio magazine.

Personally I do not support, nor have contributed to the Spectrum Defence fund, but those who have, have a right to know how their money is being spent. They have a right to see proper audited accounts concerning the fund.

Peter Lewis G4VFG G20322 Hon. Secretary International Short Wave League (ISWL)
Bittaford
Ivybridge
Devon

News & Products

Send your info to:

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

YouKits – Ready-Made Equipment From China

Jeff Stanton G6XYU contacted *Newsdesk* with an up-date on a range of equipment Waters & Stanton are importing from The People's Republic of China and news of their open day in May. Jeff reports, " I'm attaching first information on a new range of QRP transceivers from China. These are ready-built radios from 'YouKits' that I'm sure will be of interest to your readers. I'm also pleased to announce that Waters & Stanton have been appointed as UK Agents for YouKits."

The Models are:-

1: The HB-1A-MK3-40-20 available now, which covers 7 and 14MHz (20 and 40m) for up to 7W transmit and receives continuously between 5 - 16MHz. Price is £199.95 including VAT.

2: The HB-1A-MK3-30-20 available soon which covers 10 and 14MHz (30 and 20m). Other details as above.

3: The TJ6A-PRO-A a 6-band transceiver available in summer 2011. No price yet. Further details from:

Jeff Stanton G6XYU
Waters & Stanton PLC
***Spa House*, 22 Main Road**
Hockley, Essex SS5 4QS
Tel: (**01702**) **204965**
FAX: (**01702**) **205843**
E-mail: **sales@wsplc.com**
Website: **www.wsplc**

Richard Atcherley G1GRD Joins Martin Lynch as UK Sales Manager

Martin Lynch G4HYK contacted *Newsdesk* to announce the appointment of Richard Atcherley G1GRD as new UK Sales Manager. Martin commented, "Richard brings with him a wealth of sales experience covering professional aviation, PMR, component sales and running his own motorcycle and car business."

A very keen Radio Amateur, Richard himself said, said "I'm delighted to join the largest dedicated Amateur Radio company in the UK and have actually been – like most UK Amateurs – one of Martin's long standing customers."

Richard will oversee three sales staff and back order processing from the ML&S store located in Chertsey, Surrey.

Further information from
Martin Lynch G4HYK
Martin Lynch & Sons
73 Guildford Street
Chertsey
Surrey KT16 9AS
Tel: (**01932**) **567 333**
FAX: (**01932**) **567 222**

Northamptonshire D-Star 'Meet & Greet' Day

Stuart Walker G7HIF writes, "D-Star Northampshire and the UK Interconnect Team (UK-IT) are organising a D-Star Meet & Greet Day on Sunday May 29th. This will be held in Northampton at, **Tetra Communications**, **Bunting Road**, **Northampton NN2 6EE**.

"The event, will include help and advice from D-Star Northants and UK-IT. We hope that a number of D-Star repeater keeper and other D-Star Gurus will be on hand to help with Radio programming and set-up and general D-Star training. Please pass this information on to anyone you think might be interested. Also at this event you will have the opportunity to visit the Tetra Communications Warehouse, which will be open for the duration of the event, and may be find yourself a real bargain!" Stuart Walker G7HIF and **Gavin Nesbit MM1BFX**, D-Star Northamptonshire.

Further details from Stuart via **g7hif@d-star-online.co.uk**

Barford Norfolk Radio Rally July 3rd

The Norfolk Amateur Radio Club's Barford Rally takes place at Barford Village Hall & Green, Barford, Norwich NR9 4AB on July 3rd.

The rally opens 0900 (traders from 0800) with Talk-in on S22 and featuring trade stands, car boot sales, bring and buy, raffle, repeater groups, catering and free car parking. Entry £1.50 per person, with under 16s free. Pitches £8, indoor tables £10.

Website: **www.norfolkamateurradio.org**

Further details from **David Palmer G7URP**
Home Tel: (**01953**) **457322** (evenings only please)
FAX: **(01953) 458849**
E-mail: **radio@dcpmicro.com**

Angel of the North Amateur Radio Club

Nancy Bone G7UUR invites *PW* readers in the north east of England, "to our Wireless version of 'Gardeners Question Time'. Come along on Monday May 16th at 7.30pm and listen to our panel of experts and ask your knotty questions of our gnarled experts. Propagate your antenna farm and branch out with your radials. All welcome. Monday May 23rd from 7pm. to 9pm. You can join us and take to the air during our 'Natter night'.

"We meet at the **Whitehall Road Methodist Church Hall**, **Bensham**, **Gateshead NE8 4LH**. The hall is at the corner of **Whitehall Road** and **Coatsworth Road.** The entrance to radio club room is through door at the side of building next to the car park (Knock twice and ask for Nancy! Hi!). The car park entrance is on Whitehall Road. Public Transport Details:
Go-Ahead routes 53 and 54. Club callsign: **MX0GGP**."
Further details from the Hon. Secretary Nancy Bone G7UUR, **217 Bensham Road Gateshead NE8 1US**.
Tel: (**0191**) **477 0036** (Evening),
Tel: **07990 760920** (Day).
E-mail: **nancybone2001@yahoo.co.uk**
Website: **www.anarc.net**

QSL Communications

The staff at PW Publishing Ltd. wish Graham and Jayne at QSL Communications a long and happy retirement. Their store is now closed but you can contact them for a short while on **01934 512757**.

Up-dated Foundation Licence Now Talking Book

The RAIBC is the charity working on behalf of disabled Radio Amateurs. **Russell Bradley G0OKD**, the RAIBC Secretary contacted Newsdesk, "The RAIBC audio reading team has updated the Foundation Licence Course talking book to the latest edition of *Foundation LIcence Now*. The disks are produced with the permission of the Radio Society of Great Britain (RSGB) for the use of anyone with visual impairments (VIs), text reading difficulties or disabilities that restrict the ability to read printed material.

"The disks are available post free for the use of VI and dyslexic students and all the RAIBC ask in return, is a small donation to funds to cover the cost of the disk and packing and to further their work for Amateurs with disabilities.

"The RAIBC has an expert team with experience of assisting Radio Amateurs with disabilities and if you require any help in a personal capacity or as an instructor please contact the RAIBC Helpline on **08000 141 743** or E-mail: **russell.bradleyg0okd@ntlworld.com** Full details of RAIBC Services and activities are available at **www.raibc.org.uk** The RAIBC would like to thank the authors of the books for the excellent material and the RSGB for permission to copy them to audio format." Russell G0OKD.

Free Application For Android Phones

Nicolas Pike M1HOG, a member of the Stevenage & District Amateur Radio Society (S&DARS) contacted *Newsdesk* with interesting news for anyone using mobile 'phones using the Android operating system. Nicholas comments, "I have published a free application for Android 'phones, that it might be of interest to *PW* readers. You can easily find Amateur Radio Repeaters across the UK by just using your Android Phone.
"With the application you can;

- Use Network, GPS or just enter a Locator to find repeaters locally or across the UK.
- Complete directory of UK Analog, IRLP, Echolink and D-Star Repeaters.
- No network connection required.
- Displays your locator and selection distance.
- Comprehensive selection and sorting.
- Displays distance, heading and full repeater details.
- Fast and flexible, designed to help you use the UK repeater network.
- No adverts.
- Free app.
- Just set your radio and QSO.

Read more: **https://market.android.com/details?id=com.zbm2 repeater &feature=search_result**

If *PW* readers have lists of repeaters for other countries we would be delighted to include them. If you have any questions or suggestions, please E-mail via **nicolas@jetblackjelly.com** or Tel: **0797650 4148.**

Chase That Castle & Stately Home On The Air!

Keen YL Amateur and Castles and Stately Homes On The Air (CASHOTA) organiser Bobby Wadey MI0RYL writes, " May 2011 will be the month for chasing castles and stately homes on air. The weekend of the 21st and 22nd will be International castles weekend from 0100hours Saturday 21st until 2300 hours on Sunday 22nd. This weekend is open to anyone world wide and if interested in activating a historical site then please contact your local representative. For UK stations information can be found at **www.cashota.co.uk**, **www.cashota-ni.org** or **www.cashota-ireland.org**

But if you miss the first event then there's also the following weekend, the UK and Ireland CASHOTA weekend. This event will start 0000 Saturday May 28th and end 00.00 Sunday May 29th. Castles and Stately Homes on The Air is open to anyone, and for those who wish to activate a location it is very simple; Contact your local area representative (details on **www.cashota.co.uk**), complete the activation form, a minimum of 10 days before the weekend and submit it to be allocated your location reference. For more information contact **Chris Darlington M0DOL.**
Tel: **07720580968** or Bobby MI0RYL on **07751007490**. Many thanks".
Bobby Wadey MI0RYL. E-mail: **lamph121@btinternet.com**

Keen YL Amateur Bobby Wadey MI0RYL practices what she preaches and supports Castles and Stately Homes on the Air as much as she can – and she's fully prepared for the vagaries of the Irish weather!

Special Event Calls GB5RNLI & GB6RNLI For Morecambe Bay Walk

The Lifeboat Amateur Radio Society contacted *Newsdesk* regarding a special Morecambe Bay walk."We have reserved the callsigns **GB5RNLI** and **GB6RNLI** for use with the RNLI Morecambe Bay Walk Special Event Stations on June 25th. The callsign GB5RNLI will be operated from Holker Hall in Cumbria, whilst GB6RNLI will be used by the Special Event station at Arnside in Cumbria on the Estuary of the River Kent, at the north eastern corner of Morecambe Bay.

"It's likely that the Arnside special event station, the starting point for the walk, will be operated from the car of **Bob Hughes-Burton MW0RHD**. The walk ends at Holker Hall and we will be operating a special event station from the car park to make visitors to the gardens and tea rooms aware of the event.

"If *PW* readers can help at either venue, please let us know as soon as possible. The Morecambe Bay Walk, or Cross Bay Walk to give it its official title, is being organised by the Royal National Lifeboat Institution and further details can be found on the RNLI web site via **http://www.rnli.org.uk/rnli_near_you/north/event_detail?articleid=660540&categoryid=21826**
Further information via **info@lifeboat-amateur-radio.org.uk**

Icom Launch The IC-7410 HF/6M Base Station

Icom UK have announced the launch of their new IC-7410 h.f. and 50MHz base station. Their press release states, "Icom are pleased to announce the launch of the IC-7410 Amateur Radio base station. The new IC-7410 has been designed as a specialised h.f./50MHz transceiver sporting excellent performance and features and brings superior DSP speed and capability to a rig that's priced and designed for everyday use.

"The IC-7410 employs a high grade digital signal processing (DSP) unit and double conversion superheterodyne system developed from the latest technology found in Icom rigs including the IC-7600, IC-7700 and IC-7800 series. In addition, the Icom IC-7410 h.f./50MHz base station transceiver has a built-in 15kHz 1st i.f. filter and can accept up to two optional filters (3kHz/6kHz). When operated with these 1st i.f. filters, narrow mode signals such as the c.w. and s.s.b. modes are protected from adjacent and unwanted strong signal interference. Like the IC-7600, the IC-7410 features an impressive +30dBm third-order intercept point (IP3) on 14MHz.

"Today's Amateurs often combines the capabilities of a transceiver with a PC to maximise operating speed, efficiency and enjoyment. The IC-7410 comes with a standard USB (type-B) connector on its back panel. Modulation input, audio output, RTTY demodulator output and CIV command can be controlled via the USB cable. Also, a conventional CI-V remote control jack is built in to the IC-7410.

"The IC-7410 is ruggedly built, with an impressive, one-piece cast aluminium heat sink to dissipate heat efficiently. A high stability TCXO crystal oscillator provides ±0.5ppm of high frequency stability over a wide temperature range (0°C to +50°C). The IC-7410 is available from Monday April 11th 2011 at a suggested retail price of £1999.99 (inc.VAT) and is available from authorised Icom Amateur Radio dealers".

Further details from;

Icom UK Ltd.
Blacksole House
The Boulevard
Altira Park
Herne Bay
Kent CT6 6GZ
Tel: (**01227**) **741741**
FAX: (**01227**) **741742**
E-mail: **marketing@icomuk.co.uk**

It's QRP In The Country Time!

Tim Walford G3PCJ of Walford Electronics and *PW* author invites all local clubs to come and display their activities at this year's 'QRP in the Country' event. It is being held on Sunday July 17th at Upton Bridge Farm, Long Sutton, Somerset TA10 9NJ. Tim encourages everyone to attend, "It's a QRP radio rally with a difference! I hope that Clubs (and individuals) will come and show off what they are up to in Amateur Radio because this is bound to be of interest to other radio enthusiasts.

Tim continued, "There's plenty of space for as many clubs and individuals as can easily travel to central Somerset. So, if your Club can come and put on a display or 'activity', get in touch as soon as possible. Any theme related to **QRP and low powered radio and home construction** will be of interest. This is a rally for clubs and individuals! There's no charge for stalls or attendance!

"Power, antennas and tables are available by prior arrangement. If the weather is good it will be held outside in the field – if poor, in the clean cattle sheds. Attractions will include displays of elderly radios (military, domestic and Amateur), the famous G3GC 'Plank' 1930s rig, a Buildathon construction project (details later), kits, technical assistance, the *PW* Editorial team, the GQRP Club and the Radio Society of Great Britain (RSGB) will be in attendance. You can enjoy a farm walk, fresh air and of course, excellent very local food and drink!

We're looking forward to seeing you all! Tim G3PCJ.

Further details from

A relaxed looking Tim Walford G3PCJ (left) leans against one of the farm trailers that doubled up as equipment stands at the 2010 QRP in the Country Event. Meanwhile Janet Walford acts as compere as Gerald Stancey G3MCK draws the winning tickets during the raffle. An excellent time was had by all!

Tim Walford G3PCJ
Walford Electronics
Upton Bridge Farm, Long Sutton
Langport, Somerset TA10 9NJ
Tel: (**01458**) **241224**
FAX: (**01458**) **241186**
E-mail **walfor@globalnet.co.uk**

Review

Regular *PW* columnist Ben Nock G4BXD takes a look at some interesting portable h.f. loops.

The New Design G4TPH Magnetic Loop Antennas

When I was contacted by Rob, *PW*'s Editor, I was pleased to accept the job of reviewing Tom Brockman G4TPH's new design for his Magnetic-Loop antenna. As some readers will know, I have quite a few ex-military man-pack radios here at my 'Kidderminster Kollection' private museum and often operate them portable. Usually I use the man-packs' whip or maybe a random wire antenna, so the Editor and I thought the chance to try a tuned loop antenna would be quite interesting.

Tom G4TPH sent me an example of the two versions he makes, the ML-40 MkII and the ML-20 MkII, which cover the 7 to 21MHz (40 to 15m) bands and the 14 to 28MHz (20 to 10m) bands respectfully can handle up to 35W of s.s.b. or c.w. carrier for Morse operations. They differ only in the size of the loop the kit produces, approximately 1.1m diameter for the ML-40 MkII and 900mm for the ML-20 MkII.

Fig. 1: The kit for each of the two loops has different number of aluminium strips and has one box for the tuning capacitor and another for coupling the feeder to the loop.

Fig. 2: On test, hanging from the washing line!

Fig. 3: The two additional boxes, Ben would have preferred the coaxial socket to have been on the bottom of the coupling box.

The Kit

The kit for each antenna, **Fig. 1**, comprises several lengths of cut and drilled aluminium strip, a plastic box housing the tuning capacitor and another plastic box housing the coupling for the coaxial cable connection. A sheet with written instructions on how to assemble the loop along with pictures of it assembled are also provided. The kit of parts is very compact and light and would easily fit in a holiday suitcase or such without any trouble.

Assembly of the loop is straight forward and I had it done in a matter of minutes. As it was a sunny day I first tried the loop hanging from the washing line, **Fig. 2**, and using my PRC320 transceiver on 14MHz. Receive wise the loop is very good. You just rotate the tuning control to peak the received noise, on doing this I heard quite a few stations at good strength.

For transmitting purposes I think it's really necessary to insert a standing wave ratio (s.w.r.) meter in the feed line. Then, with the transmitter keyed the tuning knob is adjusted for minimum s.w.r., bearing in mind though that your body slightly affects the tuning. So, you might need to trim then move away then trim again until you're satisfied with the results.

Tom G4TPH's website at **www.G4TPH.com** has full details of the s.w.r. figures you could expect – but suffice it to say – once tuned for the middle of the 20m band no further tuning was needed. I would have liked the BNC connector to be mounted at the bottom of the coupling box though, **Fig. 3.** This would then allow the coaxial cable to hang vertically. I understand from Tom that they work equally well when hung in a horizontal position – thus providing an omni-directional radiation.

I also tried the loop inside my attic shack and, while it did work, it must be remembered other items in the shack, house wiring, window frames, etc., will all affect the performance of any indoor antenna. Also, it's best to keep the loops as far away from mains wiring to reduce r.f. getting into the wiring.

Although I heard stations in VK, ZL2, WA9 – and many more DX stations – actual contacts were mainly within Europe, a YU1 at 1850km and S56 at 1400km being typical. As a tuned antenna of small size and being easy carried – the G4TPH loop certainly works and for anyone not wishing, or not able to make their own wire dipoles or tuners – then I think they provide a very viable option. My thanks go to Tom Brockman G4TPH for the loan of the review units.

PW

Product
The G4TPH Mag-Loop

Supplier/Manufacturer
Tom Brockman G4TPH

Contact
1 Dalby Crescent
Newbury, Berkshire
England RG14 7JR
Website **web:** www.g4tph.com

Pros
Lightweight, easy assembly,
Covers several bands with good s.w.r. values.

Cons
Needs supporting or hanging off suitable fitting.

Prices
ML-20 MkII £75
ML-40 MkII £79

Tom Brockman G4TPH comments: I would like to thank Ben Nock G4BXD for a comprehensive review of my portable MKII range of Magloop antennas. Designed originally for my use at my Spanish apartment: no ground plan, counterpoise or ATU is needed. Tune for maximum noise, tweak s.w.r. and away you go! 73s **Tom**.

KENWOOD

Authorised dealer

Hand-helds

TH-D72E Dual band 2/70cm with GPS & APRS **£429.95**
TH-F7E Dual band 2/70cm RX 0.1-1300MHz **£239.95**
TH-K2ET Single band 2m with 16 button keypad **£169.95**
TH-K2E Single band 2m **£164.95**
TH-K4E Single band 70cm **£164.95**

Mobiles

TM-D710E Dual band 2/70cm with APRS RX 118-524MHz & 800-1300MHz, 50 Watts **£444.95**
TM-V71E Dual band 2/70cm with EchoLink RX 118-524MHz & 800-1300MHz, 50 Watts **£299.95**
TM-271E Single band 2m, 60 Watts **£169.95**

Base

TS-590S HF & 6m 100W all mode transceiver **£1,369.95**
TS-2000X All mode transceiver HF/50/144/430/1200MHz 100 Watts All mode transceiver **£1,799.95**
TS-2000E All mode transceiver HF/50/144/430MHz 100 Watts All mode transceiver **£1,549.95**
TS-480HX HF/6m 200 Watts Transceiver **£879.95**
TS-480SAT HF/6m 100 Watts Transceiver **£779.95**

Accessories

PS-60 25amp power supply unit ideal for the new TS-590S **£309.95**
SP-23 External speaker **£71.95**
SP-50B Mobile speaker **£29.95**
MC-90 Deluxe desk microphone suitable for DSP transceivers **£194.95**
MC-60A Desk microphone with pre-amplifier **£124.95**
HS-5 Deluxe headphones **£56.95**

WOUXUN

Authorised dealer

Handhelds

KG-UVD1P Great value dual band 2/70cm **£91.95**
KG-699E Brilliant single band 4m 44-88MHz **£91.95**
KG-679E Superb single band 2m **£59.95**

Accessories

WO/ELO-001 Battery eliminator **£10.49**
WO/CCO-001 12v Car charger **£10.49**
WO/SMO-001 Speaker microphone **£15.49**
WO/PSO-110 Programming software **£20.49**
WO/CASE Leather case **£10.49**

TYT

TYT-800 2m 144-146MHz 5 watts 199 channels amazing **£49.95**
TYT TH-UVF1 2/70 5 watts 128 channels **£99.95**

Accessories

TYT-BE Battery eliminator **£14.95**
TYT-SP Speaker microphone **£14.95**
TYT-EP Ear piece **£9.95**

MOONRAKER

HT-90E 2m single band transceiver with full 5 watts output just **£59.95**
The HT-90E is a brilliant compact radio, perfect for beginners to the hobby. Comes complete with battery, belt clip, antenna, and rapid charger all for under £60 quid! Everything you need to get on air is in the box!

Hand-helds

ICOM

Authorised dealer

IC-E80D D-Star dual band 2/70cm handheld with wideband RX 0.495-999.99MHz **£329.95**
IC-E92D Dual band 2/70cm RX 0.495-999.9MHz with built in DSTAR **£389.95**
IC-E90 Tri band 6/2/70cm RX 0.495-999.9MHz **£239.95**
IC-T70E dual band 2/70cm handheld with 5W Tx & 700mW loud audio **£159.95**
IC-V80E single band 2m handheld with 5.5W Tx & 750mW loud audio **£104.95**

Mobiles

IC-7000 All mode HF/VHF/UHF 1.8-50MHz, 100 Watts output **£1,195.95**

ID-1 Single band 23cm 1240-1300MHz digital and analogue DSTAR transceiver **£719.95**
IC-E2820 + UT123 Dual band 2/70cm with DSTAR fitted, 50 Watts output **£699.95**
IC-E2820 Dual band 2/70cm DSTAR compatable, 50 Watts output **£499.95**
ID-E880 D-Star ready dual band with wide band RX 0.495-999.99MHz **£439.95**
IC-2200H Single band 2m 65 watts **£229.95**

Base

IC-9100 HF/VHF/UHF All in one transceiver to 23cm (optional) – amazing! In stock NOW **£2,999.95**
IC-7800 HF/6m All mode 200 Watts Icom flagship radio **£8,995.99**
IC-7700 HF/6m 200 Watts with auto ATU transceiver **£5,999.95**
IC-7600 HF/6m 100 Watts successor to the IC-756 ..... **£3,299.99**
IC-7410 coming soon ..... **£TBA**
IC-7200 HF/VHF 1.8-50MHz RX 0.030-60MHz, 100 Watts output (40w AM) **£839.95**
IC-718 HF 1.8-30MHz RX 300kHz - 29.999MHz, 100 Watt output (40w AM) **£594.95**
IC-910H dual band with optional 23cm, 100 Watts output **£1,299.95**

Accessories

PS-125 25 amp Power supply unit **£329.95**
SM-30 Desktop Microphone designed for SSB and FM **£119.95**
SM-20 600 Ohm 8-pin deluxe base station microphone **£169.95**
SP-10 Mobile 5w speaker 4 Ohms **£54.95**
SP-22 Mobile extension speaker **£34.95**
SP-20 Base station speaker with filters **£184.95**
SP-21 Base station 3w speaker 8 Ohms **£119.95**
SP-23 Base station speaker with built in high and low pass filters **£149.95**

QUANSHENG

TG-UV2 dual band 2/70cm 5 Watts with 200 memories ..... **Only £81.95**

The Quansheng TG-UV2 is a dual band 2m/70cms handheld. It covers 136.00 - 173.995, 400 - 469.995MHz and FM broadcast 88-108MHz. The radio includes 7.2v 2Ah Li-ion battery for extended life. It also comes with AC charger, carry strap and belt clip. This is a very robust radio - don't underestimate its performance from the price!

YAESU

Authorised dealer

Hand-helds

VX-8DE Triband same spec as VX-8E but with enhanced APRS **£369.95**
VX-8GE Dual band with built-in GPS antenna and wideband 100-999.90MHz Rx **£359.95**
VX-7R Tri band 50/144/430MHz RX 0.5- 900MHz, 5 Watts outut **£299.95**
VX-6E Dual band 2/70cm RX 1.8-222/420-998MHz, 5 Watts output **£239.95**
FT-60E Dual band 2/70cm RX 108-520/700-999.99MHz, 5 Watts output **£179.95**
VX-3E Dual band 2/70cm RX 0.5-999MHz, 3 Watts output **£159.95**
VX-170E Single band 2m, 16 digit keypad, 5 Watts output **£99.95**
FT-270E Single band 2m, 144-146MHz, 137-174MHz Rx **£104.95**

Mobiles

FT-857D All mode HF/VHF/UHF 1.8-430MHz, 100 Watts output **£669.95**
FTM-350 Dual band with Bluetooth, GPS & APRS **£479.95**
FT-8900R Quad band 10/6/2/70cm 28-430MHz, 50 Watts output **£369.95**
FT-8800E Dual band 2/70cm RX 10-999MHz, 50 Watts output **£329.95**
FTM-10E Dual band 2/70cm, 50 Watts output **£309.95**
FT-7900E Dual band 2/70cm 50/40 Watts with wideband RX **£239.95**
FT-2900E Single band 2m 75 Watt heavy duty transceiver **£139.95**
FT-1900E Single band 2m 55 Watt high performance transceiver **£129.95**

Portable

FT-897D HF/VHF/UHF Base/Portable transceiver 1.8-430MHz 100 Watts HF+6, 50 Watts 2M, 20 Watts 70cm **£779.95**
FT-817ND HF/VHF/UHF Backpack Transceiver RX 100kHz – 56MHz 76-154MHz 420-470MHz 5 Watts **£509.95**

Base

FT-DX5000MP Deluxe HF/6m all mode 200W transceiver with 300Hz roofing filter & SM-500 station monitor **£5,295.95**
FT-DX5000D Deluxe HF/6m all mode 200W transceiver with SM-500 station monitor **£4,795.95**
FT-DX5000 HF/6m all mode 200W transceiver **£4,349.95**
FT-2000D HF/6m All mode 200 Watts transceiver RX: 30kHz – 60MHz **£2,599.95**
FT-2000 HF/6m All mode 100 Watts transceiver RX: 30kHz – 60MHz **£1,999.95**
FT-950 HF/6m 100 watt transceiver with DSP & ATU RX 30kHz – 56MHz **£1,299.95**
FT-450AT Compact transceiver with IF DSP and built in ATU, HF+6m 1.8-54MHz, 100 Watts output **£719.95**
FT-450 Compact transceiver with IF DSP, HF+6m 1.8-54MHz, 100 Watts output **£639.95**
FT-450D "New" model compact transceiv er with built-in ATU **£799.95**

Accessories

MD-200A8X Ultra high fidelity desktop mic **£239.95**
MD-100A8X Deluxe desktop microphone **£119.95**
FP-1030A 25amp continuous power supply unit **£199.95**
SP-2000 Base station external speaker **£179.95**
MLS-100 High power mobile speaker **£29.95**
MLS-200 Compact mobile speaker **£26.95**
ATAS-120A Active tuning antenna system **£299.95**

Check on-line for all updates, new products and special offers

PayPal® We now accept PayPal payments online PayPal®

Yagi Antennas

All Yagis have high quality gamma match fittings with stainless steel fixings! (excluding YG4-2C)

YG27-4 Dual band 2/70 4 Element (Boom 42") (Gain 6.0dBd) **£59.95**
YG4-2C 2 metre 4 Element (Boom 48") (Gain 7dBd) **£29.95**
YG5-2 2 metre 5 Element (Boom 63") (Gain 10dBd) **£59.95**
YG8-2 2 metre 8 Element (Boom 125") (Gain 12dBd) **£79.95**
YG11-2 2 metre 11 Element (Boom 185") (Gain 13dBd) **£119.95**
YG3-4 4 metre 3 Element (Boom 45") (Gain 8dBd) **£69.95**
YG5-4 4 metre 5 Element (Boom 104") (Gain 10dBd) **£79.95**
YG3-6 6 metre 3 Element (Boom 72") (Gain 7.5dBd) **£69.95**
YG5-6 6 metre 5 Element (Boom 142") (Gain 9.5dBd) **£89.95**
YG13-70 70 cm 13 Element (Boom 76") (Gain 12.5dBd) **£54.95**

ZL Special Yagi Antennas

The ZL special gives you a massive gain for the smallest boom length ... no wonder they are our best selling yagi's!

ZL5-2 2 Metre 5 Ele, Boom 95cm, Gain 9.5dBd **£59.95**
ZL7-2 2 Metre 7 Ele, Boom 150cm, Gain 12dBd **£69.95**
ZL12-2 2 Metre 12 Ele, Boom 315cm, Gain 9.5dBd **£99.95**
ZL7-70 70cm 7 Ele, Boom 70cm, Gain 11.5dBd **£39.95**
ZL12-70 70cm 12 Ele, Boom 120cm, Gain 14dBd **£49.95**

HB9CV

Brilliant 2 element beams ... ideal for portable use

HB9-70 70cm (Boom 12") **£24.95**
HB9-2 2 metre (Boom 20") **£29.95**
HB9-4 4 metre (Boom 23") **£39.95**
HB9-6 6 metre (Boom 33") **£49.95**
HB9-10 10 metre (Boom 52") **£69.95**
HB9-627 6/2/70 Triband (Boom 45") **£69.95**

Halo Loops

Our most popular compact antennas, great base, mobile, portable, or wherever!

HLP-2 2 metre (size approx 300mm square) **£22.95**
HLP-4 4 metre (size approx 600mm square) **£34.95**
HLP-6 6 metre (size approx 800mm square) **£39.95**

G5RV Wire Antennas

The most popular wire antenna available in different grades to suit every amateur .... All from just £19.95!

G5RV-HSS Standard Half Size Enamelled Version, 51ft Long, 10-40 Metres **£24.95**
G5RV-FSS Standard Full Size Enamelled Version, 102ft Long, 10-80 Metres **£29.95**
G5RV-DSS Standard Double Size Enamelled Version, 204ft Long, 10-160 Metres **£54.95**
G5RV-HSH Half Size Hard Drawn Version, pre-stretched, 51ft Long, 10-40 Metres **£29.95**
G5RV-FSH Full Size Hard Drawn Version, pre-stretched, 102ft Long, 10-80 Metres **£34.95**
G5RV-HSF Half Size Original High Quality Flexweave Version, 51ft Long, 10-40 Metres **£34.95**
G5RV-FSF Full Size Original High Quality Flexweave Version, 102ft Long, 10-80 Metres **£39.95**
G5RV-HSP Half Size Original PVC Coated Flexweave Version, 51ft Long, 10-40 Metres **£39.95**
G5RV-FSP Full Size Original PVC Coated Flexweave Version, 102ft Long, 10-80 Metres **£44.95**
G5RV-HSX Half Size Deluxe Version with 450 Ohm ladder, 51ft Long, 10-40 Metres **£49.95**
G5RV-FSX Full Size Deluxe Version with 450 Ohm ladder, 102ft Long, 10-80 Metres **£54.95**

Accessories

G5RV-IND Convert any half size G5RV to full with these great inductors, adds 8ft on each leg **£24.95**
MB-9 Choke Balun for G5RV to reduce RF Feedback **£39.95**
TSS-1 Pair of stainless steel springs to take the tension out of a G5RV or similar **£19.95**

Trapped Wire Dipole Antennas

Commercial quality trapped wire dipoles that resonate, so require no ATU!

MDT-6 FREQ:40 & 160m LENGTH: 28m POWER: 1000 Watts **£79.95**
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts **£69.95**
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts **£79.95**
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts **£129.95**
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts **£69.95**
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts **£119.95**

(MTD-5 is a crossed dipole with 4 legs)

Multiband Mobile

Why buy loads of different antennas when Moonraker has one to cover all! SPX series has a unique fly lead and socket for quick band changing

SPX-100 9 Band plug n' go portable, 6/10/12/15/17/20/30/40/80m, Length 165cm retracted just 0.5m, Power 50W complete with 38th PL259 or BNC fitting to suit all applications, mobile portable or base ... brilliant! **£44.95**
SPX-200 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, 3/8th fitting **£39.95**
SPX-200S 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting **£44.95**
SPX-300 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, 3/8th fitting **£54.95**
SPX-300S 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W,PL259 fitting **£59.95**
AMPRO-MB6 6 Band mobile 6/10/15/20/40/80m, length 220cm, 200W, 3/8th fitting, (great for static use or even home base – can tune on four bands at once) **£69.95**
ATOM-AT4 10/6/2/70cm Gain 2m 2.8dBd 70cm 5.5dBd, Length 132cm, PL259 fitting (perfect for FT-8900R) **£59.95**
ATOM-AT5 5 Band mobile 40/15/6/2/70cm, Length just 130cm, 200W (2/70) 120W (40-6M) PL259 fitting, (great antenna, great price and no band changing, one antenna, five bands) **£69.95**
ATOM-AT7 7 Band mobile 40/20/15/10/6/2/70cm, Length just 200cm, 200W (2/70) 120W (40-6M) PL259 fitting, (Brilliant antenna HF to UHF with changeable coils) **£79.95**

Yagi Antennas

Diamond performance from the superb Diamond factory

A502HBR 6m 2 Elements, Power 400W, Gain 6.3dBi, Radial Length 3m **£99.95**
A144S10R 2m 10 Elements, Power 50W, Gain 11.6dBi, Boom Length 2.13m **£94.95**
A144S5R 2m 5 Elements, Power 50W, Gain 9.1dBi, Boom Length 95cm **£49.95**
A430S15R 70cm 15 Elements, Power 50W, Gain 14.8dBi, Boom Length 224cm **£74.95**
A430S10R 70cm 10 Elements, Power 50W, Gain 13.1dBi, Boom length 119cm. **£59.95**

HF Mobiles

Get great results with the Moonraker range of HF mobiles ! ... from as little as £17.95!

AMPRO-10 28MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-12 24MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-15 21MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-17 18MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-20 14MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-30 10MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-40 7.0MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-80 3.5MHz, Length 220cm, 38th fitting (slimline design) **£24.95**
AMPRO-160 1.8MHz, Length 220cm, 38th fitting (heavy duty design) ... **£59.95**
ATOM-20S 14MHz, Length 130cm, PL259 fitting (compact design) **£24.95**
ATOM-40S 7.0MHz, Length 165cm, PL259 fitting (compact design) ... **£26.95**
ATOM-80S 14MHz, Length 165cm, PL259 fitting (compact design) **£29.95**

New Ground Plane Free Colinear Verticals

We have always wanted antennas without radials without the compromise of performance – well now you can.

SQBM110P 2/70cm, Gain 3/6dBd, RX:25-2000MHz, Length 100cm, SO239 fitting **£54.95**
SQBM1010P 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, SO239 fitting **£84.95**
SQBM1010N 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, N-Type fitting **£89.95**
SQBM225P 2/70/23cm, Gain 2.5/5.0/8.5dBd, RX25-2000MHz, Length 130cm, SO239 fitting **£79.95**
SQBM225N 2/70/23cm, Gain 2.5/5.0/8.5dBd, RX25-2000MHz, Length 130cm, N-Type fitting **£84.95**

VHF/UHF Mobiles

GF151	Glass Mount 2/70cm, Gain 2.9/4.3dBd, Length 78cm complete with 4m cable and PL259	**£29.95**
MRM-100	MICRO MAG 2/70cm, Gain 0.5/3.0dBd, Length 55cm, 1" magnetic base with 4m coax and BNC	**£19.95**
MR700	2/70cm, Gain 0/3.0dBd, Length 50cm, 3/8 fitting	**£9.95**
MR777	2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting	**£19.95**
MRQ525	2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality)	**£19.95**
MRQ500	2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality)	**£26.95**
MRQ750	2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality)	**£36.95**
MR2 POWER ROD	2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass colinear)	**£26.95**
MR3 POWER ROD	2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass colinear)	**£32.95**
MRQ800	6/2/70cm Gain 3.0dBi/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality)	**£39.95**
MRQ273	2/70/23cm Gain 3.5/5.5/7.5dBdBd, Length 85cm, PL259 fitting (high quality)	**£49.95**

Dual and Triband Colinear Verticals

Diamond quality – Moonraker prices ! These high gain antennas have been pre-tuned for your convenience, easy to use, easy to install, and a choice of connection ... look no further

SQBM200P	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239	**£54.95**
SQBM200N	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£59.95**
SQBM500P	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239	**£74.95**
SQBM500N	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, N-Type	**£79.95**
SQBM800N	2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type	**£139.95**
SQBM1000P	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239	**£84.95**
SQBM1000N	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, N-Type	**£89.95**
SQBM223N	2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£74.95**

CHAMELEON™ ANTENNA

The CHAMELEON V1 HF/VHF/UHF Multiband AntennaTM is a revolutionary antenna that stands at a mere 8.5 feet tall and contains a unique trap coil design. This antenna is ideally designed for mobile, portable or base station purposes were limited space is a concern.
Frequency Range: 80/60/40/30/20/17/15/12/11/10/6M + 2M/1.25M/70cm (144MHz - 500MHz) + USAF MARS/CAP (3.3MHz, 4.5MHz & 7.6MHz) **£249.95**

GP2500

All Band HF Vertical

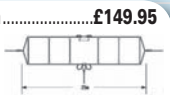
This is the perfect answer for anyone with limited space and requires no radials. Covering 80 through to 6M with a VSWR below 1.5:1!

Frequency 3.5-57MHz without tuner, Power 250 Watts, Length 7.13M

All at an amazing £229.95!

NEW GP2500F fibreglass version now in stock **£279.95**

MTD-300 2-30M Broadband wire dipole antenna £149.95



The MTD-300 broadband dipole antenna is designed to provide optimum performance over a wide frequency range and is very easy to assemble and use.

● Frequency 2-30MHz ● Radiator length: 25m (82ft) ● Type: Terminated Folded Dipole ● Radiation: directional ● Feedline: 50 Ohm coax (30m) ● Connector: SO239 ● SWR: <2.0:1 to <3.0:1 depending on factors ● No transmatch required ● Power: 150W (PEP) ● Spreaders: 46cm (18in) ● Weight 3.1kg.

HUSTLER

HF Verticals

Brilliant HF antennas that can be ground mounted if required which in todays limited space is a popular option. Also extra trap tuning is also available to get that perfect match if required.

Hustler 4-BTV 4 Bands 40-10m 1000W Length 6.52m Weight 6.8kg **£189.95**
Hustler 5-BTV 5 Bands 80-10m 1000W Length 7.64m Weight 7.7kg **£229.95**
Hustler 6-BTV 6 Bands 80-10m 1000W Length 7.30m Weight 7.5kg **£269.95**

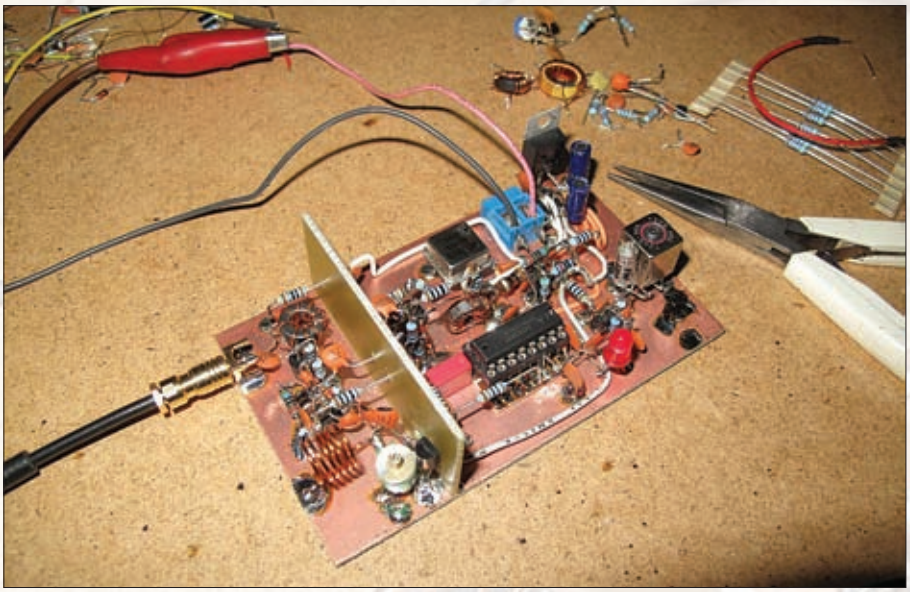
Moonraker Retail Shop & Mail Order
Cranfield Road, Woburn Sands,
Bucks MK17 8UR
Tel: 01908 281705
Open Mon-Fri 9-5:30pm

Moonraker Satellite Shop
@ M5 Communications
Moto Services Area, Junction 30 M5 South
Exeter EX2 7HF. Tel: 01392 427269
Open Mon-Thur 9-6pm Fri 9-4pm

Technical

Ron Taylor G4GXO of Cumbria Designs brings you a stable, v.h.f. local oscillator design that's controlled by a low frequency oscillator.

Design Idea
A Phase Locked VFO



The local oscillator (l.o.) is one of the most critical stages of any receiver or transceiver, and frequency stability is arguably the most challenging aspect of l.o. design. For single sideband (s.s.b.) and c.w. working, frequency stability (or 'drift') limits the upper operating frequency of a free-running variable frequency oscillator (v.f.o.) to about 10MHz and below. Above this frequency other techniques such as mixer v.f.o.s, tunable i.f.s and since the 1990s, Frequency synthesis are used to ensure stability.

This project was designed as an 81MHz local oscillator for a 70MHz transceiver with an 11MHz intermediate frequency (i.f.). With minor changes it is easily adapted for other bands, from h.f. to v.h.f. As a project, a phase locked v.f.o. represents a stimulating challenge. Whether this design is built purely as a learning exercise or as part of a receiver or transceiver, it will hone the constructor's technical and practical skills!

One less familiar approach is the 'phase-locked v.f.o.' (p.l.v.f.o.) principle. This novel scheme lends itself to single band l.o. As most Amateur receiver or transceiver projects tend to be single band (to keep circuit complexity low), then the p.l.v.f.o. is an ideal candidate for a stable high frequency v.f.o.

Phase Locked VFO

A phase-locked variable frequency oscillator uses an inherently stable low frequency v.f.o. to control the frequency of a (much) higher frequency voltage controlled oscillator (v.c.o.) from which the 'real' l.o. output is taken. The key elements of the p.l.v.f.o. and signal flow are shown in **Fig. 1**. The frequencies shown are those used in my 70MHz version.

Starting with the voltage controlled oscillator (v.c.o.), the output is buffered and amplified to drive the external load. Another v.c.o. output, also feeds into a mixer where it's mixed with a crystal oscillator and filtered to extract the low frequency difference between the v.c.o. and crystal frequencies.

The filtered mixer output drives one input of a phase detector. The other input is driven by a low frequency stable v.f.o.

It's perhaps easiest to consider the phase detector output in terms of the two input frequencies. In this design the phase detector output pulses high when the v.c.o. frequency is lower than the v.f.o. and low the v.c.o. is frequency is higher than the v.f.o. Swapping the phase detector inputs inverts the output. When the two frequencies match the output becomes high impedance.

The phase detector output is low pass filtered in the 'Loop Filter' section to produce the control voltage for the v.c.o. This sets the reverse bias on a variable capacitance diode within the v.c.o. tuned circuit, thus setting the v.c.o. frequency.

The phase detector action is to adjust the control voltage and hence v.c.o. frequency, to bring the phase detector input from the mixer into the same phase as the input from the v.f.o. In this state, the loop is 'locked' and any change in the v.f.o. frequency (including drift) will be tracked by the v.c.o.

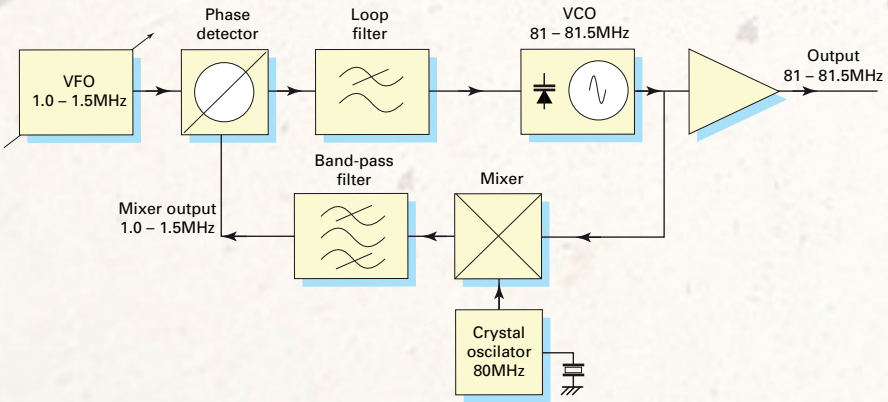


Fig. 1: The block diagram of the phase-locked oscillator, as originally designed.

Practical Design

The schematic for the practical design of my version of the p.l.v.f.o. is shown in **Fig. 2**, where you can see a j.f.e.t. Colpitts oscillator (Tr2) is used in the

v.c.o. section. The v.c.o. shares the same stabilised 8V supply as the v.f.o. The centre frequency is set by adjusting TC1 and if necessary, by squeezing or stretching the coil slightly.

The varicap diode has a capacitance range of about 25–45pF over the 5V control voltage range. There are many varicaps (and even some ordinary silicon diodes) that could be used here. Coupling capacitor C13 sets the effective capacitance swing of the tuned circuit. Increasing C13 increasing the capacitance swing, reducing C13 reduces the capacitance swing.

With the loop locked and the v.f.o. set to the centre of the tuning range, the v.c.o. should be tuned to give a mid range control voltage of 2.5V. Increasing the v.f.o. frequency will increase the control voltage, decreasing the v.f.o. frequency will decrease the control voltage.

Mixer-Oscillator

A common base bipolar buffer (Tr6), isolates the mixer input from the v.c.o. improving signal purity. Two j.f.e.t.s (Tr4, Tr5) form a cascode mixer, (a discrete version of the dual-gate m.o.s.f.e.t. mixer). The signal input is fed to Tr5, the conversion oscillator drives Tr4. A standard packaged crystal oscillator (IC4) provides a cost effective and simple alternative to a discrete crystal oscillator circuit. The 5V logic level square wave output drives the gate of Tr4 directly.

The output of the mixer is developed across transformer T1 wound onto an FT37-43 core, with a primary winding of 15 turns and five turn secondary. The secondary winding drives a low pass filter which extracts the 1.5MHz difference (81.5MHz - 80MHz = 1.5MHz) required by the phase detector (IC3). The filtered mixer output is amplified by Tr1 and drives the comparator input of the phase detector of the i.c.

Phase Detector

The 74HC7046 phase detector (IC3), incorporates two separate phase detectors, a v.c.o. and a loop filter charge pump and a lock detector. The tri-state output is averaged by the loop filter to produce the control voltage.

Loop Filter

A simple passive low pass resistance/capacitance (RC) filter is used as the loop filter. Despite its simplicity this filter provides good performance in this application. The output of the filter is de-coupled at radio frequency (r.f.) and biases the varicap diode via 150kΩ resistor R9. This is installed through the partition screen that shields the v.c.o. and buffer from the rest of the circuitry.

Variable Oscillator

There are many on, or off-board oscillators that could be used for the low frequency v.f.o. stage. I chose a well tested

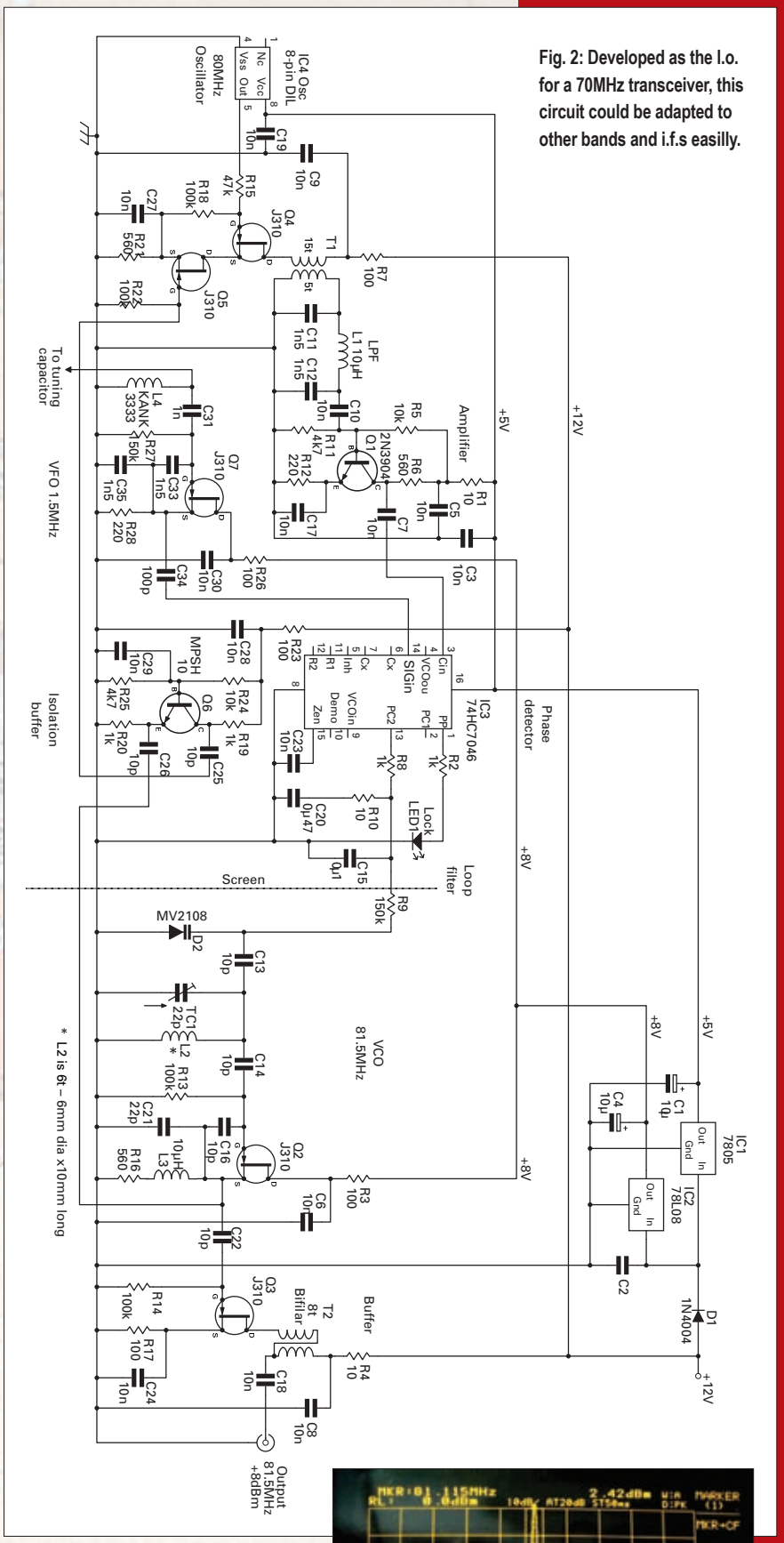


Fig. 2: Developed as the l.o. for a 70MHz transceiver, this circuit could be adapted to other bands and i.f.s easily.

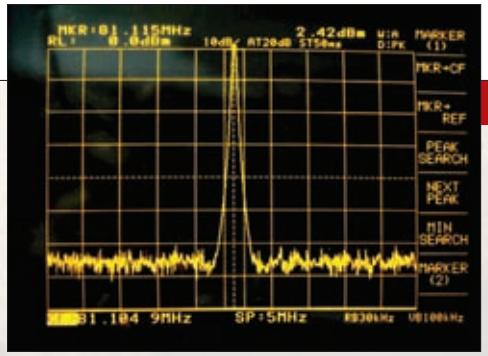


Fig. 3: The clean output of the p.l.v.f.o. at a little over 80MHz, as seen on a spectrum analyser.

voltage tuned Colpitts oscillator (Tr7) operating at up to 1.5MHz. A suitable variable capacitor of around 350pF to 500pF fitted with a reduction drive will provide full coverage to tune over all of the 70MHz band. The coil L4 should be adjusted in conjunction with the variable capacitor to set the tuning range. If necessary, 'pad' the tuning capacitor with series and/or parallel capacitor(s) to set the desired tuning range.

The output of the v.c.o. tracks whatever the v.f.o. is doing (but some 80MHz higher). Any drift at the v.f.o. will be faithfully reproduced in the v.c.o.'s output! So, apart from setting the output the frequency, the v.f.o. is also sets frequency stability.

Good construction practice, will ensure that frequency drift is low. This would imply: rigid mechanical construction, use of negative positive zero (NP0) or polystyrene capacitors and shielding from heat sources such as warm regulators.

No buffer stage is used with the 1.5MHz v.f.o. The phase detector inputs in the i.c.s are buffered internally and present high impedance at their signal input pins. At higher frequencies a buffer may be required.

Output Buffer

A single J310 broadband amplifier (Tr3) produces around +7-8dBm output, that's enough to drive a diode ring mixer such as an SBL-1, TUF-3 etc. A bifiliar transformer (T2) wound onto a FT37-43 or similar small ferrite toroid, provides a low impedance output suitable for driving a 50Ω load.

The number of turns on the toroid is not critical. Anything greater than six or more turns will offer enough reactance to allow efficient 50Ω operation at 80MHz. Increasing the turns will allow operation at lower frequencies; 10 turns or more will support operation down to high frequencies (h.f).

To wind the core take two 200mm lengths of 0.3mm enamelled copper wire. Twist one end together and hold it in a small bench vice. Next, gently tension the two lengths, twist the loose ends together and place into the chuck of a small hand drill.

Keeping the wires under tension, you should then gently turn the drill to twist the wires together until you reach about seven turns per 10mm. Wind this new 'wire' onto the toroid, trim, scrape and tin the ends and connect as shown in the schematic.

The DC Supplies

Two voltage regulators provide supplies for the logic devices and the v.c.o. and v.f.o. The integrated circuit, IC1, a tabbed +5V 500mA regulator, supplies the cystal oscillator and the 74HC7046. IC2 a T092 +8V 100mA regulator provides a stabilised supply to the v.c.o. and v.f.o. to prevent frequency fluctuations and drift due to supply changes.

Construction

As this is only thought of as design idea, I've not created a printed circuit board (p.c.b.) for this project. From my own early experience in construction, too much valuable time can be lost attempting to make unnecessary p.c.b.s for a one-off project. So, I construced the circuit, 'Manhattan style' by soldering components directly onto a copper laminate earth plane, as shown the the accompanying photographs.

With practice, the Manhattan construction is capable of tidy and electrically sound circuits that when boxed are entirely suitable for everyday use and even the rigors of portable operation. As a bonus, the absence of a p.c.b. allows for easy modification, a real plus for experimenters!

My version pictured here went through many changes during development. Most components were re-used and many were veterans of previous projects. This type of construction is the ultimate in flexibility and recycling!

Starting Construction

Construction should start with the voltage regulators and d.c. power connector (a section of 6A screw terminal block works well for this). Once the supply circuitry is in place, build and test the v.c.o. and buffer. A gate or grid dip meter or frequency counter may be used to confirm operation. A gap should be left across the main board to take a screen to isolate the v.c.o. and buffer from the rest of the circuitry.

Next build the mixer, crystal oscillator, low pass filter and amplifier. This section can be tested with a general coverage receiver or a basic oscilloscope. Tuning the v.c.o. across the crystal oscillator frequency will cause the low frequency output from the low pass filter amplifier to change in frequency.

Working backwards from the v.c.o., install the loop filter. This will set the position of the phase detector which should be mounted in a socket soldered to dual-in-line sized copper laminate pads. If you don't have the specific thing, you can use a small piece of Veroboard. Or you could may your own strip with a piece of single-sided laminate board and a small hacksaw.

If the on-board v.f.o. is to be used, add this last ensuring that it's clear of the 5V regulator (to prevent thermal drift). This can be tested for frequency with a general coverage receiver, oscilloscope or frequency counter.

With all of the stages in place, make the connections between each stage and test the operation of the p.l.v.f.o. Once you are satisfied that it is working, insert the inter stage screen into the gap left on the board, remaking connections through holes drilled in the screens. The v.c.o. may require re-tuning due to the capacitance introduced by the screen.

Setting Up

After checking for shorts on the supply and regulator outputs, apply +12V to the p.l.v.f.o. Ignore the Lock Detect l.e.d. at this stage, until the circuit is operating correctly it will probably give misleading results! With the control voltage being measured with a digital voltmeter (d.v.m.) or oscilloscope, adjust the v.c.o. frequency with TC1 (using a trimmer tool, not a metal screw driver!) until the control voltage shows around 2V to 2.5V.

The control voltage will be high (+5V) if the v.c.o. frequency is too low, and it will be low (0V) if the v.c.o. frequency is too high. If not enough tuning range is available from the trimmer, stretch or compress the v.c.o. coil slightly to move the v.c.o. tuning band up or down in frequency.

With the control voltage mid-range the Lock l.e.d. should now be lit indicating a phase lock of the v.c.o. to the v.f.o. Changing the v.f.o. frequency should cause the control voltage to change and with it, the v.c.o. frequency. Then switch the whole project off and back on to check that it locks up without adjustment.

Unreliable Lock?

In all phase locked loops, the two most critical quantities are the v.c.o. gain, i.e. the v.c.o. tuning range per volt of control voltage, and the loop filter bandwidth. Both of which can conspire to prevent a loop from locking. In this design the loop filter components are about right which leaves the v.c.o. gain as the chief variable.

Depending upon the characteristics of the varicap used, the coupling capacitor between the varicap and the v.c.o. tuned circuit may need adjusting to set the v.c.o. gain. If the tuning range is too great the chances are that the loop will not lock. In this case reduce the value of the coupling capacitor.

If the tuning range is too small then the loop may loose lock at some

point over the v.f.o. tuning range. This is because the control voltage has limited. Increasing the varicap coupling capacitor will solve the problem.

Finally, once the v.c.o. is working as required it must be protected against mechanical vibration. Melted candle wax dripped over the coil and v.c.o. components will hold everything in place. Leave the trimmer clear of wax just in case you need to revisit the tuning at some stage.

Other Frequencies

Modifying the circuit for other frequencies is fertile territory for more experienced constructors. The following design notes will assist in adapting the design for other frequencies to cover other bands or for operation at other i.f. frequencies.

Covering 70MHz With 10.7MHz IF

With minor adjustment of the v.f.o. and v.c.o. frequencies, the output can be moved to 80.7MHz needed to operate at 70MHz with a 10.7MHz i.f.. The v.f.o. should be adjusted to give an output frequency range of 700kHz–1.2MHz to correspond with 70–70.5MHz.

Covering 70MHz With 9MHz IF

This combination, is slightly more involved than the 10.7MHz case; Firstly, the phase detector inputs need to be swapped so that the v.f.o. is connected to pin 14 and the mixer output to pin 3.

The v.c.o. should be placed on the lower side of the 80MHz conversion oscillator at 79MHz. The v.f.o. maximum frequency should now be adjusted to 1MHz, this will correspond with 70MHz. Reducing the v.f.o. frequency (reverse tuning) will increase the v.c.o. frequency. 500kHz that corresponds with 70.5MHz.

Other Bands

The circuit can be scaled for other frequencies by redesigning the v.c.o. for the frequency of choice and selecting a different frequency crystal oscillator. You could perhaps, change the v.f.o. such that their sum equals the required v.c.o. frequency.

For example, for 37MHz v.c.o. operation for the lower portion 10m with a 9MHz i.f., you could use a 32MHz crystal oscillator and a 5MHz v.f.o. Or you could use the same v.f.o. as described here with a 36MHz crystal oscillator. If you change the v.f.o. range, you will have to alter the low-pass filter to pass the v.f.o. frequency.

The Components

Almost all of the necessary components can be purchased from major on-line sources such as RS and Farnell. Minimum order values apply to avoid handling and shipping charges, so it pays to club together and place group orders.

Some parts, such as resistors and capacitors are only available in minimum quantities. Don't be put off, by ordering in quantity, you can benefit from bulk discounts and stock up your component drawer with rich stock of staple parts that will find uses in many future projects.

Finally, don't forget the 'small-guy' suppliers. These small component suppliers specialize in offering parts for the Amateur market, some of which would be very hard to find elsewhere.

In addition to the semiconductors used in this project, the smaller retailers may also be able to supply the v.f.o. inductor and perhaps a suitable air spaced capacitor to tune it with! In return for you business, you will be assured good service and you will be supporting a valuable resource for the amateur constructor. Enjoy building and learning from this project!

Component List

Capacitors

6	10pF (C)	C13, C14, C16, C22, C25, C26
1	22pF (C)	C21
1	100pF (P)	C33
1	1000pF (P)	C31
4	1n5 (P)	C11, C12, C32, C34
16	10nF (C)	C3, C5, C6, C7, C8, C9, C10, C17, C18, C19, C23, C24, C27, C28, C29, C30
2	100nF (C)	C2, C15
1	0.47uF (P)	C20
2	10uF 16V	C1, C4
1	22pF Trimmer	TC1

VC1 350pF to 500pF variable capacitor

Resistors

3	10Ω	R1, R4, R10
5	100Ω	R3, R7, R17, R23, R26
2	220Ω	R12, R28
3	560Ω	R6, R16, R21
4	1kΩ	R2, R8, R19, R20
2	4.7kΩ	R11, R25
3	10kΩ	R5, R15, R24
4	100kΩ	R13, R14, R18, R22
2	150kΩ	R9, R27

Semiconductors

1	7805	IC1
1	78L08	IC2
1	74HC7046N	IC3
1	HCMOS 80MHz	IC4 (Crystal oscillator module)
1	2N3904	Tr1
5	J310	Tr2, Tr3, Tr4, Tr5, Tr7
1	MPSH10	Tr6
1	1N4004	D1
1	MV2108	D2 (VARICAP See Text)
1	LED	LED1

Inductors

1	KANK3333	L4 (or Spectrum 45u0L)
2	10µH Axial RF Choke	L1, L3
1	6t 6mm dia x 10mm 1mm copper wire	L2

T1, T2 see text

Miscellaneous

Copper Laminate, suitable power and RF connectors, FT37-43 cores for T1 and T2

Colin Redwood G6MXL introduces the 2011 low power 144MHz contest that provides a fun day out for everyone who joins in. So, choose your site, get that battery charged, antenna, rig, and cool-box ready to go!

The 28th Annual Practical Wireless 144MHz QRP Contest

Editorial comment: *Once again it's my pleasant duty to thank the Contest Adjudicator* ***Colin Redwood G6MXL*** *for his continuing hard work organising the event, which takes up much time during the year. Colin's also busy preparing for our 70MHz Contest, which takes place in September this year. I think that the best way to acknowledge Colin's efforts are to support the events. Good luck everybody and let's hope for good weather and propagation conditions!* ***G3XFD****.*

The 28th Annual *Practical Wireless* 144MHz QRP contest takes place on Sunday June 12th 2011 from 0900 to 1600 UTC. The format of the 144MHz contest is simple, designed to maximise participation from newcomers and keen contesters alike, whilst keeping it a friendly and fun event to take part in.

For those new to Amateur Radio contests, the *PW* 144MHz QRP contest is a perfect introduction. Every year Amateurs new to contests try their hands for the first time. In fact, some radio clubs use it as an opportunity to introduce their members to the joys of Amateur Radio contests.

Even if you are limited to operating from home for just a short time, please join in all the fun of the contest.

So, on **Sunday June 12th 2010**, why not find yourself a location with a good take-off, operate for a few hours with no more than 3W on the 144MHz band? June is a time of the year when (hopefully!) the weather might be reasonably kind and when we might be lucky with some good propagation on the 144MHz band. And there'll certainly be plenty of other *PW* readers on the air, eagerly wanting to work you!

Equipment Needed

In terms of equipment, all you need is a 144MHz transceiver and an antenna. Whilst most activity will take place on upper side band (u.s.b.), there will also be some contacts on c.w. and f.m. If you haven't tried operating from a local hill-top, you may be surprised just how far 3W can go!

Sometimes, the contest is blessed

Sample Logsheet.

Practical Wireless 144MHz QRP Contest 2011

Date: Sunday June 12th 2011	Callsign	Locator	Sheet no. of

Time UTC	Callsign	Report & serial number		Locator *
		Sent	Received	

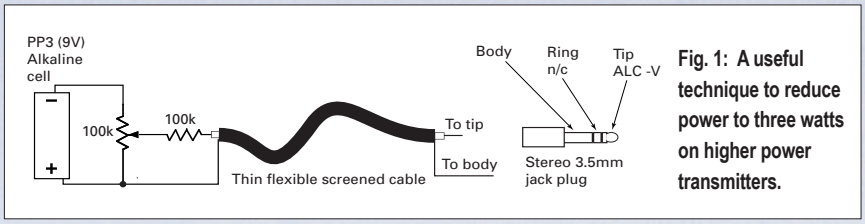


Fig. 1: A useful technique to reduce power to three watts on higher power transmitters.

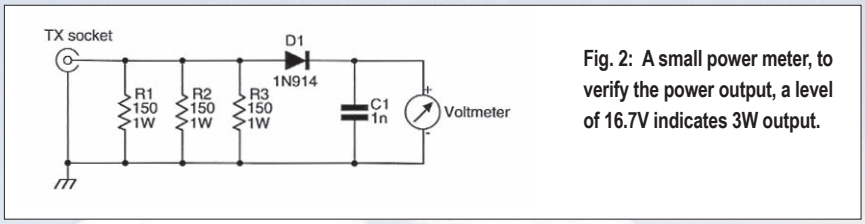


Fig. 2: A small power meter, to verify the power output, a level of 16.7V indicates 3W output.

The Mid-Sussex ARS G5RV/P during last year's contest operated with a well-supported mast and antenna.

The well laid out mobile 'shack' used by the French group TM7T/P in locator square JO00UV in 2010. Will you work them this year?

with some Sporadic-E propagation when just about anywhere in Europe might be worked with just 3W on the 144MHz band!

Any source of power can be used to power the station for the *PW* 144MHz QRP Contest.

Antenna Polarisation

For operation on u.s.b. and c.w., you will find that most stations use a horizontally polarised antenna. And here's a tip – you'll almost certainly work longer distances if you also use a horizontally polarised antenna.

Output Power

If you have a transceiver with an output power of greater than 3W, you will need to reduce the power to **3W or below**. With a number of modern transceivers such as the popular Yaesu FT-817ND for example, power can be reduced by using a menu setting. If this is an adjustment that you don't normally perform, you may want to refer to the operating manual in advance of the contest.

An alternative method of getting the output power down to 3W is to use a technique that has been successfully employed by a number of stations over the years. This involves applying a d.c. voltage externally to the automatic level control (ALC) socket of the transceiver. (See **Fig. 1**). Whilst measuring the power out, adjust the variable resistor and the ALC voltage is applied to the transmitter, thereby reducing the power to the level required. This technique has been used for example with the popular Yaesu FT-897 and some h.f. transceivers when driving 144MHz transverters.

Note that the 3W limit is at the output of the 144MHz transmitter or output of the 144MHz transverter, **not at the antenna**. You cannot rely on feeder loss to meet the 3W rule.

Hints & Tips

I would certainly recommend re-reading the results article of last year's contest in the November 2010 issue of *PW*. It contains many suggestions for improving your overall score in 2011.

I would also encourage entrants to enter their cover sheet details on the contest web site at **www.pwcontest.**

org.uk and to include an E-mail address, so that I can contact entrants if their e-mailed logs have not been received.

Outlying Squares

I really urge stations to point their beams towards the outlying squares. Not only can this give some really valuable multipliers, it also encourages stations in South West England, Northern Ireland, Eire, and Scotland to participate.

After the contest please submit an entry, thereby joining the thousands of radio amateurs who have participated over the years in this popular contest. Although electronic entries via E-mail are preferred, the computer phobes will no doubt be pleased to know that you can easily submit an entry without going anywhere near a computer if you so wish!

Contest Logs

Over the last few years in the UK we've not been required by our licence conditions to keep a log of our contacts. However, entrants are reminded that time must be logged in UTC (not BST) and that callsign suffices (e.g. /P) must be correctly logged for the contest.

The preferred form of a log is a computer file sent by E-mail. This may be a file generated by logging software, provided it contains all the information listed above.

Assembling the antenna at G5RV/P during last year's contest.

Files in any other suitable format (plain text is fine provided each of the items required is separated by a separating character such as a comma or tab) can also be accepted. Please don't mix separators within your entry!

All entrants should please note that:

1: the contest web site is at **www.pwcontest.org.uk**

2: E-mailed entries should be sent to **contest@pwpublishing.ltd.uk**

3: Postal entries should be sent to **Colin Redwood G6MXL, 53 Woodpecker Drive, Poole, Dorset BH17 7SB.**

4: No matter how you submit your entry, please note that it must be **received by Tuesday 5th July 2011. Late entries will not be accepted.** If you are entering by post, you are recommended to use first class post.

Even if you are a regular participant, please take the time to read the rules thoroughly.

Entering From Abroad

If you are entering from abroad, please note that in order for your entry to be tabulated in the main adjudicated results table, at least one of your contacts must be with a station located in the United Kingdom (including the Channel Islands, Isle of Man) or Eire. Other overseas entries are welcome. A separate certificate will be provided to the overseas station with the highest score.

Let's hope for some good propagation on the day so that we can all have a really enjoyable time. Make a note in your diary now, the 28th Annual *Practical Wireless* 144 MHz QRP contest takes place on Sunday 12th June 2011. Don't forget to charge your batteries a day or two before, and also make a note to remind yourself to submit your entry on time! **PW**

Happy and relaxed operating at M0VRL/P at last year's day out.

The log spreadsheet introduced in 2009 will be available again this year. It has proved to be popular with many entrants over the last two years. It can be downloaded from the *PW* Contest web site at **http://www.pwcontest.org.uk**

Submitting logs using either the spreadsheet or REG1TEST format will assist the adjudicator.

A high viewpoint can improve your chances of a good score, so make sure you 'book' yours early!

The 28th Annual *Practical Wireless* 144MHz QRP Contest Rules

1. General: The contest is open to all licenced Radio Amateurs, fixed stations or portable, using s.s.b., c.w., a.m. or f.m. in the 144MHz (2m) band. Entries may be from individuals or from groups, clubs, etc. The duration will be from 0900 to 1600 UTC on Sunday 12th June 2011.

All stations must operate within the terms of their licence. Entrants must observe the band plan and must keep clear of normal calling frequencies (144.300MHz and 145.500MHz) even for "CQ" calls. Avoid frequencies used by GB2RS during the morning (144.250MHz and 145.525MHz) and any other frequency that is obviously in use for non-contest purposes.

This year there is also an Amateur Television contest taking place the same day so please also avoid the ATV talk-back frequencies of 144.525 and 144.750MHz. **Contest stations must allow other users of the band to carry out their activities without hindrance.**

The station must use the same callsign throughout the contest and may not change its location. Special event callsigns may not be used.

2. Contacts: Contacts will consist of the exchange of the following minimum information:

(i) callsigns of both stations (**including any /P suffices**)

(ii) signal report, standard RS(T) system

(iii) serial number: a 3-digit number incremented by one for each contact starting at 001 for the first contact.

(iv) locator (i.e. full 6-character IARU Universal Locator for the location of the station.

Information must be sent to, and received from, each station individually, and contacts may not be established with more than one station at a time. Simultaneous operation on more than one frequency is not permitted.

If a non-competing station is worked and is unable to send his full Universal Locator, their location may be logged instead. However, for a square to count as a multiplier (see rule 4), a full 6-character locator must have been received in at least one contact with a station in the square.

Contacts via repeaters or satellites or using digital modes (including DSTAR and Echolink) are not permitted.

3. Power: The output power of the **transmitter or transverter** final stage shall not exceed 3W p.e.p. If the equipment in use is usually capable of a higher power, the power shall be reduced and measured by satisfactory means. The simplest way is often to apply a (variable) negative voltage to the transmitter automatic level control (ALC) line reached via the accessory socket (See Fig. 1). Stations cannot rely on feeder loss to meet the 3W power limit.

With a number of modern transceivers such as the popular FT-817ND for example, power can be reduced by using a menu setting.

The output power can be accurately measured using the simple circuit of Fig. 2. Connect this to the 50Ω output of the transmitter and adjust the power so that the voltmeter does not exceed 16.7V on a 'good whistle' into the microphone.

4. Scoring: Each contact will score one point. The total number of points gained in the seven-hour period will then be multiplied by the number of different locator squares in which contacts were made (a 'square' here is the area defined by the first four characters of the universal locator).

Example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01 squares; final score = 52 x 5 = 260.

Only one contact with a given station will count as a scoring contact, even if it has changed its location, e.g. gone /M or /P. If a duplicate contact is inadvertently made, it must still be recorded in the log, and clearly marked as a duplicate (not necessary in computer logs submitted by E-mail).

5. The Log: Logs may be submitted by E-mail or by post. In either case the log must contain the following information for each contact:

(a) Time (**UTC** - **NOT BST**)
(b) Callsign of the station worked (**including any /P suffix**)
(c) Report sent (e.g. 56)
(d) Serial number sent
(e) Report received (e.g. 54)
(f) Serial number received
(g) Locator received (or location).

The preferred form of a log is a computer file sent by E-mail. This may be a file generated by logging software, provided it contains all the information listed above, or a file in any other suitable format (plain text is fine) provided each of the items above is separated by a separating character such as a comma or tab. Give the file a name including the station call sign (e.g. g6mxl-p.log), and send as a standard E-mail attachment to **contest@pwpublishing.ltd.uk**

Most formats of log are acceptable (the REG1TEST format or the spreadsheet available on the contest website **www.pwcontest.org.uk** are preferred). If there is any problem with your entry, you will be contacted by E-mail.

If a computer log file is not available, a paper log may be sent by post. This must be clearly written on one side of A4 sized paper only, ruled into columns for each of the items listed above. Underline or highlight the first contact of the locator squares worked. At the top of each sheet, write:

(a) The callsign **(including /P suffix)** of your station used in the contest
(b) Your locator as sent during the contest
(c) Sheet number and total number of sheets (e.g. "Sheet no. 3 of 5")
(d) 144MHz.

Log sheets and covering information sheets which may be used for paper-based entries are available for downloading from the contest Web site **www.pwcontest.org.uk**

6. Entries: The covering information listed below must be provided with each entry. The preferred method of submitting this is by the use of the online facility on the web site **www.pwcontest.org.uk**

Alternatively, the information may be written in the E-mail message to which the log file is attached. For entries sent by post, it should be written on a separate sheet of A4-sized paper.

The information required for every entry is:

(a) The name of the entrant (or of a club etc. in a group entry as it is to appear in the results table and on the certificate.
(b) The callsign used during the contest **including any /P suffix** (e.g. G6MXL/P).
(c) The name and address for correspondence.
(d) The location of the station during the contest.
(e) The full 6-character locator as sent during the contest.
(f) Whether single or multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her); if multi-operator, include a list of operators names and callsigns.
(g) The total number of contacts and locator squares worked (not required for a log sent as a computer file).
(h) A list of locator squares worked (not required for a log sent as a computer file).
(i) A full description of the equipment used including transmitted p.e.p. output power.
(j) If the transmitting equipment (including any transverter employed) is capable of more than 3W p.e.p. output in the 144MHz band, a description of the methods used to (i) **reduce** and (ii) **measure** the 144MHz output power.
(k) The antenna used and the approximate station height in metres above sea level (a.s.l.)
(l) If you receive or send a report of poor quality signals (e.g. wide / splattering), full details of the complaint, including time, callsign, nature of complaint and actions taken **during** the contest to investigate and resolve.
(m) The following declaration must be included in the E-mail text or written and signed by the entrant: "I confirm that the station was operated within the rules and spirit of the event, and that the information provided is correct."

Failure to supply the required information may lead to loss of points or disqualification.

Entries & Other Information
Entries by E-mail must be sent to contest@pwpublishing.ltd.uk
Paper entries should be sent to: ***Practical Wireless* Contest, c/o Colin Redwood G6MXL, 53 Woodpecker Drive, Poole, Dorset BH17 7SB.**

Entries must be received not later than Tuesday July 5th 2011. Late entries will be disallowed.

Any other general comments about the station, the contest and conditions during it are welcome (written in a separate sheet of paper in the case of entries sent by post). Photographs of the station are also invited. Please note photographs cannot be returned and may be used for publication in *Practical Wireless* or on the www.pwcontest.org.uk website. If these are not available by the time the entry is submitted, they may be sent later by E-mail or post, **to arrive by August 11th 2011**.

A summary of the results will be published later this year in *Practical Wireless*.

7. Miscellaneous: When operating portable, obtain permission from the owner of the land before using the site. In particular observe any restrictions on access associated with Bird Flue, Blue Tongue, Foot & Mouth etc. Always leave the site clean and tidy, removing all litter. Observe the Country Code.

Take reasonable precautions to avoid choosing a site which another group is also planning to use. It is wise to have an alternative site available in case this problem does arise.

Poor Signals: Make sure that your transmitter is properly adjusted and is not radiating a broad or poor quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous strong signals it will have to handle, and that this may lead you to believe that another station is radiating a poor signal. Before reaching this conclusion, try heavy attenuation at the received input. The use of a high-gain r.f. pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it is best to be able to switch it off when necessary.

If you receive or send a report of poor quality signals (e.g. wide / splattering), you must record on the cover sheet full details of the complaint including time, callsigns of stations involved, nature of complaint and actions taken **during** the contest to investigate and resolve.

Adjudication: Points will be deducted for errors in the information sent or received as shown by the logs. Unmarked duplicate contacts in paper-based logs will carry a heavy points penalty. Failure to supply the complete information required in rule 6 may also lead to deduction of points. A breach of these rules may lead to disqualification. In the case of any dispute, the decision of the adjudicator will be final. **PW**

KITS & MODULES

TRANSVERTERS for 2 or 4 or 6 metres from a 10 metre rig, or 4 or 6 metre from a 2 metre rig. Includes new overtone local oscillator, and integral interface unit. 20dB receive gain, 25W transmit power. Low level drive dual IF versions **TRC2-10dL, TRC4-10dL & TRC6-10dL**, high level drive single IF versions **TRC2-10sL**, **TRC4-10sL**, **TRC6-10sL, TRC4-2sL, TRC6-2sL**, Complete kit **£179.00**. **Built £266.00.**

TRANSVERTERS for ICOM rigs, supplied with cables. Automatic with no cable switching. IC756Pro & II & III, 775, 781, 7600, 7700, & 7800 use type **TRC4-10L/IC1.** IC735, 761, & 765 use type **TRC4-10L/IC3. Built to order £280.00.**

PSK31 INTERFACE KIT. Module as described in PW Feb 2009. Suitable for a variety of digital modes. PCB and components **£21.00**. Box kit complete with cables but excluding microphone plug **£35.50**.

STATION PREAMPS for 2 or 4 or 6metres. RF & DC switched. Adjustable 0-20dB gain. 100W power handling. **RP2S, RP4S, RP6S, PCB & Hardware kit £35.00, Ready Built £57.00**.

MASTHEAD PREAMPS, for 2 or 4 or 6meters. 20dB gain 1dB NF. 100W through handling. RF switched & DC fed via the coax. Heavy duty waterproof masthead box, and a DC to RF station box with SO239 connectors. **RP2SM, RP4SM, RP6SM, PCB & hardware kit £41.00, Ready Built £65.00. Masthead fitting kit £6.00**.

MASTHEAD PREAMPS 400W rated, for 2 or 4 or 6metres. RF switched. DC fed via a separate wire. 20dB gain 1dB NF. Heavy duty waterproof masthead box with SO239 connector. **RP2SH, RP4SH, RP6SH. PCB & hardware kit £42.50, Ready Built £65.00. Masthead fitting kit £6.00**.

TRANSMIT AMPLIFIERS, for 2 or 4 or 6 metres, single stage RF switched, class AB linear. Diecast box with heatsink and SO239 connectors. **TA6SA** 2W in 25W out, **TA4SA** 2.5W in 25W out, **TA2SA** 5W in 25W out. **Complete kit £63.00, ready built £82.00**.

TA6SB 5W in 50W out, **TA4SB** 7W in 50W out, **Complete kit £70.00, ready built £89.00**.

TRANSMIT AMPLIFIER & RECEIVE PREAMP, for 2 or 4 or 6 metres. Receive gain adjustable 0-20dB. Switching for either part or straight through. RF switched on transmit. Diecast box with suitable heatsink and SO239 connectors. RF input and output as detailed in paragraph above. **TARP6SA, TRRP4SA, or TARP2SA complete kit £89.00, ready built £123.00. TARP6SB, and TARP4SB complete kit £92.00, ready built £126.00**.

NEW CRYSTAL SERVICE

HC18U, 25U, & 49U QUARTZ CRYSTALS

3-22MHz parallel mode 30pF load, 22-60MHz series 3rd overtone, 60-80MHz series 5th overtone. Cut to order, tooling charge £5.00 per frequency, plus £5 per crystal. Delivery 4-6 weeks.
Stock unused crystals, £5.00 each. Stock used crystals, £2.50 each. P&P £1.00 any quantity. See our web-site or send SAE for list.

COMPONENTS

See our web-site or send SAE for list.

CAPACITORS, ceramic, poly block, electrolytic, mica, trimcaps.
RESISTORS, ¼ W carbon film, 10Ω to 1MΩ, and trimpots.
DIODES, small signal, zener, rectifier, Shottky, & varicap.
TRANSISTORS, small signal AF and RF bipolar and FET, medium and high power VHF.
INTEGRATED CIRCUITS, linear & logic.
VALVES, tested good, B7G, B8A, Octal, and older.

DUAL GATE MOSFETS
BF964S £1.50, 3SK45 £2.00, 3N201 £2.25, 40673 £2.50.

SPECTRUM 10mm COILS, pin compatible with TOKO types. Coil values 1.2, 2.6, 5.3, 11, 23, 45, and 90uH. Some types have the primary tapped at ¼ turns and a low impedance secondary winding. Others have centre tapped primary and relatively high impedance secondary winding. Full details of turns ratios, etc. can be found on the components page of the website.
1-24 qty 75p each plus £1 P&P. 25-99 qty 55p each plus £2.50 P&P.

CERAMIC WAFER SWITCH 4 pole 5 way with silver plated contacts. Rated at 2kV and 10A for use in ATU's and Power amplifiers. **£8.50 each plus £1.50 P&P**.

NEW PRODUCT

DUAL GANG BROADCAST VARIABLE CAPACITOR
330+330pF with 3:1 reduction drive. £8.50 each plus £1.50 P&P.

OFF-AIR FREQUENCY STANDARD, crystal calibrator unit phase locked to Radio 4 using a two-loop system. Includes a monitor receiver to ensure Radio 4 is being heard loud and clear. Fixed outputs 10MHz at 2V p-p, and 1KHz at 1V p-p as oscilloscope CAL signal. Switched outputs 1MHz, 100KHz, 10KHz, and 1KHz at 6V p-p, into 500 Ohms. Single board design as featured in July & Sept 2008 PW. Background heterodyne whistle at 2KHz confirms lock condition. 12/13.5V DC operation at 65mA. **PCB kit with ferrite rod £50.00, PCB kit + drilled box and hardware complete £86.00. Ready built £131.50.**

NEW PRODUCT

5W WIDE-BAND HF AMPLIFIER
A useful push-pull broadband amplifier module giving a nominal 5W output over the range 1.8 to 29.7MHz with drive levels ranging from 37 to 97mW. Harmonics typically are 2nd –42dB, 3rd –18dB, 4th –49dB, and 5th –29dB. Should be used in conjunction with a double Pi type low pass filter, either harmonic halfwave or 5 element Chebychev. Normal supply 13.5V DC with current between 900mA and 1.86A. **Full kit of parts with heatsink but without wound toroids £29. Full kit with wound toroids £39. Ready built £49**. Price includes postage but not low pass filters.

PORTLAND VFO

A rock stable FET VFO. Meets the requirement for the Intermediate Licence VFO project. Modified to allow alignment to top and bottom of required band. Several versions available: 5.0 - 5.5Mhz for 20 & 80 metres; 7.0-7.2MHz for a direct conversion for the extended 40metre band; or 7.900 - 8.400MHz for use as part of a mixer-oscillator system as local oscillator for 4m RX or TX. Supplied with Buffer 2A to deliver 1.6V p-p into 50Ω with 2nd harmonic 40dB down. **PCB and component kit with potentiometer £18.00. Drilled Box and PCB kit with potentiometer and feedthroughs £27.00. Ready built £50.00**. State required frequency when ordering.

LCR BRIDGE

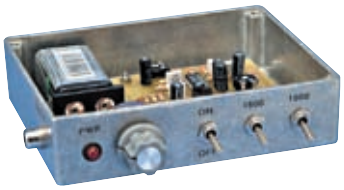
With 5 resistance ranges 100, 1K, 10K, 100K & 1M. 3 capacitance ranges, 100pF, 1nF, 10nF and 3 inductance ranges, 1mH, 10mH & 100mH, plus external reference. Scale calibrated 0.01 to 10 times reference value. Optional drilled and labelled plastic or painted diecast box. **PCB & parts with pot and switch £26.00. With plastic box £39.00, with diecast box £44.00.**

CLASSIC 20/80m SSB RECEIVER

Classic superhet receiver for 20 and 80m using a 9MHz IF and a 5.0-5.5MHz VFO. Uses a 6 crystal ladder filter with near symmetrical passband, 2dB insertion loss, 1.8:1 shape factor, and 70dB stopband. Minimum discernable signal 0.2uV. Fixed tuned bandpass preselector on 20m, tunable preselector on 80m. Logarithmic AGC and Signal meter response. Maximum signal handling 1mV. 500mW audio output. Supply requirement 13.5V at up to 250mA. **VFO with its drilled box, preselector and main board PCB's and component kits including crystals £92. Complete kit including box and hardware £147.00. Ready built £240.00.**

UPWEY 160m AM/LSB RECEIVER

Single conversion superhet receiver for Top Band using a 4 pole ceramic IF filter LTW455HT. Stopband –40dB at + - 9KHz, -60dB at + - 100KHz. Ultra stable Colpitts VFO, and resonator-stabilised high-side BFO. Minimum discernable signal 0.1uV. Tuneable preselector and S meter. 500mW audio output. Supply requirement 13.5V at up to 250mA. **PCB & parts kit including Main board, VFO with its box and tuning capacitor, preselector with polyvaricon, and BFO £92.50. PCB and parts kit plus drilled and labelled case and all hardware including meter, speaker, and slow motion drive £175.50. Ready built £241.50.**



TWO TONE OSCILLATOR as featured in *PW* March 2005. A vital piece of test equipment used together with an oscilloscope for setting up AM, DSB, & SSB transmitters. **PCB & hardware kit £28.00. Ready Built £52.50**.

G2DYM / G4CFY AERIALS

TRAP DIPOLE for 80/40/20/15//&10m. 106 feet long. Supplied with 70 feet of low impedance twin feeder. Low TVI and low noise. 2S points quieter than a G5RV with same feeder length. PVC covered wires with lugs. Light duty 150W rated £157.00, 600W rated. £164.50, medium duty 600W rated £182.50, inc. carriage.

TWIN FEEDER 100 Ohm, 2kW rated, 24/0.2 in individual polyethylene sheaths with an outer cover of polyethylene. Solid construction to avoid water ingress. Good flexibility to overcome work hardening and fracture. Typically 0.5dB/m quieter than wide spaced 300 and 450 Ohm feeder and coax. Loss 0.04dB/m at 10MHz. 75p/metre plus £3 P&P. 100m drum. £70 inc P&P.

1:1 BALUN 160-10m, 1kW rated. Loss under 1dB from 1.8 to 40MHz. Ideal for use with the G4CFY trapped dipole, or any other aerial fed with low impedance twin feeder. £43.00 inc P&P. Version with Marconi-T switching. £53.00 including P&P.

TRAPPED INVERTED L AERIAL 80/40/20/15 & 10m, for a small garden. Coax driven from far end of garden and tuned against ground. A good all round aerial with 6dB more gain than a 24 foot trapped HF vertical. That's 4 times power on TX and one S point extra on RX. Regular duty £80.00, strong £95.00, inc. carriage..

E-mail: tony@spectrumcomms.co.uk

Prices inclusive of postage unless stated. Payment by Credit/Debit card, Cheque or Postal Order. Cheques or Postal Orders payable to Spectrum Communications.

Web site: www.spectrumcomms.co.uk
Web site: http://spectrumcomms.eu5.org

Tony Nailer G4CFY's Technical for the Terrified
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-mail: tony@pwpublishing.ltd.uk

Antenna gains & bandwidth – again!

Tony Nailer G4CFY has had some feedback on his April *Technical for the Terrified* column.

Welcome to *Technical for the Terrified* (*TfT*). Shortly after the April issue *PW* hit the store shelves I again received E-mails from Steve Hunt G3TXQ and Dave Kimber G8HQP taking issue with the article.

Steve G3TXQ pointed out that the graph reproduced from the Radio Society of Great Britain (RSGB) is now out of date and more recent versions of the graph show that the curve bottoms out at about 45Ω at 0.08 wavelengths. Also that the ground conductivity has a great effect on this and the value of 30Ω I used in the example calculation would never be realised. (I have no problem with that!). A more up-to-date graph taken from the *ARRL Handbook 1996* is included in **Fig. 1**.

Steve also pointed out that the value of 76Ω, that I derived for a dipole seven half-waves long from *HF Antennas For All Locations* by **Les Moxon G6XN**, is wrong and would be about 135Ω. (I have no problem with this also).

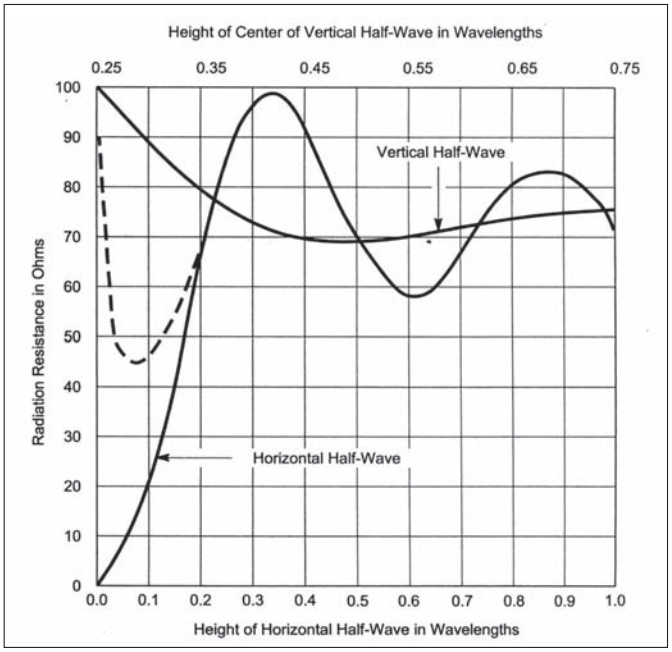


Fig. 1: A graph of the variation of antenna impedance taken from the ARRL Handbook. The original caption is: "Variation of radiation resistance of vertical and horizontal antennas at various heights above flat ground. Solid lines are for perfectly conducting ground; the broken line is the radiation resistance of horizontal half-wave antennas at low height over real ground." *Courtesy of the ARRL.*

Another issue was dipole bandwidth, where Steve was surprised by 'my claim' that a dipole on 3.65MHz could cover the whole band with an s.w.r. of about 2:1. He stated that a dipole using 14s.w.g. wire at 10m above ground would have a 2:1 s.w.r. bandwidth of just 140kHz, and would be about 4:1 at the band edges. Even a humble dipole would require an a.t.u. to work with a modern solid-state transmitter.

Not A Claim!

When I stated the figures in *TfT* in the April *PW* issue, it wasn't a claim of mine but the application of an equation, which again I took from page 122 of *HF Antennas For All Locations*. The formula that Les derived was that the Bandwidth (2δf) = (R*4*f)/(Zo*π) MHz, where R is the radiation resistance, f is the centre frequency, Zo the characteristic impedance.

Then I applied the formula to a 3mm diameter wire at 10m (32.8) feet) above ground operating as a dipole on 3.65MHz, which is a wavelength of 82.2 metres. The antenna is 0.12λ above ground and a radiation resistance R of just 30Ω, according to the graph included. The characteristic impedance Zo found previously was 486Ω.

So BW = (3.65*4*30)/(486*π) = 0.287MHz.

Studying page 122, of *HF Antennas For All Locations* again, I noticed that in his derivation he stated that R ≈ 2*ω*L*δf/f, which probably should have been R ≈ ω*L*δf/f. Also at the top of the right hand column he pointed out that this was for the 3dB down bandwidth corresponding to a 2.6:1 standing wave ratio (s.w.r), and for a 2:1 s.w.r. we would need to multiply the answer by 0.75. Taking these points into consideration the formula for a 2:1 bandwidth becomes BW = (1.5*f*R)/(Zo* π).

Taking the radiation resistance from the up-to-date graph of 50Ω for a height of 0.12λ, and all other variables given above, the result is now a bandwidth of 0.179MHz, or 179kHz. This is quite close to the bandwidth Steve G3TXQ quotes from accepted theory and computer modelling.

A further issue that was raised concerns antenna gain and my statement that the gain was proportional to the physical length. Steve said this was simply not true and that by halving the length of the antenna the radiation resistance drops by a factor of four. What happens then is the wire resistance becomes increasingly significant and the efficiency rapidly falls.

Steve stated that I misunderstood basic antenna theory and should read some good antenna engineering textbooks and also visit the website of **Charles Rauch W8JI** (**www.w8ji.com/**)

David Kimber G8HQP said much the same and that the limiting factor was that an isotropic radiator is only 2.15dB lower gain than a dipole and you couldn't get less than that, because it was a point source. He admitted it was counter-intuitive and that I should read one of the standard antenna textbooks. He thought that Krauss was probably the most practical author and actually made antennas for a living.

Antenna Gain Re-visited

Using again the reference of *HF Antennas for all Locations*, the opening chapter urges the reader to experiment with ideas based on multiples of quarter-wave and half-wave antennas. Always to apply intuition to any scheme, and at the end of that first chapter he highlighted the statement ***The importance of subjecting all findings to the test of "does it make***

sense?" must however be stressed.

In chapter 2 of *HF Antennas for all Locations* the explanation of the directional gain of a doublet or dipole is considered. The diagram is reproduced here and shows that, as expected, the gain, or maximum directivity is at right angles, or broadside to the axis of the wire. This broadside gain is theorised to be 2.15dB higher than the imaginary model of an isotropic radiator.

As we move around the dipole the apparent length becomes shortened and the gain drops accordingly, as shown in **Fig. 2**. It actually changes with the sine of the angle. When broadside and at right angles to the axis of the dipole the gain is maximum because the sine of 90° is 1.

I have worked it out that when the observer is at an angle of 38° to the axis of the dipole, the apparent length is 0.616 of the full length. At this angle the gain will be 2.15dB less than the broadside gain. Further, note that when 'end-on' to the dipole the apparent length is zero, and so is the gain, as the sine of 0° is 0.

The Isotropic Radiator

The concept of an isotropic radiator is a model developed to aid in the understanding of antennas. It's neither hypothesis nor theory, because it cannot be constructed and tested. Mathematics are then created to fit the model, and nowadays the mathematics can be used in computer models, which makes the model even more believable, even if it is wrong.

Although I don't have a problem with the concept of an isotropic radiator – I do have a problem with the further assumption that it is a point source. This is counter-intuitive and leads to an unacceptable conclusion that even a minute antenna cannot have less gain than 2.15dB relative to a dipole.

Applying intuition, I think it would be more reasonable to consider a model of an isotropic radiator in a single plane, as a circle rather than a sphere, and with a diameter of 0.616 of the length of a dipole at a specific frequency. As such it will have a gain of –2.15dBd in every direction in the horizontal plane.

From this model it's now possible to have progressively smaller antennas with gains down to zero for a point source. It does not agree with presently accepted theory but intuitively it works for me!

Loaded Vertical Antennas

When CB radio really took off in the UK in 1978, I became involved as someone who could sort out problems and repair blown-up radios. I also set up mobile antennas to achieve a low standing wave ratio (s.w.r.) as was required to protect the p.a. devices.

At the time, I would arrive home from work as a Senior Design Engineer with Sperry Gyroscope and there would always be one or two cars waiting outside my home! I always walked my dogs first and then had my evening meal, during which time more cars usually arrived. During an evening I would often check and set up three antennas and mend several CB rigs, often finishing at around 11pm.

This went on almost without pause for two or three years, during which time I had fitted and sorted out somewhere between 500 and 1000 CB antenna installations. I learned a lot of things, such as that cars made mainly of plastic were rubbish as a ground plane. I also learned that the antennas had a low angle of radiation over the metalwork – so it was best to site them in the middle of the roof.

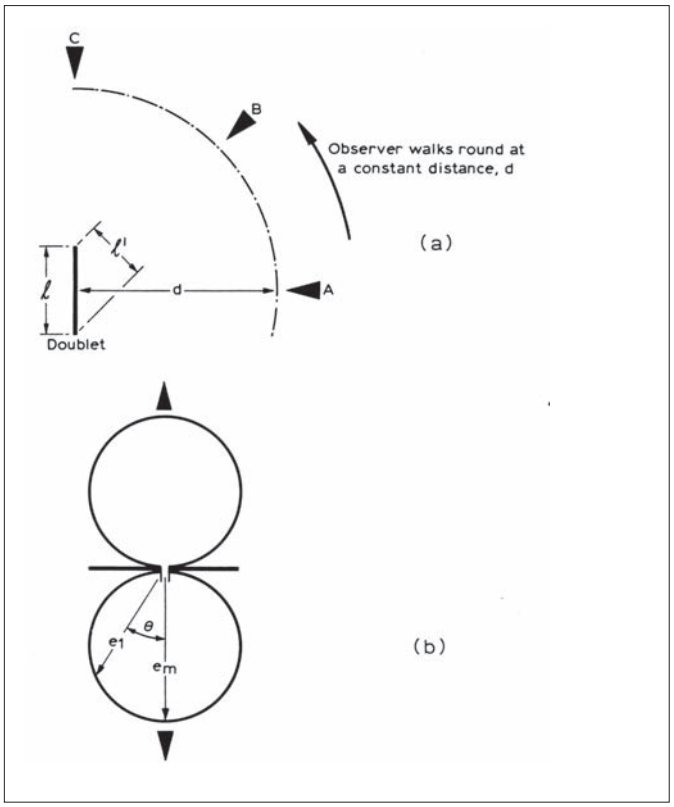


Fig. 2: Variation of the apparent size of a dipole antenna varies with the sine of the angle made to the line of the elements. From the RSGB's *HF Antennas For All Locations*, the original caption read: "(a) Derivation of directional pattern. As observer walks round from A to B at constant distance the apparent length of the antenna shrinks from l to l' . At C it disappears completely; d is assumed large compared with l. (b) Shows the directivity in polar coordinates of a λ/2 (or shorter) dipole: e_1 and e_m represent the relative field strengths in the direction indicated." *Copyright of the Radio Society of Great Britain and reproduced with their kind permission.*

Initially, some of the difficulties I often experienced, in trying to achieve a low s.w.r., were resolved when I started using a half wave-length feeder cable. Using lengths that suited the cable run within the vehicle, often made the initial setting up difficult to achieve. Once the antenna was correctly tuned the feeder length had little effect and the s.w.r. was still low.

Some antennas were physically short, with lots of loading coil inductance and others were much longer with less loading coil inductance. Despite getting the s.w.r right with all the different lengths of antenna it was soon established that antennas the maximum length worked really well and the shorter ones proportionately less.

Popular Antennas

At that time there were several popular CB mobile antennas; the 1.65m long 'Modulator', the 1.4m long 'K40', the 1.5m long 'Z27', and the 1.5m long top-loaded 'DV27'. Among the shorter antennas was the *Dial-a-Match* range, with various lengths from 0.3 to 1.2 metres. There was also the 'short Z27' at some 0.8m long and short 'Thunderbolt'.

As some antennas had compact coils, others had large well-spaced coil turns, then there was the DV27 with its long thin coil at the top, you can imagine that performance comparisons were difficult to categorise. Fundamentally though, the physically longer antennas worked proportionately better than the short ones. This led to the obvious conclusion that antenna gain and performance is directly proportional to

physical length and that by replacing whip with coil degraded the performance.

During the last 20 years the 'Springer' and Mini-Springer antennas have become most dominant and are similar in construction. The uncut length of the long one is 1.5m and the shorter one is 0.86m. To achieve a low s.w.r. it's often necessary to crop off as much as 100mm. They both are base-loaded with substantial spring coils about 50mm diameter mode from chrome plated steel of about 3mm thickness.

It's now much easier to compare the two antennas because the construction is identical. The signal pick up of the Mini Springer is close to 60% of the long Springer and the range is affected in the same proportion. All indications are that the Mini Springer provides over 4dB lower gain than the long one. In the area around Dorchester, Doset (which is quite hilly) the range on CB frequencies with the full-size Springer antenna is about about 8km (5 miles) and with the Mini Springer about 4km (2.5 miles).

Comparison Study

A comparative antenna study by **B.A. Watling G3RNL** published in *Radio Communication* (*RadCom*) March 1968, switching between a reference dipole, a G8KW trapped dipole, a G5RV doublet, a trapped inverted-V, a trapped inverted-L, and a Partridge Joystick antenna gave very interesting results.

The tests were undertaken on the 3.5, 7. 14 and 21MHz bands (80, 40, 20, and 15 metre bands). Each antenna was tuned for low s.w.r on each band before each comparative test was made. The results were much in keeping with my findings regarding the relationship between physical size and gain.

The results for the Joystick antenna, which was only about 1.8 metres long, were that it was typically four to five S-points lower for received signals at both ends of the communication path. The important point being that the receiver's S-meter probably was between 3 and 6dB per S point, which suggests its gain was between 12 and 30dB lower than the dipole. That article alone was probably the death-knell for the Joystick antenna.

Overall, from the test describe in the article, the best all-round antenna was the trapped inverted-L. This wasn't 'magic', but proved that it was always capable of picking up signals in the vertical and/or horizontal planes. So, although it didn't do as well as the dipole for horizontally polarised signals – it beat the dipole for vertically polarised signals.

Conflict With Theory

Both Dave G8HQP and Steve G3TXQ assure me that I don't understand antenna theory and that I should read some good engineering books and look at various websites. Their opinions of what happens, is that as the length of the element is reduced, the signal voltage reduces proportionately but the radiation resistance reduces by the square of the reduction.

As gain is V squared divided by R, the power picked up or radiated is the same. Theory is then that the gain of a full size dipole and a half size (presumably inductively loaded) dipole are the same. With lower resistance though, the current increases so losses become significant. This means that it becomes increasingly difficult to match to the antenna and that explains the difference between perception and theory.

I think it's more likely that by defining the isotropic radiator as a point source rather than a larger sphere, antenna theory is wrong for physically short antennas. Practical results for shortened antennas clearly indicate that they can be many S-points down when compared to a full size dipole, or to an unloaded λ/4 vertical. If it was possible to make short antennas with comparable gains to full size ones – we really wouldn't use the full size ones any more.

I wish to thank Dave G8HQP and Steve G3TXQ for their arguments and recommendations. But I don't think this issue is going to be easily resolved, and I need lots more measurements from readers regarding practical comparisons between shortened antennas and dipoles to test my hypothesis.

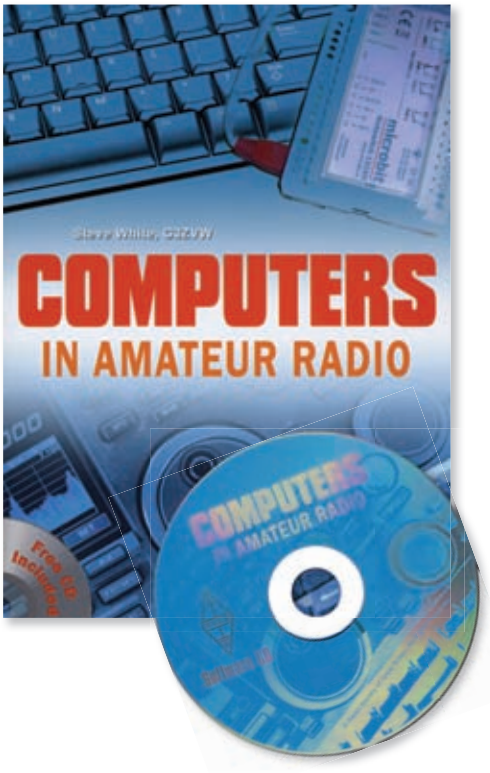
The next *T4T* will move on from this topic, but I am sure I will revisit it again in the future when I've collected sufficient data to merit another article. You can contact me via **tony@pwpublishing.ltd.uk** Cheerio for now!

PW

Book Review

New Book By Steve White G3ZVW available from the *PW* bookstore now.

Computers in Amateur Radio



How can we integrate the computer into the radio hobby? Fortunately, Steve White G3ZVW has come to the rescue with this new book, *Computers in Amateur Radio*. It's not only aimed at the beginner but also provides a useful information source for others.

The book is broken down into chapters, written by specialist authors with Steve White covering others. There are two appendices, one covering a typical desktop computer, the other covering the software on the accompanying CDROM.

In *Data Modes*, Steve gives a general overview of many of the modes that have developed by using the PC's sound card – making these modes simple and cheap.

The *Logging software* section, by **Mike Ruttenberg G7TWC**, is a comprehensive introduction to logging programs and how they can make log-keeping very much easier.

Ian Birkenshaw G4UWK, deals with using software to design and predict the capabilities of antennas. This software can visualise how well (or not so well) the antenna design will work, without putting a single (physical) element in place!

Gwyn Williams G4FKH, has written a chapter entitled *Propagation Modelling*. There's also chapter on *Terrain Modelling for HF* by **Alan Hydes G3XSV**, ideal to help you evaluate the proposed site for the next h.f. field day!

Our own *DataModes* columnist **Mike Richards G4WNC** looks into the subject of *Software Defined Radio,* where the computer sound card's mathematical power is used to decode and encode the outputs from two phase-locked direct conversion mixers.

For *Slow Scan Television*, **Paul Young G0HWC** does the explaining, before the chapter by **Wojtek (Berni) Bernasinski G0IDA/SP5GU**, showing how you can remotely control your rig over the internet. The digital *D-Star* mode is tackled by **Dave Thomas 2W0RUH** and he hands over to **Chris Dunn G4KVI** to show how Automatic Packet/Position Reporting (APRS) works.

I think that the chapter coving electromagnetic compatibility (*EMC),* will be useful to everyone. **John Pink G8MM** and Steve White point out some of the EMC pitfalls and solutions to try. There's also a section on the problems that can exist with ADSL (broadband). Steve also explains that ADSL also a tool that's useful for *Internet Linking* of radios and repeaters.

The Internet is becoming increasingly centre-stage in how we use our radios, and how we track down information and contacts. In this chapter Steve White discusses 'Chat Rooms', On-line receivers, Reverse Beacons, DX Clusters, live v.h.f. DX maps, and for propagation enthusiasts, sites having near real-time magnetometer readings, and MUF maps. There's also a section on programs and websites to visit.

The accompanying CDROM contains many programs on varied topics, many of them in the 'free to use' category. These include: *AALog*, which can interact and log with *CwType*, *CwGet, TrueTTY*. Also you can use *AAVoice* for voice operations. *Also* included is a copy of *N1MM Logger*, a popular contest logging program.

There's a whole raft of AGW Software including: *AGW Packet*; *AGW Tracker*; *AGW Monitor*; *AGW GMT Clock* and *AGW DX Robot*, which displays DX Robot Aurora and Sporadic-E Propagation for Europe.

Several Morse decoding packages are provided, including *CW Decoder*, *CwType, CwGet* and *CW Skimmer*. There's also *Morse Runner*, a contest simulator; *Morse Trainer* produced by G4FON.

Utilities

Of the utilities, that might be useful, there's **Dr Godfrey Manning G4GLM**'s suite of useful tools for Amateur Radio calculations. You'll also find *Great Circle Map* from **SM3GSJ**: *IcePac* is an h.f. Propagation program from NTIA/ITS. This includes *VOACAP* - a free professional propagation prediction program and the *Ham Cap* propagation prediction tool with sunspot data for 2008-2015.

For antenna modelling, try *MMANA-GAL* that's based on *MININEC*. *Satscape* can currently track 500 satellites simultaneously. *WinGrid* - IARU QTH Locator grid square distance and bearing calculator. *RF Safety Calculator*, *Power Loss / dB Calculator*, *Solar/Lunar Tracking Program*, *P3T AO-40 Telemetry Program* for logging, interpreting, and replaying the telemetry from AO-40.

The *SD* suite of programs includes; SD, *SDI* for RSGB IOTA contest, *SDV* covering many v.h.f. contests and *SDX* for DXpeditions & Special Events

For the DXer, *DX Lab* is a suite of applications designed to enhance the activities, the applications are: *Commander*; *DXKeeper* logging software; *DXView* presents a world map; *Pathfinder* makes it easy to find web-based infromation; *PropView* uses *VOACAP*, *ICEPAC*, and *IONCAP* propagation prediction engines; *SpotCollector*

Data Enthusiasts

For data enthusiasts, a user friendly digital mode software package *Airlink Express*, is available. Like *Digipan*, it offers PSK, MFSK and RTTY digital modes with logging and macro capabilities. There's also *WinWarbler* for PSK31, PSK63, PSK125, and RTTY modes.

Jason Mode is a weak signal communication program for l.f. work; also try; *MAP65*, *WSJT and WSPR*. *SimJT* is a simulation program, generating audio JT65 and c.w. signals with white noise for testing purposes. There's *MMSSTV* for SSTV; *MMTTY for RTTY*; *MMVARI* supports multi data modes; *UI-View* an APRS program developed by the late **Roger Barker G4IDE**.

Also included is Ham Radio Deluxe, which is more than just rig controlling software and offering built-in logbook, integrated DX cluster, a satellite tracking interface and 'synchronise', where control of up to ten instances of *HRD* are possible. Tune one radio, the rest follow!

200 pages

Price: £16.99

Of necessity, just a taster of this excellent book! **Tex Swann G1TEX**

SHOWROOM & MAIL ORDER:
Unit 1, Purfleet Industrial Estate, Off Juliette Way, Aveley RM15 4YA

Haydon Communications

LOCAL TO GLOBAL

TEL: 01708 862524
FAX: 01708 868441

Mail Order & showroom open:
Mon-Thurs: 10.00am - 4.00pm
Friday: 10.00am - 3.00pm.
Our showroom is 5 mins from "Dartford River Crossing"
E&OE (next day delivery available)

★ WANTED: USED EQUIPMENT FOR CASH OR PART EXCHANGE ★

SEE OUR NEW SHOPPING CART **www.haydon.info**

To contact our sales dept. E-mail:- admin_@haydon.info

PayPal SWITCH VISA

HF TRANCEIVERS

FT-5000DX

FT-5000DX (200W HF + 6m)...£4299.99
FT-5000DX (above + monitor).£4749.99
FT-5000DX (above + filters)...£5149.99

FT-2000D

FT-2000D (200W).....£2579.99
FT-2000D + SP-2000.....£2129.99
1 x 2000D as new (1 month old)..£2349.99

FT-2000

FT-2000 (100W HF + 6m).....£1975.99
FT-2000 + matching speaker..£2125.99

FT-950

HF + 6m IF DSP

OUR PRICE **£108 9.99**
OR WITH NISSEI PS-300
£1299.99

FT-817 ND

HF + 6m + 2m + 70cms. Incl's battery/charger + antennas. Optional case £22. Extra spare battery £49.99
OUR PRICE **£509.99**

STAR BUY - FT-817ND + extra battery + case..... £569.99

FT-897D

Includes DSP

OUR PRICE **£749.99**
OR FT-897 + MS-1228
£809.99

MD-200

Broadcast quality dynamic mic. It sounds & looks superb. Fits 8-pin round & 8-pin modular radios. (Optional 6-pin modular adapter £19.99)
SALE PRICE **£235.00**
Yaesu MD-100A8X.....£129.99

FT-857D DSP

HF + 6m + 2m + 70cm.
OUR PRICE **£649.99**
OR FT-857 + MS-1228
£709.99

SP-2000

External speaker + audio filters. features a large 4.7"/120mm speaker along with a 3-selection hi-cut and 2 section low cut. Dual switched input + headphone socket.
£149.99

NEW FT-450D

This is the latest IF DSP marvel from Yaesu. HF + 6m (500/300 CW filters as standard). New design + ATU.
OUR PRICE **£785**

DIAMOND SD-330

L: 1.85m. Freq: 3.5-30MHz (200W SSB) 12V DC supply required. (Included 3-way mag mount). Auto tuning.
£429.99

FT-450

Amazing Rx front end performance. (IF DSP). HF + 6m (100W)
£629.99
or FT-450AT (+ ATU) £719.99
One customer claimed, "this is the best kept secret of the communications industry".

IC-7000

HF + 6m + 2m + 70cm. Superb IF DSP. Colour display.
£1169.99
or IC-7000 + MS-1228 £1219.00
IC-9100 new HF to 23cm... £phone

PSUs

WATSON PSU

Power-Mite NF 22amp..... £69.95
Power max (25A) £89.95
Power max (45) £115.00
Power max (65) £225.00
W-10AM 25A (linear)..... £59.95
W-25AM £89.99

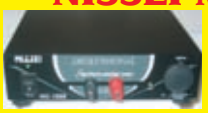
DIAMOND GZV-4000

Includes built-in extention speaker
OUR PRICE **£169.99**
GZV-2500 25 amp version of above. Sale price £129.99

DIAMOND GSV-3000

"Linear power supply". 30A @ 13.8V. 1-15V variable. Diamond quality PSU
OUR PRICE £169.99

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.
QUALITY MADE PRODUCT **£89.99**

NISSEI PS-300

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.
30 AMP/12 VOLT PSU
A truly professionally made unit built to outlast most PSUs.
TRUE 'LINEAR' PSU
OUR PRICE **£169.99**

VHF/UHF TX

YAESU FT-8900 R

10m + 6m + 2m + 70cm. (up to 50W).
INCLUDES DTMF MIC.
OPTIONAL DETATCH KIT £39.99
£369.99

YAESU FT-7900 R/E

Latest commercial built 2m/70cm mobile + wide Rx. (Incl's DTMF mic)
£239.99
FREE YSK-7900 DETATCH KIT THIS MONTH

YAESU FTM-350

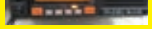
2m/70cm Tcvr with APRS & dual Rx (50W O/P). Includes wideband Rx. Includes DTMF mic. **£449.99**
INCLS FREE GPS ANTENNA UNIT WORTH £70

YAESU FT-2900 R/E

THE GOLIATH OF MOBILES
2m FM (75W)

£135.00

ML-5189



Compact FM mobile. 4m/25W
£149.99 del £5

YAESU VX-8E

6m/2m/70cm. "APRS" with Rx:- 0.5-1GHz. Incl's battery & chgr.
SPECIAL VX-8 + EXTRA BATTERY £319.99
£299.99

YAESU VX-7R

6m/2m70cm + wide RX. An amazing 6W water proof hand-held. Case £19.99. Spk mic £32.99. Cigar lead £24.99. BNC adapter £6.00.
Silver **£249.99**

NEW YAESU FT-270 R/E

2m FM handie (keypad). Incl's batt/charger. **£99.99**

ACCS

MFJ-993B INTELLITUNER

Fully automatic (1.8-30MHz). 300W SSB.
Easy to use ATU.
£245.00

MFJ-949E

£179.99
● 1.8-30MHz 300W ATU ● Large cross needle meter ● 30/300W PEP power meter ● VSWR ● 3-way antenna selector ● Internal balun + dummy load.

MFJ-259B ANALYSER

1.8-170MHz
£259.99
Case 259B £29.99

MFJ-269 ANALYSER

1.8-170MHz + 70cm
£339.99
Dip Coils 259/269£29.99 Case 269B £29.99

MFJ-269 pro version £369.99
MFJ-260C 300W dummy load £49.99
MFJ-264 1.5kW dummy load..... £79.99
MFJ-969 Rollercoaster ATU (300W) £199.99
MFJ-962D 1.5kW (metered) antenna tuner ..... our price £269.99
MFJ-994B (600W) intelli tuner £319.99

SGC BARGAINS

SGC MAC-200 New auto tuner 1.8-54MHz (200W) wire, vertical, dipole. You name it. (5 selectable outputs).
£289.99

SGC-239 Mini tower ATU (1.8-30MHz) £199.99
SGC-237 HF+6m Tuner..... £309.99
SGC-230 (HF-200W) ATU..... £449.99
SGC-Smart lock (specify model)..... £69.99

GIZMOS ANTENNAS

DIAMOND CP-6

A superb (diamond quality) 6 band trap vertical antenna with trap radials – "rotary" trap system allows "flat wall" mounting. 80m/40m/20m/15m/10m/6m. 200W SSB, HT 4.6m (15ft tall).
SEND SAE FOR DATA SHEET
OUR BEST SELLING VERTICAL
£349.99

ATAS-120A

Military spec mobile antenna – superbly made. Covers HF + 6m + 2m + 70cm. *Fully automatic. (*certain Yaesu radios).
OUR PRICE
£279.99

NEW INTRUDER III

13 band (80-10/6/2). PL-259 fitting. Includes WARC bands. 13 band version of Intruder II.
£49.99
(2 for £89.99)

INTRUDER II

11 band (80-10 6/2/70cm). PL-259 fitting. Colapses to 95cm (~ 3 ft).
£37.99
(2 for £70.00)

DIAMOND V-2000

6m + 2m + 70cm. 2 section (2.5m long) PL-259 fitting.
Superb quality
£129.99

GIZMOS

WOUXUN HANDIES

FREE POST
UVPD1P (2m/70cm) £92.99
KG-679E2 (2m) £59.99
KG-679E70 (70cm) £59.99
KG-699E (4m) £92.99

KENWOOD TH-F7E

2m/70cm Tx. Rx: 0.1-1000MHz (AM/WFM/FM/SSB). Incl's battery pack (Lion) + charger.
Includes free speaker mic
£235.00

ALINCO DJ-596E

2m + 70cm Handie. Includes nickle metal N.M.H.I and charger.
Includes free speaker mic
£149.99

QUANSHENG TG-UV2

2m/70cm hand-held (SW O/P) VOX/CTCSS/DCS 200 channels. Dual watch. Incl's battery and drop in charger.
£79.99 P&P £5.00

WINRADIO EXCALIBUR

9kHZ-50MHz (all mode) receiver with spectrum analyser. Most manufacurers try to follow standards - WINRADIO sets them! WR-G3100C pack includes:- receiver + software + PSU + USB cable + BNC adapter. Requires PC.
ALL THIS FOR **£649.99**

ETON SATELLIT 750

0.1-30MHz SSB/AM 88-108MHz (FM stereo) 118-137MHz airband/rotary antenna. 1000 mems/ rotary tuning/wide-narrow filters & more.
+ FREE HD-1010 headphones
£299.99

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. Phone (£19.99 each). Replacement foam windshield £3.00 + P&P.

Back in stock – 8-pin modular 8-pin round Yaesu adapter £19.99

£79.99

10m PNEUMATIC MAST

LIMITED STOCK

We have a small quantity of "military spec" pump-up masts (part of a Government order). All brand new in a crate and supplied with cover (close HT ≈ 6 foot). Anodised green finish.

40m guy kit pack £49.99
Ground fixing spikes (3-off) £35.00
2 foot all ground fixing kit..... £99.99
(Can be hand operated or by compressor/foot pump)

Del £40 10m MAST, ONLY **£1199.99**

NEW DIAMOND WD-330

Amazing performance. Twin folded dipole. 2-30MHz – and it really works. No ATU required (25mts long). Supplied with 30 mtr PL-259 feeder – ready to go. If you want great transmission, look no where else. Japanees quality made product

WOW **£209.99**

W-8010 DIAMOND SHORTENED DIPOLE

80-10m & only 19.2m long! (Up to 1.2kW) Includes 1:1 Balun. Bargain. Superb Japanese quality antenna system.

£184.99

NEW DIAMOND BB6W

2-30MHz (250W) 6.4m long. End-fed wire antenna. Icludes matching balun. Sling up & away you go.

£199.99

CUSHCRAFT BARGAINS

Delivery £15.00

MA5B	Mini beam 10, 12, 15, 17, 20m..... WOW	£479.99
A4S	4 ele beam (10 - 20m).....	£669.99
A3S	3 ele beam (10-20m)..... WOW	£575.99
R-8E	Vertical (40 - 6m) "special"..... SPECIAL	£499.99

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).

SEND SAE FOR LEAFLET

£219.99

NEW Wire Penetrator 50ft long (1.8-70MHz).....£189.99

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end).....£34.99 P&P £4.00 (a pair)

TRAPS BACK IN STOCK

BALUNS & TRAPS (1kW)

Baluns 1:1 or 4:1 or 6:1.....£39.99 each P&P £4
Traps 80m or 40m or 20m or 15m.....£39.99 pair P&P £5

GENUINE COAX SWITCHES (P&P £6.00)

2 way CX-201 (0-1GHz) SO239.....£24.99
2 way CX-201 'N' (0-1GHz) 'N' £29.99
4 way CX-401 (0-500MHz) SO239.....£79.95
4 way CX-401 'N' (0-500MHz) 'N' £89.95

WATSON COAX SWITCHES

(POST £4.00)

CX-SW4N DC-1.5GHz (5xN).....£59.99
CX-SW4PL DC-800MHz (5 x SO-239).£56.95
CX-SW3N DC-1.5GHz (4 x N) £49.95
CX-SW3PL DC-800MHz (4 x SO-239).£41.95
CX-SW2N DC-3GHz (3 x N) £32.95
CX-SW2PL DC-1GHz (3 x SO-239) £26.95

REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF .....£22.00 P&P £3
DC-2 Standard 2-pin/15A fits most VHF/UHF .... £10.00 P&P £3
DC-3 Fits Yaesu FT-7800/8800/8900, etc ..... £17.50 P&P £3

YAESU REPLACEMENT MICS

MH-IC8 8 pin Yaesu mic (8-pin round) .....£44.99 P&P £5
MH-4 4 pin fits older HF, etc. (4-pin round) .....£39.99 P&P £5
MH-31A8J 8 pin modular .....£39.99 P&P £5

COAX BARGAINS

True military spec real UK coax

RG-58 Military spec x 100m.
£69.99 or 2 for £100.00
Coax stripping tool (for RG-58).....£4.99
RG-213 Military spec x 100m (10mm dia).
£199.99/100m or 2 for £300.00

Q-TEK TRI-MAGMOUNT

Very heavy duty. Available:- SO-259 or 3/8 – specify. **£44.99**

HEAVY DUTY 24ft SWAGED MAST SET

New extra heavy duty 2" mast set. 4 sections x 6 foot that slot together.

SPECIAL BUY

£69.99 each. Del £10 THREE FOR £149.99 DEL £15.00

NEW SWAGED MAST SETS

24 foot mast. 1½" – 4 sections (6ft long). (Swaged) **£49.99**

24 foot mast. 1¼" – 4 sections (6ft long). (Swaged) **£46.99**

H/DUTY CAR BOOT MAST SET

18 foot (1½" dia).
18 foot – 6 x 3 foot (1½") slot together ally sections.

£49.99 each.

TWO FOR £79.99 DEL £13.00

NEW CAR BOOT MAST SET

Superb 18 foot (6 x 3 foot sections) that slot together.
Dia: 1¼" ideal to take anywhere.

£39.99

2 for £79.99 del £13.00

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 £14.99 / 5 for £32.99 (P&P £4.00)

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to avoid tangling.
(Fits up to 2" mast) **£13.49** + P&P £4.50
30m pack (4.4mm) nylon guy rope £15.00
132m roll 4.4m nylon guy (480Kg b/f) ..... £45.00 Del £7.50

NEW EASY FIT WALL PULLEY

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

£13.49 + 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).....£15.00
132m (4.4mm) nylon guy (480Kg) £45.00

HANGING PULLEY

Heavy duty die-cast hanging pulley. Hook and go!

£24.99

BARGAIN WINCH

500kg brake winch. BARGAIN PRICE

£89.99 Del £10.00

(Now includes cable grip)
Winch wall bracket..... £22.99

BUTTERNUT VERTICALS

HF-2V (80/40m).....£279.99
HF-6V (80/40/30/20/15 /10m).....£375.00
HF-9V (as HF-6V + 17/12 & 6m).....£425.00

TONNA YAGIS

22089 9ele 2m..... £79.99
220811 11ele 2m..... £109.99
220817 17 ele 2m..... £139.95
220818 9ele 2m XD..... £129.95
220921 21ele 70cm £109.00
2208938 9ele 70cm XD..... £135.99

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) ..... £79.95 P&P £6.50
RS-102 1.8-150MHz (200W) ..... £49.95 P&P £6.50
RS-402 125-525MHz (200W) ..... £49.95 P&P £6.50
TM-3000 1.8-60MHz (3kW) Incls mod meter ..... £69.95 P&P £6.50
RS-40 144/430MHz Pocket PWR/SWR..... £34.99 P&P £5
DL-30 diamond dummy load (100W max) ..... £29.99 P&P £5

LOW LOSS PATCH LEADS

£4.50 P&P

Connectors	Length	Price
PL-259 - PL-259	0.6m	£11.99
PL-259 - PL-259	1m	£14.99
PL-259 - PL-259	4m	£19.99
PL-259 - PL-259	20m	£49.99
BNC - BNC	1m	£12.99

MT-3302

Heavy duty universal mount.
Includes 5m cable **£29.99**

MT-6601

Adjustable roof rack/window bar mount
£19.99

YAESU G-450C

Heavy duty rotator for HF beams, etc. Supplied with circular display control box

WOW **£319.99** or £369.99 with 25m cable/plugs

G-650C extra heavy duty rotator..... £359.99 or £419.99 with cable
G-1000DXC extra heavy duty rotator..... £459.99 or £519.99 with cable
G-2800DXC The goliath of rotators..... £845.99
GS-065 thrust bearing £59.99
GC-038 lower mast clamps £35.99

AR300XL

Quality rotator for VHF/UHF. Superb for most VHF-UHF Yagis, 3-core cable required. 3-core cable £1 per mtr.
GS-050 stay bearing £39.99 OUR PRICE **£89.99**

DIAMOND YAGIS

No tuning required

2m/5 element	No tuning required SO-239 feed	£43.99
2m/10 element	No tuning required SO-239 feed	£79.99
70cms/10 element	No tuning required SO-239 feed	£49.99
70cms/15 element	No tuning required SO-239 feed	£64.99
6m/2 element	No tuning required SO-239 feed	£84.99

Q-TEK COLLINEARS (VHF/UHF)

Del £12.50

X-30 GF 144/70, 3/6dB (1.1m)..... £44.99
X-50 GF 144/70, 4.5/7.2dB (1.7m)..... £59.99
X-300 GF 144/70,6.5/9dB (3m)..... £79.99
X-510H GF 144/70, 8.5/11dB (5.4m) £139.99
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m)....£89.99

DUPLEXERS & TRIPLEXERS

MX-2000 50/144/430MHz Triplexer £74.99
TSA-6011 144/430/1200MHz Triplexer.....£74.99
MX-72 144/430MHz.....£34.99
MX-72 "N" 144/430.....£35.99
MX-62M (1.8-56MHz + 76-470MHz) £69.99

MOBILE ANTENNAS

Del £10.00

DB-7900 2m/70cm (5.5/7.2dB) 1.6m (PL-259).....£39.99
DB-770M 2m/70cm (3.5/5.5dB) 1m (PL-259).....£24.99
Diamond HV-7CX 7/14/21/28/50/144/430.....£129.99
Diamond CR-8900 10/6/2m/70cm (1.26m) £99.99
Diamond AZ-506 2m/70cm – only 0.67m long.....£39.99
PL-62M 6m/2m (1.4m) PL-259 .....£23.99
PL-627 6m/2m/70cm (1.7m) PL-259.....£44.99

RH-9000 BNC

40cm flexible whip for the ultimate in gain. **£29.99** P&P £5.00
Tx:- 2m + 70cm (Rx:- 25MHz-2.9GHz).

RH-9090 SMA

40cm flexible whip that is ideal as replacement. Tx:- 2m + 70cm. Rx:- 25MHz-2.9GHz **£34.99** P&P £5.00

EP-300

Over the ear earpiece.
£9.95
P&P £4.00

RH-770H (BNC)

2m/70cm Tx + wide Rx. High gain up to 5.5dB.

£54.99
P&P £5.00

STATION A4 LOG BOOK OFFER

3 FOR £10.00
P&P £4.50

EARPIECE/BOOM MIC

Over ear earpiece + boom mic. Available in Kenwood version or Yaesu/Alinco/Icom.

£24.99 P&P £4.00

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/ OD35mm. 6 for £12.00 P&P £4.00
12 for £20.00 P&P £5.00
30 for £40.00 P&P £10.00

COPPER ANTENNA WIRE ETC

Hard drawn (50m roll).....£40.00 P&P £7.50
New: 50m roll, stranded antenna wire.....£19.99 P&P £7.50
Flexweave (H/duty 50 mtrs) .....£44.99 P&P £7.50
Flexweave H/duty (18 mtrs) .....£21.99 P&P £7.50
Flexweave (PVC coated 18 mtrs) .....£24.99 P&P £7.50
Flexweave (PVC coated 50 mtrs) .....£59.99 P&P £7.50
Special 200mtr roll PVC coated flexweave.....£180.00 P&P £10.00
Copper plated earth rod (4ft) .....£14.99 P&P £8.00
Copper plated earth rod (4ft) + earth wire.....£24.99 P&P £8.00
New RF grounding wire (10m pack) PVC coated.....£14.99 P&P £5

METALWORK & BITS (Del Phone)

2" mast-floor base plate.....£14.99
6" stand off brackets (no U-bolts)..... £8.99
9" stand off brackets (no U-bolts)..... £10.99
12" T & K brackets (pair) £18.99
18" T & K brackets (pair) £22.99
24" T & K brackets (pair) £26.99
U-bolts (1.5" or 2") each £1.50

All bracket measurements are from wall to end of bracket

8mm screw bolt wall fixings £1.70
8-nut universal clamp (2" to 2") £7.99
2" extra long U-bolt/clamp £6.99
2" crossover plate with U-bolts £14.99
15" long (2") sleeve joiner (1.5" also available) £18.99
3-way guy ring £5.99
4-way guy ring £6.99
Heavy duty guy kit (wire clamp, etc.) £49.99
Set of 3 heavy duty fixing spikes (~0.7m long)..... £29.99
30m pack (4.4m) 480Kg B/F nylon guy £15.00
Roll of self-amalgamating tape 25mm x 10mtr..... £8.99
Special offer:- Self-amalgamating 3 rolls..... £20.00

Rev. George Dobbs G3RJV's Carrying on the Practical Way
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-Mail: pracway@pwpublishing.ltd.uk

More Variable Crystal Oscillator Experiments

The Rev. George Dobbs G3RJV takes another look at variable crystal oscillators. They can provide simple frequency control and be frustrating at the same time – but George really knows his subject!

One man's constant is another man's variable.
Alan Perlis (American Scientist)

In the March 2011 edition of this column I offered a circuit idea in memory of the late Walter Farrar G3ESP. The circuit is reproduced in **Fig. 1**. Walter's circuit is unusual in that two crystals are used in the same oscillator circuit. He pointed out that the transistor oscillates simultaneously on the frequencies of X1 and X2 and the difference between their frequencies can be taken from the emitter of the transistor.

The circuit, Fig. 1, is just the bare bones system and the output requires filtering to remove the unwanted products of the frequency mixing. I used 12MHz and 10.15MHz crystals in the circuit. The difference between the two is 1.85 MHz in the middle of the 160 metre (1.8 to 2MHz) Amateur band.

Although both crystals oscillated in the circuit – I was unable to detect the difference product (1.85MHz) and appealed to *PW* readers to solve the problem. I then received an E-mail from **Kevin Jackson AA3XV** (**G4NEJ**) who is now living in the USA.

Kevin's E-mail

Kevin wrote: "I was very interested in the G3ESP circuit using two crystals in Fig. 2 of your column in March 2011 *PW*. So much so, I had to build it and give it a try to see if I found the same results as you. I was interest to check if I could see the sum and difference products just as you had been looking for. I looked over my crystal box and found one crystal at 11.0592MHz and another at 4MHz.

"The difference between the two is in the 7MHz c.w. section of the band. I used exactly the same component values as you did, so it was exactly the same. First I fitted just the 11.0592MHz crystal and it worked like a dream. I then added the 4MHz crystal. I got products at both the sum and difference. The wanted 7MHz product is at a decent level but needs some filtering to clean it up and get rid of the many intermodulation products – but this is possible to do and it would work.

"I get around 60kHz of 'pull' on the 7MHz product using a variable capacitor on the 4MHz crystal (from 7.06 MHz to 7.120MHz) so it provides a decent VXO. range. I have attached some screen shots from my spectrum analyser, so you can see how it looks. My frequency counter shows the 7MHz product when the circuit is powered from 9V and the trigger/filter is set up correctly – but when I increase the rail voltage to 12V the 4MHz crystal is the dominant output and shows on the counter. I hope this is helpful and I did enjoy a few hours playing on the bench as my day job never allows me to get down in the 'weeds' at circuit level these days."

Thanks for your feedback Kevin! The photographs of **Fig.s 2** to **4**, show Kevin's board and two spectrum analyser screen shots. The more complex screen shot of Fig. 3 shows a 10MHz span centred on 7MHz.

The 4 and 11MHz peaks can be seen on either side – with a distinct 7MHz peak in the centre. The screen shot (Fig. 4) at 7MHz also shows that peak. So, I'm grateful to Kevin for his information and confirmation that Walter's circuit idea does work. It still remains a mystery **as to why** my version did not work! Kevin used a 2N2222A transistor in place of my 2N3904 but having taken my board apart I've not been able to check if that makes a difference!

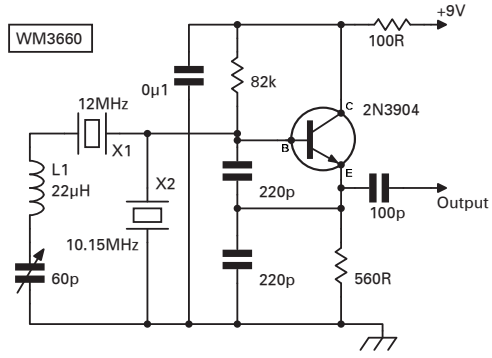


Fig. 1: From the March 2011 edition of *PW*, this circuit by the late Walter Farrar G3ESP caused George some consternation as he couldn't get it to work. But help has been at hand!

The Super VXO

In the article in the March issue, I mentioned that I had been discussing the Super variable crystal oscillator (VXO) with Walter G3ESP the last time I met up with him. This is shown in **Fig. 5**.

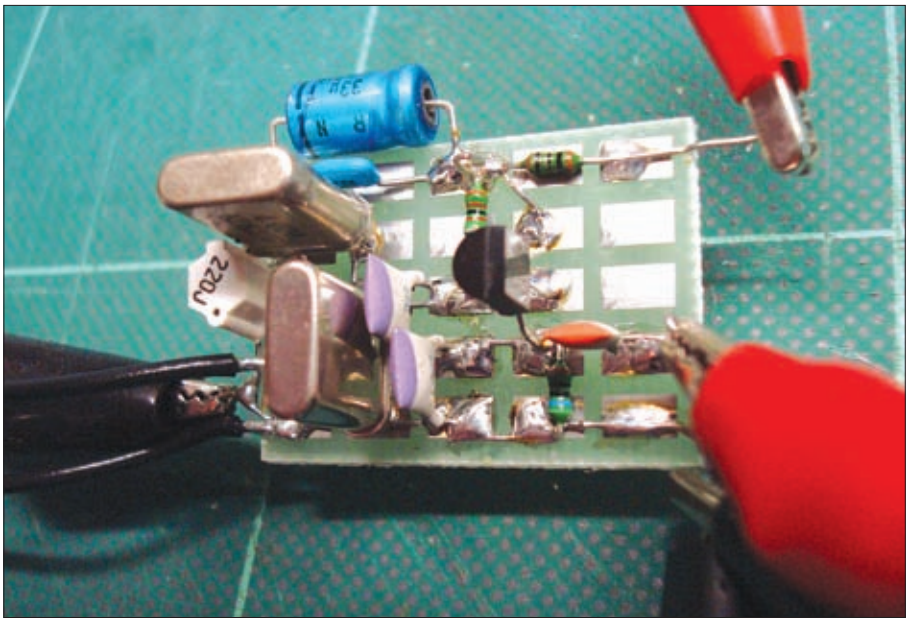


Fig. 2: Kevin Jackson AA3XV, built his version of Fig. 1 and found that it did work, though it was sensitive to supply voltage changes.

The Super VXO was invented by **Tadashi Okubo JH1FCZ** with **JA0FAS**. They discovered that if two crystals of the same frequency (X1 and X2) are connected in parallel the frequency shift is greater than using one crystal. Others have suggested that greater frequency shifts can be achieved by using various types of inductor. I decided to try a few simple VXO circuit ideas using the circuit shown in **Fig. 6**.

In Fig. 6 the basic Super VXO oscillator (Tr1) is followed by a cascade amplifier that I've used in previous projects. I configured the board so that one or two crystals could be used. The HC-25U type crystals have appropriate sockets but some of my crystals are wire ended HC-49U types.

It's possible to fabricate a HC-49U holder using integrated circuit (i.c.) header sockets. The optional 22kΩ resistor across L1 is added in some versions of the Super VXO to avoid hysteresis effects, although I found it made no difference. The values of C1 and 2 can be varied to suit the oscillator frequency.

My VXO tests where done on the 14MHz band (14.060MHz crystals), and the 7MHz band (7.030MHz crystals). In each test the variable capacitor (VC1) was a 60pF polyvaricon type capacitor.

Off-the-shelf axial low current radio frequency (r.f.) chokes were used for L1 in most of the tests. These are small inductors that look like a quarter watt (0.25W) resistor, except that they are fatter. 'Axial' means that a wire at each end of the component is used for connection. They also use coloured band coding for their value in the same way as a resistor. The results of the tests are as shown in **Table 1**.

Table 1: The G3RJV VXO Experiments Tables

14MHz (C1/C2 = 150pF)

Crystal MHz	Inductor uH	Range MHz	Notes
14.060	10	14.039 – 14.063	
14.060	15	13.827 – 14.060	High end cramped
2 x 14.060	10	13.948 – 14.069	Super VXO
14.060	5t. FT37-43	14.056 – 14.065	Inductor = 11.5µH
14.060	Spectrum 11u0L	14.033 – 14.062	Set at 10µH
14.060	Spectrum 11u0L	14.000 – 14.062	Set at 14MHz

Table 2: Showing the results using 7.030MHz crystals

7MHz (C1/C2 = 150pF)

Crystal MHz	Inductor uH	Range MHz	Notes
7.030	33	7.012 – 7.031	
2 x 7.030	33	6.878 – 7.0337	Super VXO
7.030	Spectrum 45u0L	7.010 – 7.0306	Set at 33µH
2 x 7030	Spectrum 45u0L	7.00 – 7.034	Set at 7MHz
7.030	18 + 18	7.017 – 7.034	Spaced at 3mm
7.030	18 + 18	6.98 – 7.031	Chokes touching

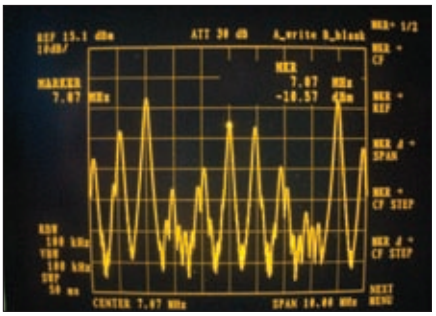


Fig. 3: Centred on 7.07MHz, the spectrum analyser shows strong fundamentals at 11 and 4MHz with strong intermodulation products everywhere.

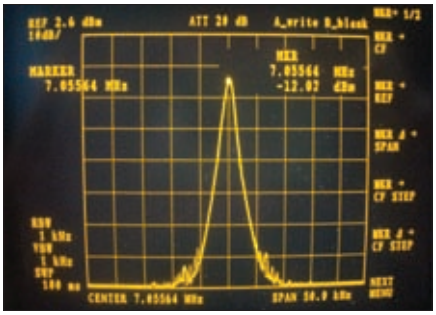


Fig. 4: The wanted difference signal at around 7.05MHz after it has been filtered out.

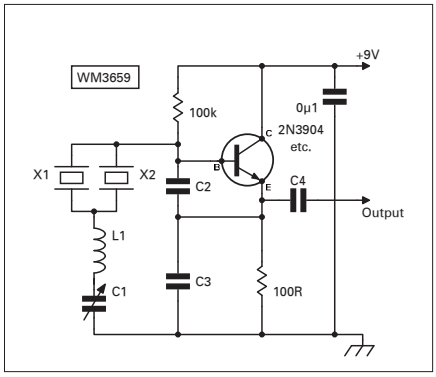


Fig. 5: The 'Super-VXO' with two paralleled crystals with the same nominal frequency.

Previously built 14MHz VXO projects suggest that 10µH is a useful value for L1. I used an axial 10µH choke and obtained a tuning range of 14.039 to 14.063MHz. The inductor, L1, facilitates the downward shift in frequency and the capacitor, VC1, allows the frequency to be raised over the nominal frequency of 14.060MHz. The frequency shift of 24kHz is useful – but not very great.

The next test was to increase the value of the inductor, L1. I substituted the 10µH choke with a 15µH choke. This gave an improved range of 13.827 to 14.060MHz. The tuning of a VXO is never linear in that the rate of frequency shift is usually greater at the higher frequency end of the range than at the lower frequency end of the range. This results in a slower tuning rate at the lower end of the tuning range.

Using the 15µH choke takes the frequency below 14MHz and so the slowest tuning rate is at frequencies below the beginning of the band.

The highest and most useful, tuning range is very cramped. In addition, the arrangement does not allow for any tuning above the QRP Calling Frequency at 14.060MHz.

Super VXO Configuration

The Super VXO configuration adding X2, another 14.060MHz crystal, produces a tuning range of 13.948 to 14.069MHz. The low end of the tuning range is only just below the beginning of the band and the highest frequency, 14.069MHz, goes above the QRP Calling Frequency. This is a useful range and covers the majority of the usually c.w. operating frequencies on the band. Certainly at 14MHz, I think the Super VXO is worth the modest cost of a second crystal.

The small axial r.f. chokes are very small inductors. Breaking one open reveals a small cylinder of ferrite material with a coil wound with very thin (sometimes thinner than a human hair) wire. It's a commonly held view that physically larger coils make better inductors for a VXO circuit. So, I tried an inductor wound on a ferrite toroidal core.

Winding 5 turns of 24 s.w.g. wire on an FT37-43 ferrite toroid gives an inductance of around 11.5µH. However, using this for L1 gave disappointing results. The tuning range was only 14.056 to 14.065MHz. Perhaps I needed to try a more conventional cylindrical coil?

In recent editions of this column I've made use of the recently introduced range of 10mm 10K coils from **Spectrum Communications**. This series of 10mm diameter coils in screened cans with adjustable iron dust cores replace the former Toko range of coils. In the Spectrum range is an '11u0L' coil. This designation means an 11µH coil with a link winding.

I set the main winding of an 11u0L coil to a value of 10µH using the adjustable core and my L C Meter. This produced a 14.033 to 14.062MHz tuning range – quite useful but hardly amazing. It then occurred to me, that using the adjustable core, I should be able to set the low end of the tuning range on 14MHz.

When I adjusted the core to produce a frequency counter output of 14MHz, the tuning range was then 14 to 14.062MHz. This represents a very useful tuning range and is achieved with only one crystal. The Super VXO version of the circuit is obviously the best choice – but one crystal and the 11u0L coil set on 14MHz offers a good second choice

Using 7.030MHz Crystals

I've shown the results of using 7.030MHz cystals in **Table 2**. I used an axial choke of 33µH for L1 and it gave a frequency shift of 7.012 to 7.031MHz – less than 20kHz. However, the Super VXO configuration – with two 7.030MHz crystals and 33µH – gave a range of 6.878 to 7.0337MHz. This is a very useful range, although the tuning was a little critical at the high end of the range.

A slightly lower value of inductance would probably produce a better range. Following the promising results with the Spectrum coil at 14MHz, I tried a Spectrum 45u0L coil. The 45u0L coil – set to an inductance of 33µH – gave a tuning range of 7.010 to 7.0306MHz (hardly better than the 33µH choke).

Setting the Spectrum 45u0L coil core to produce 7MHz at the low end of the tuning range gave a range of 7.0 to 7.034MHz. This is a tuning range that's more useful than the Super VXO version (a vindication of the larger coils produce better frequency shift idea).

Sprat Article By HB9BWY

Some years ago in the **G QRP Club** journal *Sprat,* **Norbert Litz HB9BWY** suggested using mutual inductance between small axial r.f. chokes as a way of increasing VXO range. Mutual inductance is the property where a current change in one coil affects the current and voltage in another coil. It is what makes transformers work.

The effect depends on the physical proximity of the coils. Norbert HB9BWY used series connected chokes and varied the spacing between the chokes. When inductors are connected in series, the total inductance is the sum of the connected inductors; often called 'series aiding'. The diagram, **Fig. 7**, shows how the chokes are connected. The mutual inductance depends upon the spacing of the chokes.

I tried two 18µH chokes, series aided to give 36µH, spaced at 3mm apart (as in Fig. 7**a**) which gave a 7.017 to 7.034MHz tuning range. The two chokes side-by-side and touching (as in Fig. 7**b**) gave a range of 6.98 to 7.031MHz. This suggests a useful field for experimentation and readers might like to try three or more chokes as shown in Fig. 7**c**.

Although the tests were simple and weren't not checked with other examples of crystals or inductors, they do suggest a few useful general points. Overall, the Super VXO proves to be a worthwhile method of increasing VXO range.

If pairs of crystals aren't available, I think it's worth trying physically larger coils; those with adjustable cores can be useful. Two (or more) chokes arranged to produce mutual inductance may also give worthwhile increases in VXO range.

I look forward to chatting to you again next month. Cheerio for now.

PW

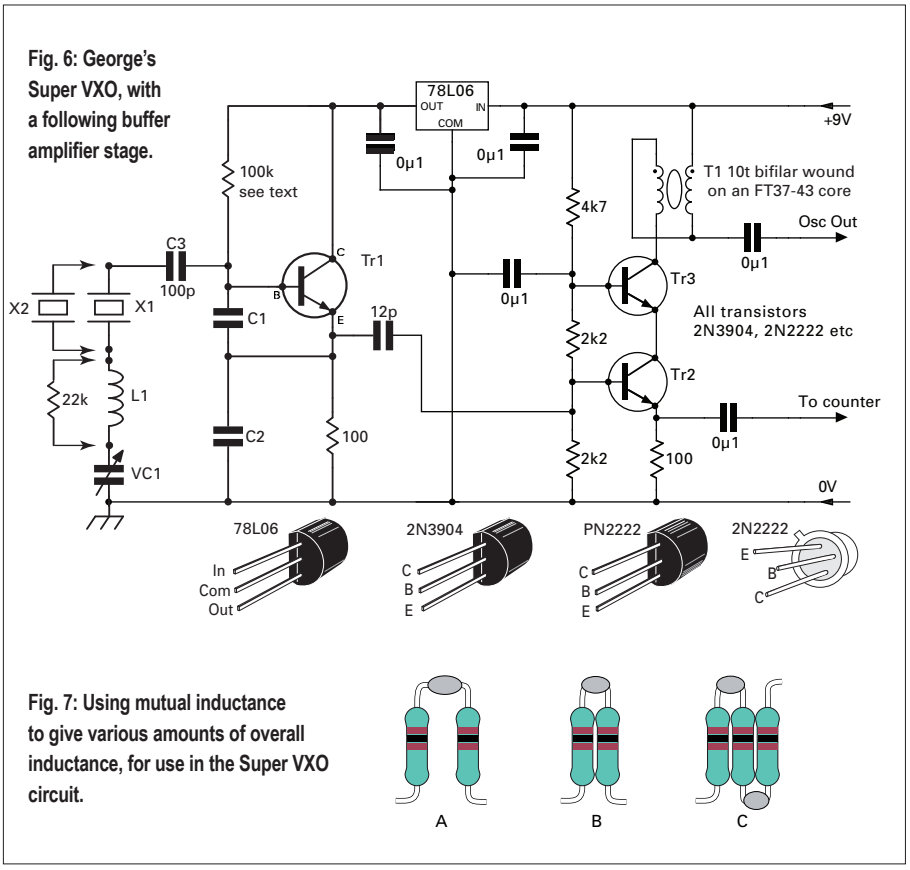


Fig. 6: George's Super VXO, with a following buffer amplifier stage.

Fig. 7: Using mutual inductance to give various amounts of overall inductance, for use in the Super VXO circuit.

Mike Richards G3WNC's Data Modes
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-Mail: mike@pwpublishing.ltd.uk

A Hell of a Mode!

Mike Richards G4WNC describes the Hellschrieber mode of operation in this month's *Data Modes* column.

Welcome to *Datamodes* (*DM*)! As we have been progressing through ever more complex data mode signals quite quickly, I thought it was time to take a break and look at a totally different but equally interesting data mode. That mode is Hellschreiber, which has been around since the late 1920s – but still has an active Amateur Radio community with regular nets, contests and other events.

Hellschrieber Background

The Hellschreiber mode of data transmission was developed back in 1925 by German engineer and inventor Dr Rudolf Hell with a patent being granted for the system in 1929. It seems that Herr Dr Hell (wow!) was a talented inventor and a very successful businessman. His Hellschreiber business thrived and Siemens AG became a majority (80%) shareholder in 1971, taking over full ownership in 1981.

Dr Hell pioneered all manner of new technologies including the development of electronic digital typesetting. This remarkable man lived to the ripe old age of 100 years and died a wealthy man in March 2002.

The Hellschreiber machine was a very early direct text printing system and had the advantage of being very much simpler than the alternative teleprinter based systems. In the early days there were two distinct Hellschreiber models. The first variant was the, receive only, Presse-Hell that was used by the press agencies to handle the distribution of news reports.

The second, and perhaps the more important variant, was the military version called the Hell Feldfernschreiber, now more commonly known just as Feld-Hell – this enjoyed great operational success. The standard of construction of the mechanism was superb, resulting in a very reliable system that could withstand the rigours of battlefield operations. I've shown a photograph of a Feld Hell in **Fig. 1**.

Fig. 1: The Classic Feld-Hell Machine.

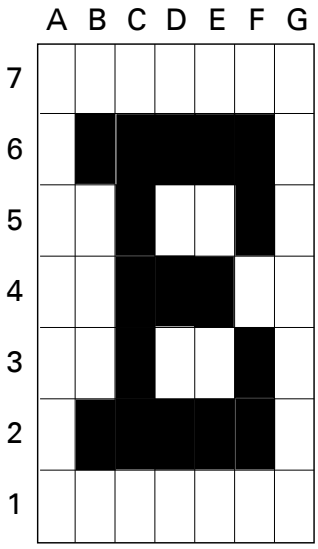


Fig. 2: The original Hell Font.

Commercially, the use of Hellschreiber continued right through to the 1980s so it enjoyed a very long life, especially when you consider the amount of technical development that occurred during that period.

Operating Principles

The simplest way to think of Hellschreiber is as a FAX system but for alpha-numeric characters. At the heart of the systems is dot matrix rather similar to that used for older computer printers. Each character in the Hellschreiber alphabet is constructed from a matrix of 49 pixels (dots) arranged in a 7 x 7 grid. In **Fig. 2, I**'ve shown how the letter B is represented. In practice, the active part of the grid is just 5 x 5 as there is a single dot border around most characters to provide the inter-character and line spacing.

Although this low resolution results in a fairly crude character set, Dr Hell created a special font to make the best of the system and maintain readability even under poor signal conditions. The transmission of characters constructed from this grid is done one dot at a time, starting at the bottom left and scanning vertically.

Referring back to Fig. 2 the transmit sequence of the character matrix would

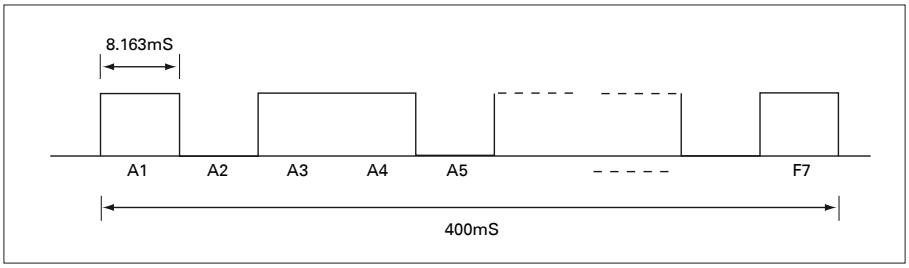


Fig. 3: Timing of the Hellschreiber signal.

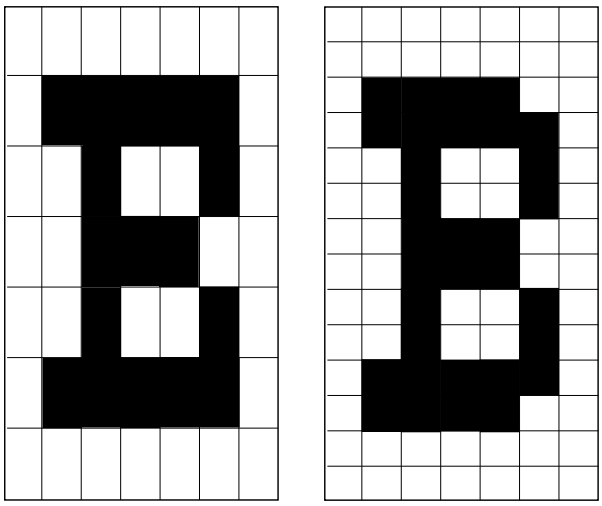


Fig. 4: Comparison of the original and the newer half pixel font used in the Feld-Hell.

be as follows: A1, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, B5, B6, B7, C1, C2… etc. To keep the transmitter requirements simple, only on/off or tone keying was used, so that standard c.w. or a.m transmitters could be used for the Hellschreiber transmission. The average duty cycle of a transmission is around 20%, which is less than c.w. so Hellschreiber operations could be run at full power.

The operating speed of the original Feld-Hell was a very respectable 25 words per minute (w.p.m.), which is about as much as you need for hand-typed messages and makes Feld-Hell ideal for conventional QSOs rather than the 'canned' messages that are often used.

A rate of 25w.p.m. translates to about 400ms for each character which when divided by 49 pixels gives a pixel period of 8.163ms and hence a baud rate of 122.5Baud (1/0.008163) – see **Fig. 3**. The other important measure is the column rate which represents the speed that the paper moves in the receiver (more later). Standard Feld-Hell has a column rate of 17.5 columns/second.

To help improve readability, Feld-Hell introduced the use of half-height pixels. These were particularly useful for handling the rounded elements of alpha-numeric characters. I've shown an example in **Fig. 4**, where you can see a comparison between the original and the additional half height pixel system.

The addition of the half height element was very cleverly implemented as all elements were transmitted as half height pixels but the font was arranged so that a single half height pixel (black or white) was never sent. This rather clever solution delivered much improved resolution – with no increase in bandwidth. This can be seen very clearly in the letter B which uses half-height pixels to improve the shape of the curve.

Hellschrieber Reception

Reception of Hellschreiber signals is very simple, comprising an electromechanical marker in the form of a spindle/helix and a moving a paper tape. The tape moves forward at a steady rate and the marker scans across the tape making a black mark every time a pixel is detected in the transmission.

There's no encoding or interpretation of the received pixel sequence – this is left to the excellent eye/brain pattern recognition capability of the human operator. In fact all Hellschreiber operation runs without start/stop sync (and software) prints each pixel twice, but spaced apart. So you end up with two identical and parallel rows of the same text. This is done to improve readability when the receiver is not running at exactly the same speed as the transmitter and the printed text line is slanted and runs off the paper tape.

Feld Hellschreiber Machine

The machine itself was remarkably simple and compact, especially when compared with the rival teleprinter systems. The main component was the drum that contained concentric rings of contacts – one ring for each character – see **Fig. 5**.

When the operator pressed a letter on the keyboard a wiper was brought into contact with the appropriate ring and the drum made a single rotation so sending the appropriate series of pixel pulses for that character.

The keyboard had a mechanical linkage to prevent operation of another key until the rotation had completed. The reception process was equally simple with a moving paper tape and a solenoid that responded every time a pixel was received. The ingenious printing system used a continuously-turning two-turn spindle (helix), installed just above and across the paper tape.

The solenoid serves to push the tape up against the (inked) spindle. Synchronisation was also straightforward with a simple motor speed adjustment that was used to get

Fig. 5: The Feld-Hell encoding drum.

the best printed copy. If you would like to know more about the Hellschreiber machines I strongly recommend that you pay a visit to **Frank Dörenberg N4SPP**'s site **www.hellschreiber.com**

Frank has amassed a huge amount of information along with very detailed photographs of a number of Hellschreiber machines. Frank also very kindly supplied the photographs used in this article.

Simple & Thriving

Despite its simplicity, Hellschreiber continues to thrive as an active mode and has undergone a number of modifications. Modern systems are entirely software based and make use of your computer's soundcard to generate and receive Hellschreiber signals. There are many software packages around that I'll cover a bit later. The software solutions use tone generation within the soundcard to produce the Hellschreiber signal.

For an emulation of the original Feld-Hell signal, the software generates a single audio tone at 980Hz but in most software the tone is freely selectable. But it's best to keep it near the middle of the audio bandpass of the transmitter for each active pixel in the message. The tone is then applied to the microphone input of your rig (set to s.s.b.) hence creating the on/off carrier of the original signal.

More Modern Variants

With so much computing power available these days it's no surprise to find there are a few, more modern, variants around. Here I will concentrate on a couple of systems - 105/245Baud phase shift keying (p.s.k.) and frequency modulation (f.m.) modes.

The introduction of the 105Baud mode was driven by a desire to reduce the signal bandwidth to a minimum. The technique employed was to change from the 7x7 matrix to a smaller 7x6 matrix that used seven columns of 6 dots each.

The column rate remains the same as the original at 17.5 columns/second but the reduced number of pixels brings the pixel/baud rate down to just 105Baud. However, in the 105Baud mode, there are no half pixels and a special font has to be used to maintain the readability.

The 245Baud mode was introduced to provide increased resolution but at the expense of a wider bandwidth. This mode again maintains the important 17.5 columns/second rate but increases the number of pixels in each column to 14, thus giving a total matrix of 98 pixels (14 x 7). The increased resolution from this 98 pixel matrix allows the use of a wide variety of fonts.

There are two main modulation systems that are used in place of the original on/off keying of Feld-Hell. The first of these is Phase Shift Keying (p.s.k.) that uses a phase shift of the signal to carry the modulation. Because h.f. propagation frequently causes all manner of phase shifts it's not possible to use two separate phase conditions to represent the pixel/no pixel conditions. Instead, it's a change of phase that carries the modulation.

As each dot starts, the phase of the signal is reversed to show a white pixel or unchanged for a black pixel. This is similar to the modulation system we saw with PSK-31 and it suffers the same potential problem – a sudden phase change is the same as switching-off one transmitter and turning-on another but at a different phase. The net result would be huge key clicks.

The solution is to quickly (but not instantaneously) reduce the power of the signal to zero, swap the phase and then return the power. This eliminates the key clicks but delivers the phase reversal. Whilst this is an elegant solution, the transmitter does need to be operating in its linear mode and the duty cycle is around 90% so your maximum output power may need to be reduced to avoid overheating.

The FM-Hell mode was developed as a refinement of PSK-Hell and avoids the need for a sudden phase change by slowly changing the phase through the duration of the pixel. This modulation is a variation of Minimum Shift Keying (m.s.k.) and provides for 245Baud operation with a 122.5Hz shift and avoids the need to operate the transmitter in linear mode.

Hellschreiber Software

There are many software packages available for Hellschreiber so it's very easy to get on the air. If you already have *Ham Radio Deluxe* (*HRD*) you will find several versions of HellSchreiber included in the excellent *Digital Master 780* that's included as part of *HRD*.

Alternatively, you could go for the *IZ8BLY Hellschreibe*r that's available free from: **http://xoomer.virgilio.it/aporcino/** This is a dedicated Hellschreiber program that supports all the main

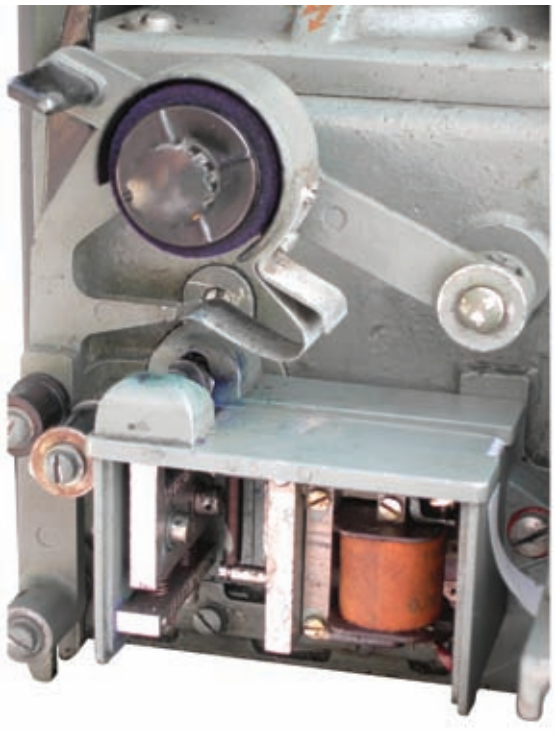


Fig. 6: The Feld-Hell helix printing mechanism.

Hellschreiber modes namely Feld Hell, PSK 105/245 and FM 105/245.

Other Hellschreiber software to consider are *MultiPSK* (**http://f6cte.free.fr/index_anglais.htm**), *FLdigi* (**http://www.w1hkj.com/Fldigi.html**), *MixW* (**http://www.mixw.co.uk/download/download.htm**) (not freeware) and *WinHell* (**www.dxzone.com/cgi-bin/dir/jump2.cgi?ID=17493**).

Using Hellschreiber

Hellschreiber is still in regular use so it's relatively easy to get started. Once you have your software installed and running it's worth taking a look at the Feld-Hell club website at: **http://sites.google.com/site/feldhellclub/** Not only is this site packed with useful information about Hellschreiber but it also has all the operating frequencies listed plus full details of their regular nets and monthly contests. Membership of the Feld-Hell Club is free so I would recommend joining.

You will also find a very useful Hamspots site (**http://hamspots.net/fh/**) that's used by Feld-Hell members to report activity. This can often be the best place to start as you can see who's around and on what frequency. **PW**

Thanks

I'd like to thank Frank Dörenberg N4SPP, for his generous support and who very kindly supplied the photographs used in creating this article. For more pictures and information, visit Frank's site at: **www.hellschreiber.com**

Open six days a week. Mon - Fri: 9.30am - 5.30pm Sat: 9.00am - 4.30pm

ML&S martin lynch & sons
The World's Favourite Ham Store

Outline House, 73 Guildford Street,
Chertsey, Surrey KT16 9AS
Tel: 0345 2300 599
(Local Call Number) Tel: 01932 567 333 (Direct Dial Number)
Web: www.hamradio.co.uk
E-mail: sales@hamradio.co.uk

Huge price increases announced by Yaesu UK

Due date 9th May 2011

Peter Hart reviewed [illegible] The crown [illegible] was sh[illegible] The new FTdx5000 grabs the po[illegible] of the Perseus SDR, Elecraft K3, Flex-5000 [illegible] that order.

The [illegible] la[illegible] the World's Favourite Hamstore. To get a [illegible] on the very best HF transceiver available today, call 0345 2300 599 and get a trade-in value on your current kit or the very best outright buy. Either way, you just know you will be buying this important landmark in Japanese engineering from a company that understands and supports HF DX Amateur Radio.

FT-DX5000 HF BASE TRANSCEIVER

For more information see: www.FTdx5000.com or see our YouTube channel, search MLandSshop.

Principal sponsor for the RSGB convention & T32C DXpedition

Japanese earthquake and tsunami disaster

With the devastation caused throughout Japan I'm sure all of us wish our Japanese suppliers and the people of this industrious country a swift recovery. Yaesu, in particular, has their major HF manufacturing plant in Fukushima. Jun Hasegawa, CEO & President, announced on the 30th of March: "that production has already re-started on a limited basis". As the UK's largest official dealer of Yaesu, ML&S invested heavily in more stock that was still available at Yaesu UK the day after the disaster was announced. Please be patient and check with our sales team to confirm availability.

YAESU

YAESU FT-897D

The best multi-purpose multi-band transceiver on the market!

ML&S: £759.95

FT-897D with AT-897Plus Auto ATU £924.95

NEW FT-450D

Following on the success for the FT-450 original, the FT-450D has many improvements and comes fitted with the Auto ATU as standard.

- ✓ 400MHz built-in IF
- ✓ Built-in Electronic Keyer
- ✓ LCD Multi-function Display
- ✓ Bar-Graph Metering
- ✓ Built-in TCXO ± 1 PPM/hour (after warm-up)
- ✓ AGC Fast-Slow-Auto-Off Selection
- ✓ Clarifier adjustment
- ✓ Built in Antenna Tuning System
- ✓ Classically Designed Knobs
- ✓ Included Dynamic hand mic
- ✓ Dedicated Data Jack for FSK-RTTY-CTCSS
- ✓ User configurable functions
- ✓ Digital voice announcement of frequency, mode and S-meter
- ✓ 500 Regular Memories and Two voice memories
- ✓ CW Beacon function
- ✓ 10kHz Roofing Filter
- ✓ Key Illumination
- ✓ Foot Stand
- ✓ 500 & 300 Hz CW Filters

Available now
£799.95

FT-950 HF BASE TRANSCEIVER

A "proper size" HF/6m Base Station offering 100W output on all bands.

FT-2000 100W £1999.95

The DX choice of 3B7C.
Always in stock. Always on demo.

FT-2000D 200W VERSION AVAILABLE AT £2699.95

YAESU FT-857D & ATAS-120A PACKAGE

160m-70cm HF Base/Mobile. Still our best selling HF Mobile Radio.

FT-857D only £669.95 or with ATAS-120A £919.95

YAESU FTM-350E

Latest Dual-Band APRS Mobile from Yaesu!

ONLY £469.95!

NEW YAESU VX-8DE

With Enhanced APRS

Triple Band 6/2/70 APRS enhanced version of the VX-8E. Due to user requests Yaesu has extended some capabilities of the fantastic handheld in respect of APRS functions. All other functions remain unchanged, the same accessories are used.

£359.95

VX-8GE

2/70cm version of the VX-8DE. Fitted GPS, dedicated to APRS on 2/70.

Only £349.95

Yaesu FT-817ND. ML&S £559.95
Still the only truly hand-portable 160m - 70cm all mode transceiver available today.

Yaesu VX-3E. ML&S £159.95
Micro Handie 2/70 with scanner. Complete with Li-ion battery, charger & antenna.

Yaesu FT-60R. ML&S £179.94
Latest twin band handie complete and ready to go.

Yaesu VX-6R. ML&S £234.94
Yet another 2/70 handie from Yaesu.

Yaesu VX-7R. ML&S £289.95
The UKs best selling Triple Band Handie.

FT-7900 with FREE YSK7800. £239.95

FT-1900. Replacement for the FT-1802. Rugged 50W 2m FM. £129.95

FT-270E. Replacement for the VX-170 2M 5W Handie. £109.95

FT-2900. NEW! Replacement for FT-2800. MiL spec, high performance. £134.95

Yaesu FTM-10R. ML&S £269.95

Yaesu FT-8800. ML&S £329.95
Similar to the FT-7800 but can receive on 2 & 70 simultaneously.

Yaesu FT-8900. ML&S £379.95
High-power FM on 10m, 6m, 2m & 70cm. When your local repeater is busy, slip onto 10m & work DX!

Yaesu FT-897D.
High Power version of the FT-897. Use as a transportable, (20W) or as a base/mobile (100W) Bundle Price: £CALL (Rig only: £776.12)

Yaesu FT-857D. The Ultimate HF Mobile Installation! Plus ATAS-120D 40m-70cm Auto Antenna.
Bundle Price: £939.95 (Rig only: £673.98)

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Open six days a week. Mon - Fri: 9.30am - 5.30pm Sat: 9.00am - 4.30pm

ML&S martin lynch & sons
The World's Favourite Ham Store

20 Celebrating Years ML&S

Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS
Tel: 0345 2300 599
(Local Call Number) Tel: 01932 567 333 (Direct Dial Number)
Web: www.hamradio.co.uk
E-mail: sales@hamradio.co.uk

WiNRADiO WR-G31DDC EXCALIBUR

A high-performance, low-cost, direct-sampling, software-defined, shortwave receiver with a frequency range from 9kHz to 50MHz.

Available from stock £699.95

- ✔ 9kHz to 49.995MHz continuous frequency range
- ✔ Direct sampling
- ✔ Digital down-conversion
- ✔ 16-bit 100 MSPS A/D conversion
- ✔ 50MHz-wide, real-time spectrum analyzer
- ✔ 2MHz recording and processing bandwidth
- ✔ Three parallel demodulator channels
- ✔ Waterfall display functions
- ✔ Audio spectrum analyzer
- ✔ Audio and IF recording and playback
- ✔ Recording with pre-buffering
- ✔ EIBI, HFCC and user frequency databases support
- ✔ Very high IP3 (+31dBm)
- ✔ Excellent sensitivity (0.35 µV SSB, 0.16µV CW)
- ✔ Excellent dynamic range (107dB)
- ✔ Selectable medium-wave filter
- ✔ USB 2.0 interface

UK & Ireland Distributor for WOUXUN

KG-699E/4m
4m Handie
ML&S Price: £92.99

KG-UVD1P
Full Dual Band Handie!
ML&S Price: £92.99

KG-679E
2m Handie
ML&S Price: £59.99

See www.wouxun.co.uk

ICOM

New Icom IC-7410
HF & 6m
All mode Base Station

NOW AVAILABLE FROM STOCK

ML&S Price: £CALL

Icom HF Products

IC-718	£539.95
IC-7200	£837.39
IC-7000	£1189.95
IC-7600	£3299.95
IC-7700 DEMO	£4995
IC-7800	£Call!
IC-PW1Euro	£Call!!

Icom V/U Products

IC-V80E	£105.00
IC-T70E	£158.25
IC-E80D	£329.95
ID-E880E	£439.10
IC-E90	£239.95
IC-E90/4m	£299.95
IC-E92ED	£388.95
IC-E2820	£489.95
IC-E2820+D	£649.95
IC-910H	£1296.96
IC-910X	£1549.95

Icom Receivers

IC-R9500	£Call!!

NEW Icom IC-9100
HF through to 23cms Base Transceiver

Intro Price: £2995
available ex-stock
Or Plus 4 Pack only £3875*

V/UHF Satellite + HF/50MHz bands + D-STAR DV mode

- HF/50MHz 144/430(440)MHz & 1200MHz coverage
- SSB, CW, RTTY, AM, FM & DV modes
- 100W on HF/50/144MHz, 75W on 430(440)MHz. 10W on 1200MHz
- 32-bit floating point DSP & 24-bit AD/DA converter
- Double superheterodyne with image rejection mixer
- Optional 3kHz/6kHz 1st IF (roofing) filters (for HF/50MHz bands)
- Satellite mode operation
- Optional D-STAR DV mode operation

Options:

UX-9100 23cm Module	£623.99
UT-121 D-Star Board	£180.00
FL-430 6kHz Roofing Filter	£60.00
FL-431 3kHz Roofing Filter	£60.00

*Plus 4 Pack includes all of the above.

Icom IC-7600

This mid-range HF base station from Icom has arguably the best screen for user interface in the business. Successor to the IC-756Pro3.

£3299.95

New! Solid State Amplifiers from RM!

BLA-1000. £2799.95
Flagship 1kW key down all mode HF Linear Amplifier with built in PSU.

Full range now in store. See web for details.

KENWOOD

AVAILABLE FROM STOCK
£1369.95

New TS-590S HF/6m Transceiver

Add an MC-60A DESK MIC worth £118 for only £100!

Peter Hart says: "I found the radio friendly, intuitive & easy to use"

For further information see our website: www.hamradio.co.uk

TS-2000X
Flagship HF-23cm
All Mode Base Station.
This really is a total shack in a box.

SPECIAL OFFER ONLY £1599.95

Kenwood HF Products

TS-480SAT	Remote head HF/6m 100W inc ATU Transceiver	£779.95
TS-480HX	200Watt version of above, no auto-ATU	£879.95
TS-2000E	100Watt all mode HF/2/6M with auto-ATU etc	NOW ONLY £1319.95
TS-2000X	As above but fitted with 10Watts on 23cm (all mode)	£1599.95

Kenwood V/U Products

TH-F7E	The only 2/70 FM Handie with SSB/CW WB Receiver	£235.95
TM-V71E	First Class 2/70 FM Mobile with remote head	£299.95
TM-D710E	The only 2/70 FM Mobile/Base with APRS/TNC etc	£445.95

NISSEI *One of the oldest names in Ham Radio*

Compact metal body Cross Needle Meters. Fantastic value all PEP & Average reading.

Nissei	RX-103	1.6-60MHz, 20/200/2kW	£49.95
Nissei	RX-203	1.8-200MHz, 2/20/200W	£49.95
Nissei	RX-403	125-525MHz, 2/20/200W	£49.95
Nissei	RX-503	1.8-525MHz, 2/20/200W	£69.95

New Range to ML&S, HUGE DISPLAY, PEP & Average reading.

Nissei	TX-102	1.6-200MHz, 2/20/200W	£59.95
Nissei	TX-402	125-525MHz, 2/20/200W	£59.95
Nissei	TX-101A	1.6-60MHz, 20/200/2kW	£84.95
Nissei	TX-502	1.6-525MHz, 2/20/200W	£89.95

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Perseus VLF-LF-HF Receiver

only £699.95

as reviewed in Radcom May Issue

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

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

RFspace

SDR-IQ™ Software Defined Radio, Spectrum Analyzer and Panoramic Adapter.

Now in stock together with the IF-2000 IF Interface board for the FT2k & FT-950. Both on DEMO at Chertsey.

£489.95

See http://www.hamradio.co.uk/acatalog/RF_Space.html

The New RadarBox is now available from ML&S!

We like to give our customers a choice when it comes to choosing a new Virtual Radar so what better way than to add the RadarBox to the range.

Radar Box-3D. ML&S: £489.00
Radar Box-Pro. ML&S: £399.00

AirNav Systems

There is more excitement amongst RadarBox users and potential users now that the 3D version of the RadarBox is now available. This radical software upgrade brings to life the RadarBox with superbly detailed Google Earth mapping overlay. This is a major advantage that puts RadarBox firmly on top of it's competitors. Just look at these crisp, clear screenshots with the pictures of the aircraft in 3D and their precise position shown on the map. RadarBox has always given the best graphics of any system, and this latest addition really underlines the superiority of RadarBox. Known as RADARBOX-3D this complete system is available from all good communications dealers around the world. There is also an upgrade disc available for all existing users of RADARBOX-PRO, order this upgrade as RADARBOX-UG. RADARBOX-PRO is still available for those users who want a radar decoder without Google Earth and 3D.

LDG Auto Tuner Range

TWO NEW SUPER MODELS FROM LDG

NEW! YT-450	Auto Tuner for the FT-450 & FT-950	£224.63
NEW! YT-847	Want a really good Auto ATU for your FT-847? Here it is!	£224.63
NEW AT-600pro	600W Auto ATU	£299.95
AT-100proII NEW	Desktop tuner covering all frequencies from 1.8-54 MHz	£189.95
AT-200pro	Designed for new generation of rigs	£209.95
AT-1000Pro	1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ohms	£499.95
AT-897Plus	Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too!	£179.95
IT-100	New version of the AT-7000	£159.95
YT-100	NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control	£177.65
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D	£119.95
Z-100Plus	Ultimate autotuner for Yaesu FT-817D	£134.95
Z-11ProII NEW	Portable compact & tunes 100mW to 125W	£159.95
RCA-14	4-way DC Breakout Box	£52.12
KT-100	Dedicated tuner for Kenwood radios	£173.57
RBA-1:1	Probably the best 1:1balun out there	£35.69
RBA 4:1	Probably the best 4:1 balun out there	£35.69
FT-Meter	Neat Analogue back-lit Meter for FT-897/857. S-meter, TX Pwr, ALC Etc	£44.95
NEW FTL- Meter	Jumbo version of the famous FT-Meter	£79.95

FACTORY APPOINTED DEALER for FLEX

The entire FLEX Range is now on demonstration in the ML&S Super Store!

Flex 1500 SDR
Low cost SDR Transceiver, connect via USB & you have 5W 160-6m! **£599.95**

Flex 3000 with ATU
100 Watt SDR 160-6m with Auto ATU fitted. **£1299.95**

Flex 5000A
Flagship 100W SDR Base 160-6m **£2495.95**

Flex 5000A-ATU
Same as 5000A but built-in Auto ATU **£2795.95**

Flex 5000A-ATU+Twin RX
as above but with second receiver **£3434.95**

VENTUS WX-928-ULTIMATE

ULTIMATE in professional weather stations, offering the usual feature set of the WX-831 but uses a Anemometer with solar cells, Satellite Meteotime forecast over the next 4 days and a massive split screen.

Only £199.95

VENTUS WX-831 New much improved wireless Weather Station ML&S Price: £119.95.

The UK's favourite rig-mounted antenna system

NEW! WonderWand Widebander
1.8-460MHz with Monster 1.8M Whip! **£119.95**

NEW! WonderWand Mk4
7-432MHz antenna with 1.8m Whip **£89.95**

Wonder-TCP
40-10m Tuneable Counterpoise **£59.95**

MyDEL New ML-5189

Includes FREE DTMF Mic

4m Mobile Transceiver at £148.95

With the massive increase in 4m activity thanks to the new Wouxun KG-699 4m handie, along comes this new 25W 4m mobile.

- Frequency: 70MHz - 4m Amateur band (66-88MHz)
- Output Power: 25W 250 channels, every channel can be named with 32 characters.
- CTCSS/DCS/DTMF/2Tone, 5 Tone decodes and encodes.
- Compander to reduce noise.
- ANI function (display missed calls) / PTT ID.
- Single call, group call, selective call and emergency

ShackSign

Want to see your Callsign in lights? Treat your self to a beautifully crafted BRITISH MADE illuminated sign for your shack. Supplied with a small switch mode PSU or direct connect to any DC 13.8Volt supply.

Only £54.95 or £59.95 inc PSU.

Ideal gift from your partner of why not buy one yourself?

Palstar

Palstar AT-2KP
The combination of affordable pricing and high quality construction and performance makes this the tuner of choice for many Hams. Only £449.95

AT-500 600W PEP Antenna Tuner ..... **Special Price £349.95**
AT-1500DT 1500W Differential Antenna Tuner **£449.95**
AT-2KP (2000W) Antenna Tuner **£449.95**
NEW AT-2KD The AT-1500DT and the AT-1KP have been combined into a new 2Kw Tuner **£449.95**
AT-4K (2.5kW) Antenna Tuner **£789.95**
AT-5K (3.5kW) Antenna Tuner **£999.95**
BT-1500A Balanced Antenna Tuner **£589.95**
PM-2000AM Power/SWR Meter **£159.95**

Palstar Dummy Loads
DL-1500 (1.5KW) **£119.95** **DL-2K** (2kW) **£229.95** **DL-5K** (5kW) **£379.95**

Palstar R30A Receiver
Palstar R30A, fitted Collins filters for SSB & AM **£649.95**
MW550P Active preselector & ATU for AM & 160M reception **£259.95**
SP30 Matching Desk Speaker **£69.95**
AA30 Active Antenna Matcher 300kHz-30MHz **£109.95**

MyDEL Power Supplies

PS-30SW11
Latest high performance switch mode PSU. 25amp. £84.95

SPS-8250	25A continuous, fully metered power supply	£79.95
MP-960060A	Switch mode power supply	£179.95
MP-9626	120A, 13.8V DC power supply	£299.95
MP-8230	13.8V DC, 25A power supply BACK IN STOCK	£69.95
MP-925	Linear 25-30A, 13.8V DC power supply	£99.95
MP-6A	13.8V DC, 6A power supply	£29.95

NEW Mini VNAPro Now with Bluetooth!

The new miniVNA PRO, the big brother of the well-known miniVNA, is an extraordinary and unique handheld vector network analyzer that makes available a multitude of new features and capabilities which are perfect for checking antennas and RF circuits for hams and commercial users. Together with your PC/Laptop, you can add to your laboratory the further advantages of having this first-class VNA instrument. This is the first world's wireless analyzer able of scanning and sending the data using an integrated Bluetooth module to a remote PC/Notebook up to 100 meters from the miniVNA PRO's location. This makes real-time antenna setup easy!

ML&S: £349.95

MiniVNA original still available (without Bluetooth): £259.95

Miracle Antenna

Miracle Antenna is back! **With some important Hot New products.** Introducing the New MMD Mixed Mode dipole. The first and only electrically centre-fed mechanically end-fed dipole ever offered to the Ham Radio market, the MMD provides a host of benefits never available in an end-fed dipole.

MMD-17 17M MIXED MODE DIPOLE,+ 5 BANDS WITH ATU **£89.95**
MMD-20 20M MIXED MODE DIPOLE, OTHER BANDS WITH ATU **£89.95**
MMD-30 30M MIXED MODE DIPOLE **£99.95**
MMD-40 40M MIXED MODE DIPOLE **£99.95**
Miracle Ducker iL HF-70cm Mini ATU with BNC **£109.95**
Miracle Ducker HF-70cm with PL-259 ..... **£109.95**
Miracle Antenna HF-70cm fitted with telescopic **£109.95**

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

A Rig Control Interface

Mike Jones G3UED explains his rig interface allowing him to use a computer to enhance his Amateur Radio experience.

Nowadays, we often see computers located in Amateur Radio shacks. But, these computers are not always stand-alone – they're often actively used in radio operations.

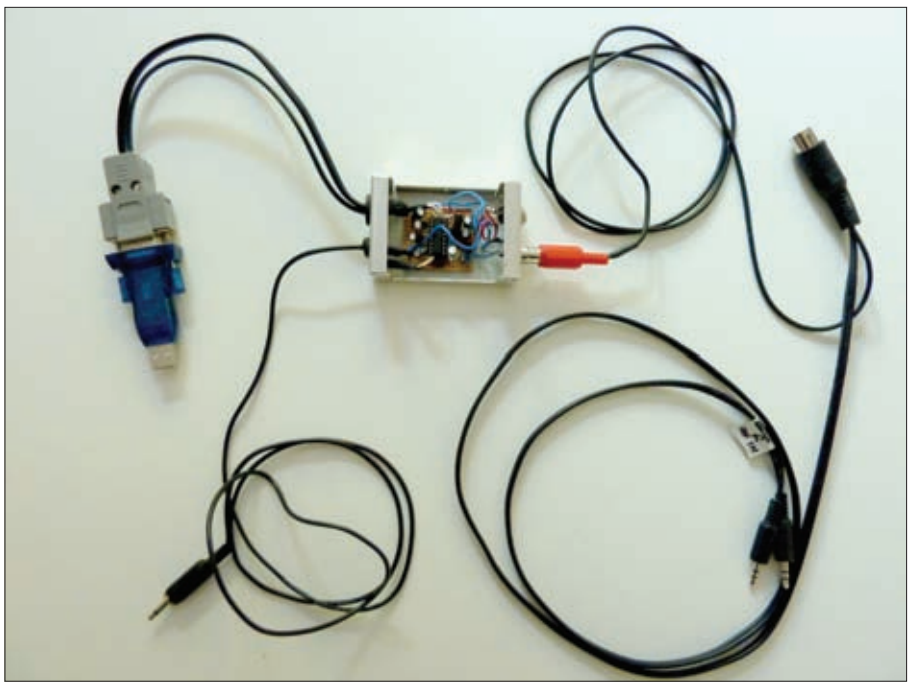
Contact logging is one obvious use for a computer in the shack and there are a number of programmes available that perform this function. Additionally, it's possible to actually control some transceivers from the computer. There are programmes that will read and adjust the frequency in use and control other functions from a control panel that appears on the computer screen.

Version 5.0 of *Ham Radio Deluxe* (*HRD*), by **Simon Brown HB9DRV** is one such programme and this actually links the control function to the logging function. It's only necessary to enter the callsign of a contact on the computer and the frequency and mode will be automatically added. What's more, this programme can automatically look-up the callsign on ***QRZ.com*** to save you having to enter the other station's location (QTH) and name!

A free download from **www.ham-radio-deluxe.com** will get you a copy of *HRD*. The minimum computer requirements and supported radios are stated on the website. The 'Download' page gives access to more information on interfaces and is well worth reading if you're planning to connect your radio to your computer.

Also included as part of *HRD* is *Digital Master 780* (*DM780*). This is a fascinating programme enabling transmission and reception using a wide range of digital modes including the popular PSK31 (Phase Shift Keying at a speed of 31.25 baud). This is the only mode I've explored to-date but it's a good place to start and there's much activity on the designated HF frequencies – try 14.070 MHz for DX.

Many facets and options are available which need to be explored to appreciate the complexity of *DM780* before using it. For instance, repetitive parts of a QSO can be preloaded into key-stroke macros and called up as needed by a single key-click, to save having to type this in each time.



The completed interface unit.

Very Different Skills

Real-time keyboard communications requires very different skills to speech or Morse. If, like me, you're new to this type of communications, I recommend spending some time just tuning in to a number of PSK31 QSOs that appear on the 'waterfall' display before actually trying to make a contact.

Once you've seen how it works, and appreciate the DX available at low power levels, I'm sure you'll find it an exciting aspect of Amateur Radio!

Connecting The Transceiver

To enable a computer programme to control a transceiver, it's necessary to make the appropriate connections but, this can pose problems. However, a simple interface is possible and, with care and attention to the overall installation, a fully effective interface using a minimal component count is possible.

Fortunately, PSK31 is very effective at low power and this helps reduce compatibility problems. Many PSK31 stations operate with well below 50W output.

Computer configuration is required to make the software operate correctly with your interface and radio. The *HRD* home page gives information on configuration and there are many web-sites that provide assistance should things not work out as expected.

My interface requires both 'Request to Send' (RTS) and 'Data Terminal Ready' (DTR) on transmit when setting up *HRD*. A little experimentation and searching the internet should enable problems to be resolved.

Interface Unit

The heading photograph shows the interface I've built and used successfully with *HRD* and other similar

Fig. 1: A converter from USB to RS232 serial interface.

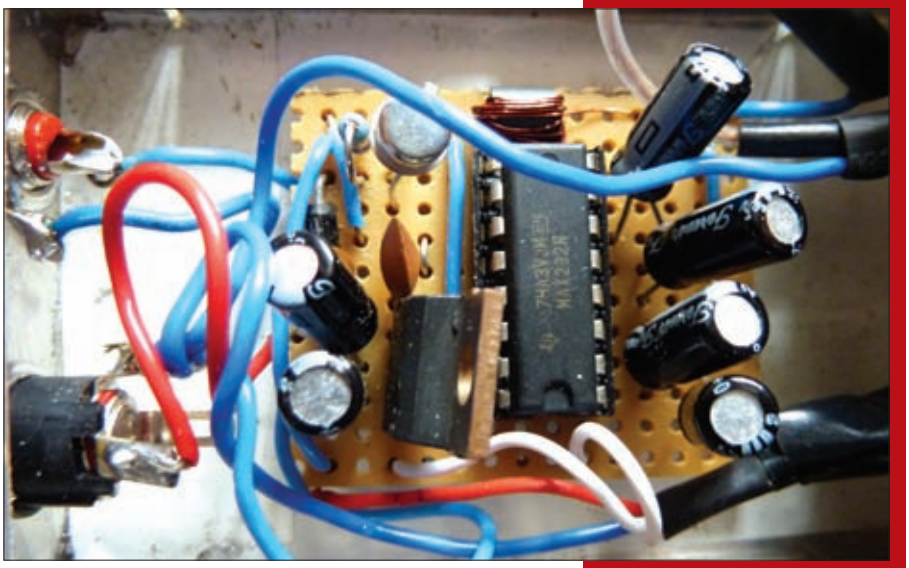


Fig. 2: Interface installed into a suitable box. Almost any box would work.

programmes together with my Icom IC-718 transceiver. There's a connection between the *HRD* programme and the transceiver for the control function and a connection to key the transmitter. A direct audio connection between the radio and the computer sound card is also needed to enable digital communications.

My Icom transceiver has a 3.5mm mono jack socket for the CAT, CI-V (which stands for: Computer Aided Transceiver, Computer Interface 5) control function. A 13–pin DIN-type accessory socket provides keying and high impedance audio in/out (approximately 100mV at 10kΩ and 4.7kΩ respectively) connections and independent of the speaker and microphone connections (which are not recommended). Other makes of transceiver have similar connections and reference to your handbook will identify these for you.

In common with most laptops and, probably, most new desk-tops, my computer doesn't have a serial RS232 connection. As far as I'm aware, *HRD* and all similar programmes require a serial connection (commonly called RS232) to the computer. However, the Universal Serial Bus (USB) seems to have become the standard means of connecting peripherals and all modern computers will have this facility.

I chose to buy a simple USB-serial converter rather than build a circuit to carry out the conversion, after I found a small device, **Fig. 1,** on eBay for less than £5! So, plugging the USB connector into the computer gave me a 9-pin 'D'-type RS232 port. Although my converter came with driver software on a disc, my computer recognised the device immediately without loading the software.

The next requirement was to connect my radio to my new RS232 port. The main problem here is that the CI-V interface is TTL (Transistor-Transistor Logic) operating with logic levels of zero and +5V. Unfortunately, RS232, on the other hand uses quite different voltage levels, usually somewhere between 3 and 15V and either positive or negative to represent the two logic levels. Consequently, we cannot directly connect these terminations together. So, research was necessary to identify a level changer.

Some circuits employ buffering on the digital lines and isolation transformers for the audio inputs and outputs to minimise the risk of unwanted pick-up. However, I decided to keep my interface simple, dealing with any interference effects as and when they arose. I built it on Veroboard and installed it in a small metal box (**Fig. 2**) using double sided sticky pads. 'Dead-bug' construction would be an alternative or, if you're a skilled home-brewer, you could design and make a printed circuit board.

Component List

IC1:	MAX232.
IC2:	78L05.
TR1:	2N2222.
D1, D2:	1N4148.
R1:	2.2kΩ Metal Film.
C1, C2, C3, C4, C5, C7:	22µF, 16v Wkg Electrolytic.
C6, C8, C9:	0.01µF Disc ceramic.

USB to RS232 Converter.
Two 3.5mm Stereo Jack Plugs for audio connections to the PC.
One 3.5mm Mono Jack Plug for CI-V connection.
9-way 'D'-Type Socket, plus Shell.
13-way DIN Plug (for Icom Transceivers).
Two Ferrite beads for RFC1 & 2 plus suitable length of 32swg (or similar) enamelled wire.
Appropriate d.c. input connector, if required.
Suitable length of single core screened lead.
Metal box 76 x51 x 25mm, (Maplin AB12, or similar).

Circuit Diagram

The circuit diagram is shown in **Fig. 3**. The transmitter keying function is provided by a simple 2N2222 transistor and the level changer is a MAX232 integrated circuit (i.c.) which is also used in Icom's own CT-17 interface. The audio connections don't need to pass through the unit connecting directly from the transceiver accessory socket to the computer audio jack sockets. These are stereo type sockets but I used only the tip and outer connections.

It's sometimes possible to power the MAX232 from the RS232 socket. Alternatively, transceivers usually have an auxiliary 13.8V output. However, I decided to apply external power from my bench 13.8V power supply. I took this approach because I didn't know whether the USB converter could provide sufficient current and

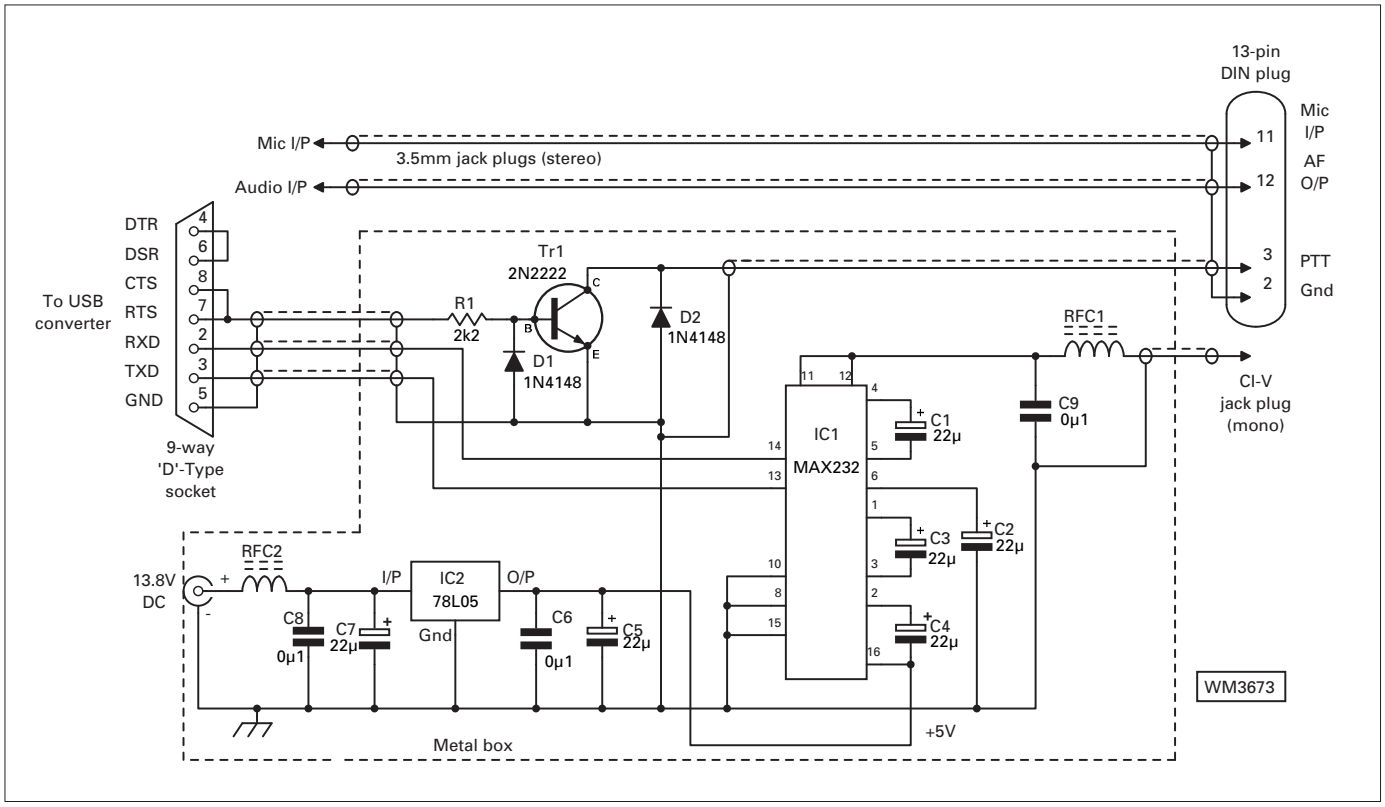


Fig 3: The circuit diagram of the interface, showing a comparative simplicity. It can be built up in almost any form you find suitable.

inadvertent contact with another pin on the transceiver auxiliary plug could cause damage to the radio.

It's worth highlighting here that making external connections to one's transceiver should be made very carefully to avoid damage. I suggest that you consult your handbook and diagrams to ensure you're using the right connections – and you should always check to ensure there are no bridges between connector pins. Only make such connections if you feel confident in what you are doing.

The diode (D1) is necessary to protect the keying transistor (Tr1) from the negative voltage present on pin 7 (RTS) when at logic '0'. Diode D2 provides protection from possible voltage spikes during switching of the transceiver.

Power (5V) for the MAX232 (IC1) is provided by a 78L05 voltage regulator (IC2) fed from the external 13.8V input. Capacitors C7 and C8 and RFC2 on the input side of IC1 provide filtering to minimise radio frequency (r.f.) pick-up. Similarly, RFC1 and C9 filter the output connection to the radio.

The i.c. IC1 requires four electrolytic capacitors to function properly as a level changer. Capacitors C1, 2, 3 and 4 vary from design to design between 1µF and 22µF. The MAX 232 data sheet quotes 1µF but, because I had 22µF capacitors to hand, I used those with total success. The links to pins 4, 6 and 8 of the RS232 connection are necessary to satisfy handshaking requirements.

All connections are best made with individually screened leads, as shown on the diagram, to minimise pick-up.

Radio Frequency Chokes

For the radio frequency chokes (RFC1 and RFC2), I threaded a length of fine (32s.w.g.) enamelled copper wire through a small ferrite bead as many times as possible. **Note:** Actual number of turns is not critical.

Similar Interfaces

Other makes of transceiver use similar interfaces. Yaesu, for example, use the same interface but with pins 11 and 12 of IC1 presented to the radio separately. However, careful reference to your radio handbook should be made before using this interface with other radios.

Installation Considerations

There will always be some unwanted r.f. radiated within the shack during transmission. The trick is not only to minimise this, but also reduce the likelihood of pick-up on the interface circuitry and cabling. The audio cables can also introduce hum on the transmission and some interfaces include transformer coupling to minimise this effect.

In my case, I use a ferrite balanced-to-unabanced (balun) at the feed-point to my loft installed 20m dipole (See May 2010 issue of *Practical Wireless*) and a choke balun at the feed-point to my outdoor vertical antenna system (See February 2009 *Practical Wireless*). In the shack, I've ensured that all my r.f. cabling runs vertically at one end of my operating desk and all other cables (telephone, broadband, etc.) run vertically at the other end.

All cabling from my transceiver to my interface (and other equipment) then runs horizontally along my desk. This arrangement minimises pick-up and, even with so much cabling in close proximity, I've experienced no compatibility problems and I believe my transmitted PSK31 signal is clean. It's important that the transmitter power and audio drive level from the computer are kept low to minimise r.f. in the shack and transmitter splatter.

The Results

The results I've achieved with my interface show that a low cost digital interface between a computer and transceiver is possible. But care in making connections to the transceiver is recommended to avoid damage. Although this interface was built to provide the Icom CI-V function, it may be used with other transceivers with slight modification, as necessary, by careful reference to the radio handbook.

My interface is a simplistic approach and, although it works very well in my case, might not work so well in all instances as it doesn't have the built-in isolation of the more comprehensive units available. However, by using low power and taking sensible precautions to minimise pick-up, it can work very well. **PW**

ALINCO

QUALITY • STYLE • PERFORMANCE

DX-SR8

100 Watts HF Transceiver – with new 0.1-2W QRP Feature!

Features

- Transmit: 1.8 - 30Mhz Amateur Bands
  (5MHz Band Transmit is optional with modification)
- TX: SSB, CW, AM, FM
- Power: up to 100 Watts SSB/CW/FM - 40 Watts AM
- QRP Mode: (0.1 to 2.0) Watt extra low power setting
- RX – 150-29.999Mhz (when optional 5MHz mod is enabled, RX extends to approx 35Khz-34.999MHz)
- Detachable front control panel
- Direct frequency entry via key pads
- Fight QRM with STANDARD features
  - IF shift, Narrow Filter, Noise Blanker
- Emphasis on CW operation
  - Built in electronic keyer, QSK operation, CW Narrow Filter
- World class transmit audio quality
- Enhanced Scan Modes
- Adjustable switched RF Attenuator
- 4 Stage RF pre-amplifier
- Dual VFO's - Split frequency operation
- 600 channel memories in 3 banks
- Connection for Auto tuner
- ALC for Linear amplifier
- CTCSS enabled for 10 Metre FM repeater access
- Large Cooling Fan with overheat power limiter
- SWR Protection built in
- Dimensions: 240 (w) x 94 (h) x 255 (d) mm
- Weight: 4.1 kg (approx)

A compact HF transceiver with all the facilities an experienced operator would expect as standard, Narrow filters, IF Shift, RF pre-amp, noise blanker and CW keyer with full break in. For the QRP enthusiast a special super low output power setting. With a detachable front panel, front-facing speaker and logically laid out controls, the DX-SR8 is engineered to endure heavy-duty cycles and harsh operating environments.

£599.00

Included accessories

- EMS-64 Dynamic microphone
- DC cable
- Microphone hanger EBC-7

Optional Accessories

- EDS-17 Front control remote kit (5m cable, front panel bracket, unit cover and hardware)

DX-R8E SDR capable Communications Receiver

The brand new DX-R8 from Alinco allows you to tune the world using SDR technology without breaking the budget. This full shortwave and LF coverage receiver has an IQ output which allows you to monitor AM/FM/SSB/CW signals either as a superheterodyne desktop radio or using your PC with free software (not supplied) as an SDR radio.

Enjoy DRM Hi-fi broadcasts without a converter. PC-decode of HFDL, FAX, NAVTEX, RTTY, PSK and more.

Optional Accessories

- 12V Power Supply..£14.95

£549.00

Features

- Frequency range: 150 kHz-34.999 kHz
- Modes: AM / FM / CW / USB / LSB
- Frequency stability : ± 1 p.p.m.
- Sensitivity:
  AM 0.15-1.8 MHz: 10 µV, 1.8-30 MHz: 2 µV
  FM 28-30 MHz: 0.25 µV
  SSB 0.15-1.8 MHz: 1 µV
  CW 1.8-30 MHz: 0.25 µV
- Selectivity:
  AM Narrow 2.4 kHz (-6 dB), 4.5 kHz (-60 dB)
  AM/FM 6 kHz (-6 dB), 18 kHz (-60 dB)
  SSB/CW 2.4 kHz (-6 dB), 4.5 kHz (-60 dB)
- IF-frequencies: 1st: 71.75 MHz, 2nd: 455 kHz
- Image rejection 70 dB
- Audio output: <2.0 W into 8 ohm 10% THD
- Memories: 600 channels in 3 banks
- Power requirements: 11.7 - 15.8V DC
- Current drain: 1A max
- Dimensions: 240 x 100 x 293 mm
- Weight: 4.1 kg (9 lbs)

DM-330MW-UK
30 Amp switching power supply

- Low noise
- Lightweight and portable
- Triple Protection circuit
- Low Ripple
- Fully CE-Approved

£99.95

EDX-2
120W Weatherproof Automatic Antenna Tuner

- Wired Alinco

£289.00

EMS-14
Desktop microphone

- Wired Alinco with 8 pin Plug

£89.95

DR-135E MkIII
High Power 50 watts 145MHz (2m) FM/Data Mobile Transceiver
£179

DJ-175E
Tough, Rugged 145MHz (2m) 5 Watts Handheld
£79.95

DJ-195E
Direct Entry Keypad 145MHz (2m) 5 Watts Handheld
£129.95

DJ-V17E
Water Resistant 145MHz (2m) 5 Watts Handheld
£149

DJ-G7E NEW!
Tri-Band 145/433/1296MHz (2m/70cms /23cms) Handheld Transceiver
£299

DJ-X3ED
700 Channel AM/FM/WFM Wideband Handheld Scanner
£139.95

DJ-X11E
All Mode AM/FM/SSB Handheld Scanner with IQ Output
£339

nevadaradio®

BUY ONLINE **www.nevadaradio.co.uk**

CALL **023 9231 3090**

UK Importers & Distributors of Alinco Unit 1 Fitzherbert Spur Farlington Portsmouth PO6 1TT

Phil Cadman G4JCP's Valve & Vintage
21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX
E-mail: phil@g4jcp.freeserve.co.uk

For the Record

Phjil Cadman G4JCP is dressed (temporarily!) in his familiar brown dust coat, is on duty in the vintage 'shop' – ready and waiting to discuss vintage tape recorders and *PW* itself.

Hello and welcome to the *Valve & Vintage* (*V&V*) 'shop', which is currently 'wired for sound' with myself on duty! I'm actually going to remove my usual brown dust coat in favour of some summer 'visiting' attire, because it's high time I began to practice what I preach!

Rather than repeating my usual suggestion to 'get out your soldering irons', this time I want you to get out your microphones and tape recorders and start recording. And it's all **Godfrey Manning G4GLM**'s fault! Godfrey, as readers of *PW's* sister magazine *RadioUser* will know, writes the *Sky High* column for that magazine, and he recently placed a Wanted Advertisement in the *Bargain Basement* section of *PW*.

Godfrey – who has kindly helped me on a number of occasions – needed the circuit diagram of an early 1960s **Civic** tape recorder, see **Fig. 1**. I couldn't recall any tape recorder by that make or model, so I consulted a book I've mentioned before: *Tape Recorder Servicing* by **H.W. Hellyer**, published in 1965. I hadn't noticed before but the book is dedicated to 'WNS', who must be **W. N. Stevens**, a former Editor of *PW*. Incidentally, H.W. Hellyer used to write for *PW* in the 1960s and 1970s.

Although there was no Civic tape recorder listed in the index, a previous owner of the book had pencilled a note saying that the Civic was the same as the **Sound A41**. Certainly from Godfrey's description of the valves used in the Civic, it could be the correct circuit. But what was curious, this little known tape recorder brand - made by Tape Recorders (Electronics) Ltd - had some 30 models listed in the index. This is a surprisingly high number considering home tape recording – in the Civic's price bracket – had only been popular for a few years.

Fig. 1: The Civic tape recorder, was it a 'badged' version of the Sound A41, made for Currys?

Asking around my (elderly!) friends (and searching the Internet), I found Civic was a brand name used by Currys. This fact would explain why Godfrey hadn't found a manufacturer's name on the machine. Most probably, the tape recorder had been made for Currys by some third party manufacturer. This made me think that many of the models listed under the Sound name in Tape Recorder Servicing, may have been sold under brand names used by the then major high street chains. Was that indeed the case?

If Sound was just such a manufacturer, can anybody provide any additional information? Even better would be a cross reference showing what Sound model was sold under what brand name. This information would be of great help to anybody with a similar machine. I'd guess the same was true for radios as well. Again, a cross reference would be very useful.

By the way, there's a web page on the Internet giving information about *Radio City*, a pirate radio station which broadcast from the Shivering Sands Army Fort in the mid 1960s. On the page at **www.bobleroi.co.uk/ScrapBook/SutchCityPics7/SutchCityPics7.html** there's a photograph showing a Civic tape recorder. So now we know where the Radio Pirates did their shopping!

So what has this to do with my request for you to get out your microphones? Well, Godfrey's plea for information reminded me that there are recordings of radio broadcasts spanning many years, but there are precious few audio recordings of ordinary people. That's unlike the many photographs which most of us have, sometimes going back over one hundred years.

Although camcorders capture sound as well as images, they can be intrusive, and are a relatively recent development. Of course, the tape recorders of the

1960s were pretty intrusive too, but now there is a much smaller alternative, see **Fig. 2**.

This is one of a new kind of solid state audio recorder which use Secure Digital (SD) cards for storage. Lower cost models can be bought for as little as £100 (the model shown cost £125).

Don't confuse these high quality recorders with digital dictation machines (the sort used for making voice notes). These new recorders can record audio at CD quality: 16-bit resolution at a 44.1kHz sampling rate. They have built in stereo electret microphones and include the ability to record directly in MP3 format too. Some models will even record at 24-bit, 96kHz resolution.

Location recording has never been easier, so get out there! You can record all sorts of sounds - and people, with their permission, of course. But I'd like you to concentrate on recording valve and vintage subjects, particularly people who used to work in the radio and electronics industry. Even those employed in little radio shops that were once such a common sight on the high street. But most of all, get people who were involved in the early days of radio to record their stories and reminiscences. There are very few of them left, and their knowledge and expertise will soon be lost forever.

Unfortunately, I can't tell you what to do with any recordings you make, other than just keep them safe! And label them (with audio as well as text) with all relevant information. At least who, where, when and the subject matter.

Sad to say, I've missed the opportunity to record some old-timers I have known, hence my opening comments. From now on I'm going to make a special effort to record people who have interesting stories to tell, and I shall endeavour to take my recorder with me on all visits.

World's Smallest Radio?

On the subject of things getting smaller, in the summer of 1964 – about the same time as H.W. Hellyer was writing his tape recorder book – a very young chap called **Clive Sinclair** was introducing a tiny radio. Advertised as 'the world's smallest radio', the **Micro6** measured just 1.8 by 1.3 by 0.5 inches. That's 46 by 33 by 13mm. Whether the 'smallest radio' claim was justified is another matter – but the radio certainly was tiny!

Fig. 2: With built-in stereo microphones, electronic recorders are now capable of storing several hours of CD-quality sound on small memory cards.

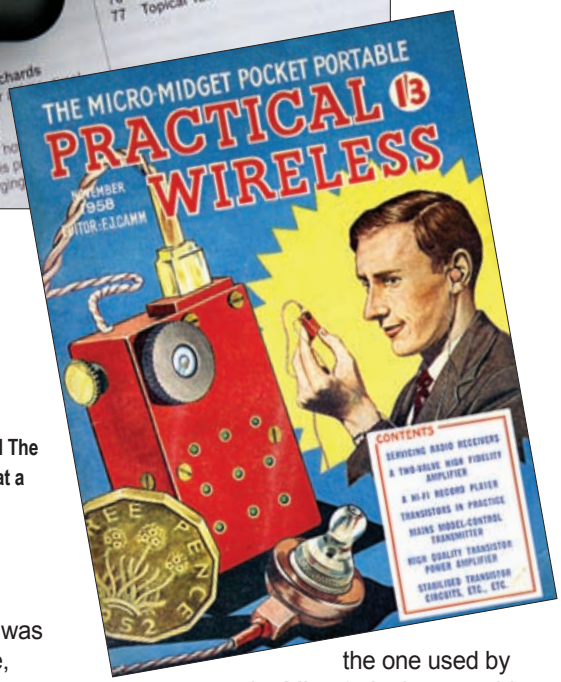


Fig. 3: November 1958's issue of *PW* featured The MicroMidget Pocket Portable radio, and is that a 'picture' of the young Clive Sinclair too?

The claim of 'smallest' wasn't necessarily true of the price, which was given as 59 Shillings and six Pence, almost £3. That would be equivalent to nearly £40 today, hardly cheap. The radio itself used two germanium diodes and three microalloy (MAT) transistors in a six-stage reflex circuit, and was powered by two 1.4V mercury cells. For an extra seven Shillings and Sixpence (7/6d), you could have a wristband (called the Transrista) to enable the radio to be worn on the wrist.

A successor to the Micro6 was the **Sinclair Micromatic** radio launched in early 1967. Like its predecessor, it used (then) up-to-date transistors – this time silicon planar - in another reflex circuit. Still priced at 59/6d, it used only two transistors instead of three, although the case was admittedly smarter than the one used by the Micro6. And you could buy it ready built for an extra £1. I have to admit I bought one of these miniature miracles but never got it to work properly. As time passed, I found out that I was not alone. Maybe I should have bought the ready-built version.

While Sinclair's miniature radios are familiar to many radio enthusiasts, his magazine article about a similar miniature radio is less well known. And it's something of a mystery. The cover article of the November 1958 issue of *PW* was *The MicroMidget Pocket Portable*, an uncredited miniature radio design which bears comparison with Sinclair's later 'Micro' series of radios. In fact, I think that there's a likeness of the

young Clive Sinclair on the front cover (see **Fig. 3**) pictured holding the radio.

I believe it was unusual for a real person to be featured on the cover of *PW* at that time, so possibly **F.J. Camm** - *PW's* famous Editor – wanted to encourage a young designer. Alternatively, Sinclair's biography on the Mensa web site **www.mensa.org.uk** says that he was editing *PW* at that time, due to Camm having a serious illness and Camm's Assistant Editor not being able to cope. Is that why – unusually – the author of an article was featured on the cover of *PW*? Apart from the Mensa biography, **this is pure speculation on my part**.

According to **Rob Mannion G3XFD**, the present Editor of *PW*, there's no evidence that Clive Sinclair was ever on the staff of *PW*. Neither is there even any evidence that F. J. Camm even knew Clive Sinclair, although Sinclair Radionics advertised extensively in *PW* (see **http://en.wikipedia.org/wiki/Practical_Wireless**).

Nevertheless, the November 1958 article and front cover are curious, and there is something of a mystery here. Can any *V&V* reader offer conclusive proof, one way or the other?

MicroMidget Circuit

The circuit of the MicroMidget is shown in **Fig. 4** and it would be interesting to try this receiver today. However, don't try using modern transistors, they won't work. If you wish to try out the circuit then old – at least 1960s vintage Germanium – transistors must be used. If no white-spot or red-spot transistors are available, then try an OC44 for Tr1 and OC71s (or OC70, etc.) for Tr2 and 3.

The earpiece – labelled EP – was specified as a magnetic type with a 600Ω impedance. A ceramic earpiece may work satisfactorily but it must be shunted by resistor (try 680Ω) to maintain a d.c. path to the collector of Tr3.

Notice that R3 provides both bias and positive feedback to Tr2, so it's possible the circuit may oscillate. Positive feedback was one way to increase gain, a very useful feature as the red spot transistors of the day had comparatively low gain. Also note that Tr1 has no base bias.

Germanium transistors had a very high leakage by today's standards, even at low collector voltages. Varying the voltage on the base (or varying the base-emitter impedance) would modulate the leakage current and so the transistor would amplify.

To save space the radio is permeability tuned. The coil is made by winding 100 turns of fine enamelled copper wire around a small diameter piece of ferrite rod about one inch (25mm) long. Before winding, the rod has a couple of turns of paper wrapped around it, secured with adhesive tape. In use the rod should slide freely – but not too loosely – within the paper tube so formed. The original article says that the coil has sufficient self-capacity to resonate over the medium waveband.

The radio needs a few feet of wire to provide a suitable antenna but no earth connection. If a small audio output transformer with a primary d.c. resistance of 250Ω and a 9:1 ratio is substituted for the earpiece, the radio can reputedly drive a loudspeaker.

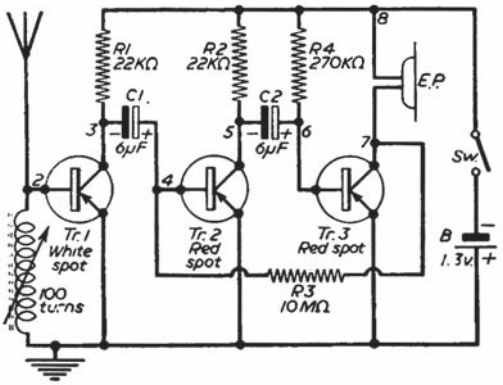


Fig. 4: The circuit of the MicroMidget Pocket Portable radio. It needs to use older 'leaky' Germanium transistors to work properly.

The "I Don't Believe It" Section!

Next, it's on to the 'I don't believe it' section of the *V&V* column. Way back in the early 1980s, I bought a mixed bag of capacitors from a trader at an Amateur Radio rally.

Luckily, there were three 1μF 400V paper capacitors in the bag (see **Fig. 5)** as well as several 10nF 400V capacitors of a similar type. Ideal for use in valved equipment! I noticed that the capacitors had a NATO (military) part number and were rated for use at 100C. They had never been used and so I thought I'd done quite well as the whole bag had only cost one pound of my spending money!

A couple of years later I was looking through an STC catalogue, and purely by chance came across the very same capacitors. I was absolutely stunned by the price. The 1uF, 400V capacitors were listed at £142 each! Of course, if you wanted a hundred or more, then you could have them for a mere £60 each. That's not a misprint, nor an April Fool joke, they really were that expensive!

I've never used the capacitors and over the years I've not thought much about them. But a couple of years ago I bought a small, ex-military 'Amplifying Unit' which contained some capacitors of a similar type to the ones I'd chanced upon at that rally.

Fig. 5: Phil wonders what could possibly justify the enormous 'one-off' price of these capacitors. Does any reader know the reason perhaps?

Whilst recently cleaning out part of my loft, I came across the capacitors and thought it high time I tried to find out why they were so expensive.

So, does any *V&V* reader know? I fully realise that components for use in military equipment have to be very tough and reliable, and naturally that makes them expensive. But £142 for a 1μF, 400V, 20% tolerance capacitor? Surely – that's a bit excessive?

Oh yes, a search on the Internet revealed that they are still available, but I haven't the nerve to ask the current price! The fact that they are still available begs the question, why were such expensive, brand-new capacitors available in a 'lucky bag' at an Amateur Radio rally? Who would authorise the disposal of what must have been literally thousands pounds worth of components?

If anybody does know, or if you have any comments or ideas for the column, please let me know, either via E-mail to: **phil@g4jcp.freeserve.co.uk**, or by mail to: **21, Scott's Green Close, Scott's Green, Dudley, West Midlands DY1 2DX**. 73, Phil G4JCP **PW**

Tel: 01922 414796

Established 1997

Radioworld communications

34-42 Brook Lane, Great Wyrley,
Walsall, WS6 6BQ
skype: radioworld_uk
E-mail: sales@radioworld.co.uk
Open six days a week - Mon-Fri 9.00am-5.00pm, Sat 9.30am-4.00pm
http://www.radioworld.co.uk

HF/VHF/UHF transceivers

TM-D710E VHF/UHF mobile ... £448.99.
TS-480SAT - HF&6m 100W..... £743.99.
TS-480HX - HF & 6m 200W.... £849.00.
TS-2000 - HF/6/2/70cms ..... £1438.00.
TS-2000X-HF/6/2/70/23cm... £1765.00.
TM-V7E - 2m/70cm's ..... £376.00.
TH-F7E - 2mtrs/70cm's £233.99
TM-271E-2m/FM Mobile ..... £172.99.
TM-V71E - VHF/UHF ..... £295.00.
IC-7600 HF 6m transceiver....£3149.00.
IC-7700 HF & 6m Base .....£5995.00.
IC-7800-2 HF/50MHz 200W.....£8875.00.
IC-7200 HF+6m 100w .....£799.00.
IC-7000 - HF/6m/2m/70cm's.....£1149.00.
IC-718 - HF 100W.....£569.00.
IC-910H - 2M 100W/70cm 75W £1279.00.
IC-E91 - Top Flight Handheld....£259.95.
IC-E90 - 2m/6m/70cm Handheld £238.99.
IC-E2820 Dualband VHF/UHF ....£478.99.
ID-E880 2/70 digital mobile .....£433.00.
IC-E92D D/STAR handy ..... £368.00.
IC-V80E 2M handheld ..... £101.50.
ID-1 mobile TRX 23CM/FM..... £714.00.
IC-T70E 2M/70CM Handy ..... £158.00.
IC-E80D D-Star V/U ..... £320.00.
PW-1 HF Amp 1KW ..... £5055.00.
FT-950 HF Transceiver..... £1197.00.
FTM-10E - VHF/UHF tx/rx ... £297.99.
FT-897D - HF/6m/2m/70cm.. £754.99.
FT-817ND - 1.8-430MHz 5W. £548.95.
FT-857D - HF/6m/2m/70cms £658.99.
FT-7900 mobile VHF/UHF ..... £214.95.
FT-8800E - 2m/70cm mobile. £316.99.
FT-8900 - 10m/6m/2m/70cm. £356.99.
FT-1900 - 2m 55W mobile.. £133.00.
FT-2900M - 2m 75W mobile.. £137.00.
VX-7R - 6m/2m/70cm handy. £281.99.
VX-6E - 2m/70cm handheld.. £229.99.
VX-3E - 2m/70cm handheld.. £151.99.
FT-60E - 2m/70cm FM 5W .. £172.99.
FT-450 - HF/6m transceiver. £616.00.
FT-450AT transceiver..... £687.99.
VX-8DE handy with APRS ..... £398.95.
FT-450D transceiver ..... £799.00.
FT-2000 HF/6M Base 100W... £1998.00.
FT-2000D 200W HF/6M Base £2675.00.
FT-DX5000 ..... £4429.95.
FT-DX5000D ..... £4892.00.
FT-DX5000 MP ..... £5400.00.

Transceiver accessories

Yaesu SM-5000 monitor ..... £459.95.
Yaesu SP-2000 speaker ..... £149.95.
Yaesu MD-200 mic ..... £219.99.
Yaesu MD-100 mic ..... £118.00.
Yaesu FC-30 ext. ATU ..... £203.00.
Yaesu FP-30 PSU..... £198.00.
Icom SP-20 speaker ..... £197.99.
Icom SP-21 speaker ..... £98.99.
Icom PS-126 psu ..... £449.95.
Icom PS-125 psu ..... £326.99.
Icom RMK-7000 kit ..... £57.50.
Icom OPC-581 ..... £34.49.
Icom OPC-589 ..... £19.95.
Kenwood SP-23 speaker ..... £71.95.
Kenwood HS-5 headphones ..... £55.99.
Kenwood MC-90 mic ..... £191.99.
Kenwood MC-60 mic ..... £120.00.
Kenwood MC-58DM mic ..... £56.95.
Kenwood MC-43 mic ..... £20.99.

MFJ Enterprises

MFJ-989D 1500W Auto ATU..£399.95
MFJ-986C 3Kw HF.....£359.95
MFJ-993B dual 300/150 Auto £254.95
MFJ-991B Auto Intellituner....£214.95
MFJ-976 1500w ATU £479.95
MFJ-969 300w Rollercoaster £219.95
MFJ-962D 1.5Kw Inductor.....£299.95
MFJ-949E 300w W/D-Load....£184.95
MFJ-948 300w HF.....£164.95
MFJ-945E Mobile £134.95
MFJ-941E 300w £144.95
MFJ-934 ATU+AG £204.95
MFJ-921 2m ATU.....£98.95
MFJ-924 70cms £98.95
MFJ-914 Extender £90.95
MFJ-901B 200w Versa tuner....£111.95
MFJ-1026 Active Antenna £204.95
MFJ-267 Dummy Load / SWR - £162.95
MFJ-802 Field Strength Mtr..... £55.95
MFJ-249B 1.8-170 Dig.....£264.95
MFJ-259B 1.8-170 .....£269.95
MFJ-269 HF/VHF/UHF £369.95
MFJ-201 grid dip meter.....£154.95
MFJ-269PRO 1.8-170&430-520 £389.95
MFJ-250 1kw Oil filled £78.95
MFJ-250X 1KW without oil £56.95
MFJ-260C 300w PL259 .....£45.95
MFJ-260CN 300w N-Type £54.95
MFJ-264 1.5kw PL259 .....£77.95
MFJ-264N 1.5kw N-Type £84.95
MFJ-267 Load/VSWR £162.95

RigExpert ®

AA-500 analyser 5 to 500 MHz .. £574.00.
AA-54 HF ANALYZER ..... £309.00.
RigExpert AA-230 ..... £442.95.
AA-230PRO ..... £520.95.
RigExpert AA-30 - HF Analyzer .. £269.00.
RigExpert AA-520 Analyzer .....£470.00.
RigExpert Plus .....£225.00.
RigExpert Standard .....£164.00.

HEIL SOUND Microphones & Headsets

PR-781-PTT deluxe base mic...£159.96.
Pro-Set-Plus Headset .....£219.95.
Pro-Set-Plus-IC Headset .....£239.95.
Pro-Set-HC-4/6 Headset .....£139.95.
Pro-Set-HC-IC Headset .....£149.95.
Goldline GM-4 Stick mic .....£139.95.
Goldline GM-5 Stick mic .....£139.95.
Goldline GM-V vintage mic ..... £149.95.
HM-4 Handy mic w/HC-4 insert £79.95.
HM-IC Handy mic + Icom insert £89.95.
HM-10-4 Hand mic + HC-4 .....£79.95.
HM-10-Dual mic HC 4+5 .....£119.95.
PR-20 hand microphone £159.95
PR-30 hand microphone ..... £212.95.
PR-40 hand microphone ..... £249.95.
Pro-Set-Elite with HC6 ..... £174.95.
Pro-Set-Elite-IC with HC-6 ..... £189.95.
HM-Pro mic ..... £89.95.
HP-Pro-Plus mic ..... £79.95.

COMET

CHA250B broadband vertical, covers 80-6m, no gaps ..... £299.95.
Comet V-250 3.5-54MHz Max 200w. Ideal for limited space ..... £299.95.
GP-6 High Gain Dualband CoLinear 2/70cm Max 200w ..... £99.95.
GP-15 Tri-Band 2/6/70 Fibreglass Antenna. Max 150w ..... £99.95.
GP-9 highgain dualband co-linear...£139.95.

Tigertronics

SL-USB-13PDI 13pin DIN Icom £94.95
SL-USB-13PDK 13pin Kenwood £94.95
SL-USB-4R 4pin round mic cable £89.95
SL-USB-5PD 5 pin round mic cable £89.95
SL-USB-6PMD 6pin m/DINYaesu £94.95
SL-USB-8PD 8pin m/ DIN £89.95

WATSON

POWER-MITE NF 22A peak £69.95
W-25AM 25A Supply £89.95
W-10AM 10A Supply £59.95
W-5A 5A Supply £29.95
W-10SM 10A Supply £49.95
W-30 2/70 Base £49.95
W-50 2/70 Base £54.95
W-300 2/70 Base £74.95
W-2000 6/2/70 Base £89.95

butternut

Butternut HF-2V 40/80m £299.95
Butternut HF-6V 80-10m £399.95
Butternut HF-9V 80-6m £449.95
Butternut HF-5B 20-10m £469.95
STR-II radial kit £159.95

HUSTLER

Hustler 5-BTV £229.95
Hustler 4-BTV £189.95
Hustler 6-BTV £269.95
Hustler RM-10 10m resonator £21.99
MO-1 mobile mast section £39.95
MO-2 mobile mast section £39.95
MO-3 mobile mast section £29.95
MO-4 mobile mast section £27.95

PALSTAR

AT-1500DT 1500w ATU £534.95
AT-2K 2000W ATU £594.95
AT- Auto 1500 Watt ATU £1129.95
AT5K 3500 Watt ATU £999.95
DL-5K 5kw dummy load £424.95

Miracle Antenna

Miracle Whip QRP allband £119.95
Miracle Ducker IL ATU..... £109.95
Miracle Ducker PL for HF £109.95
Miracle Ducker TL HF/VHF/UHF ... £109.95

AT-1000 Pro

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

£506.95

Z-100 Plus

125w Auto ATU - 1.8-54MHz - 0.1 - 6 secs

£140.99

DM-7800

Made exclusively for the IC-7800. This will give you a true analogue meter

£136.00

AT-100 Pro II ..... £199.95.
AT-200Pro ..... £209.99.
AT-897+ ..... £184.00.
KT-100 ..... £169.00.
AT-600Pro ..... £331.95.
YT-450 ..... £224.95.
Z-11ProII ..... £157.95.
YT-100 ..... £172.00.
FT-Meter ..... £40.99.

Z-817 ATU

ATU specific for FT-817 Uses CAT / ACC port Powered by batteries 0.1 - 20w : 1.8 - 54MHz

£120.00

LDG IT-100

Icom ATU 125w Auto ATU - 1.8-54MHz 0.1-6 seconds Tune

£163.00

LDG RBA 1:1&4:1

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

£34.00

Radioworld - the longest-running LDG dealer in the UK!!

TONNA

Tonna 20505 6m 5el ..... £118.95.
Tonna 20809 2m 9el ..... £79.95.
Tonna 20811 2m 11el ..... £114.95.
Tonna 20817 2m 17el ..... £148.95.
Tonna 20909 70cm 9el ..... £74.95.
Tonna 20919 70cm 19el ..... £94.95.
Tonna 20921 70cm 21el .....£119.95.
Tonna 20635 23cm 35el ..... £93.95.
Tonna 20655 23cm 55el ..... £119.05.
Tonna 20745 13cm 25el ..... £102.95.

WEST MOUNTAIN RADIO

RIGblaster Pro ..... £299.95.
RIGblaster Plus USB ..... £159.95.
M4-CBL RG45/4Pin lead ..... £18.95.
RIGRunner 10way 12v distribution board £159.95.
CBA-III Computerised Battery Analyser ... £149.95.
CBA/AMP/240 CBA-II Amplifier ..... £719.95.
PG-40S 12V Backup Power System ..... £144.95.

DIAMOND ANTENNA

HF10FX 10m Mobile ..... £49.95.
HF15FX 15m Mobile ..... £49.95.
HF20FX 20m Mobile ..... £49.95.
HF40FX 40m Mobile ..... £49.95.
HF80FX 80m Mobile ..... £52.95.
CR8900 10/6/2/70 ..... £112.95.
CP6 Base 6m-80m ..... £389.95.
X50 Base 2/70 ..... £82.95.
X200N Base 2/70 ..... £129.95.
X300 Base 2/70 ..... £149.95.
X7000 Base 2/70/23 ..... £255.95.

AMERITRON

The High Power Specialist

AL-811XCE 10-160m 600w £949.95
AL-811HXCE 10-160m 800w £1049.95
ALS600X Solid State 10-160m 600w £1599.95
AL-1500XCE 10-160m 1.5KW £4269.95
AL-1200XCE 10-160m 1.5KW £3899.95
AL-82XCE 10-160m 1.5KW £3099.95

RAPID RADIO

CW-160 160-10m (252ft) £165.95
CWS-160 160-10m (133ft) ... £159.95
CW-80 80-10m (133ft) £134.95
CWS-80 80-10m (66ft) £152.95
CW-40 40-10m (66ft) £121.95
CW-40+ 40-10m (66ft) £142.95
CW-20 20-10m (34ft) £104.95
G5RV+ 80-10m £82.95
G5RV-XF Fullsize £71.95
G5RV-XH Halfsize £56.95

SGC

SGC-230 HF..... £529.95
SGC-500 HF £1399.95
SGC-235 HF-500W £1199.95
SGC-237 HF+6m £309.95
SGC-237 Porta £559.95
SGC-237 PCB £349.95
SGC-239 HF..... £199.95
MAC-200 ..... £279.95

Rotators

G-2800SDX Rotator ..... £850.00.
G-450C Rotator ..... £314.95.
G-550C Rotator ..... £295.00.
G-650C Rotator ..... £355.00.
G-1000DXC Rotator ..... £459.95.
G-5500C Rotator ..... £584.95.
AR-35X Hy-Gain rotator.....£99.95.

Feeders & Wire

RG-213 Military Spec High grade 50 Ohm coaxial Cable

£139.95 per 100m Drum

RG58U ..... £0.70 per Metre
RG8 Super ..... £1.00 per Metre
RG213 ..... £1.36 per Metre
W103 Westflex ..... £1.95 per Metre
RG-8 100 Metre Drum £70.00
Flexweave 50m Flex £30.95
Flexweave-PVC-50 50m £40.95
Enamelled Copper Wire 50m . £17.95
Hard Drawn Copper Wire 50m £24.95

Rotator Cable: - Color coded Cable
3 core ..... £0.80 per Metre
7 core ..... £1.20 per Metre
8 core ..... £2.00 per Metre

DC Connecting Cable
10A DC Cable ..... £0.50 per Metre
15A DC Cable ..... £0.65 per Metre
25A DC Cable ..... £0.90 per Metre
40A DC Cable ..... £1.35 per Metre

FlexRadio Systems

FLEX-1500 SDR Transceiver... £579.95
FLEX-3000 SDR £1299.95
FLEX-5000A Transceiver £2495.95
FLEX-5000A-ATU £2795.95

Telecom linear amplifiers

Self-contained, solid state

23CM150 23cms 150W .....£1999.
2M-HK 2m 500W .....£1999.
64-HK 6m&4m dualband 500W. £1999.
70CM-HK 70cms 500W .....£1999.

Cushcraft

X-7 - 20/15/10 7EL Yagi. .... £899.95.
A3S - 20/15/10 3EL Yagi .....£629.95.
A4S - 20/15/10 Yagi .....£699.95.
A3WS - 12/17 3EL Yagi .....£499.95.
ASL-2010 13-32MHz Log ..£999.95.
MA5B - Mini Beam .....£529.95.
D-3 - 20/15/10 Dipole .....£359.95.
R-6000 - 6Band Vertical ... £449.95.
R-8 - 40-6m Verical .....£559.95.
MA5VA - 10/20m Vertical ....£309.95.

Second Hand List

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

Amplifiers
Yaesu FL-2025 25W Linear Amplifier £99.00
Tokyo Hy-Power HL-50B 80m-6m Amp £269
Kenwood VB-2200GX 2M Amplifier £79.00
AL-811HXCE Ameritron 800W HF Amp £849
RM KL501 HF AMPLIFIER 1.8 - 30MHz, 300W MAX 600W SSB £210.00
Ampere APB-57A UHF Amplifier £129.00
MML 144/30-LS 2m 30W Amplifier £89.00
Analyzers + SWR meters
Daiwa CN-103L Meter £59.00
TSA-6601 SWR/POWER METER 2/70 £25.00
YW-3 SWR meter £30.00
Diamond SX-400 VHF-UHF SWR Meter £70
Harrier SWR-1 SWR & Power Meter £15.00
Oskerblock SWR-200B £49.00
PALSTAR PM2000AM Mobile Watt Meter £120
PM-2000 SWR & PEP Meter £99.00
SMC T3-170L SWR Meter £25.00
TOYO T-430 SWR £39.00
SX-20C Diamond VSWR POWER Meter £59
Antenna Tuners
MFJ-969 ATU £159.00
MFJ-994B 600 Watt IntelliTuner ATU £275.00
Yaesu FC-30 Antenna Tuner Unit £169.00
TSA-6602 - Quartz mini antenna tuner. (Rare) 144-430 £25.00
LDG AT-7000 Auto Tuner £129.00
Vectronics VC-300D Tuner £199.00
Global AT-1000 SWL ATU £69.00
MFJ-935B Loop Tuner £149.00
MFJ-924 MFJ UHF ATU £85.00
Antennae
Mirror Mount £5.00
MV6+3 6/10/12/15/17/20/30/40/80 £88.95
Miracle Whip: QRP All-band antenna £89.00
Sidekick-black Compact Motorised Mobile HF Antenna £299.00
Set top TV antenna £3.00
EZ-TUNE-7000IBOX Control box for £85.00
Garex Angler Antenna £25.00
SE-1300 Discone £40.00
CX-310A 3-way Coax Switch (SO-239) £55
MC-4MT Mobile Cable £13.00
CB
Lodestar SWR-2T SWR Meter £15.00
Emperor Ninja CB £69.00
Lodestar SWR-2S SWR Meter £15.00
CTE-737 50-Watt CB Amplifier £34.95
CB SWR Meter £15.00
Ranger RCI 2970DX 10 - 12m " 150w" Transceiver £249.95
Moonraker Minor Plus 80 Channel UK CB Radio £45.00
DAB Radio
Gemini 46 Digital Radio £39.00
Sony XDR-S55DAB £30.00
Data Comms
Kamtronics KAM Multimode TNC £129.00
USB 56K MODEM £10.00
MFJ-1278b DSP Multimode Data Controller £249.00
DC/Cig adapter/chargers
CD-24 Ni-MH Battery Charger Adaptor £80
BC-135 Desktop Rapid Charger £40.00
NC-386 Ni-Cd Battery Charger £20.00
Duplexer / Triplexer
TSA-6001 Duplexer £25.00
Filters (various)
Bremi BRL-10 - TVI Low Pass filter 27MHz £10.00
AEC LP-30 - Low Pass Filter £15.00
Workman TVI-2K Low Pass Filter £25.00
CF-30MR 30MHz LPF £34.95
Frequency Counter/finder
Watson Hunter 10MHz-3GHz £55.00
Handheld Transceivers
Yaesu VX-2E Dual Band Handy £99.00
Yaesu VX-1R Dual Band Handy £85.00
FT-60E Yaesu 2m / 70cm FM 5W £129.00
Alinco DJ-V17E £105.00
FDC-450A 70cm Handheld £79.00
FDC-150A 2m Handheld £79.00
Quansheng 70cm Handheld £79.00
Quansheng 2m Handheld £69.00
FDC Battery £15.00
Yaesu FBA-39 dry cell battery case £15.00
Wouxun KT-689 2m Transceiver £59.00
CSC-90 Soft Case for VX-2E £10.00
FT-708R 70cm Hand Held Transceiver £49.95
FNB-82LI (Spare) 1000mA Battery £18.00
HF Transceivers
Icom IC-7400 £899.00
Icom IC-756 £699.00
Icom IC-707 Amateur HF transceiver £399
Kenwood TS-570DG/E HF transceiver £599
Alinco DX-70TH HF & 6m transceiver £399.00
Yaesu FT-1000MP Mark -V Field £1,199.00
Icom IC-706 MkIIG with DSP £629.00
IC-756PRO-MKIII Icom HF + 6m Trx £1,699.00
Yaesu FT-2000 100W with internal psu £1,599
Yaesu FT DX9000 D Transceiver £6,495.00
IC-7400 HF, 6m & 2m transceiver £899.00
Kenwood TS-870S HF Transceiver £849.00
Kenwood TS-850S /AT £699.00
Icom IC-718 HF Transceiver £459.00
Icom IC-7700 - TRANSCEIVER £4,795.00
Yaesu FT-950 £989.00
Yaesu FT-690R II £275.00
IC-7200 HF Transceiver £649.00
IC-706 MK2 With UT-106 Fitted £529.00
DC-DC Converter for FT-101ZD + FT-902 £59
Mics and Speakers
SM-20 Deluxe Base Station Desk Mic £114.95
SMC-34 Speaker/Mic with Vol Control £21.63
HM-133 Remote Control Mic for IC-E208 £52.46
MH-34B4B Speaker/Microphone £15.00
YD-148 Yaesu microphone £30.00
BH1 NES10-2 DSP Speaker £79.00
extension speaker £9.99
EMS-47 Remote Control Hand Speaker/mic direct VFO in £15.00
Yaesu MH-32 Speaker-Mic £15.00
MFJ-295 £12.95
HM-10-4 Heil Hand mic. with HC-4 insert £60.00
Eagle A069 Earpiece £5.00
YM-24A Speaker Microphone £25.00
ICOM SM-6 600 Ohm Base Station Mic. £39.99
Morse keys / tutors
Morse Key £89.00
NATO Morse Key £199.00
Ex-Army Key with Operators Unit £39.00
Bencher Twin Paddle Morse Key £89.00
Star-Masterkey CW Keyer £49.95
MFJ-451X Morse Interface (no keyboard) £85
Other
MFJ-704 Low pass filter £39.95
M/Mods 144/100 £149.00
EDC-16B adapter £9.99
50-Watt Dummy Load £56.95
TS-711/811PX Interface £59.95
Kenwood YK-88S SSB Filter £49.00
MFJ-461 Pocket Morse Reader £69.00
Kenwood YK-88CN-1 CW 270Hz Filter £50.00
MFJ-784B DSP Filter £219.00
AOR ARD9000 Digital Voice Interface. £126.31
MB-105 (IC-7000) MOUNTING BRACKET £7.95
Midland 48 Plus Multi £69.00
FL-223 9MHz Filter SSB narrow 1.9kHz £40.00
MFJ-1817 2m/70cm Telescopic Rubber Duck 36.8cm long £22.00
CSC-83 Soft Carry Case for FT-817ND £15.00
Icom PS-85 Icom 20A 13.8V Switch Mode £159.00
Kenwood FM-430 - fm unit £59.00
FL-101 9MHz Filter CW narrow 250Hz £60.00
SC-45 Soft Case for TH-G71E £10.00
CASE FOR KENWOOD TH-47 £10.00
ALINCO ESC-28 £10.00
010-10117-02 Garmin GPS Carry Case £5.00
HS-800/PRO High Sierra Standard Control Box for 180 £75.00
BP-206 Lithium Ion Battery Pack for IC-R-20 & IC-R3 £30.00
HMC-3 Vox Headset £20.00
Host Master II £20.00
Eton S-350 Field Radio £65.00
CSC-88 Soft Case for VX-7R £10.00
Bremi BRL-5 - 3-way switch with 5Watt dummy load (52 £20.00
JD Model 151 - TVI Low Pass Filter £10.00
Archer Antenna Discharge Unit £15.00
Mizuho KX-2 antenna coupler £59.00
Yaesu SC-1 Station Console £89.00
Dee Comm Dummy Load £69.00
BRV-1 Mirror Mount £10.00
25W Max Dummy Load £20.00
60W Max Dummy Load £20.78
300W Max Dummy Load £79.00
Antenna Switch £15.00
Aluminium Travel Case £15.00
BP-262 Battery Case £7.00
Drake DL-300 Dummy Load £50.00
Revex L20 50 Ohm Dummy Load £25.00
MTU-30/20 RF u-tuning Unit C £500.00
MTU-80/40 RF u-tuning Unit B £500.00
Kenwood LF-30A-N low pass filter fitted with n-type £35.00
Bush Sunrise Radio £49.95
CT-44 Microphone adaptor £6.00
KIF700 Keyboard & Interface £69.00
SC-37 Soft Case £6.00
SC-41 Soft Case £6.00
Diamond DL1000 Load £99.00
DS-8000 Speech Inverter £60.00
CT-5000 CTCSS Board for AR-5000 £60.00
SPECTRUM-MASTER-CD PC Control, £12.00
Philips HC8349 Wireless Rechargeable Headphones £25.00
OPC-1529R Data Cable RS-232C £16.00
Toyo T-100 Dummy Load £59.95
MAG-BM145PL £14.95
MFJ-332B BNC Magmount £15.95
Power supplies
Kenwood PS-30 PSU £89.00
Microset PT 135 PSU £149.00
Icom PS-15 20A power Supply £119.00
Watson W-25SM 22A Power Supply £59.00
PT-1012 Microset 12A 13.5 PSU £109.96
Seif PS-134,DC power supply £20.00
Farnell G-12 £59.00
B.N.O.S 12amp power supply £59.00
Drae 6-Amp PSU £49.00
240V AC to 110V AC Dropper £20.00
Yaesu FP-8 PSU £69.00
Apollo CB-35 PSU £20.00
Micronta PSU £15.00
Skytronic RPS1203 PSU £15.00
Altai RPS-1203 £20.00
Maplin XM22Y PSU £20.00
Maplin XM20W PSU £20.00
Manson SPA-8230 PSU £65.00
W-3A Watson 3A 13.8V PSU £18.00
Receivers
Icom IC-R72 Receiver £399.00
FR-101 Receiver HF+2m+6m £399.00
Icom IC-R75 £449.00
Trio R2000 HF Receiver £299.00
AOR AR-2002 Receiver £199.00
AOR AR-8600MK1 Wide Band Receiver £469
Icom IC-R5 Receiver £129.00
Icom IC-R8500 Receiver £1,099.00
AOR AR-3000A Wideband Receiver £450.00
AOR AR-7030+ HF Receiver £699.00
Drake R8E HF Receiver £425.00
Lowe HF-225 HF receiver £299.00
R-30CC HF PALSTAR HF Rx £499.00
Alinco DJ-X30 Scanning Receiver £125.00
Ten tec RX-320 PC COMM RECEIVER £275.00
ABM-1-KIT Airband Monitor Kit £60.00
AR-5000A AOR Wide band Receiver £1,199.00
IC-EX257 FM Board for IC-R71 £69.00
Palstar R-30A Short Wave Receiver £499.00
Scanners
Bearcat UBC-9000 Scanner £179.00
Icom IC-R10 Hand held Scanner £179.00
Bearcat UBC-780XLT £179.00
Realistic Pro-2042 Base Scanner £150.00
GRE PSR-214 FM Base Scanner £99.00
Yupiteru MVT-9000 MK2 Scanner £240.00
AOR AR-8200Mk3 Scanner £349.00
PSR-282 GRE Handheld Scanner £50.00
AOR 8200 Mk I £220.00
UBC-785XLT Base Scanner £209.00
AR-MINI - pocket sized receiver £120.00
FR-100 Handheld Scanner £55.00
VHF/UHF Transceivers
Icom IC-490E 70cms Mobile £250.00
Kenwood TS-271E £165.00
Kenwood TS-790E 2/70 Base £750.00
FT-290RMKI 2m Multi mode £150.00
Icom IC-821H £599.00
Yaesu FT-8900 Quad Band Mobile £279.00
Yaesu FT-1500M £129.00
IC-7400 HF, 6m & 2m transceiver £999.00
Yaesu FT-857D Multi-band Mobile £539.00
Yaesu FT-690R II 6m transceiver £275.00
Kenwood TM-V7E 2/70 FM Mobile £249.95
Kenwood TM-D700E Dual Band Mobile £299.00
Yaesu FT-8800E Dual Band Mobile £259.00
Yaesu FTV-901R 2m/70cm Transverter £275
Yaesu FT-817ND HF 6m VHF UHF 5W £419.00
Icom IC-910H 2m/70cms base 100w £999.00
Yaesu FT-897D Multiband Portable £649.00
Kenwood TM-702E VHF/UHF £149.00
ICOM IC-2200H 144-146 £189.00
FT-817bhiDSP Yaesu with bhi dsp £459.00
The TINY-2 MK-II £109.00
Kenwood TM-741E £229.00
Alinco DR-620 remote cables £12.00
ICOM IC-E2820 dual-band mobile £369.00
ADI AR-146 2m FM Transceiver £89.00
Virtual Radars
AirNav Radarbox 2009 version £299.00

bhi

ANEM amplified module. .....£127.99.
1042 6-way switch box.....£29.99.
NEDSP-1061-KBD DSP module..£101.95.
NEDSP-1062KBD Noise Module.... £106.95.
NEIM1031 Noise Module.....£142.95.
NES10-2 MK III speaker .....£112.95.
1090 Radiomate Keypad.....£89.95.

bhi

PayPal MasterCard VISA VISA Electron SWITCH SOLO

Stock and prices accurate as of 22/02/2011. E&OE.
For accurate, up-to-date prices please check our website before visiting our shop

http://www.radioworld.co.uk

Tel 01922 414796
Fax 01922 417829
skype radioworld_uk

Tim Kirby G4VXE's World of VHF incorporating VHF DXer
Willowside, Bow Bank, Longworth, Oxfordshire OX13 5ER
E-mail: tim@g4vxe.com Twitter id: G4VXE

Contest, Tropo and the Bands

Tim Kirby G4VXE Looks at the *PW* 70MHz contest changes and talks about tropo ducting before reporting on state of the v.h.f. and u.h.f. bands during the last month.

Welcome to the *World of VHF* (*WoVHF*)! I had the pleasure of hearing from Colin Redwood G6MXL recently, when he wrote to me with details of the *Practical Wireless* VHF contests for 2011. The 144MHz QRP contest takes place on **Sunday 12th June 2011**. Rules are virtually the same as previous years, and will be appearing in the June (this issue!) issue of *PW*.

The 70MHz contest moves to **Sunday 25th September 2011**. The rules are changing to have two sections. The Low Power Section will remain at 10W peak envelope power (p.e.p). This year there will also be an Open Section with power limited only by normal licence conditions. Hopefully, the change of date and new sections will encourage greater participation. Colin expects that the rules will appear in the September issue of *PW*.

Let's hope there will be great activity for both of these events. Over the years the *PW* 144MHz QRP contest has, I believe, been one of the best supported events in the v.h.f. contest calendar. I hope this trend will continue. It would be good to see the 70MHz event well supported too. More and more people are getting on 70MHz, whether on s.s.b or f.m. So, again, let's hope this is reflected in the activity on the day!

As I used to say in my *Contesting* column in *RadCom*, even if you're not a contest fan, it's well worth coming on for events such as these. This is because we know there will be some activity and you stand a good chance of making some interesting QSOs!

Tropospheric Ducting

Next, we'll do what the adverts call, 'the science bit'! I was discussing some v.h.f./u.h.f. tropo propagation on the air with **Richard Gosnell G4MUF** (Wootton Bassett, Wiltshire). Richard, before he retired, was professionally involved with the Meteorological Office. He kindly promised that he would put together a few notes for the column, looking at the specifics of how a tropospheric (tropo) opening 'works' and how it affects v.h.f./u.h.f. And I'm sure that you, like me, will find Richard's analysis fascinating.

Richard began, "Between March 2nd and 8th, there was an anticyclonic spell giving good tropospheric ducting, (with DX hopefully reported by Tim in this column!). My point here is to look at a duct's structure via radiosonde messages from Larkhill, Wiltshire, and I found the attached one, **Fig. 1**, a good example of the vertical profile of temperature, dew-point and humidity against height which produces good DX if it is widespread across a big area.

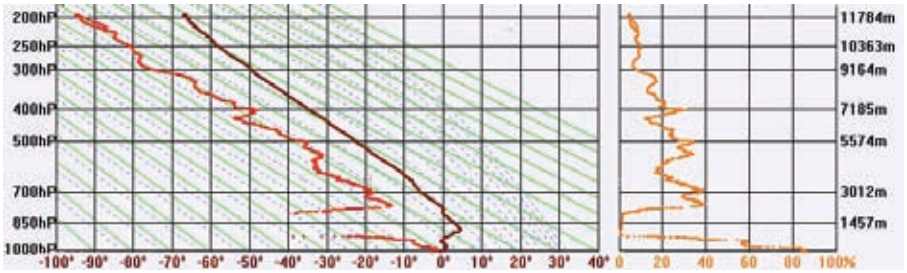


Fig. 1: A vertical atmosphere profile decoded from a radiosonde messages from Larkhill in Wiltshire, by using *Sondemonitor* software.

"I myself made an in-flight recording of this one (March 3rd 0600Z) by using *Sondemonitor* software but we can also view aerological data at e.g. Wyoming University's meteorological website. The left-hand panel shows temperature (brown) and dewpoint (red) against height, and the right-hand panel shows relative humidity (orange) against height.

"The graphs show the classic damp colder layer resting on the ground, overlaid by drier warmer air. Of particular interest is the extreme dryness the air above the duct. We see the damp air below, then it rapidly dries, becoming, at 638 metres, RH=56%, and then RH=3% at 854 metres. From there up to 2022 metres the RH is either 0 or 1%!

"This low value of RH equates to a dew-point of -40°C! In fact the radiosonde equipment cannot calculate the dewpoint when it's any drier than 2%. Above that the RH returns to more normal values. The very dry air can only come from one source: a great height aloft, possibly up in the stratosphere. It spent some time slowly descending within an established anticyclone, and it warms and dries following the dry adiabats on a tephigram.

"As a high declines, the dry air spreads out laterally before it gets to the ground (in our climate, but it does get there at e.g. Basra and Kuwait!), so it can cover a wider area. On mountains you might notice the dryness if you are up within this air. When the high deteriorates or moves, the dry air supply is cut off, and more normal air slides in over the top from the side, often as a warm front. The very dry air is an important component in producing v.h.f. ducting, and its history of formation fits in with the proverb that 'lifts' occur as a high declines.

Sporadic E (Es)

"For the v.h.f. enthusiast, the months of June and July (in the Northern Hemisphere, at least) are very special as they generally see a peak in Sporadic E propagation, sometimes known as Es.

"Wikipedia introduces Sporadic E as 'an unusual form of radio propagation using characteristics of the Earth's ionosphere. Whereas most forms of skywave propagation use the normal and cyclic ionisation properties of the ionosphere's F region to refract (or 'bend') radio signals back toward the Earth's surface, sporadic E propagation

bounces signals off smaller 'clouds' of unusually ionised atmospheric gas in the lower E region (located at altitudes of approx. 90 to 160km). This occasionally allows for long-distance communication at v.h.f. frequencies that aren't usually well-suited to such communication.'

"Sporadic E affects the high h.f. bands, 24 and 28MHz as well as the v.h.f. bands, 50, 70 and 144MHz. Very occasionally, Amateurs in the USA have experienced Es openings on their 220MHz band. Distances can vary enormously. On the 144MHz band, single 'hop' contacts are generally of a maximum of around 2200km.

"However, this is not a hard and fast rule and in any case, multi-hop openings can occur to extend the range significantly. It's unusual for an Es opening on 144MHz to provide more than 2 hops, but on 50MHz, it is thought that many hops can take place, allowing contacts, for example, from the Mediterranean to the west coast of the USA.

"Sporadic E openings are generally at their best in the late morning and early evening. The maximum useable frequency (MUF) usually builds, so keep an ear on 28MHz for European stations. You may then notice propagation extend to the 50 and 70MHz bands. Depending on the intensity of the opening, you may notice DX on the Band 2 FM segment (88 – 108MHz). Once this happens it's time to keep a very careful ear on 144MHz!

"The internet is our friend for keeping an eye on propagation – you may choose to use a DX Cluster, or a more specialised website such as the excellent 'DX Sherlock' (**www.vhfdx.info/spots/map.php?Lan=E&Frec=50&ML=M&Map=EU&DXC=N&HF=N&GL=N**) which plots DX openings on a v.h.f. band of your choosing onto a map."

Thanks for that explanation Richard, I think that's enough to digest for now! After the theory of propagation though, it's something that keeps my fascination in radio going! Let's see what's been happening on the bands?

The 50MHz band

It was great to hear once again from **Ronald Pincho ZB3B** (Gibraltar). Ronald is an enthusiastic *Practical Wireless* reader though he says *PW* can be hard to find in Gibraltar. Ronald wrote to say that he had found 50MHz opening on a number of occasions to the south, via Trans Equatorial Propagation (t.e.p). Ronald has worked a good few stations.

On March 8th he worked PP5XX (GG53), on March 9th PP1CZ (GG87) and on March 12th PU1SGT (GG87) and PY1SX (GG87). There was an excellent opening on March 13th when Ronald worked PU1KGG (GG87), PY2MTV (GG66), PY2NQ (GG66), PY1WS (GG87), PY2XB (GG66), PY2JMH, PY2KP (GG66), PY2VA (GG66) and ZD7VC (IH74). Ronald reports the ZD8VHF beacon from Ascension Island on 50.033MHz and the ZD7VC beacon from St Helena on 50.007MHz as being useful indicators of openings to the south. (Ronald is running about 50W to a 4-element Yagi).

Ronald advised me that **Ernie Stagnetto ZB2FK** was pleased to make his first QSOs on 50MHz into South America using an FT-200D and a Diamond V2000 vertical.(Congratulations Ernie!).

Mark Marment CT1FJC reports plenty of DX from the south, mostly via t.e.p. His log includes; March 7th: ZS6NK (KG46) c.w., V51PJ (JG82) JT65a, 5N7M (JJ39) SSB, PP1CZ (GG99) on s.s.b. Then came PY1NB (GG87) s.s.b.; March 8th: PP5XX (GG53) via c.w., PY5AB (GG54) on s.s.b.; March 9th: ZS6CCY (KG45) s.s.b., PY4AQA (GG88) s.s.b., ZD7VC (IH74) s.s.b. March 11th: PU1KGG (GG87) using s.s.b., PY1SX (GG87) on s.s.b. Next came PY2XB (GG66) using c.w., PY5QW (GG54) s.s.b., PY2XB (GG66) s.s.b. March 12th : V51PJ JG82 s.s.b. March 13th: PP5XX (GG53) with s.s.b., PP5BK (GG51) using c.w., PP5EJ (GG53) c.w., CE4WJK (FF45) SSB. March 14th; Z22JE (KH52) using s.s.b., ZS6CCY (KG45) using s.s.b., D44TD (HK86) s.s.b. On March 21st he worked D2CQ (JH69) using s.s.b. And finally, on March 23rd came V51YJ (JG87) who was worked using s.s.b.

It's really good to see these 50MHz openings starting to happen. Although propagation is very different from the UK, you can easily expect to hear some of the DX that Ronald, Ernie and Mark have been working, if conditions are right. This usually means a Sporadic E opening from the UK to the Mediterranean and then from the Mediterranean to Africa or South America via t.e.p.

An impressive number of v.h.f./u.h.f. antennas from Panos SV1GRN.

An unusual mounting point for a pair of v.h.f. antennas sent in by Panos SV1GRN who writes on behalf of the Athens QRP group.

Closer to home, thanks to the efforts of **Adam Willis G1MAW (Shropshire)**, a new 50MHz repeater, **GB3GT** has come on the air from Clee Hill in Shropshire. It has good coverage and I've already heard it from as far south as Didcot in Oxfordshire. Just a few miles further north, signals were stronger and I

was able to work through it from my mobile station parked near Faringdon (Oxfordshire). The *PW* Editor **Rob G3XFD** has also heard it regularly in Bournemouth – using only a simple 6m vertical antenna at 10m on his mast!

Matthew Porter 2E0XTL (Shropshire) reports that GB3GT was only running 5W output, so signals from the repeater should get stronger once the output goes up to the intended (and licenced) power of 25W. Matthew also says that his 50MHz f.m. activity has increased and he is a regular Summits on the Air (SOTA) activator.

Mathew has used his Palstar KH6 50MHz handheld (which he purchased for £16 on eBay) for many of the contacts from Mid and South Wales to **Alan Richards G7RHF** located near Ludlow.

A very impressive shack used by Leo Fiskas SV2DCD (KN00), who made the first 70MHz QSO between Greece and South Africa working Willem ZS6WAB (KG46) over a distance of 7213km.

The 70MHz band

On to 70MHz now and – via the 'The Four Metres Website' (**http://www.70mhz.org**) comes news that on March 27th, **Pieter Jacobs V51PJ** (JG82) made the first Namibia to South Africa 70MHz QSO with ZS2ACP (KF26sa) using the FSK441 mode. He then worked ZS6NK (KG46) and ZS6WAB (KG46). Pieter runs a 25W transverter and 6-element Yagi antenna.

Trans-Equatorial Propagation can also affect 70MHz and on March 28th, **Leo Fiskas SV2DCD** (KN00) made the first 70MHz QSO between Greece and South Africa by working **Willem ZS6WAB** (KG46) over a distance of 7213km.

Spiros SV8CS also worked ZS6WAB. Superb contacts and congratulations to everyone involved. Once again, it's not impossible to imagine that stations such as ZS6WAB and V51PJ could be worked from the UK by a combination of Es and t.e.p. Keep listening!

Again closer to home, the Tring 'parrot' store-and-forward repeater, MB7FM is back on the air and generating some activity. I was pleased to be able to get a signal through it over a path of around 80km using my Wouxun 70MHz handheld whilst operating from Harrowdown Hill in Oxfordshire. **Larry Smith G4OXY (Bedfordshire)** reads the GB2RS news on 70.425MHz from his home in Dunton each Sunday at 10.00 local time and appreciates reports after the news broadcast.

If you are interested in making a lightweight portable beam for 70MHz, **Matthew Porter 2E0XTL (Shropshire)** published details of his 3-element Yagi for 70MHz on the Summitsbase website (http://www.summitsbase.org.uk).

The 144MHz Band

Increasing frequency next, we go to the 144MHz band. During the 144MHz/432MHz contest on March 5th/6th I was pleased to find some good tropo. Best DX was DF5GZ/P (JN47) at around 800km with F5OOM/P (JN38) at about 650km. There was a fair amount of UK contest activity too. As I was tuning across 144MHz around 0800z on March 6th I was surprised and pleased to hear **Marco Angioni IS0BSR** calling "CQ" from Sardinia, the Italian Island in the Mediterranean sea.

The Sardinian call was due to a meteor burst and the signals came up for a few seconds. Long enough for me to call Marco, but unfortunately not long enough to make a QSO! It was nice though, to E-mail Marco to let him know that I'd heard him in the UK. Marco was kind enough to send me a link to a video he had made that weekend during the contest – it was fascinating to get an insight into what it's like to operate a 144MHz contest from Sardinia.

Graham Boor G8NWC (Lincolnshire) reports "Now that spring has finally appeared, it's time to start thinking of portable operation for the coming months. I've spent the last few days remaking leads, organising a new battery, and checking the collapsible beam which is of G4DHF design. I've had great results with this antenna. Construction details for this and other light weight antennas are on his website." Graham concludes by mentioning how much he is looking forward to getting on some high ground for a few hours.

As always, it was great to hear from **Panos Dadis SV1GRN** who writes on behalf of the Athens QRP group. He writes, "March 20th was the time for another Winter v.h.f. QSO party, organised again by the Athens QRPNet. All weather predictions were rainy and disappointing, especially for an event at 1400m. a.s.l. But, with the motto "who dares wins" in mind we climbed the mountain!

"At Mount Parnitha (KM18ud) we established three stations. The first one with an FT-857 and a 7-ele home-made yagi antenna. operated by SW1JGW, SW1MNO & SV1GRN. The second station for 50MHz operated by SV1KU used a home-made antenna. The third station was operated by SV1BJY with an FT-817 and a 5-ele home-made antenna. All of the stations ran on battery power.

"Our second team of SV1EIW and SW1QEG set up on Artemida hill. near Athens airport. Many participants of our recent '144MHz Propagation and DX Seminar' joined us so, we had practical experience of what we have learned from our teachers SV1BJY & SV1NK. Many stations participated in the activity from Greece and Turkey. Despite the propagation being down we managed a lot of QSOs especially over the Aegean Sea."

The 432MHz band

Not many reports on the band this month, although I worked F1ISM (JN09) on March 6th.

My Final!

That's it for this month. I hope these columns are providing you with some inspiration to try new things on the v.h.f./ u.h.f. bands. Many new licencees are tempted to head straight for h.f., but I hope some – and perhaps some more established licencees too, maybe tempted to try something new on v.h.f./ u.h.f. Until next time, whatever you do – have fun! **PW**

Radio Spectrum under threat!

As users of the Spectrum, the issue is simple: PLA devices are causing interference and if we don't do something now we might not have a hobby take part in – it's that serious. Now is the time to start a Spectrum Defence Fund – not just to fight the PLT issue but other threats as and when they come up. The RSGB intends to challenge Ofcom's interpretation of the various Acts and Directives in respect of the PLA/PLT threat. We aren't looking to remove Comtrend and other such devices from the market place – that's an expectation too far, neither are we likely to see rapid results. What we are looking for, among other things, is to challenge Ofcom on their duty to ensure that in the future, non-compliant items such as Comtrend, are not put on the market.

A Judicial Review would likely cost in the region of £75,000 but could be a lot more as we'd be taking on organisation with almost unlimited funds to defend their corner who could, if they so desired, play a very long game that in turn we'd have to match. If every amateur in the UK pledged £10 to the Spectrum Defence Fund we'd probably have enough to fight the case and so we need your donations (no matter how small) to help us meet the threat.

Please help amateur radio and the radio spectrum by donating to the fund today!

Help us protect the future of Amateur Radio
Please donate online at

www.rsgb.org/defencefund

You can also donate by post by sending a cheque payable to 'The Spectrum Defence Fund' and sending it to; Spectrum Defence, RSGB, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford, MK443WH. The 'Spectrum Defence Fund' is a secure and independently audited fund, the proceeds of which will only be used in defence of the radio spectrum.

Spectrum Defence Fund

Advertising space kindly donated to the Spectrum Defence Fund by PW Publishing

nevada radio®

Ecoflex®

New Ecoflex Low Loss Cables & Connectors at Nevada!

New range of cables & connectors at Nevada! Flexible with PE-LLC dielectric and gas content of over 70% for very low loss and use up to 6 GHz

Ecoflex 15

Specification
- Diameter: 14.6mm
- Loss per 100m: 2.81dB @ 100MHz, 1.96 dB @ 50MHz

Price: £5.60 per metre, **£504** per 100m drum

Ecoflex 15 Connectors
- **PL259** connector (Part: 7350) **£8.95**
- **N type** connector (Part: 7395) **£9.95**

Ecoflex 10

Specification
- Diameter: 10.2mm
- Loss per 100m: 4.0dB @ 100MHz, 2.8 dB @ 50 MHz

Price: £2.65 per mtr, **£238** per 100m drum

Ecoflex 10 Connectors
- **PL259** connector (part: 7378) **£5.95**
- **N type** connector (part: 7367) **£6.50**
- **BNC type** connector (part: 7379) ... **£6.50**

Aircell

Aircell range is a highly flexible coaxial cable for use up to 6 GHz. The low losses in relation to the diameter and the small bend radius of the cable make it perfect for the Radio Amateur.

Aircell 5

Specification
- Diameter: 5.0mm
- Loss per 100m: 9.4dB @ 100MHz, 6.61dB @ 50MHz

Price: £1.35 per mtr, **£121.50** per 100m drum

Aircell 5 Connectors
- **PL259** connector (part: 7760) **£2.25**
- **N type** connector (part: 7700) **£3.95**
- **BNC type** connector (part: 7720) ... **£3.25**

Aircell 7

Specification
- Diameter: 7.3mm
- Loss per 100m: 6.28dB @ 100MHz, 4.52dB @ 50MHz

Price: £1.70 per mtr, **£153** per 100m drum

Aircell 7 Connectors
- **PL259** connector (part: 7390) **£2.65**
- **N type** connector (part: 7392) **£5.25**
- **BNC type** connector (part: 7371) ... **£5.25**

Aircom Plus

Operating up to 10 GHz, this semi Air spaced cable has a massive oxygen free copper inner conductor covered with a thin film of PE to prevent corrosion permanently

Aircom Plus

Specification
- Diameter: 10.3mm
- Loss per 100m: 3.8dB @ 100MHz, 2.6 dB @ 50MHz

Price: £2.95 per mtr, **£265.50** per 100m drum

Aircom Plus Connectors
- **PL259** connector (part: 7378) **£5.95**
- **N type** connector (part: 7367) **£6.50**
- **BNC type** connector (part: 7379) ... **£6.50**

BEST DEALS ON ICOM YAESU KENWOOD

no free Bits 'n' Pieces just the **LOWEST PRICES - GUARANTEED!** ...Daily Web specials too !

KENWOOD TS-590S

IN STOCK!

~~£1489.95~~ See Nevada Web for **BEST PRICE**

TS-480SAT	HF/6m 100W inc ATU	£779.95
TS-480HX	HF/6m 200W – no ATU	£879.95
TS-2000E	100W HF/6/2m with ATU	£1439.95

Kenwood Accessories

SP-23	Extension speaker	£68.95
HS-6	Lightweight headphones	£35.95
HS-5	Deluxe headphones	£52.95
MC-60A	Desk Microphone	£117.95
MC-43S	Hand Microphone	£19.95
MC-47	Hand Microphone	£39.95
SP-50B	Mobile Speaker	£27.95

YAESU FT-DX5000MP

NEW

~~£5295.95~~ See Nevada Web for **BEST PRICE**

FT-DX5000	**NEW** Fully featured	~~£4239.95~~ See Web!
FTM-350R	**NEW** VHF/UHF Mobile	£529.95
FT-450ATU	HF + 6m + Auto Tuner	£699.95
FT-817D	Portable Transceiver	£499.95
FT-857D	HF/VHF/UHF Mobile	£649.95
FT-897D	HF/VHF/UHF transceiver	£749.95
FT-950	HF + 6m Base Transceiver	£1289.95
FT-1900	**NEW** 55 Watts 2m Mobile	£139.95
FT-2900	**NEW** 75 Watts 2m Mobile	£134.95
FT-7900	**NEW** VHF/UHF Mobile	£239.95
FT-8900	2m/70cms/6m/10m FM Mobile	£379.95
FT-60E	2m/70cms Handheld	£179.95
VX-8DE	**NEW** 2m/70cms/6m Handheld	£399.95
VR-160	Miniature Scanning Receiver	£219.95

QUALITY USED EQUIPMENT

ALL WITH 6 MONTHS NEVADA WARRANTY

Kenwood TS-570 DGE	Good example	£699
Icom IC-756 Pro III	100 Watts HF/6m	£1699
Yaesu FT-2000	Excellent condition	£1699
Yaesu FTDX-5000	Only one week old!	£4199
Yaesu FT-857	Transceiver	£499
Yaesu FRG-100	Communications receiver	£299
Yaesu MD-100	Microphone	£99

(ALL SUBJECT TO AVAILABILITY)

YAESU YH-77STA
Stereo Lightweight communications headphones

£49.95

Icom IC-8500

HF communications receiver
- 100kHz to 2,000MHz coverage
- In stock !

~~£1788~~ **£1379**

Winradio Excalibur

Top quality SDR receiver
- Covers 9 KHz to 50 MHz

£649.95

Eton G3

Portable Shortwave Receiver with SSB

Ideal for your holidays - great receiver!
- AM/FM/Long Wave
- Shortwave: 150kHz - 30MHz
- VHF Airband: 118 - 137MHz

£99.95

NEW

TYT-UVF1

Dual Band Transceiver
- 2m/70cms
- 128 Memory Channels
- Supplied c/w re-chargeable battery pack, drop in charger and power supply, rubber duck antenna, belt clip, carry strap, DC charge cable for the car

£99.95

NEW

TYT-800

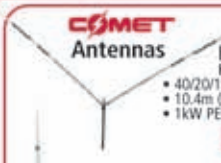
VHF 2 Metre 5W Handheld
- 199 memory channels
- Steps: 5, 10, 12.5, 20, 25, 30, 50kHz
- 50 CTCSS codes
- VOX time-lapse function,
- Channel scan
- Voice prompt function
- Emergency alarm
- FM radio receiver function

£69.95

TYT-800 Accessories

Battery Eliminator	£11.99
Speaker Microphone	£15.99

COMET Antennas



H422

HF Rotary Dipole
- 40/20/15/10M
- 10.4m (straight), 7.4m (V)
- 1kW PEP

£269.95

CHA-250B

Wide Band Vertical
- 80 to 6 Metres No ATU needed!
- 250W PEP
- 7.2m high

£299.95

CWA 1000

HF Trapped Dipole
- 80, 40, 20, 15, 10m
- Power: 500W

£99.95

6 Metre Beams

CA-52HB4
4 El 50 MHz beam ... £119.00

CA-52HB2
2 El 50 MHz beam £79.95

Duplexers

CF360A	28/50MHz SO239/PL259/PL259	39.95
CF416A	144/430MHz SO239/PL259/PL259	34.95
CF416B	144/430MHz SO239/PL259/N male	34.95
CF503C	50/144MHz SO239/SO239/SO239	44.95
CF530C	50/144MHz SO239/PL259/PL259	44.95
CF530A	50/430MHz PL259SO239/SO239	39.95
CF4160B	144/430MHz SO239/SO239/SO239	32.95
CF706	For Icom IC706	39.95

Triplexers

CFX431A	144/430/1200 N/PL259/N/N	49.95
CFX514N	50/144/430 SO239/PL259/PL259/N	49.95

HF Baluns 1:1

CBL-1000	50 ohm 1kW ... 1.7 – 30 MHz	35.95
CBL-2500	50 ohm 2.5kW 1 – 56MHz	38.95

Low Pass Filters

CF30H	Cut off 32 MHz 2kW	69.95
CF50MR	Cut off 57 MHz 1kW	49.95

COMET Antenna Tuners

NEW

CAT-273

VHF/UHF Antenna Control Centre

£179.95

Incorporates:
- Two Antenna Tuners 2m & 70cms
- Two SWR Meters 2m & 70cms
- Separate units for each band all in one unit
- Tune LW, G5RV & other antennas!

CAT-300

High Quality HF Tuner
- Covers HF + 6 metres
- Power 300W (SSB)

£189.00

CAT-10

Mobile Antenna Tuner
- 3.5 to 50 MHz
- Power: 10W
- Size 162x58x12mm
- Ideal For FT817 and similar radios

£99.00

CMX-200
- 1.8-200MHz
- 3kW HF, 1kW VHF
- Average & PEP

£99.95

CMX-400

VHF/UHF Version
- 30/60/200W

£89.95

Daiwa Meters

801HP SWR Power Meter

Japanese high quality, huge twin needle display reading Average power, Peak power and SWR
- Freq: 1.8 - 200MHz
- Power: 20/200/2KW
- Connectors: SO239

£99.95

CN801VN	140-520MHz (N type Sockets)	£119.95
CN101L	1.8-150 MHz	£99.00
CN103LN	140-525MHz	£99.00
CN801S	900MHz-2.5GHz N types	£119.95
CN801V	140-520MHz (SO239)	£99.95

OPEN: Mon to Fri 9.00am - 5.30pm
Unit 1 Fitzherbert Spur Farlington
Portsmouth Hampshire PO6 1TT

023 9231 3090

warehouse

BEST
- Products
- Delivery
- Service

THOUSANDS of products online

LDG Tuners
Popular Models
NOW in STOCK!

AT600 Pro	600W Auto Antenna Tuner	£324.94
AT-100 Pro II	160 - 6m) 125W	£199.95
AT-200 Pro	(160 - 6m) 250W	£209.95
AT-897 Plus	for Yaesu FT897 Plus	£179.95
AT-1000 Pro	(160 - 6m) 1kW	£499.95
IT-100	for Icom IC-7000	£209.95
YT100	for Yaesu radios 125W	£199.95
Z-11 Pro2	(160 – 6m)125W	£159.95
Z-817	QRP for FT817 & others	£119.95
FTL	Meter for FT857, FT897	£79.95
Balun 1:1	200 watt	£34.95
Balun 4:1	200 watt	£34.95
YT450	for FT8897, 857, 950	£224.95

MFJ Accessories

MFJ 269

MFJ 259B	HF/VHF Analyser	£279.95
MFJ 269	HF/VHF/UHF analyser	£349.95
MFJ 941E	300W Tuner	£139.95
MFJ 949E	300W HF tuner	£179.95
MFJ 16C06	4 pack Ceramic insulators	£4.95
MFJ 260C	300W Dummy load	£44.95
MFJ 550	Morse Key	£16.95
MFJ 901B	Portable ATU	£72.95
MFJ 945E	300W Tuner	£129.95
MFJ 948	300W Tuner w/balun	£159.95
MFJ 969	300W Tuner	£209.95
MFJ 971	200W Portable Tuner	£118.95
MFJ 993B	300W Tuner	£249.95
MFJ-557	Morse key w/Oscillator	£34.95

Antenna Switches

Comet CSW 201G

Two Way

Comet CSW201G	1kW 600MHz (SO239)	£19.95
Daiwa CS-201G II	1kW 600MHz (N type)	£29.95
Zetagi V2	500W HF (SO239)	£14.95

Three Way

Zetagi V3	2Kw HF..(SO-239)	£26.95

NEVADA – Cable Specialists

Westflex 103		
1,000 metre Drum		£1357.50
100 metre drum		£139.95
75 metre length		£106.86
50 metre length		£71.24
Price Per metre		£1.50
RG-213U – Mil Spec		
100 metre drum		£109.95
75 metre length		£93.75
50 metre length		£62.50
Price per metre		£1.29
RG-213tm – Economy version		
100 metre drums		£99.00
RG-Mini 8 (Super XX)		
100 metre drum		£59.95
Price per metre		£0.79
RG58/CU – Mil spec		
100 metre drum		£39.95
Price per metre		£0.45
450 Ohm Twin Feeder		
1,000 metre drums		£678.50
100 metre drum		£69.95
Price per metre		£0.99
300 Ohm Twin feeder		
1,000 metre drums		£581.50
100 metre drum		£59.95
Price per metre		£0.85
Flexweave Antenna Wire		
100 metre drums		£49.95
Coated Flexweave Antenna Wire		
100 metre drums		£79.95

PRO Antennas
High quality British manufacture

"I am delighted to recommend these two NEW antennas from Pro Antenna. They provide high efficiency, multi band operation, for portable or home use".
Mike Devereux G3SED

Dual Beam Pro
Capacity loaded rotary Antenna
Covers: 20, 17, 15, 12, 11, 10m plus 30 & 40m (at reduced efficiency).

Constructed with aerospace alloys and using a novel non resonant design (which may require an ATU on some bands), the **Dual Beam Pro** provides excellent performance with bi-directional main lobes and an impressive 30dB+ end rejection. The bi-directional radiation pattern means it only needs to be rotated 180 degrees to give full world coverage. Putting the maximum radiation lobe where you need it, can give outstanding pile-up busting performance!

SPECIFICATION
- Turning radius: 2.5m
- Span of main element: 5.0m
- Span of end elements: 2.5m
- Weight (inc bracket & matching unit): 4.0kg
- Power: 400 watts PEP

£219.00 £9.95 P&P

I-Pro Home
Capacity loaded vertical Dipole
Covers: 20, 17, 15, 12, 11 10m plus 30 & 40m (at reduced efficiency).

Constructed with aerospace alloys for excellent corrosion resistance. With its capacitive end loading and a high efficiency matching network, it has a low profile for use at home or portable. Using a non-resonant design presents a broadband match, however some transceivers will require an internal or external ATU to provide full power output. Supplied with heavy duty base bracket and GRP base mount (requires a 5ft ground post for mounting).

SPECIFICATION
- Height: 5.0m
- Span of end elements: 2.5m
- Weight (inc matching Unit): 4.5kg
- Power: 400 watts PEP

£229.00 £9.95 P&P

4 Metre Equipment

Anytone AT-5189D
4 Metre FM Mobile
Supplied with DTMF microphone
- Covers 4 M Band
- Power: 0 - 25W adjustable
- 250 memories
- CTCSS/DCS/DTMF/2TONE
- Compander noise reduction

£148.95

Wouxun KG-699E
4 metre Handheld
- 4 metre Handheld
- 66-88MHz '4m FM Band'
- CTCSS/DCS tones
- 128 memories
- 8 groups scrambler
- Channel name edit
- Power 5W or 1W
- VOX (Level adjustable)
- Wide/Narrow bandwith

£89.95

4 Metre Antennas

Sirio CX-4	
Base antenna	£69.95
Sirio SY-68-3	
3 Element yagi	£79.95
AT5189A	
Mobile mag. mount	£25.95

PALSTAR Power Supplies

PS 8250
25 Amp Switch Mode Supply
- Twin meters for current and Voltage
- Lightweight
- Fully protected

~~£99.95~~ **£79.95**

SPS-9600
60 Amp Switch Mode Supply
- Variable output voltage
- Fully protected

£199.95

PS-50
50 Amp (peak) Bench Supply
- Fully protected
- Voltage & Current metering

£199.95

PS-30M
30 Amp (peak) Linear Supply
- Variable Voltage
- Fully protected

£99.95

Other Palstar supplies

PS-04	4A 13.8V DC supply	£24.95
PS-06	6A 13.8V DC supply	£29.95
PS-15	15A 13.8V DC supply	£59.95
SPA-8230	23A 13.8V DC Switch Mode	£59.95

ALINCO

Alinco DJ-G7E
Brand new model!
- Transmit: 2m/70cms/23cms
- Receives: 0.5-1299.995MHz
- 1,000 Memory Channels
- Full duplex operation
- CTCSS, DCS encode/decode
- DTMF Auto-dialer
- Supplied c/w Li-ion 1200mAh battery and Drop-In charger

£299.00

DJ-V17
Waterproof Handheld
- TX/RX 144 - 145.995MHz (optional 137- 173.995MHz)
- 2 touch repeater access
- Submersible 1m/3feet for 30min) and rugged body
- 39 CTCSS tone squelch encode + decode settings
- 200 memories
- VFO, Memory, scan modes

£149.00

DR-635
Advanced Dual Band Mobile transceiver
- Remote head facility & multi-colour display
- Bands 144 / 430 MHz with wideband RX
- (VHF to VHF) or (UHF to UHF) capability
- 50 Watts output power
- 200 Memory Channels

£299.00

Antenna Collection

VHF/UHF Base Antennas		
Comet		
GP1	144/430 MHz 3.0 / 6.0dbi 1.25m	59.95
GP3	144/430 MHz 4.5 / 7.2dbi 1.78m	69.95
GP6	144/430 MHz 6.5 / 9.0dbi 3.07m	99.95
GP15N	50/144/430 MHz 3/6.2/8.6dbi 2.42m	99.95
GP98	144/430/1200 MHz 2.94m long	139.00
CA-52HB4	– 4 Element 50 MHz beam	£119.00
CA-52HB2	– 2 Element 50 MHz beam	£79.95
Diamond		
V-2000	50/144/430 MHz 2.5m	£127.67
Multicomm		
V-2000	...50/144/430 MHz 2.5m	£89.95
Sirio		
SPO	144MHz 5.15dBi 2.9m long	£129.95
CX-4	70 MHz 4.15dBi 2.9m long	£69.95
SY-68-3	3 Element Yagi – 70MHz	£79.95
Tornado	Base Antenna 50MHz	£59.95
HF Base Antennas		
Comet H-422	40/20/15/10m Dipole	£269.95
Comet CHA-250BL	6 to 80m Vertical	£299.95
Sirio SY27-3	3 Element 28 MHz Yagi	£74.95
Sirio SY27-4	4 Element 28MHz Yagi	£89.95
Moonraker GP-2500	6-80 mtr Vert	£199.95
HF Wire Antennas		
Van Gorden	G5RV 40-10mtrs	£21.95
WDM3	40/10mtr Heavy Duty Windom	£69.95
WDM4	80/10mtr Heavy Duty Windom	£89.95
G5RV	40/10 mtr Flexweave	£34.95
G5RV	80/10 mtr Flexweave	£39.95
WDM-8010	Std. 80/10 Windom	£44.95
WDM-4010	Std. 40/10 Windom	£39.95

"Thinking of changing your radio?"

Then why not call us for the VERY BEST PART EXCHANGE DEAL?

www.nevadaradio.co.uk

Harry Leeming G3LLL's In the Shop
The Cedars, 3a Wilson Grove, Heysham, Morecambe LA3 2PQ
Tel: (07901) 932763 E-mail: G3LLL@talktalk.net

Radio Frequency Speech Processing

This month Harry Leeming G3LLL harks back to the busy time when he was running his Amateur Radio shop and remembers his experiences with r.f. speech processors.

Four years ago in this column (*ITS*) I reproduced the circuit, and gave details of my design for an add on radio frequency (r.f.) speech processor for the FT-101MK1, MK2, and B models, which was marketed in the 1970s. I don't intend to repeat myself, but as a result of the queries that I have had, it is worth briefly going over the basic principles of r.f. speech clipping, and as to how it's incorporated in various Yaesu models.

As we saw last time, if you try and increase the average level of the audio input to a single sideband (s.s.b.) transmitter by clipping the audio peaks, you create harmonic distortion. Using r.f. speech processing gets round this problem to a large extent, by doing the clipping at r.f. A typical set-up, with the controls and switching somewhat simplified, as used in the FT-101ZD is shown in **Fig. 1**.

The audio from the microphone is applied via the microphone gain control to the microphone amplifier. The output of this goes into the balanced mixer, is mixed with the carrier frequency of 8.986MHz for lower sideband (l.s.b.) operation, or 8.989MHz when using upper sideband (u.s.b.).

The resultant double sideband (d.s.b.) signal is applied to the first s.s.b. filter which removes the unwanted sideband, and delivers an s.s.b. signal to point 'A'. From here with the processor switch in the 'Off', the s.s.b. signal is fed as a normal unprocessed signal on to the next stage of the transmitter.

Next, let's see what happens when you switch the processor 'in' (On). If for instance you feed a 1kHz audio signal into the FT-101ZD and you will get a signal of either 8.987 or 8.988MHz depending on which side band you have selected. When this is clipped – you'll still get harmonic distortion, but it will be at multiples of the radio frequency and so will be removed by any subsequent filters or tuned circuits.

Yaesu Signal Processor Route

So let's follow the signal through the Yaesu processor. When the 'In' (On) position is selected the s.s.b. signal from point 'A' is routed to the clipping integrated circuit (i.c.). A typical s.s.b. voice signal is shown in the upper trace of **Fig. 2** and it will be seen that if the voice peaks are chopped off as shown in the lower trace, then the rest of the signal can be increased and made much louder, without overdriving the transmitter.

How much clipping of the peaks occurs depends on the strength of the s.s.b. signal applied to the clipping stage, this is adjusted by the compression level control VR2. Turn VR2 too high and the signal will sound overloaded , set it too low and the transmission will lack 'punch'.

Once the signal has been clipped it is applied to the second s.s.b. filter, this removes all the harmonic distortion, and any intermodulation distortion products that are outside the filter's pass band. The only distortion left is that within the pass band of the filter, hence the signal that is going to be transmitted has been very considerably cleaned up.

The signal is then passed via R3 the 'Drive' control, which is set so as to just produce full output from the power amplifier (p.a.) stage. Once R3 is correctly set the transmitter cannot be overdriven, however loud you shout!

The most troublesome intermodulation products remaining are those produced by low frequency male voice peaks. And while on this topic – I think it's a great pity that Japanese manufacturers have only realised in the last few years that microphones optimised for their own language and voices, don't suit Europeans with deeper voices!

When using speech processing with early Yaesu rigs, a considerable improvement in readability can be achieved if the original microphone is substituted for one with a nice bright response. As a cheap alternative, when the original FT-101ZD 600Ω microphone is used, it is worth trying the effect of

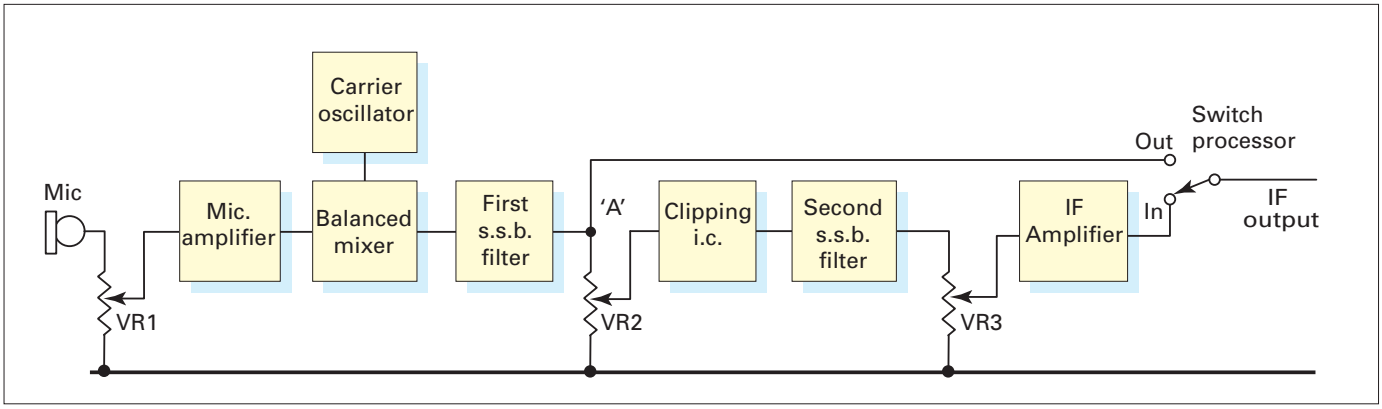


Fig. 1: The block diagram of the speech processor fitted in many early Yaesu transceivers.

fitting a 0.05µF (or 47nF) capacitor in series with the live lead, as this will cut the low frequencies, and 'clean up' the sound.

The FT-101E used a 50kΩ microphone. So in this case try a capacitor of about 2000pF.

Fitting a capacitor in this position will reduce the microphone's output, and may make the speech rather too thin for your liking when working local stations, but it's great for DX!

When we were marketing the G3LLL RF Clipper for the old FT-101 series, we also sold a modified Shure 444 microphone. We fitted these with a series capacitor, and included a switch so that it could be shorted when necessary. Nowadays, Yaesu also fit a switchable series capacitor in the microphones supplied with many of their h.f. rigs, and it certainly helps particularly if the operator has a deep voice.

Well that's enough about speech processing for this month! But I'll include more about its application and use with various Yaesu rigs next time.

Remote Controls

I mentioned in the August 2009 issue, as to how I had managed to rescue my video recorder's remote control using a pencil. My recorder now lies unused, due to the advent of digital TV, but the following helpful comments from **Edward (Ted) Bailey**, are applicable to many remote controls.

"*Some time ago you mentioned a problem regarding the malfunction of hand control units. Your solution at the time was to mark the pad with lead pencil, this would then give a temporary connection. I found this method to be effective for a short while. A more permanent remedy I discovered is as follows. Find an old dynamo or electric motor brush, then with a razor blade or sharp knife scrape some of the brush onto a clean surface, wipe the pads clean with turps or other suitable cleaner, put a dab of Pritt Stick glue onto the pad then put some of the brush dust onto the pad and allow to dry, any surplus dust can be blown off before reassembly. I have found this system to be quite effective*"

Thanks very much Ted! I'm always on the lookout for bright ideas and hope your idea helps someone.

Problems With An FRG-8800

'**Joe**' had been a good customer and a short wave listener (s.w.l.) for many years. During the summer months he used his FRG-8800 in his conservatory, but when winter, dark nights, and cooler temperatures arrived, he moved inside and used his other receiver.

One day however, he decided to bring his FRG-8800 into the house and give it a bit of exercise. He carried it in and plugged it into the mains, whereupon there was a bang and a puff of smoke. A few days later he was on my doorstep!

A quick look around revealed that the internal screening covers, which normally are bright and shiny, were dull, and that the printed circuit strip, through which the mains supply entered the power supply unit, was black and carbonised – obviously the receiver had been somewhere damp.

I then left the receiver in a warm place to dry out before I scratched off the carbon, and applied a coat of polystyrene cement to the damaged board. After this had dried the fuse was replaced and the receiver was as good as new.

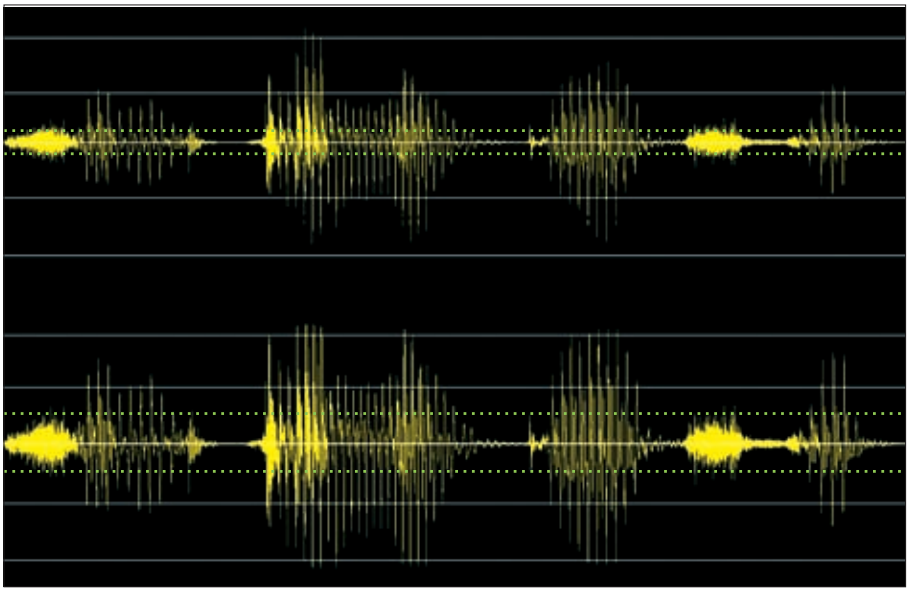


Fig. 2: the upper trace is of the unprocessed audio with its comparatively low average level. The lower trace is of the same audio after clipping and processing with its higher average level now visible. The dotted green lines show the average level of each signal.

A Profitable Tower

When 'Joe' returned to collect the receiver, he mentioned that he had moved house, we got talking and gradually the story came out about his very profitable 100ft tower.

Many years earlier he had fancied getting 'a bit of land', and he had managed to obtain a house with a few acres in an elevated location. On one corner of the land was a 100ft tower – this belonged to the council who paid him an annual rent. After a few years the council contacted him and advised him that they no longer needed the tower and wished to discuses cancelling the remaining years of the lease, and then dismantling the tower.

Joe did a quick think. To dismantle the tower, remove the concrete base, and return the land to the state it had been in before the tower was erected was going to be expensive for the council; he also reckoned that he could legitimately claim many years rent for the balance of the lease. He made these points to the council, and offered to buy the tower. After some negotiation he obtained it for the princely sum of £1.

Joe now owned the tower but it needed painting. However, if you don't have a head for heights, how do you go about this and fixing your antennas? No problem! Quick-witted Joe made a few enquiries and found a climbing club who wanted something to practice on. When they examined the tower they were quite enthusiastic, and a deal was agreed. They would take out insurance, paint and maintain the tower, fix his antennas and they could then climb up and down it to their heart's content!

The years rolled on, the radio scene changed, and Joe started getting enquiries from mobile phone companies regarding fixing their antennas to his tower. At first he wasn't interested, but as he and his wife got older, they got less enthusiastic about farming and the 'phone companies became more frantic.

Joe then realised that he was onto a winner, as the phone companies were finding it extremely difficult to obtain planning permission to erect masts in the 'green belt'. He discussed the matter with his wife, and they 'reluctantly' let it be known that they might consider selling the house and land complete with tower.

Very soon they had several phone companies making them offers that were too good to refuse; they sold the lot for a very good price, and moved down the hill to the village. Joe's only

Fig. 3: The 200W FT-1000 is now proving too heavy for Harry to lift and move around.

regret is that he does miss his antenna system and tower!

The 200W FT-1000 Version

Even though I'm retired I still do a few repairs on rigs such as the FT-101ZD for locals who can come round personally. However, as I'm now in my 70s I reckon that the Yaesu FT-1000, **Fig. 3**, is too heavy and too complex, so I normally refuse to handle them. Recently though, a friend pleaded with me just to have a look at his. So, on the understanding that he carried it up the stairs, I weakened and he carried it up and placed it on my bench.

The rig was transmitting, but apart from a background hiss, it was 'dead' on receive. I then found that the receiver antenna input relay wasn't being 'pulled in' by Q7203 (see **Fig. 4**), and that D7208, the high power transmitter switching diode, was conducting on receive as well as on transmit – and there the problems started!

The circuit shown in Fig. 4 should be the result after Yaesu's "Preventing Antenna Relay Failure" modifications have been carried out, as per the 1991 issue of the service manual. I had actually done this work to his rig about 15 years previously, when I was still operating the shop. Carrying out the modification is not easy as the printed circuit board (p.c.b.) is double-sided, and it involves swapping an *npn* transistor for a *pnp* type, replacing the relay, removing and fitting some parts, cutting various tracks and adding links to the p.c.b..

Any subsequent servicing is then involves tracing connections on a double sided board, where the layout is not as original. Eventually, I discovered that C7278 had an insulation resistance of only 500Ω, I replaced it and expected everything to work, but still D7208 was conducting and the relay wouldn't 'pull in'. I suspected Q7202, managed eventually to extract it from the double-sided board and fitted a suitable replacement. Three cheers – everything then functioned!

Finding the faults was made more difficult, by the absence of reference voltages in the FT-1000 service manual. As the antenna transmit/receive switching seems to be a weak link on the 200W FT-1000, (I had replaced C7678 a few years back in the same rig), I have recorded these voltages and hope that they now might help others with similar problems. But please do not ask me to do the job!

You Pay For Knowledge!

In my early days in the TV trade, we often got complaints on the lines of, "He only plugged in a new valve, why did you charge me £5 for that, anyone can plug a valve in?"

Many years ago, in the days before decimal currency, VAT and 'call out' charges, a Plumber was called to repair a leak. The pipe in question was made of lead, and a fine spray of water was coming from a small hole. The plumber produced a hammer, and proceeded to gently tap the pipe until he had reformed the lead and cured the leak. He went away and sent a bill for £2-1s-6d (Two pounds one shilling and sixpence).

The householder wrote to the plumber and asked him to itemise the invoice. Back came the itemised invoice, "18 taps of hammer at 1 pence per tap, for knowing where when and how to tap £2".

I read the above story some considerable time ago when we were still on lead pipes, and some time later after a freeze-up, I had just the same problem. Out came the hammer and yes – it did cure the leak! See you next month! **PW**

Problems: I like to hear about problems with older equipment, particularly pre 1990 Yaesu rigs. Please E-mail me, (add some radio related term in the subject heading, to differentiate against spam), or write and enclose a stamped addressed envelope. Remember that electricity is dangerous, if you are not familiar with safety precautions you must never work on your equipment whilst it is plugged into the mains. (Switching off at the wall socket does not necessarily make equipment safe).

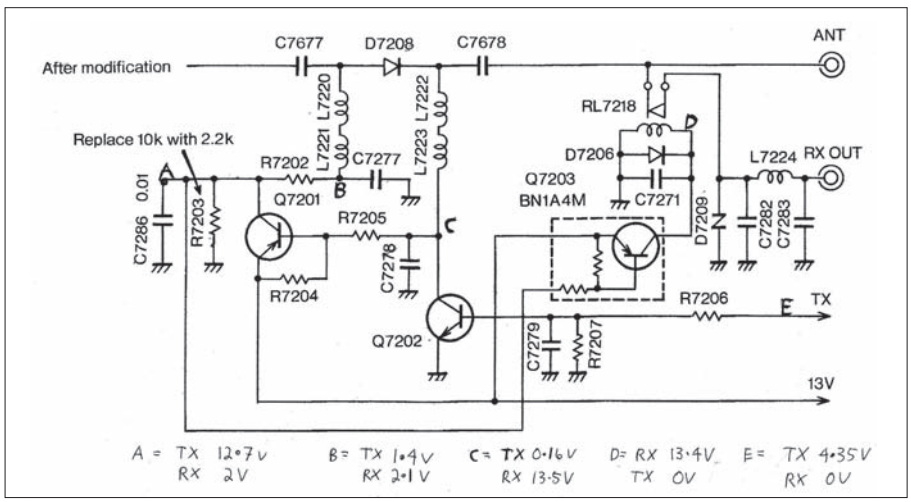


Fig. 4: Part of the T/R circuit for the FT-1000 after some 1991 circuit modifications have been carried out. But the original p.c.b. had to be 'hacked about' to do it, creating some difficult when working on it recently.

Graham Hankins G8EMX's In Vision
92 Sunningdale Road, Tyseley, Birmingham B11 3QJ
E-mail: g8emx@tiscali.co.uk

FRARS Open Day

Graham Hankins G8EMX comments on a live streaming event and brings you news of Irish ATV activity.

The streamed video from the Flight Refuelling Amateur Radio Society's open day showing the huge satellite dish outside their clubhouse.

On Saturday March 19th Flight Refuelling Amateur Radio Society (FRARS) held an Open Day to support Science & Engineering Week 2011 at their headquarters at Merley, near Wimborne in Dorset. The event was streamed live from the club's premises by members of the British Amateur Television Club (BATC). The BATC club's 'streaming' service takes Amateur video from ATV stations and distributes it around the internet, enabling anyone to watch an ATV 'transmission'.

So, following my 'informal audit' of some 'streaming' activity in a recent *In Vision*, I decided to watch a 'live' BATC outside broadcast for the first time. Transmissions were scheduled to start at 0925 local time, but in true Amateur tradition, after a few audio noises and shaky images, the programme came 'on air' shortly after 1000.

The First Scene

The first scene was of a local member of FRARS, complete with wind-shielded microphone, standing in front of a huge satellite dish. Sound and vision were, well, satisfactory as he welcomed viewers, chatted about the programme to come, before moving inside the building to put the exhibits into vision and do some interviews. And that's when it all started to go wrong.

Vision started to 'freeze' and sound became intermittent. A fundamental with interviewing is not to let the interviewee turn away from the microphone and to move it closer to the person when they are talking. So, answers were sometimes barely audible and often cut out altogether. This, along with vision 'freezes' every few seconds, were rapidly making the 'stream' unwatchable.

Fortunately, comments on the text-based 'chat-room' were highlighting these faults; eventually, the 'frame-rate' going into the local server was reduced from 25 to 15 frames per second and this cured both problems. The transmission continued into the afternoon and chat-room comments indicated that it had been well-received by all who had logged on to the 'stream'.

A Welcome

May I now welcome **Bill Shepherd**, who holds the callsigns **EI4KB**, **PA3FDK** and **G0KPR** to *In Vision*. I first met Bill at the BATC convention about five years ago and as we were clearly in agreement about several aspects of ATV. We've maintained correspondence ever since, even though Bill spends a lot of his time in Ireland and Holland these days. I've convinced Bill to write about ATV as he sees it in these countries.

So Bill, for the rest of this column, over to you!

He writes: "ATV activity in the Republic of Ireland is challenged by the terrain. The population centres of Dublin, Cork, Galway and Limerick are separated in many cases by rugged and somewhat hilly signal paths. Nevertheless, there's a significant level of ATV activity, which sometimes calls for innovation to overcome these challenges. There's also a national ATV organisation, **The Irish Amateur Television Club**, with a brand new website at **www.iatc.ie** containing repeater information and accounts of television activity in the area.

"One of the active groups is centred in Drogheda to the north of Dublin. A member of the groups is **Pat Fitzpatrick EI2HX** and he has taken an energetic approach to the problem of difficult signal paths. He lives close to a hill to the north of his QTH and so, to overcome this problem, he has gone mobile with ATV. He transmits ATV from an 1.2GHz Alford slot antenna mounted on the roof rack of his car. He also operates '/P' on 10GHz taking advantage of the elevation provided by the hills around Dublin and uses sea ducting to transmit from the bays on the east coast of Ireland.

"Much of his equipment is home constructed or assembled from modules. Pat writes a column in every issue of the **Irish Radio Transmitters Society**'s magazine *Echo Ireland*. The column is entitled *The HX files*. Fortunately Pat also publishes his projects online at **http://thehxfiles.blogspot.com** where readers can find detailed accounts of the projects that he and his group have developed.

"Using his callsign to search in Google you'll find Youtube footage of activity from Clogerhead. At Clogerhead also **Thomas Caffrey EI2JD** has an antenna 'farm' that would be the envy of any Amateur and this can also be seen on Youtube."

Bill continues: "There are other groups centred around Dublin and Cork and in other locations promoting and developing ATV in their areas. The space in this column will not permit a full account of ATV activity, but by following the links provided and also by looking at the Irish club sites one can get a wider picture of the ATV scene."

Two Clear Lessons

Finally for this time, Bill concludes: "Two lessons are clear from Irish activity in ATV. Firstly with enthusiasm and innovation even difficult physical circumstances can be overcome and real enjoyment and satisfaction gained from the hobby. Secondly ATV in an area grows organically from a nucleus of a small number of committed and active enthusiasts. It would be good if sometime in the future the Irish and UK ATVers could find ways of linking up - yes on air!"

Many thanks for that Bill, please continue to keep us all up to date with what's happening in EI. See you next time. **PW**

Rallies

Send your rally info to:

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

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations. PW Publishing Ltd. is attending at rallies marked *. Please check with the organisers that the rally is 'on' before leaving home.

MAY

May 15th

Vintage Communications Fair

The National Vintage Communications Fair organised by the British Vintage Wireless Society will be held in the Warwickshire Exhibition Centre, The Fosse, Fosse Way, Leamington Spa CV31 1XN. There will be free car parking, the show will be open from 10.30am to 4.00pm and entry will cost £6.00 (under 14s free). Early entry (about 9.00am) will be available for £20.00.

E-mail: info@nvcf.org.uk
www.nvcf.org.uk/index.htm

May 22nd

The Dunstable Downs Boot Sale

The Dunstable Downs Radio Club Boot Sale will be held at Stockwood Park, Luton LU1 5NR (M1 J10 then yellow DDRC signs). The boot sale opens to the public at 9.00am and there will be talk-in on S22 (V44). Car parking will cost £2.00 and catering will be available.

www.ddrcbootsale.org

May 22nd

The Mid Ulster Rally

The Mid Ulster Amateur Radio Club Rally and Boot Sale will be held in the Drumgor Youth Centre, Drumgor Heights, Craigavon BT65 4AP. The doors will be open from 12 noon to 4.00pm and there will be talk-in, car parking and a Bring & Buy.

www.muarc.com

May 29th

The Kinetic Avionic Party

The Kinetic Avionic Party will be held at Elstree Aerodrome (EGTR), Borehamwood WD6 3AR between 10.00am and 4.00pm. There will food and refreshments and in the afternoon there will be a programme of displays and lectures along with photo opportunities, rides and the chance to fly in a helicopter. Everyone is invited to this free event – more information is available on the Kinetic Avionic website.

www.kinetic.co.uk

JUNE

June 5th

The Newhaven Fort Rally

The Newhaven Fort Amateur Radio Group Rally and Fort Open Day will take place at Newhaven Fort, East Sussex, near the southern end of the A26. The doors will open at 10.30am and admission will cost £2.00. There will be car parking, a car boot sale, special interest groups, catering, attractions for the family and facilities for the disabled.

Eddie G0ECW
Tel: 01273 300772
E-mail: eddie@zamboodle.demon.co.uk

June 5th

The Red Rose QRP Festival

The 15th Red Rose QRP Festival will take place in the Formby Hall, Alder Street (off the High Street), Atherton, Manchester M46 9EY from 11.00am to 3.00pm. Admission will be £2.00 (children under 14 free) and there will be free car parking, trade and individual stands, club stands (including RSGB and GQRP), a low cost Bring & Buy, catering with a licensed bar and facilities for the disabled. Some tables are available at £8 but please book early.

Les Jackson G4HZJ
Tel: 01942 870634
E-mail: g4hzj@ntlworld.com

June 5th

The Spalding Rally

The Spalding and District Amateur Radio Society Annual Rally will take place in the Sir John Gleed Technology School, Halmer Gardens, Spalding, Lincolnshire PE11 2EF. The doors will open at 10.00am and there will be free parking, trade stands, catering and a car boot sale.

John G4NBR
Tel: 07946 302815
Graham G8NWC
Tel: 07947 764481.
E-Mail: rally-secretary@sdars.org.uk
www.sdars.org.uk

June 12th

The Ipswich Radio Rally

The East Suffolk Wireless Revival (Ipswich Radio Rally) will take place in the Orwell Crossing Lorry Park, A14 Eastbound, Nacton, Ipswich IP10 0DD. The doors will open at 9.30am, admission will cost £1.00 and there will be talk-in on S22, car parking, a Bring & Buy, a car boot sale, special interest groups, the GB4SWR HF station and catering.

Steve M1ACB
Tel: 07711 329624
www.eswr.org.uk

June 12th

The Junction 28 QRP Rally

The 10th Junction 28 QRP Rally organised by the South Normanton, Alfreton and District Amateur Radio Club in association with the G-QRP Club will take place in the Alfreton Leisure Centre, Church Street, Alfreton, Derbyshire DB55 7BD. This is ten minutes from J28 on the M1 and the A38. The doors will open at 10.00am and there will be trade stands, a Bring & Buy, special interest groups and catering.

Russell Bradley G0OKD
Tel: 01773 783658
E-mail: russellbradleyg0okd@ntlworld.com
www.snadarc.com

June 19th

The Newbury Rally

The Newbury Radio Rally and Boot Sale will take place in the Newbury Showground, which is next to J13 of the M4. It will open at 9.00am and admission will be £2.00. Sellers will have access from 8.00am and pitches will cost £10. There will be talk-in on S22, free car parking, trade stands, catering, a flea market, special interest groups and facilities for the disabled.

E-mail: rallynadars.org.uk
www.nadars.org.uk

June 25th

Amateur Radio Jumble

The Amateur Radio Jumble event will take place at the Kilham Village Hall, near Driffield, East Yorkshire YO25 4RG. The doors will open at 9.30am and admission will cost £1.00, which includes tea or coffee.

John G3XYF
Tel: 01377 254441
E-mail g3xyf@btconnect.com

June 26th

The West of England Radio Rally*

The West of England Radio Rally will be held at the Cheese & Grain, Bridge Street, Frome, Somerset BA11 1BE. There will be car parking, trade stands, catering and facilities for the disabled.

Shaun G8VPG
Tel: 01225 873 098
E-mail: rallymanager@westrally.org.uk
www.westrally.org.uk

JULY

July 2nd

The Bangor Rally

The Bangor and District Amateur Radio Society Rally will be held in the Donaghadee Community Centre, County Down BT21 0HE. The doors will open at 11.30am, admission will be £2.00 and there will be trade stands, a Bring & Buy, catering and special interest groups.

Bill GI4AAM
Tel: 028 9181 6707
E-mail: bill.langtry@btinternet.com
www.bdars.com

July 2nd

The Stockport Rally

The second Stockport Rally (previously known as the Reddish Rally) will be held at Walthew House, Shaw Heath, Stockport SK2 6QS. The doors will open at 10.00am and the entrance fee will be £1.00. There will be talk-in on 145.550MHz, car parking, refreshments and facilities for the disabled.

Bernard G3SHF
Tel: 01625 850088 (daytime & weekends)
Nigel G0RXA
Tel: 07973 312699 (evenings & weekends)
E-mail: info@stockportrally.co.uk
http://stockportrally.co.uk

July 10th

The Cornish Rally

The 48th Cornish Radio Amateur Club Rally will be held in the usual venue of Penair School, St Clements, Truro TR1 1TN. The doors will open at 10.30am and admission will be £2.00. There will be talk-in, a car park, trade stands, a Bring & Buy and catering.

Steve
Tel: 01209 844939
E-mail: g7voh@btinternet.com
Ken
Tel: 01209 821073
E-mail: pendennis38@btinternet.com
www.cornishradioamateurclub.org.uk

Carl Mason GW0VSW's HF Highlights
2 Golwg-y-Bryn, Woodland Road, Skewen, Neath, Port Talbot SA10 6SP
Tel: (01792) 380822 E-mail: gw0vsw@btinternet.com

HF Highlights

Carl Mason GW0VSW presents his monthly round-up of your h.f. band reports. As usual, all reports to be with Carl by the 15th of each month please!

Welcome to *HF Highlights* (*HFH*) and this month it is good to see some improved conditions on the high frequency (h.f.) bands. This has included good openings on the higher bands although they appear to remain rather random for the time being. This increase in activity has also bought with it the opportunity to work some rarer DX calls and several DXpeditions which otherwise would not have been heard. These have been listed on DX clusters which have drawn attention to the calls, operating frequencies and resulted in some major pile-ups!

Unfortunately, these stations have been suffering from some rather poor operating from many parts of the globe as Amateur Radio operators 'fight' to get the contacts into their logbooks. The conduct of some operators is becoming of increasing concern to many of our reporters, especially as it would appear that it's European stations that are bearing the brunt of the blame.

I make no apologies for mentioning again the *Amateur radio ethics and operating procedures version 3* written by **John Devoldere ON4UN** and **Mark Demeuleneere ON4WW**, which is available to download from **www.ham-operating-ethics.org/versions.html** Back in 2008, this document was accepted by the IARU Administrative Council, the highest body of the IARU, as representing the point of view of the IARU on the subject and makes very interesting reading. I think it's something that we should all make ourselves familiar with as it can only help to improve our own operating standards!

The DX News

On to some DX news now and we first head to Honduras a country situated in South America, where **Gerard Jacot F2JD** will be active as **HR5/F2JD** from Copnathe – the site of some excellent Mayan ruins near the Guatemalan border. Activity will be until mid-May and Gerard will be operating both c.w. and s.s.b. on most bands with the QSL route is via F6AJA.

In the south-western Pacific Ocean is Papau New Guinea and it's from here that **Tim Linn KD5SSF** will spend a couple of years in Ukarumpa. This is an international community that is the main centre for the Summer Institute of Linguistics (SIL) located in the Eastern Highlands Province.

Adam Watson MM6AON.

The population of Ukarumpa consists of a variety of Christian workers, their families and employee and was established in the mid-1950s by Wycliffe Bible Translators. Tim will be active as **P29ZL** and will operate both PSK31 and s.s.b. in his evenings and during the weekends using 100W and an inverted-V antennas for 7, 14, 21 and 28MHz.

To celebrate the Hungarian Presidency of the Council of the European Union several special event stations will be found on the bands including; 011A, HG2011E, HG2011EU, HG2011I, HG2011N, HG2011O, HG2011P, HG2011R and HG2011U and they will all be active until June 30th. All contacts will be confirmed automatically via the bureau and information on a free award issued for making the words 'European Union' by using the suffixes of the call signs worked can be found on QRZ.com

Another European special event callsign **DL0YLWM** and YL district stations with the callsigns **DL0YLx** or **DR11YLx** and the special DOK **YLWMx** will be on the air from June 1st until July 31st for the FIFA Women's World Cup, the women's football world championship, which is being held in Germany between June 26th and July 17th. The character 'x' stands for the respective DARC district so DL0YLF will be active for DARC district Hessen and use the special DOK YLWMF.

Radio Amateurs may apply for four awards at Bronze, Silver, Gold and Platinum levels and to achieve any of these you need to log the appropriate number of German YL stations in the given time frame. There are no band limitations and further information can found on QRZ.com Every initial band/mode QSO will be confirmed via the bureau automatically and there is no need to send a QSL card except for s.w.l. reports which go to DL4CR!

Your Reports

On to your reports now and there's a lot to get through! The first log is from **Eric Masters G0KRT** in Worcester Park, Surrey who found that band conditions "had picked up, especially on the higher bands" but tried a short spell on 7MHz c.w. using his Kenwood TS-570 and a modified home brew W3EDP antenna 26m (84 feet) long with counterpoises tuned with an SGC-211 auto tuner

to work WE3C (USA) in Fleetwood, Pennsylvania at 2001UTC.

Also on the band was **Bill Ward 2E0BWX** in Edwinstowe, Nottinghamshire who had voice contacts with PD1DER (Netherlands) 0905 and HB1OK (Switzerland) at 1418UTC using his Icom IC-7400 at 50W and a SRC X65 wire antenna.

THE 14MHz Band

Moving on to 14MHz Bill 2E0BWX tried JT65HF on the band at 25W working IZ5CMG (Italy) 0930 and OH7FMT (Finland) at 0932 while EA7ZY (Spain) made his PSK31 log at 0953. Then came LZ2LP (Bulgaria) who was worked with s.s.b. with 50W at 1030UTC.

In Portadown, County Armagh, Northern Ireland, **Tom Ruddell 2I0TJR** said "Although there has been much speculation about improved conditions recently, I found that at my location there has been no noticeable change. In fact little DX has been worked compared to the last couple of years". Stations in Tom's s.s.b. log included OD5NH (Lebanon) 1603, TF5B (Iceland) EU-021 at 1740, ZS6BGH (South Africa) 1753, 6V7T (Senegal) 1842, EA8CDP (Canary Islands) AF-004 at 1805 and PT2ZXR (Brazil) at 2134UTC.

During the evening Tom had an interesting QSO with YO4RYU/MM who was in the Atlantic Ocean 550km south of Rio de Janeiro in Brazil and YB0DJ (Indonesia). This was after breaking a large pile up for a 5/9+ report which was pleasing considering Tom was running 50W from a Kenwood TS-570DG and home-brew vertical antenna.

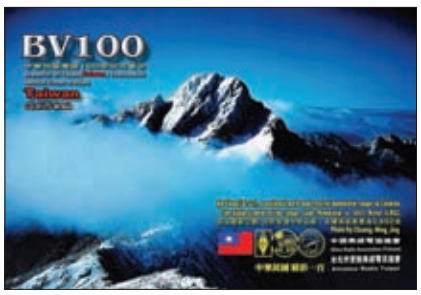
In Cambridge, New Zealand, **Peter Leng ZL4TE** used a Yaesu FT-1000MP Mk5 and Ranger amplifier with 400W s.s.b. into a Cushcraft AV3 vertical to work NH7RO (Hawaii) OC-019 at 0528, IZ5HPQ (Italy) 0730, PT2CM (Brazil) 0740, EA9BW (Ceuta and Melilla) 0811. Then came ES5GP (Estonia) 0812, JQ1QKK (Japan) 0820, EA5GI (Spain) 0833, Gary Ellis M0GME in Scarborough at 0837 and Mike Tovey GW4XSX in Aberaeron at 0851UTC.

Eric G0KRT managed a little time on the band, using 100W s.s.b. he found VO1KVT (Canada) at 1840 followed by W3LPL (USA) in Glanwood, Maryland at 1848UTC.

Nicholas Phillips 2E0MCA's shack.

Jim Pedley GM7TUD has a simple layout, but it works well for him.

Steve Gillespie MI3ATK in Derry City, Northern Ireland tried s.s.b. from a Kenwood TS-870 at 100W to a full size G5RV to work ZL2JBR (New Zealand) North Island OC-036 at 0819, TF3IG (Iceland) EU-021 1226, UN8GV (Kazakhstan) 1230. Then came and EI/MI0ADX Jim Kavanagh in Buncrana, County Donegal who Steve said "was not too far away at 17 miles but he would be chuffed to see his call in the report". Consider it done Steve!



The BV100 QSL card after he was worked by Jim Pedley GM7TUD on 21MHz s.s.b.

The NH7RO QSL card after he was worked by Peter Leng ZL4TE on 14MHz s.s.b.

The s.s.b. of **Martyn Medcalf M3VAM** in Chelmsford, Essex found SP9LID (Poland) 1052, S51A (Slovenia) 1053, KR1X (USA) in Dover, Delaware at 1057, SV4DPI (Greece) 1105. Then came CQ3L (Madeira Islands) AF-014 the contest call of **Walter Skudlarek DJ6QT** at 1112. Next into the log was YU1DW (Serbia) 1328 and EA7/G1WW (Spain) at 1434UTC using a Yaesu FT-897 and Comet CHA-250BX Vertical antenna.

The 18 & 21MHz Bands

The 18MHz band was chosen by our youngest reporter to date, **Adam Watson MM6AON** who is just 9 years old! Adam passed his Foundation Licence in February. With the help of his father **Ian 2M0CFB,** Adam was able to lash up a inverted V dipole for the band and after a few "CQ" calls using a Yaesu FT-817 at 5W, he managed to contact IZ6TSJ (Italy) at 1111 and EB8CHG in Lanzarote at 1128UTC on s.s.b. His reported strength was not that great but he got out nevertheless. I'm sure we all

look forward to hearing more of Adam's h.f. activities in the near future! (Congratulations from the *PW* Editorial team too Adam! **G3XFD**.)

In Newtownabbey, Northern Ireland **Peter Lowrie MI5JYK** uses a Yaesu FT-817 at 2.5W with a home-brew two radial wire GP for the band which continues to work very well. Stations worked with s.s.b. include LZ133GO (Bulgaria) 1132, 9A2X (Croatia) 1135, E75MC (Bosnia & Herzegovina) 1153. Then came SQ7DQX (Poland) 1158, YL2LW (Latvia) 1206, EW8A (Belarus) 1611, EA3EVL (Spain) 1627, OM3TWM (Slovakia) 1652 and EA8CXV (Canary Islands) at 1805UTC.

Next, it's on to **George Davis G3ICO** in Yeovil, Somerset who has now worked 88 countries with 5W so far this year and his logbook is still growing! Using his Elecraft K2 at 5W to a 40m long doublet antenna, George found c.w. stations VR2UW (Hong Kong) 1207, CO8LY (Cuba) NA-015 at 1209, TJ9PF (Cameroon) 1305, 3B8DB (Mauritius) AF-049 at 1419, 5R8AL (Madagascar) AF-013 at 1446, VK9C/G6AY (Norfolk Island) OC-005 at 1514 (QSL via G3SWH). Not bad going with QRP!!!

There were a few contacts on the band for Tom 2I0TJR who found a good opening one afternoon, the highlight of which, was working Allen Friedman K6YRA (USA) who lives in Encino near Los Angeles, California at 1506UTC. This was Tom's first QSO into that state for nearly seven years and a very welcome addition to his log!

The 21MHz log of **Jim Pedley GM7TUD** in Locharbriggs, Dumfries shows s.s.b. QSOs with BV100 (Taiwan) 1017 QSL direct to PO Box 84-609, Taipei, Taiwan 100, Taiwan, 3B8/SP2FUD (Mauritius) AF-049 at 1057, 5X1NG (Uganda) 1213, HH4/AF4Z (Haiti) NA-096 at 1507. Nect came YV7AJ (Venezuela) 1600, KG4SS (Guantanamo Bay) NA-015 at 1620 and TE8X (Costa Rica) on Venado Island NA-116 at 1700UTC (QSL via TI5AA). Jim was using a Kenwood TS-590, at 100W and a Cushcraft MA5B antenna. He said, "I have taken my Cushcraft D3W antenna down as it was suffering from water ingress and de-tuning on 18MHz. I can't find where the water is getting in and wondered if any readers have had similar problems?"

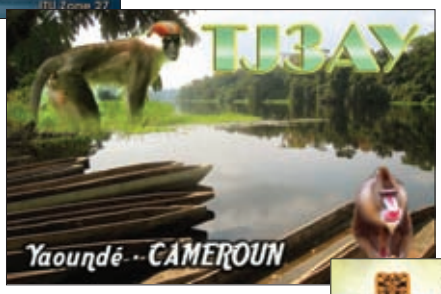
The 24 & 28MHz Bands

On the 24MHz band was another new reporter **Nick Phillips 2E0BPU** in Croydon who only works QRP s.s.b. His station includes an Icom IC-703, KW e-zee match and a 30m (100ft) doublet antenna and it works well. He worked SV2MAP (Greece) 1047, TA3AX (Turkey) 1048, SV9GPV (Crete) EU-015 at 1232, OD5ET (Lebanon) 1255, K1IED (USA) in South Windsor, Connecticut at 1326. Then came 4X4FR (Israel) who was worked with just 500mW for a 5/5 report at 1506! This was followed by EA8BWL (Canary Islands)at 1508UTC, which just goes to show that low power doesn't mean no DX!

Welcome now to **Maynard Beddard M1EGX** in Sutton Coldfield who worked TJ3AY (Cameroon) with s.s.b. at 1612UTC using a Yaesu FT-920 and 100W into a loop antenna. Maynard has been licensed since 1997 but has been interested in Amateur Radio for over 40 years. His primary interest is in experimenting with different antennas and as he only has a small garden this always presents him with something of a challenge.

The QSL card from F5PBG after he was worked by Geoffrey Powell M1EDF on 7MHz c.w.

The card from TJ3AY after he was worked by Maynard Beddard on 24MHz s.s.b.



Back in Yeovil George G3ICO logged 24MHz QSOs with5B5OJ (Cyprus) AS-004 at 1359, 3B8DB (Mauritius) 1419 and HS02CW (Thailand) at 1508 all with c.w. at 5W. Jim GM7TUD managed s.s.b. calls 9K50RX (Kuwait) 0929 and later J5NAR (Guinea Bissau) at 1308UTC QSL via HA0NAR.

A short period on the band gave Eric G0KRT QSOs with N5LZ (USA) in Mendon, Utah at 1624, CT9/DL3KWR (Madeira Islands) AF-014 at 1714 and CT8/SM6C (Azores) EU-003 at 1721UTC all using c.w. at 100W.

Finally, we climb up to to 28MHz where Jim GM7TUD used s.s.b. to log VU2DSI (India) 1105, YI1RZ (Iraq) 1115, TJ9PF (Cameroon) 1120, VK5BC (Australia) OC-001 at 1129, ZS1HL (South Africa) 1137, SU1SK (Egypt) 1202, J28RO (Djibouti) 1210, ST2BSS (Sudan) 1219 and A45XR (Oman) at 1252.

Jim reports,"the band has started to deliver DX but is very hit and miss at the moment". This is is a view shared by Peter MI5JYK who tried his Albrecht AE485S and using f.m. worked EA8/DK6XM (Canary Islands) 1221, SV2BBO (Greece) 1224 and RN6DG (European Russia) at 1234, while George G3ICO worked ZS1EL (South Africa) on the key during a brief opening at 1613UTC with 5W QRP.

Signing Off

Another month flies by and it's good to see that there has been plenty of activity on the h.f. bands and some interesting DX to work. There's a good deal of contest and IOTA activity coming up over the next few months so there should be a reasonable chance of working a 'new one' as the band conditions continue to improve. Don't forget to monitor the higher bands and maybe put out a few "CQ" calls as openings can happen at anytime.

Before I close you may be interested to hear that **Callum Graham 2M0YCG** has posted a video on YouTube showing his contact with John ZL2JBR in New Zealand while running just 5W:

The QSL card from LZ133GO after he was worked by Peter Lowrie MI5JYK on 18MHz s.s.b.

www.youtube.com/watch?v=Qhqv_c9hW3Q&feature=player_embedded

The YouTube description reads, "On Saturday 26th March 2011 at 1030UTC during the CQ WW WPX Contest I managed to work **John Brader ZL2JBR** who was located North of Wellington in the North West Part of New Zeland on Saturday 26th March 2011. I was running a Yaesu FT-817 with 5W into a Cobwebb Antenna" a distance of 18,426km". (Well done Callum!).

As usual my thanks go to **Maurio Pregliasco I1JQJ/KB2TJM** editor of the **425 DX Newsletter** for all the DX information and to all our reporters for their logs. Until next month I wish you all good DX. 73,Carl GW0VSW

PW

Classified Ads

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.

Aerials

GAREX ELECTRONICS VHF/UHF accessories and aerials, TVI Filters, 4m & 6m Transceivers.
Tel: 07714 198374
www.garex.co.uk
PO Box 52, Exeter EX4 8WX

VORTEX ANTENNA SYSTEMS New UK mainstream antenna manufacturer and hardware supplier. Visit us online at www.vortexantennas.co.uk or 07943 871893.

VORTEX ANTENNA SYSTEMS Delta Loops, Yagis. Monoband and multiband. For the home constuctor – antenna parts including 6082-T6 tubing, stainless U-bolts, saddles, mounting kits and much more. www.vortexantennas.co.uk or 07943 871893.

G4TPH PORTABLE MAGLOOPS back in production. The new ML-40 MKII covers 40m thru 15m. Improved SWR. and power handling.
See SWR charts at: www.g4tph.com

TOP PRICES PAID
for all your valves, tubes, semi-conductors and ICs.

Langrex
Unit 4, Daux Road, Billingshurst, W. Sussex RH14 9SJ
TEL: 01403 785600. FAX: 01403 785656.
www.langrex.co.uk

Accommodation

ACCOMMODATION CORNWALL Self catering bungalow and large static caravan in 1.5 acre grounds near Bude. Pets welcome. Telephone for brochure 01566 781493.

For sale

X-tals 100kHz-250MHz. Std 10.106, 10.245, 10.7, 11.155MHz @ £1.50. Callg 3.56, 7.030, 14.060, 28.060MHz @ £1.50. 1.7468MHz X-tal Clansman 321 ex-stock p.o.a. 10.7MHz 10kHz filter @ £5.75, 1.4MHz SSB filter p.o.a. P&P £1.50 + VAT. IQ Electo
Tel: 0208 391 0545.
E-mail: vincentvoy@hotmail.co.uk

CZECH MORSE KEYS 50 years old, still in original factory wrapping. Extremely well made with superb keying action.
www.czechmorsekeys.com

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 24 West Ridge, Kingsthorpe, Norhtampton NN2 7RA.

Repairs

REPAIRS TO ALL AMATEUR AND VINTAGE Rx/Tx Cost effective service. Phone or call in for details. Kent Rigs, 52 Salisbury Road, Chatham, Kent ME4 5NN. Tel: 07903 023437.

RELIABLE REPAIRS for all amateur and vintage equipment. Professional service, reasonable rates.
Tel: 01807 580376.
E-mail: radiorepairs@btconnect.com

Valves

VALVES AND ALLIED COMPONENTS IN STOCK Ring for free list. Valves/ books/magazines wanted. Geoff Davies (Radio).
Tel: 01788 574774.

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.

Please ensure that and cheques or postal orders are made out to PW Publishing Ltd.

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 20% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979, Fax: 01202 659950.

Please insert this advertisement in the ..... **issue of** ***Practical Wireless*** (if you do not specify an issue we will insert it in the next available issue of *PW*) for ..... insertion/s. I enclose Cheque/P.O. for £.....(42p per word, 12 minimum, please add 20% 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

BARGAIN BASEMENT RULES
Only £5 per advert. Subscribers FREE!
Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of **30 words**, plus **12 words** for your contact details on the form provided and send - it together with the dated corner flash and your **payment of £5** (**subscribers** can place their advert **free of charge** as long as they provide their **subs number or mailing label** and **corner flash**), cheques should be made payable to **PW Publishing Ltd.**, credit card payments also accepted.

Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert to **peter@pwpublishing.ltd.uk** (If you don't want to include your credit card details on your E-mail, just 'phone us on **0845 803 1979**.

Please help us to help you by preparing your advert carefully. Any advert which contains ?? marks indicates that the advertiseing dept. could not read/interpret the wording.

Please avoid FAXing your advert - it could delay publication.

Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted.

No responsibility will be taken for errors and no correspondence will be entered into on any decision taken by the Editor on any of these conditions.

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

Bargain Basement adverts will now cost £5 per advert (subscribers still free) and will also be published in *RadioUser*, our sister magazine, unless requested otherwise.

FOR SALE

AOR MINI bought February this year. Ten hours use, £110 including postage. Tel: Alan 0161 633 5182 (Oldham).

BRASS MORSE KEY on polished hardwood base. Ideal desk ornament or presentation gift. Only nine available, £50 each incl. P&P.
Tel: Jim 01945 583451 (Norfolk).

CLARK 40ft Scam-12 telescopic pneumatic mast. I have two. Original hand pump, swivel assemble, legs, guys, kitbag, intructions included, £460. Ex-military, substantial and heavy, delivery possible. Tel: 01654 712350 (Mid-Wales). E-mail: radio@webshack.co.uk

HITACHI DIGITAL STORAGE SCOPE VC-6D45A, £120. Yaesu FRG-100 short wave receiver, £200. Icom PCR-1000 computer controlled receiver, £150. Global AT-2000 ATU, £40. Superscan MkII active antenna 0-2GHz, £25. Audio oscilloscope, £20. Buyer collects or can deliver up to 30 miles. Tel: 07871 269239 (Sturry, Kent).

ICOM E-282 D-STAR five months old, £500. Kenwood VCH-1 visual communicater, £175. DTMF MH-59 A8J mic for 857. New, £45. Kenwood MC-60 new lead, £75. Kenwood TH-D7 3 batteries, £225. Alinco DJ-446 2 batteries + mic, £200. Icom receiver IC-R72, £220. Cash only, buyer collects. Tel: 0740 7351970 (Wiltshire).

JAPAN RADIO CORP NRD-515 D/s het Rx, superb condition. Rare opportunity, £200. Racal RA-17L table top Rx in original Racal cabinet, £225. Marconi CR-100/9 Rx very fine, £100. Buyer must collect
Tel: Tony 01342 822780 after 18:30 (Sussex).
E-mail: anthonyjohn@clara.co.uk.

LOWE 150 Rx rare, black. Not SMC with key pad, original PSU, original handbook and sales brochure, etc. Everything works as it should. Good all round condition, £240 + P&P or collect. Tel: 01903 859712 anytime (W. Sussex).

REALISTIC 2006 400 channels, 25-1300MHz, £45. Realistic PRO-39 66-980MHz, £20.
Tel: Tom M3EHA 01606 597342 (Cheshire).

YAESU FT-857 LDG tuner 100, £450. Tel: 07756 146314 (Manchester).

WANTED

OLD HALF INCH FERRITE RODS must be half inch, 12.7mm, in diameter and be six inches long or more. Will pay very good money for the rods.
Tel: Peter Tankard 0114 2316321 between 9am and 9pm (Sheffield).

NOW £5

Bargain Basement order form

Please make any cheques or Postal Orders for advertisments payable to PW Publishing Ltd.

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 .....

PW & RU ☐

PW ONLY ☐

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 send mailer label)

		(30)	

CONTACT DETAILS FOR ADVERT. Please only write in the contact details you wish to be published with your advert, ie. do you want your name & address, or just your telephone number? Your advert, you decide! **PLEASE - No FAXed Ads!** (12)

B.B. June '11

TRADERS 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.

NEVADA

023-9231 3090

TRANSCEIVERS

ALINCO DJ596 DUALBAND H/HELD £89
ALINCO DJC7 DUALBAND H/HELD £84
ALINCO DJV17 VHF/FM H/HELD £99
ALINCO DX70TH HF TRANSCEIVER £459
ICOM 910 DUAL BAND TX WITH MODULE £1099
ICOM E91 DUALBAND HANDHELD £169
KENWOOD TS570DG HF TRANSCEIVER £599
KENWOOD TS790 VHF/UHF TRANSCEIVER £499
YAESU FT2000 HF BASE TRANSCEIVER £1699
YAESU FT840 HF TRANSCEIVER £399
YAESU FT950 HF TRANSCEIVER £899

HANDHELD SCANNERS

ALINCO DJX2 AM/FM/WFM RADIO £79
BEARCAT 72XLT H/HELD £80
BEARCAT USD230 SCANNER £99
ICOM R5 HANDHELD SCANNER £145
YUPITERU MVT7100 SCANNER £149

RECEIVERS

ETON G6 RADIO £69
ETON MINI 300 PORTABLE £13
KINETIC SBS1E RADAR RECEIVER £319
YAESU VR5000 WITH DSP £435

ACCESSORIES

ALINCO EJ47U DIGITAL BOARD £46
BHI NOISE ELIMINATING SPKR £49
DRY DUMMY LOAD £19
JIM M75 SCANNER PREAMPLIFIER £54
KENWOOD MC80 MICROPHONE £99
KENWOOD MC85 MICROPHONE £79
PALSTAR AA30 ..... £69
PALSTAR PS06 POWER SUPPLY £19
PALSTAR PS15 POWER SUPPLY £29
PALSTAR PS30 POWER SUPPLY £69
PALSTAR PS50 POWER SUPPLY £149
TOYO SA450 ANTENNA SWITCH £17
UNIROSS CHARGER & BATTERIES £12
VECTRONICS VC300DLP TUNER £129
YAESU FC30 ATU £165
YAESU MH35A2B SPEAKER MIC £19
INTELLIGENT DIGITAL MULTIMETER £25
CLAMP ON DIGITAL MULTIMETER £10

B-GRADE ITEMS

ALINCO DJV17 H/HELD TRANSCEIVER £99
BEARCAT 69XLT HANDHELD SCANNER £50
BEARCAT 800XLT BASE/MOBILE SCANNER £259
ICOM R5 HANDHELD SCANNER £159
ETON E5 PORTABLE SHORTWAVE RADIO £69
ETON G3 PORTABLE SHORTWAVE RADIO £69
ETON S350 RED PORTABLE RADIO £59
ETON G8 PORTABLE SHORTWAVE RADIO £39
ETON E100 PORTABLE SHORTWAVE RADIO £35
KINETIC SBS1ER £449
MAYCOM FR100 SCANNER £69
MOONRAKER M8 RADIO £25
YAESU VX8 HANDHELD TRIBAND TX £279

SHORTWAVE SHOP LTD

01202 490099

TRANCEIVERS

YAESU FT-900 ..... £595
YAESU VX-150 ..... £99
YAESU FT-60 ..... £120
ICOM IC-703 ..... £350
ALINCO DJ-V5 ..... £200
ALINCO DJ-195 ..... £100
ALINCO DJ-S11 ..... £75
ALINCO DR-430 70cms £85
ICOM PMR 446x2Water Resist/w.charg £200
MIDLAND CB 77-25UK £50
MIDLAND CB 77-805UK £55
MAXON ALERT 7E CB £65
STANDARD HX260E Marine H/H New £99

RECEIVERS

JRC NRD 345 ..... £395
JRC NRD 535 ..... £795
PANASONIC RF-4800 10Band Comm Rx £95
AOR 8200 Mk3 Demo Model £349
LOWE HF-225 with Keypad £325
YAESU FRG-9600 ..... £225
YUPITERY MVT-7100 ..... £110
YUPITERU MVT 7300 ..... £99
UNIDEN UBC-800XLT Ex Demo/software £265
UNIDEN UBC-860XLT Desktop £65
REALISTIC PRO 2005 ..... £80
AMI DIGI SAT RX ASR WS201 ..... £129
ALINCO DJX3 ..... £70
CODAR Multiband-6 minus coils £30
WORLD RECEIVER WR2100 ..... £80
GOODMANS GCD200 DAB Special Price £50
BPL WORLD SPACE £25

ACCESSORIES

HI-MOUND HK-708 Straight Key £35
Two Part Dual Band Antenna (Base) £35
Air Ministry 1940 Straight Key £45
Military Straight Key Circa 1940 ..... £35
ICOM AH7000 DISCONE £85
CREATE CLP 5130 Log Periodic NEW £250
ICOM HS-51 Special Bulk Price £27
YAESU MD1 B8 Desk Mic £50
YAESU XF-110CN Filter £55
YAESU XF-110S Filter £55
AKD WA3 ABS Wave Meter £25
AEA PK-88 PACKET CONTROLLER £35
WATSON HUNTER Freq Counter £50
CG SB-2000 DATA CONTROLLER £75
MANSON EP0925 PSU Demo Model £85
DAIWA CN620A 1kw POWER/SWR £65
ZETAGI HP1000 SWR METER £65
MFJ 1278B DATA CONTROLLER £65
WELZ SP-220 SWR/PWR METER £65
PM-2000 2Kw Pwr Meter £70
Various CB PSU'sFrom £10
LOWE FX-1Complete £75
Trailer mounted SCAM 40 Pump Up Mast £650
1.5INCH SWAGED POLES 5ft LONG £3 each or 4 for £10

WATERS & STANTON

01702 206835

Icom	IC-A3E	Airband H/Held + NAV/COM 50ch Alphanumeric	£180
Microset	PT-110	12V Stabilized 10A PSU with Over V / A protection	£69
Nevada	PSDL	50ohms Dummy load Dc-3000MHz max 15W	£30
Heil	AD-1-Y4	Cable for pro set and yaesu 4 pin round	£10
Midland	SWR-25	3.5-150MHz SWR / Power Meter 100W	£29
Roberts	R-862	HF/VHF receiver AM/WFM 0.15-0.281 / 0.522-1.62 / 4.6-21.95 / 87.5-108 MHz 3 VDC (2*R6 / AA)	£49
Alinco	DJ-X3E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 700Ch + 8.33kHz step	£95
Optoelectronics	Model-2810	10Hz-3GHz Frequency Counter	£145
Academy	CB-34	3-way SWR Bridge and Field Strenght Meter 25W (3.5MHz) 15W (7MHz)	£15
Microset	PM-110	10Amp 13.5V PSU with inbuilt Speaker and Transceiver Frame	£110
Microset	PR-430A	70cms 100 Watt Version 15db Gain -1.2db NF	£130
Microset	RU-45	70cm 3-15W in,45W out Linear + GaAsFET Preamp 12V	£149
Kenwood	BC-10	Desk Charger for PB-5, 6, 7 & 8 Ni-Cd's with PB-6	£29
Timewave	DSP-59	Multi-mode Audio Noise Filter with Gain Control 12V DC	£89
MFJ	MFJ-940A	28-30MHz 10m Mobile ATU + meter 150W	£39
Uniden	UBC-60XLT	66-512MHz (with gaps) FM Hand Held Receiver 80Ch. 4 x AA cells	£59
MFJ	MFJ-784B	Tunable DSP Audio Filter with Noise Reduction 12V	£189
Palstar	R-30CC	1KHz-30MHz AM/SSB Communications Receiver & Collins Filters 12V + psu	£399
Microset	RU-432-95	70cm 3-25W in,95W out Linear + GaAsFET Preamp	£399
AirNav Systems		Radarbox-PRO Real-time Aircraft Virtual Radar using ADS-B + Internet Networking via USB	£279
Alinco	DJ-580	2m/70cm FM H/Held Transceiver + Full Duplex Airband RX	£119
Alinco	DJ-X30	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 1000Ch.	£129
AOR	AR-3000A	100kHz-2036MHz All Mode Communications Receiver 400Ch. 12V + psu	£499
AOR	AR-3000A	100kHz-2036MHz All Mode Communications Receiver 400Ch. 12V + psu	£499
Uniden	UBC-69XLT-225-512MHz (with gaps) FM Hand Held Receiver 80Ch. 2 x AA		£55
AOR	AR-3000A	100kHz-2036MHz All Mode Communications Receiver 400Ch. 12V + psu	£499
Icom	IC-F4SR	SRBR Hand Held Transceiver Programmed for PMR-446 24ch	£149
Icom	IC-F4SR	SRBR Hand Held Transceiver Programmed for PMR-446 24ch	£149
Icom	IC-446S	PMR-446 Hand Held Transceiver 8ch + Smart Ring & ATS	£59
Icom	IC-446S	PMR-446 Hand Held Transceiver 8ch + Smart Ring & ATS	£59
Icom	IC-R20	0.150-1305MHz All Mode Hand Held Reciever 1050ch Alpha with Full Duplex, 260min Rec & USB socket	£269
Alinco	DJ-X30E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 1000Ch.	£129
Moonraker	Master	40ch 4w UK CB Hand Held Transceiver	£29
Alinco	DJ-191E	2m FM H/Held Transceiver + CTCSS & DTMF keypad	£119
Heil	Pro-Set-IC	Dual Headphones + Boom Mic & Special Icom insert	£99
MFJ	MFJ-994B	1.8-30MHz Auto ATU + Display & Meter matches 12-800 Ohms 600W	£239
MFJ	MFJ-993RC	Remote Control Unit for MFJ-993 Auto Tuner	£25
Eurosonic	ES-200CB	40ch 4w UK CB Hand Held Transceiver	£29
Jesan	CB-950FM	40ch 4w UK CB Hand Held Transceiver	£29
Global	CX-201	0-1GHz 2-Way Coax Switch with SO-239 1kW	£12
SGC	SG-500	Power Cube 1.6-30MHz Solid State Linear Amplifier 500W (SSB CW)	£989
AOR	AR-5000	10kHz-2.6GHz All Mode Communications Receiver 1000Ch. 12V + psu	£849
Yaesu	FT-8900R	10m, 6m, 2m, 70cm FM Mobile Transceiver 50W,35W Full Duplex + Remote Head	£249
SGC	SG-237	1.8-60MHz Microprocessor controled ATU 100W	£239
Ten Tec	Model538-Jupiter HF All Mode Base Transceiver + Spectrum Scope IF-DSP Filters 100W 12V DC		£999

RADIOWORLD

01922 414796

MF J-969 ATU	£159
Icom PS-85 Icom 20A 13.8V Switch Mode	£159
Kenwood TS-271E	£165
Yaesu FC-30 Antenna Tuner Unit	£169
Bearcat UBC-9000 Scanner	£179
Icom IC-R10 Hand held Scanner	£179
Bearcat UBC-780XLT	£179
ICOM IC-2200H 144-146	£189
Vectronics VC-300D Tuner with LED PEP Meter	£199
NATO Morse Key	£199
AOR AR-2002 Receiver	£199
UBC-785XLT Uniden-Bearcat Base Scanner 25-1300MHz	£209
RM KL501 HF AMPLIFIER 1.8 - 30MHz, 300W MAX 600W SSB	£210
MFJ-784B DSP Filter	£219
AOR 8200 Mk I	£220
Kenwood TM-741E - VHF/UHF transceiver 144-146 / 430-	£229
Yupiteru MVT-9000 MK2 Scanner	£240
MFJ-1278b DSP Multimode Data Controller	£249
Kenwood TM-V7E 2m/70cm FM Mobile Transceiver	£249.95
Icom IC-490E 70cms Mobile	£250
Yaesu FT-8800E Dual Band Mobile Transceiver	£259
Tokyo Hy-Power HL-50B 80m-6m Linear Amplifier	£269
MFJ-994B 600 Watt IntelliTuner Automatic Antenna Tun	£275
Yaesu FT-690R II	£275
Ten tec RX-320 PC COMMUNICATIONS RECEIVER	£275
Yaesu FT-690R II 6m transceiver	£275
Yaesu FTV-901R 2m / 70cm Transverter	£275
Yaesu FT-8900 Quad Band Mobile Transceiver	£279
Sidekick-black Compact Motorised Mobile HF Antenna	£299
Trio R2000 HF Receiver	£299
Lowe HF-225 HF receiver	£299
Kenwood TM-D700E Dual Band Mobile	£299
AirNav Radarbox 2009 version	£299
AOR AR-8200Mk3 Scanner	£349
ICOM IC-E2820 dual-band mobile transceiver	£369
Icom IC-707 Amateur HF transceiver	£399
Alinco DX-70TH HF & 6m transceiver	£399
Icom IC-R72 Receiver	£399
FR-101 Receiver HF+2m+6m	£399
Yaesu FT-817ND HF 6m VHF UHF 5W Transceiver	£419
Drake R8E HF Receiver	£425
Icom IC-R75	£449
AOR AR-3000A Wideband Receiver	£450
Icom IC-718 HF Transceiver	£459
FT-817bhiDSP Yaesu HF/6m/VHF/UHF 5W Transceiver with	£459
AOR AR-8600MK1 Wide Band Receiver	£469
R-30CC HF PALSTAR HF Rx	£499
Palstar R-30A Short Wave Receiver	£499
MTU-30/20 RF u-tuning Unit C	£500
MTU-80/40 RF u-tuning Unit B	£500
IC-706 MK2 With UT-106 Fitted	£529
Yaesu FT-857D Multi-band Mobile	£539
Kenwood TS-570DG/E HF transceiver	£599
Icom IC-821H	£599
Icom IC-706 MkIIG with DSP	£629
IC-7200 HF Transceiver	£649
Yaesu FT-897D Multiband Portable Transceiver	£649
Icom IC-756	£699
Kenwood TS-850S /AT	£699
AOR AR-7030+ HF Receiver	£699
Kenwood TS-790E 2/70 Base	£750
AL-811HXCE Ameritron 800W HF Linear Amplifier	£849
Kenwood TS-870S HF Transceiver	£849
Icom IC-7400	£899
IC-7400 HF, 6m & 2m transceiver	£899
Yaesu FT-950	£989
IC-7400 HF, 6m & 2m transceiver	£999
Icom IC-910H 2m/70cms base 100w	£999
Icom IC-R8500 Receiver	£1,099.00
Yaesu FT-1000MP Mark -V Field	£1,199.00
AR-5000A AOR Wide band all mode Receiver	£1,199.00
Yaesu FT-2000 100W with internal power supp	£1,599.00
IC-756PRO-MKIII Icom HF + 6m Trx	£1,699.00
Icom IC-7700 - TRANSCEIVER	£4,795.00
Yaesu FT DX9000 D Transceiver	£6,495.00

THE PW PUBLISHING
RADIO BOOKSTORE
New 2011 titles now in stock!

NEW IN STOCK NOW

£16.99

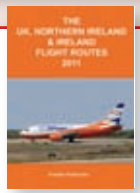
COMPUTERS IN AMATEUR RADIO

Radio amateurs have always been quick to embrace changes to their hobby to make operating easier or provide something extra. Computers are no exception and they have become essential tools to get the job done quicker and easier than ever before. But there is much that can be done with a computer and many are simply not aware of the huge potential they offer. Computers in Amateur Radio sets out to provide an insight into the wide range of amateur radio uses for the humble home computer.

Free CD

This book is supplied with a CD packed with over 500MB of software. You will find programmes for logging, contests, mapping, Morse code training, APRS, RTTY, SSTV and a whole lot more.

UK, NORTHERN IRELAND AND IRELAND FLIGHT ROUTES 2011



£14.95

This new pubilcation lists around 12,000 flights which originate or terminate in the UK, Northern Ireland and the Republic of Ireland. In excess of 160 Airline companies are listed together with their Airport of departure and arrival, with approximate times of operation. Types of aircraft in use on a given route are included as are both ATC (where available) and company flight numbers. The trend towards the growing & unpredictable use of Alpha / numeric non airline flight numbers has been addressed.

NEW!

UK & IRELAND AIRBAND FREQUENCY GUIDE

DESK TOP EDITION. Due March 2011

Over 200 amendments since the 14th Edition!

£10.50

Includes ALL Airports in England, Scotland, Wales, Channel Island, Northern Ireland and the Republic of Ireland. ACARS Frequencies - Alphabetical Airfields & Airport Frequencies with Company Frequencies. Numerical Frequency Listing - ICAO Airfield Designator Decodes - Radio Call signs, 2 & 3 Letter airline Prefixes - Civil Aircraft HF (SSB) Frequencies - OACC HF (SSB) & VHF Frequencies - Abbreviation List - Phonetic Alphabet & Morse Code. VOLMET frequencies INCLUDES REPUBLIC OF IRELAND

AIRWAVES 2011

£11.50

CALLSIGN 2011

£11.50

CIVIL AIRCRAFT MARKINGS 2011

£11.99

£11.99

MILITARY AIRCRAFT MARKINGS 2011

NEW IN STOCK NOW

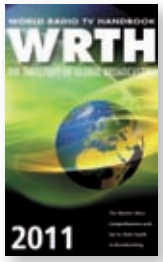
POCKET UK & IRELAND AIRBAND FREQUENCY GUIDE

15th Edition

NEW!

£6.75

The 15th Edition of this popular "POCKET FREQUENCY GUIDE" is now available, the contents represent the most comprehensive and up to date frequency listing currently available.
128 pages A6 (10.5 x 15 cm) Spiral Bound with Colour Cover.



ONLY £23.00

WORLD RADIO TV HANDBOOK 2011 EDITION

The best selling directory of global broadcasting on LW, MW, SW and FM.

The Features section has an account of the history of Radio St. Helena, reviews of the latest equipment, an intriguing look back at some classic 80s and 90s receivers, a visit to AFN in Florida and much more, including the regular *Digital Update*.

The remaining pages are, as usual, full of information on:

- National and International broadcasts and broadcasters
- Clandestine and other target broadcasters
- MW and SW and DRM frequency listings
- Equipment reviews and articles
- Terrestrial TV by country
- Extensive Reference section

and much more!

	Pages	Price
AIRBAND		
● NEW **CIVIL AIRCRAFT MARKINGS 2010** Alan S Wright. (abc)	448	£11.99
● NEW **MILITARY AIRCRAFT MARKINGS 2011** Howard Curtis. (abc)	224	£11.99
● NEW **AIRWAVES 2011** (Photavia)	144	£11.50
● NEW **CALLSIGN 2011** (Photavia)	111	£11.50
● NEW **THE UK, NORTHERN IRELAND & IRELAND FLIGHT ROUTES 2011** (Seldec)	225	£14.95
● NEW **UK & IRELAND AIRBAND FREQUENCY GUIDE** 15th Edition (Seldec) Available soon	146	£10.50
● NEW **POCKET UK & IRELAND AIRBAND FREQUENCY GUIDE** 15th Edition (Seldec)	128	£6.75
● NEW **AIR TRAFFIC CONTROL HANDBOOK David** Smith	208	£16.99
● NEW **VIRTUAL RADAR EXPLAINED** Mike Richards (RSGB)	64	£6.99
● NEW **GUIDE TO THE AIRNAV RADAR BOX** (Seldec)	163	£12.95
● NEW **THE RADARBOX COMPANION** (Seldec)	163	£12.95
● **DIRECTORY OF AIRCRAFT SELCALS** 8th edition. (Seldec)	205 PLUS CD	£15.95
● **HF AIRBAND FREQUENCY GUIDE** (Seldec)	225	£14.75
● **NORTH ATLANTIC WAYPOINT ATLAS** (Seldec)	50	£9.50
● **AIR TRAFFIC CONTROL** 10th Edition (abc)	112	£9.99
● **AIRBAND RADIO GUIDE** 7th Edition (abc)	112	£9.99
SCANNING & FREQUENCY GUIDES		
● NEW **WORLD RADIO TV HANDBOOK 2011** (WRTH)	672	£23.00
● NEW **RADIO LISTENERS GUIDE 2011**	160	£5.95
● NEW **KLINGENFUSS GUIDE TO UTILITY STATIONS 26th**	588	£43.00
● NEW **KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2011**	428	£35.00
● NEW **KLINGENFUSS SHORTWAVE FREQUENCIES CD 2011**		£26.00
● **KLINGENFUSS RADIO DATA CODE MANUAL** 18th Edition	600	£43.00
● **SCANNERS 6** B. Robertson & P. Rouse	245	£9.95
● **HF MARINE FREQUENCY LIST**. (Seldec)	225	£14.75
● **THE POCKET UK & IRELAND VHF MARINE FREQUENCY GUIDE**. (Seldec)	108	£5.75
● **UK SCANNING DIRECTORY** - 9th edition (PW Publishing)	544	£19.75
ANTENNAS/TRANSMISSION LINES/PROPAGATION		
● NEW IN NOW **STEALTH ANTENNAS** (RSGB)	208	£13.99
● NEW IN NOW **HF ANTENNAS FOR EVERYONE** (RSGB)	336	£14.99
● NEW IN NOW **BUILDING SUCCESSFUL HF ANTENNAS** (RSGB)	224	£14.99
● NEW IN NOW **BASIC ANTENNAS** (ARRL)	216	£24.99
● **EVEN MORE OUT OF THIN AIR** (PW Publishing)	80	£6.75
● **25 SIMPLE TROPICAL & MW BAND AERIALS** E.M. Noll (Babani)	54	£1.75
● **AN INTRODUCTION TO RADIO WAVE PROPAGATION** J.G. Lee. (Babani)	116	£3.95
● **ANTENNA FILE** (RSGB)	285	£18.99
● **ANTENNA TOOLKIT 2** Joseph Carr	256	£28.99
● **ANTENNA TOPICS** Pat Hawker G3VA (RSGB)	384	£18.99
● **BACKYARD ANTENNAS** Peter Dodd G3LDO (RSGB)	200	£18.95
● **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 2**. G. Brown M5ACN. (RSGB)	200	£12.95

You can see full descriptions of all these books & order securely on-line at www.mysubcare.com see the magazine's related products section. Also, see www.pwpublishing.ltd.uk/bookstore/books.html for full descriptions of all these books.

	Pages	Price
● **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
● **SIMPLE AND FUN ANTENNAS FOR HAMS** (ARRL)	200	£16.99

BEGINNERS/LICENCE/MANUALS

● **TECHNICAL FOR THE TERRIFIED** (PWP)	124	£12.99
● **ADVANCE! THE FULL LICENCE MANUAL** Alan Betts G0HIQ & Steve Hartley G0FUW. (RSGB)	104	£11.99
● **AMATEUR RADIO EXAM SECRETS** Alan Betts G0HIQ (RSGB)	104	£12.99
● **AMATEUR RADIO EXPLAINED** Ian Poole G3YWX. (RSGB)	80	£5.79
● **DISCOVER DXING**. 3rd edition. J. Zondlo	96	£6.95
● **FOUNDATION LICENCE NOW! 5th Edition** Alan Betts G0HIQ. (RSGB)	32	£4.99
● **HF AMATEUR RADIO 2nd Ed.** Ian Poole G3YWX. (RSGB)	144	£12.99
● **INTERMEDIATE LICENCE – BUILDING ON THE FOUNDATION 4th Edition** Steve Hartley G0FUW. (RSGB)	76	£6.99
● **NOVICE RADIO AMATEURS EXAMINATION HANDBOOK** I.D. Poole. (Babani)	150	£4.95
● **SECRET OF LEARNING MORSE CODE** Mark Francis. (Spa)	84	£6.95
● **MORSE CODE FOR RADIO AMATEURS**. (RSGB)	32 inc. CD	£7.99

DESIGN & CONSTRUCTION

● NEW IN NOW **HOMEBREW COOKBOOK** (RSGB)	208	£12.99
● **CIRCUIT OVERLOAD** (RSGB)	504	£18.99
● **THE ART OF SOLDERING** R. Brewster. (Babani)	84	£3.99
● **THE SUPERHET RADIO HANDBOOK** I.D. Poole. (Babani)	104	£4.95

SHACK ESSENTIALS

● NEW **RSGB PREFIX GUIDE**. 9th edition. (RSGB)	34	£8.99
● NEW **RSGB AMATEUR RADIO OPERATING MANUAL** 7th Edition (RSGB)	224	£16.99
● NEW **RSGB YEARBOOK** 2011 edition. (RSGB)	528	£18.99
● NEW **CALLSEEKER PLUS CD** 2011 edition. (RSGB)		£15.99
● NEW **ARRL HANDBOOK 2011** inc CD. (ARRL)	1416	£37.99
● **ARRL OPERATING MANUAL** 9th Ed. (ARRL)	420	£19.99
● **DXPEDITIONING - BEHIND THE SCENES FOR RADIO AMATEURS WORLDWIDE** N Cheadle & S Telenius Lowe	180	£6.95
● **THE RIG GUIDE** S W White. (RSGB)	88	£4.99
● **AMATEUR RADIO ESSENTIALS** G. Brown. (RSGB)	288	£25.99
● NEW EDITION **AMATEUR RADIO ASTRONOMY 2nd Edition** J. Fielding. (RSGB)	384	£16.99
● **AMATEUR RADIO (VALUE) LOGBOOK** (RSGB)	80	£4.95
● **DIGITAL MODES FOR ALL OCCASIONS** M Greenman (RSGB)	208	£16.95
● OUT OF STOCK **LF TODAY - GUIDE TO SUCCESS 136kHz** M Dennison (RSGB)	128	£11.95
● OUT OF PRINT **RSGB RADIO COMMUNICATIONS HANDBOOK + CD** 10th Edition. (RSGB)	864	£29.99
● **LOW PROFILE AMATEUR RADIO** 2nd edition. (ARRL)	64	£14.99

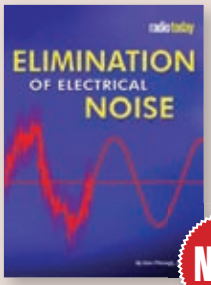
QRP

● NEW **INTERNATIONAL QRP COLLECTION**. (RSGB)	176	£11.00
● NEW EDITION **LOW POWER COMMUNICATIONS**. 3rd Edition. (ARRL)	240	£14.99
● OUT OF STOCK **More QRP Power** (ARRL)	176	£16.99



NEW IN STOCK NOW

NEW **KLINGENFUSS GUIDE TO UTILITY STATIONS 26th**..... £43.00
NEW **KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2011**.... £35.00
NEW **KLINGENFUSS SHORTWAVE FREQUENCIES CD 2011**. £26.00



ELIMINATION OF ELECTRICAL NOISE FROM 30kHz TO 30MHz

Many radio amateurs experience electrical noise problems and feel forced off the amateur radio bands. Don Pinnock, G3HVA is a firm believer that radio amateurs should deal with the problems rather than not be forced off the air. Elimination of Electrical Noise therefore tells of Don's personal experiences and provides solutions to noise problems that will help many.

NEW!

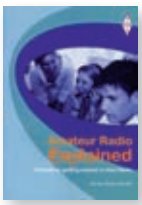
£6.99

RADIO LISTENER'S GUIDE 2011 EDITION

Frequencies and transmitter information for all BBC and commercial radio stations, plus DAB digital transmitter details.
Radio Reviews - Independent reviews of analogue and DAB digital radios. News from BBC and commercial radio stations.
Analogue Radio switch-off - The latest information about plans for FM and medium wave switch-off. Digital Radio (DAB) - The latest news and information.Sky, Freeview and Freesat radio information and channel lists. Advice shows you how to get the best from your radio.

NEW IN STOCK NOW

ONLY £5.95



AMATEUR RADIO EXPLAINED

Written by well-known author and radio amateur Ian Poole, G3YWX, this book provides the ideal introduction to the wonderful world of amateur radio. Amateur Radio Explained is for people first taking an interest in amateur radio and those ready to move on from Foundation level. Written in a readable and easy-to-understand fashion, Amateur Radio Explained is the perfect introduction to the exciting world of amateur radio. 80 pages.

£5.79

NEW!

STEALTH ANTENNAS

Tiny postage stamp-size gardens, intolerant neighbours, planning permission problems, living in apartments: these are some of the challenges facing the modern radio amateur when trying to get on the air. Stealth Antennas offers clear practical advice to those who might have thought they were unable to put up a suitable antenna.

£13.99

NEW!

HOMEBREW COOKBOOK

If you are interested in home construction, Eamon Skelton, EI9GQ is the acknowledged expert in this field. The RadCom columnist on the subject, Eamon brings his enthusiasm, common sense and easy to understand approach to the Homebrew Cookbook, such that readers will be reaching for their soldering iron with inspiration.

£12.99

NEW!

ARRL HANDBOOK 2011

88th Edition

At 1416 pages, the 88th edition of the ARRL Handbook (2011) is bigger than ever. Part reference and part applied theory and filled with practical treatments of basic electronic fundamentals, RF design, digital and software radio technology, antenna construction, the ARRL Handbook is a must have for every radio amateur.
NB This item is not available for overseas shipping due to it's weight

£37.99

FOUNDATION LICENCE NOW! £4.99.

INTERMEDIATE LICENCE. BUILDING ON THE FOUNDATION £6.99.

ADVANCE! THE FULL LICENCE MANUAL £11.99.

AMATEUR RADIO EXAM SECRETS £12.99

HITLER'S RADIO WAR

This book tells the story of Nazi international broadcasting during and before the Second World War. At its peak German radio stations broadcast in fifty-four languages to a worldwide audience. For the first time in an international conflict, citizens of the warring nations could hear enemy propaganda in their own living rooms. Many of the voices that they heard belonged to a new type of criminal, the radio traitor. The nickname Lord Haw-Haw is still famous internationally, but there were numerous other radio renegades speaking on behalf of the Nazis. The Nazis' propaganda was sinister enough, but they also ran a series of secret stations that spoke to enemy audiences in the name of 'patriotic' dissidents who claimed to be broadcasting from clandestine transmitters in their own countries. Using archival material, "Hitler's Radio War" dissects the message that Germany's overt and covert propaganda stations broadcast to their audiences, as well as the lives and motivations of the broadcasters.

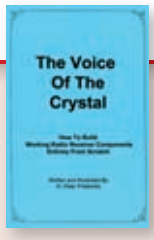
NEW IN STOCK NOW

£20.00

MARCONI'S ATLANTIC LEAP

A fascinating fully illustrated and documented description of the bridging of the Atlantic by wireless in 1901 by Marconi, who was only 27 at the time. 96 pages.

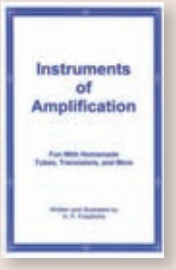
£6.99



VOICE OF THE CRYSTAL

185 pages of practical information on the fabrication of electronic components suitable for use in building crystal radio sets. Basic theory and simple analysis is combined with dozens of examples of historical practice, work by contemporary experimenters, and construction details for many instruments fabricated by the author himself.

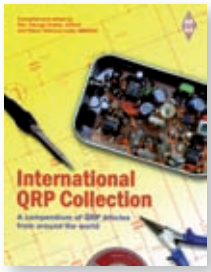
£11.95



INSTRUMENTS OF AMPLIFICATION

Rob Mannion G3XFD writes: Peter Friedrichs has written a truly superb book but has chosen a title that really hides its 'light' under the proverbial bushel! Armed with the book an interested constructor can literally build a radio from scratch anywhere! Perhaps a better title could have been Desert Island Radio for the Shipwrecked because everything from simple earphones, detectors and mechanical amplifier to home made valves (tubes) and transistors. If you enjoy Rough Science on BBC2 you'll love this book! **Very highly recommended**.

£14.95



INTERNATIONAL QRP COLLECTION

A Compendium of QRP articles from around the world.

Compiled & Edited by Rev. George Dobbs G3RJV and Steve Telenius-Lowe

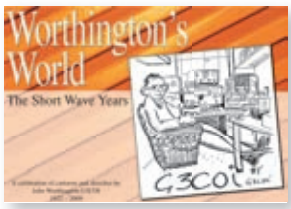
QRP (or low power) operating is practiced by many radio amateurs across the globe. Much is published by these QRP enthusiasts detailing great designs, best practice and much more. The authors of the International QRP Collection have scoured the world for the best of these and compiled them for you, into this great scrapbook.

£11.00

RADIO PIONEERS 1945

Discover the history of the Veteran Wireless Operators Association and the Amateur Radio Relay League. See some of the early wireless catalogues and amateur stations. Get a brief but to-the-point chronology of radio developments to 1925. You get pictures of early tubes, Poulsen in his lab, Marconi parabolic reflectors, a Fessenden alternator and more. The history is brief, fast reading, but informative. You'll read about the personalities and discover what they did.

£7.95



WORTHINGTON'S WORLD
The short wave years

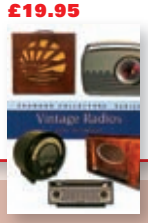
An amazingly apposite tribute to a wonderfully zany cartoonist that are presented in categories that blend together like a silky chocolate cake mix (John G3COI loved an old fashioned chocolate cake!). Chuckle away – you'll find old favourites and cartoons you missed!

£9.95

VINTAGE RADIOS

£19.95

This book tells the collector and the armchair wireless enthusiast everything there is to know about classic radios from the 1920s to the end of the 1960s. All the important makes and models are discussed and the author also covers buying and selling, care and restoration and many other topics, including foreign radios and radio-related ephemera. Illustrated with many colour photographs, this is the perfect collector's companion to the fascinating hobby. 208 pages.



THE PW PUBLISHING LTD
RADIO BOOKSTORE

mail order...huge range in stock...fast delivery...

	Pages	Price
● OUT OF PRINT **LOW POWER SCRAPBOOK** (RSGB)	320	£12.99
● **QRP BASICS**. George Dobbs G3RJV. (RSGB)	204	£14.99
VHF & HIGHER		
● NEW **MICROWAVE KNOW HOW** Andy Barter G8ATD. (RSGB)	192	£12.99
● **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
● **VHF/UHF HANDBOOK** Andy Barter G8ATD. (RSGB)	302	£14.99
HISTORICAL		
● NEW **HITLER'S RADIO WAR** Roger Tidy (Robert Hale)	240	£20.00
● **WORTHINGTON'S WORLD - THE SHORT WAVE YEARS** (PW Publishing)	146	£9.95
● **INSTRUMENTS OF AMPLIFICATION** HP 'Pete' Friedrichs	300	£14.95
● **RADIO PIONEERS 1945** (Lindsay)	64	£7.95
● **FJ CAMM - THE PRACTICAL MAN** (RSGB)	110	£10.99
● **VINTAGE RADIOS** (Crowood)	208	£19.95
● OUT OF PRINT **AMATEUR RADIO - A BEGINNERS GUIDE** (1940 REPRINT) (Lindsay Publications). Douglas Fortune W9UVC	156	£7.70
● **MARCONI'S ATLANTIC LEAP (H/B)** Gordon Bussey. (Marconi)	96	£6.99
● OUT OF STOCK **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	£15.00
● NEW LOW PRICE **THE SAGA OF MARCONI OSRAM VALVE** B. Vyse & G. Jessop	346	£17.50
CRYSTAL SETS		
● **CRYSTAL RECEIVING SETS & HOW TO MAKE THEM** (Lindsay)	124	£8.95
● **VOICE OF THE CRYSTAL** (Pete Friedrichs)	185	£11.95
ELECTRONICS		
● NEW IN NOW **COMPUTERS IN AMATEAUR RADIO** (RSGB)	200	£16.99
● NEW IN NOW **ELIMINATION OF ELECTRICAL NOISE** (RSGB)	64	£6.99
● **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

Why not tidy your shack with a binder?

BINDERS PRACTICAL WIRELESS OR RADIOUSER. £10.00

You can order securely on-line at

www.mysubcare.com

see the magazine's related products section.

HOW TO ORDER

Telephone: 0845 803 1979

Call the Bookstore, Monday to Thursday 9am to 4pm (now closed Fridays)

Callers with an appropriate BT inclusive call package can call this number free!

Your order will usually be delivered to you within a week!

Outside these hours your order will be recorded on an answerphone.

Post: Write to the Bookstore, remembering to include your name, address, daytime telephone number and payment details (Sterling please - cash not accepted. **Cheques made payable to PW Publishing Ltd.**), at: **Bookstore, 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 Bookstore and send it to: 01202 659950

E-mail: bookstore@pwpublishing.ltd.uk

Order Securely on-line: www.mysubcare.com

Photocopies & Back Issues: To order a back Issue, please call the Order Line or E-mail us 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	£3.50 (inc UK P&P)	£5.00 (inc UK P&P)
RadioUser	£3.50 (inc UK P&P)	£5.00 (inc UK P&P)

Overseas post: Europe or ROW postal charges to be added to the above.

Photocopies / Reprints (per article): £3.00 (inc P&P).

Overseas: Please add £1.50 to the above prices. E&OE

order form

06/11

Photocopies are acceptable

Please try to order from an up-to-date magazine to ensure correct prices and availability.

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

Total cost of books ordered:.....Price (£).....

Postage & Packing charges: Please remember to add P&P to your order. (£) .....

UK: £2.05 P&P for one item, £3.70 for two or more

Overseas Europe:
£3.30 P&P for one, £6.00 for two, £2 extra per item for three or more

Overseas Rest of World:
£5.30 P&P for one, £10.00 for two, £2 extra per item for three or more

Total cost of order including postage **£**

Send this completed form to:

Bookstore, 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 be made payable to PW Publishing Ltd. and please write your cheque guarantee card number on the reverse.

or please debit my MasterCard/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 delivered within a week 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.

A Perfect Father's Day Present!

Subscribe to

Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

NEW! No more renewal letters!

3, 6 and 12 Month Subscriptions are Now Available by Direct Debit*

Subscription Rates

Practical Wireless Subscription

	3 Month*	6 Month*	1 Year*	2 Year	3 Year
UK	☐ £10	☐ £20	☐ £38	☐ £73	☐ £104
Europe			☐ £47	☐ £89	☐ £130
ROW			☐ £57	☐ £108	☐ £161

Joint & Practical Wireless & RadioUser Subscription – Save £££s

	3 Month*	6 Month*	1 Year*	2 Year	3 Year
UK	☐ £20	☐ £38	☐ £73	☐ £138	☐ £197
Europe			☐ £79	☐ £170	☐ £246
ROW			☐ £101	☐ £207	☐ £307

* 3 and 6 month subscriptions are only available by Direct Debit. 12 month subscriptions are available to pay by Direct Debit if you wish (no more renewal letters!) Sorry, but due to financial restrictions, this service is not available for 2, 3 year or overseas subscriptions.

Existing subscribers will be offered the option to pay by Direct Debit at the end of their subscription.

- Never miss an issue
- Have it delivered to your door
- Subscribers get their copies before they reach the shops
- Avoid price rises
- Save £££s

To order a subscription please contact our subscription agency:

RadioUser Subscriptions
Unit 8 The Old Silk Mill
Brook Street
Tring
Hertfordshire HP23 5EF

NEW Address

Please note: any **cheques should be made payable** to **PW PUBLISHING LTD** and CASH is NOT accepted by ourselves or Webscribe.

Orders taken on:

NEW Numbers

01442 820580

between 9am - 5pm. Outside these hours your order will be recorded on an answering machine.

FAX orders taken on:

01442 827912

Secure Internet orders can be placed at:

www.mysubcare.com

or via e-mail to:

ru@webscribe.co.uk

On-line facilities are available as well as the usual way to pay by cheque, postal order, credit card and now by direct debit too.

Order a new subscription online Simply pay with a credit card or set up your direct debit subscription online using our secure server.

Check the status of a subscription online Existing subscribers can now log in to their own accounts and see how many issues they have left to run.

Update your details online If you move or change your personal details, you can now update them online without having to write in to let us know.

Renew an existing subscription online We've made renewing easier too. Everything you need to renew is now available online as well as by regular mail. (Subscribers still get a reminder in the post when it's time to renew unless it's payable by Direct Debit).

If you wish to pay by direct debit please contact Webscribe, our subs agency, to set it up - it's simple!

☐ *I wish to order a one/two/three* year subscription to* **practical wireless** *starting with the.....issue.*

☐ *I wish to order a joint one/two/three* year subscription to* **practical wireless & radiouser** *and starting with the.....issue.*

Payment Details

I enclose my Cheque/Postal Order* for £.....

*made payable to PW Publishing Ltd.

or please debit my MasterCard/Visa/Amex card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Security Number: ☐☐☐

Expiry Date.....

or please debit my Switch card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Security Number: ☐☐☐

Start 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 Telephone Number.....

E-mail.....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at time of going to press. E&OE.

Please note: All payments must be made in Sterling.
Cash not accepted.
Cheques made payable to PW Publishing Ltd.

*Delete as necessary. Photocopies of this page are acceptable

Rob Mannion G3XFD/EI5IW's

Topical Talk

The Editor discusses letters from *PW* readers featuring BBC Radio 4 long wave transmissions and discrimination shown to Foundation Licence Amateurs.

The letter from Mike Burke (*Letters* this month page 8) regarding the BBC R4 198kHz long wave service transmitted from Droitwich (Wychbold Farm) in Worcestershire, Westerglen (Falkirk, Scotland) and Burghead (Scottish Highlands near Inverness) raises an interesting point. I think it's interesting because many of us are still desperately trying to halt the introduction of the impractical Digital Audio Broadcasting technology on Band II. The authorities are still seemingly determined to replace the practical frequency modulation (f.m.) service – and there are now suggestions from some quarters regarding the possible future shut down on the long wave service.

Although I'm not usually keen to support or even propagate 'conspiracy theories' that seem to have few firm foundations, I've been receiving so many comments on the topic from our readers and Radio 4 supporters from around Europe on the matter – I thought it's time to act. I'm now aiming to 'recruit' our readers to get a rough and ready idea of the practical coverage of the BBC R4 long wave service. I say 'radio' because after 0100 hours after the shutdown of Radio 4, the transmitters then carry the BBC World Service through the night until Radio 4 starts again at around 0530 hours.

The Conspiracy Theories

The 'conspiracy theories' that have been coming into my E-mail In-Box suggest that the radiated power from Droitwich (Whychbold Farm) is (in particular) being slowly reduced with the idea of restricting the coverage area – mainly outside the UK. Personally, I really don't think this is a possibility because the 198kz service plays an important part in transmitting control signals for off-peak 'White' electricity meters and lowering the field strength isn't practical.

Additionally, the 198kHz transmissions are of paramount importance for shipping weather services and general security in times of national emergencies. Let's not forget that simple long and medium radio receivers – capable of operating for months (at a squeeze) on dry cells – would rely on transmitters such as the 'long wave three'.

Far from the radiated power being reduced, I think that in reality the long wave transmissions – particularly outside the UK's main planned coverage area – the reception of BBC R4/World Service is being badly degraded by the ever increasing man-made electrical noise levels on low frequencies such as 198kHz. Just imagine the hundreds of millions of switched mode power supplies, TV timebase radiation, power line transmissions, etc., with many of them radiating r.f. and injecting noise into the mains!

My idea is to ask our various readers throughout Europe (and beyond if you can effectively hear the 198kHz transmissions) to E-mail me on what their reception is like. It's a crude way of estimating just how effective the transmitters are. I would also like to hear whether or not 'DX' listeners to R4 on long wave consider that the signal has weakened over the years – bearing in mind the QRN!

In the far west of Ireland (Westport, County Mayo) I've found the 198kHz service to be useable in the day but difficult at night on my car radio. While I was in Germany (Wuppertal) last September, reception was practical on a small receiver during the day and night. So, I would be most interested in *PW* readers' reports.

Discrimination Towards Foundation Amateurs

Unfortunately, discrimination – as mentioned by **Lawrie Richardson M3UHQ** in his letter (*Letters* this month) is not an isolated case. What makes Lawrie's case more distressing to me is that, along with suffering from a life-changing inherited genetic syndrome, this remarkable young man also suffers from a form of autism.

Lawrie's autistic problem leads to him being somewhat abrupt at times (detectable in his E-mails) but despite his problems Lawrie is a likeable young man who has done exceedingly well as a Radio Amateur and semi-professional photographer. So, I ask everyone to be patient with 'new' Amateurs – some have really triumphed over adversity.

Finally, I often take a 'straw poll' during club visits to discover how many of the audience have entered the hobby through CB radio. The 'show of hands' adequately proves that **many** Radio Amateurs have entered the hobby via CB. Remember this; the late **Clive Trotman GW4YKL** – a former CB operator – became President of the Radio Society of Great Britain (RSGB) in 1995. So it's time to stop the discrimination. It's a dreadful stain on the face of Amateur Radio.

Rob Mannion G3XFD/EI5IW

SPECIALIST DEALERS

BERKSHIRE

LINEAR AMP UK
5 Swaledale Gardens, Fleet, Hants GU51 2TE
Tel: 01252 811370
www.linamp.co.uk
E-mail: linampuk@aol.com
Manufacturers of top quality HF, VHF and UHF high power valve linear amplifiers up to 1500W and antenna matching units.
Repairs of most make of amplifier undertaken

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

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: sales@tennamast.com
Web site: www.tennamast.com

SUFFOLK

TW MagPad
Your key to better CW

E-mail: tomwithers@btinternet.com
www.twmagpad.co.uk

WEST SUSSEX

Adur Communications
PO Box 2047, Steyning BN44 3XJ.
Tel: (01903) 879526
E-mail: service@durcomms.com
Repairs and alignment to all amateur and commercial radio equipment.

Telephone
0845 803 1979
to advertise in
Practical Wireless

DORSET

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 *Practical Wireless RadioUser, Radio Active* and *Short Wave Magazine* magazines.
Tel: 0845 803 1979

INDEX TO ADVERTISERS

The best way to ensure you receive every issue of Practical Wireless and/or RadioUser is to place an order with your local newsagent. Once set up, your copy of *Practical Wireless* and/or *RadioUser* will be held for you to collect, saving you the time and the frustration of having to search the newstand. Some newsagents may even offer a home delivery service making it even easier to obtain your copy. So don't miss an issue, simply complete the form opposite and take to your local newsagent today.

KEEP A LOOK OUT FOR THE LOGO AND NEXT TIME YOU VISIT YOUR NEWSAGENT REMEMBER TO JUST ASK! ABOUT OBTAINING COPIES OF YOUR CHOSEN MAGAZINES.

Please reserve/deliver* a copy of ..... on a regular basis,

commencing with the ..... issue. *delete as appropriate

Title/Mr/Mrs/Ms .....

First name ..... Surname .....

Address .....

.....

..... Postcode .....

Daytime Telephone No: .....

Cable

RG58 Standard, 5mm, 50 ohm, per metre **£0.35**
RG58-DRUM Standard, 5mm, 50 ohm, 100m reel **£24.95**
RG58M Mil spec, 5mm, 50 ohm, per metre (best seller) **£0.60**
RG58M-DRUM Mil spec, 5mm, 50 ohm, 100m reel **£39.95**
RG58M-DRUM new 50m reel of mil spec RG58 in a great handy size .....only **£24.95**
RGMINI8 Mil spec, 7mm, 50 ohm, in grey per metre (amateur favourite) **£0.75**
RGMINI8-DRUM Mil spec, 7mm, 50 ohm, in grey 100m reel **£64.95**
RG213 Mil spec, 9mm, 50 ohm, per metre **£1.30**
RG213-DRUM Mil spec, 9mm, 50 ohm, 100m reel **£109.95**
H100 Mil spec, 10mm, 50 ohm, per metre **£1.50**
H100-DRUM Mil spec, 10mm, 50 ohm, 100m reel..... **£139.95**
WESTFLEX103 Mil spec, 10mm, 50 ohm, per metre **£1.50**
WESTFLEX103-DRUM Mil spec, 10mm, 50 ohm, 100m reel..... **£139.95**
300-20M Ladder Ribbon, best USA quality, 300 ohm, 20m pack **£17.95**
300-DRUM Ladder Ribbon, best USA quality, 300 ohm, 100m reel **£69.95**
450-20M Ladder Ribbon, best USA quality, 450 ohm, 20m pack **£19.95**
450-DRUM Ladder Ribbon, best USA quality, 450 ohm, 100m reel **£79.95**

Antenna Wire (50m)

Perfect for making your own antennas, traps, long wire aerials etc.
SEW-50 Multi stranded PVC covered wire, 1.2mm **£19.95**
SCW-50 Enamelled copper wire, 1.5mm..... **£24.95**
HCW-50 Hard Drawn bare copper wire, 1.5mm..... **£29.95**
CCS-50 Genuine Copperweld copper clad steel, 1.6mm..... **£29.95**
FW-50 Original Flexweave bare copper wire, 2mm **£34.95**
FWPVC-50 Original clear PVC covered copper wire, 4mm **£44.95**
FW-100 Original high quality flexweave antenna wire, 100m reel **£59.95**
FWPVC-100 Original PVC coated flexweave antenna wire, 4mm, 100m reel **£79.95**

PAM-KIT

A great portable freestanding tripod which can be extended to 4m.
Perfect for field days at a perfect price
.....just **£59.95** complete

Rigging Accessories

Get rigged up, for full list of all options visit our website!
PULLEY-2 Adjustable pulley wheel for wire antennas, suits all types of rope **£24.95**
GUYKIT-HD10 Complete heavy duty adjustable guying kit to suit upto 40ft masts .. **£54.95**
GUYKIT-P10 Complete light duty/portable guying kit to suit upto 40ft masts **£39.95**
SPIDER-3 Fixed 3 point mast collar for guy ropes..... **£5.95**
SPIDER-4 Fixed 4 point mast collar for guy ropes..... **£6.95**
PTP-20 Pole to pole clamp to clamp up to 2" to 2"..... **£5.95**
DPC-W Wire dipole centre to suit either 300 or 450ohm ladder line **£5.95**
DPC-S Wire dipole centre with SO239 to suit cable feed connections **£6.95**
DPC-A Dipole centre to suit ½ inch aluminium tube with terminal connections ... **£7.95**
DPC-38 Dipole centre with SO239 socket with two 3/8th sockets to make mobile dipole **£6.95**
DOGBONE-S Small ribbed wire insulator..... **£1.25**
DOGBONE-L Large ribbed wire insulator **£1.65**
DOGBONE-C Small ceramic wire insulator **£1.00**
EARTHROD-C 4ft copper earth rod and clamp **£22.95**
EARTHROD-CP 4ft copper plated earth rod and clamp **£16.95**
G5RV-ES In-line SO239 replacement socket for 300 or 450 ohm ladder line..... **£6.95**
AMA-10 Self amalgamating tape for connection joints, 10m length..... **£7.50**

Mounting Hardware & Clamps

We have all the mounting brackets you could possible want – for all options see our website
TRIPOD-HDA Free standing, heavy duty, fold away tripod, which adjusts from 50-65mm..... **£149.95**
TRIPOD-25L Free standing heavy duty tripod to suit masts 65mm or less..... **£79.95**
TRIPOD-20L Free standing heavy duty tripod to suit masts 2 inch or less **£74.95**
TRIPOD-15L Free standing heavy duty tripod to suit masts 1.5 inch or less **£69.95**
TK-36 Heavy duty galvanised pair of T & K brackets, 36 inches total length..... **£49.95**
TK-24 Heavy duty galvanised pair of T & K brackets, 24 inches total length..... **£29.95**
TK-18 Heavy duty galvanised pair of T & K brackets, 18 inches total length..... **£24.95**
TK-12 Heavy duty galvanised pair of T & K brackets, 12 inches total length..... **£19.95**
SO-9 Heavy duty galvanised single stand off bracket, 9 inches total length **£9.95**
SO-6 Heavy duty galvanised single stand off bracket, 9 inches total length **£6.95**
CHIM-D Heavy duty galvanised chimney lashing kit with all fixings, suitable for upto 2 inch **£24.95**
CAR-PLATE Drive on bracket with vertical up stand to suit 1.5 or 2" mounting pole .. **£24.95**
CROSS-2 Heavy duty cross over plate to suit 1.5 to 2" vertical to horizontal pole**£14.95**
JOIN-200 Heavy duty 8 nut joining sleeve to connect 2 X 2" poles together..... **£19.95**
PTM-S Pole mounting bracket with SO239 for mobile whips, suits upto 2" pole . **£19.95**

Antenna Rotators *See website for full details*

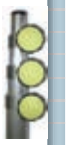
We stock all the most popular rotators to suit all requirements
Yaesu G-450 Medium duty rotator **£239.95**
Yaesu G-1000DXC Heavy duty rotator – massive maximum verticla load 200kg.. **£479.95**

bhi

NES10-2 Mk3 noise eliminating speaker ..**£112.95**
The NES10-2MKII Noise Eliminating Speaker removes unwanted background noise, hiss, hash computer hash, plasma TV interference, white noise etc from speech so that you can hear the speech much more clearly.

DESKTOP "noise away" robust base station speaker..... **£154.95**
The Desk Top "Noise Away" is a stylish robust base station speaker for use in radio communications, especially amateur radio

Telescopic Masts



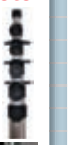
TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed..... **£129.95**
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed..... **£199.95**
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed **£149.95**
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed..... **£199.95**
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed **£249.95**
TMF-3 Fiberglass mast * 6 sections 240cm each * 65-23mm * Approx 50ft erect 8ft collapsed..... **£299.95**

20ft Mast Sets

(5ft Sections)

These heavy duty masts sets have a lovely push fit swaged sections to give a strong mast set. Ideal for portable or permanent installations . . . also available singly
MSP-125 4 section 1.25inch OD mast set... **£39.95**
MSP-150 4 section 1.50inch OD mast set... **£44.95**
MSP-175 4 section 1.75inch OD mast set... **£49.95**
MSP-200 4 section 2.00inch OD mast set... **£59.95**
MSPX-150 4 section 1.50 inch 5mm scaffold gauge (very heavy duty) **£69.95**

Portable Telescopic Masts



LMA-S Length 17.6ft open 4ft closed 2-1" diameter..... **£79.95**
LMA-M Length 26ft open 5.5ft closed 2-1" diameter..... **£89.95**
LMA-L Length 33ft open 7.2ft closed 2-1" diameter..... **£99.95**
CARPLATE-HDT brilliant drive on plate with tilt – ideal to be used in conjunction with the portable telescopic masts and only..... **£44.95**

Patch Leads

PL58-0.5 ½m Standard RG58 PL259 to PL259 lead **£3.50**
PL58-10 10m Standard RG58 PL259 to PL259 lead **£8.95**
PL58-30 30m Standard RG58 PL259 to PL259 lead **£16.95**
PL58M-0.5 ½m Mil Spec RG58 PL259 to PL259 lead **£4.50**
PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead **£12.95**
PL58M-30 30m Mil Spec RG58 PL259 to PL259 lead **£27.95**
PL213-10 10m Mil Spec RG213 PL259 to PL259 lead **£18.95**
PL213-30 30m Mil Spec RG213 PL259 to PL259 lead **£39.95**
PL103-10 10m Mil Spec Westflex 103 PL259 to PL259 lead **£29.95**
PL103-30 30m Mil Spec Westflex 103 PL259 to PL259 lead **£59.95**
(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

Connectors

PL259-6mm Standard plug for RG58..... **£0.99p**
PL259-9mm Standard plug for RG213..... **£0.99p**
PL259-7mm Standard plug for Mini8..... **£1.25p**
PL259-6C Compression type for RG58 ..... **£2.50p**
PL259-9C Compression type for RG213..... **£2.50p**
PL259-103C Compression type for Westflex 103..... **£5.00**
NTYPE-6 Compression type plug for RG58..... **£3.95**
NTYPE-9 Compression type plug for RG213..... **£3.95**
NTYPE-103 Compression type plug for westflex 103 .... **£6.00**
BNC-6 Compression type for RG58 ..... **£1.50**
BNC-9 Compression type for RG213..... **£3.50**
SO239-N Adapter to convert PL259 to N-Type male..... **£3.95**
NTYPE-PL Adapter to convert N-Type to PL259..... **£3.95**
BNC-PL Adapter to convert BNC to PL259..... **£2.00**
BNC-N Adapter to convert BNC to N-Type male..... **£3.95**
BNC-SMA Adapter to convert modern SMA radio to suit BNC... **£3.95**
SO239-SMA Adapter to convert modern SMA radio to suit SO239 . **£3.95**
PL259-38 Adapter to convert SO239 fitting to 38th thread..... **£3.95**

New lower prices!

MFJ Antenna Tuners

See our website for full details.
AUTOMATIC TUNERS
MFJ-925 Super compact 1.8-30MHz 200W **£174.95**
MFJ-926 remote Mobile ATU 1.6-30MHz 200W..... **£429.95**
MFJ-927 Compact with Power Injector 1.8-30MHz 200W..... **£254.95**
MFJ-928 Compact with Power Injector 1.8-30MHz 200W..... **£203.95**
MFJ-929 Compact with Random Wire Option 1.8-30MHz 200W **£214.95**
MFJ-991B 1.8-30MHz 150W SSB/100W CW ATU..... **£214.95**
MFJ-993B 1.8-30MHz 300W SSB/150W CW ATU..... **£254.95**
MFJ-994B 1.8-30MHz 600W SSB/300W CW ATU..... **£349.95**
MFJ-998 1.8-30MHz 1.5kW..... **£664.95**
MANUAL TUNERS
MFJ-16010 1.8-30MHz 20W random wire tuner..... **£71.95**
MFJ-902 3.5-30MHz 150W mini travel tuner..... **£102.95**
MFJ-902H 3.5-30MHz 150W mini travel tuner with 4:1 balun..... **£127.95**
MFJ-904 3.5-30MHz 150W mini travel tuner with SWR/PWR..... **£132.95**
MFJ-904H 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun **£152.95**
MFJ-901B 1.8-30MHz 200W Versa tuner..... **£109.95**
MFJ-971 1.8-30MHz 300W portable tuner **£122.95**
MFJ-945E 1.8-54MHz 300W tuner with meter..... **£134.95**
MFJ-941E 1.8-30MHz 300W Versa tuner 2..... **£144.95**
MFJ-948 1.8-30MHz 300W deluxe Versa tuner..... **£164.95**
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL..... **£184.95**
MFJ-934 1.8-30MHz 300W tuner complete with artificial GND ... **£204.95**
MFJ-974B 3.6-54MHz 300W tuner with X-needle SWR/WATT..... **£194.95**
MFJ-969 1.8-54MHz 300W all band tuner..... **£219.95**
MFJ-962D 1.8-30MHz 1500W high power tuner..... **£299.95**
MFJ-986 1.8-30MHz 300W high power differential tuner..... **£359.95**
MFJ-989D 1.8-30MHz 1500W high power roller tuner..... **£399.95**
MFJ-976 1.8-30MHz 1500W balanced line tuner with X-needle SWR/WATT **£479.95**

MFJ Analysers

MFJ-229 UHF Digital Analyser 270-480MHz **£209.95**
MFJ-249B Digital Analyser 1.8-170MHz..... **£269.95**
MFJ-259B Digital Analyser 1.8-170MHz..... **£259.95**
MFJ-269 Digital Analyser 1.8-450MHz..... **£369.95**
MFJ-269PRO Digital Analyser 1.8-170/415-450MHz..... **£389.95**

LDG ELECTRONICS Tuners

LDG Z-817 1.8-54MHz ideal for the Yaesu FT-817 ..... **£124.95**
LDG Z-100 Plus 1.8-54MHz the most popular LDG tuner ... **£144.95**
LDG IT-100 1.8-54MHz ideal for IC-7000..... **£163.95**
LDG Z-11 Pro 1.8-54MHz great portable tuner **£162.95**
LDG KT-100 1.8-54MHz ideal for most Kenwood radios **£174.95**
LDG AT-897Plus 1.8-54MHz for use with Yaesu FT-897..... **£187.95**
LDG AT-100 Pro 1.8-54MHz..... **£203.95**
LDG AT-200 Pro 1.8-54MHz..... **£219.95**
LDG AT-1000 Pro 1.8-54MHz continuously..... **£519.95**
LDG AT-600Pro 1.8-54MHz with upto 600W SSB..... **£334.95**
LDG YT-450 designed for FT-450 & FT-950 in stock now..... **£224.95**

AVAIR SWR Meters

AV-20 (3.5-150MHz) (Power to 300W)..... **£39.95**
AV-40 (144-470MHz) (Power to 150W)..... **£39.95**
AV-201 (1.8-160MHz) (Power to 1000W) **£49.95**
AV-400 (14-525MHz) (Power to 400W) **£49.95**
AV-601 (1.8-160/140-525MHz) (Power to 1000W)..... **£69.95**
AV-1000 (1.8-160/430-450/800-930/1240-1300MHz) (Power to 400W) **£79.95**

MOONRAKER Power Supplies

PS30SWII 25A continuous switch mode PSU with variable output voltage and cigar socket also includes noise offset function. All for just..... **£89.95**

QJ-PS30II 30A continuous, includes lovely large meter displays and large rear terminals for that thick power cable on high powered rigs.
Amazing at just..... **£79.95**
QJ-PS50II 50A continuous, same as above with lovely large displays and large rear terminals for that thick power cable on high powered rigs. 50AMPS for under a ton!
.....**£99.95** (intro offer only).

New Yoteku premium connectors from Japan – in stock now!

PL259-6ST 6mm pure silver plated brass PL259 with gold plate pin..... **£4.99**
PL259-9ST 9mm pure silver plated brass PL259 with gold plate pin **£4.99**
NTYPE-6CST 6mm pure silver plated brass N-type with gold plate pin **£6.95**
NTYPE-9CST 9mm pure silver plated brass N-type with gold plate pin **£6.95**

ALL PICTURES ARE FOR REFERENCE ONLY

* Optional FGPS-2 unit is required to automatically display your station information (shown with optional CT-136 antenna adaptor connected in picture above).

Compact, submersible and shockproof, it's designed to ignore the harshest environments.

The VX-8DE, the next generation handheld transceiver from Yaesu, that offers expanded APRS® capabilities.

Integrated APRS® Operation

APRS® allows you to communicate your location to other APRS® stations with your current position (latitude / Longitude), heading, moving speed and altitude displayed on your radio*.

When you receive signals and information from other APRS stations, the VX-8DR displays their positions, heading, messages, distances, icons (43 available), weather information, object etc*.

Smart Beaconing™ Function

When using APRS® for position tracking, the beacon timing is automatically adjusted to your travelling speed and location to plot a smoother trace to match your position and movement on a map. SmartBeaconing™ from HamHUD Nichetronix is able to modify its own beacon rate in response to the motion of the vehicle.

Bluetooth® Capabilities

The Bluetooth® capabilities widely known and utilised among users and enthusiasts of our VX-8E, FTM-10E and FTM-350E radios, are also available with the VX-8DE. The optional Bluetooth® Unit BU-1 makes it possible to operate hands-free with the optional Bluetooth® headset.

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