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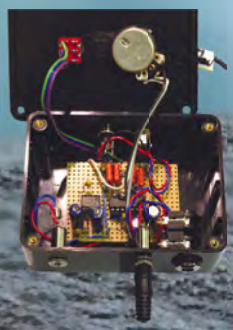
Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

Icom IC-T70E Handie Reviewed



Build

An add-on CW audio filter

Practical Way

George Dobbs G3RJV describes a "Manhatten Transmitter"

Emerging Technology

With Chris Lorec G4HCL

Amateur DXing

Below 9kHz

9 770141 085105 10

WATERS & STANTON

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AOR — W&S Are Sole AOR UK Distributors

AR-8200-MKIII

Handheld Scanner 530kHz - 3GHz.
£419.95 D

AR-8600MKII

Mobile/Base Receiver. Wide range 530kHz - 3GHz AM NFM WFM SSB, 1000 mems, Rotary tuning VFO.
£599.95 D

AR-5001D NEW

40kHz-3.15GHz Base Receiver. All mode reception, monitors 3 ch at once!
INTRO PRICE £2999.95 D

AR-MINI *New Low Price!*
Scanner 100kHz - 1300MHz.

Offers lots more than you think. From LW to GHz it has great sensitivity, CTCSS decoding & DCS. Built-in 100kHz-5MHz bar antenna & offers AM FM & WFM. Great for monitoring, airband listening or broadcast. FREE software available for programming.
£139.95 D

DV-Dongle 2 Models!


DV-DONGLE USB to your PC or Mac and work D-Star by accessing internet open D-Star repeaters worldwide. £179.95 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. £219.95 C

ICOM

ID-E880 NEW

* 2m/70cm 50W Mobile
* D-Star +D-Star Repeat Mode
* Extensive GPS Compatability
* CTCSS & DTCS + Airband Receive
* 1000+ Memories
* Detachable Head

£429.95 D

NEW IC-E80D

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

FREE software on Icom site
In Stock Now
£314.95 D

NEW IC-9100
VHF/UHF Satellite + HF + D-Star
£TBA
Arriving Soon

100W on HF-2m 75W on 70cms & 10W on 1296MHz
Some items optional

NEW FIND IT CHEAPER? We'll Match it!

IC-T70E

Dual Band 2m/70cm Handy
£159.95 D

IC-E90

Triple band 6m, 2m, 70cms.
£234.95 D

IC-E92D

A great dual band handheld woth D-Star fitted. Wide receive
£369.95 D

IC-E2820

Great dualband mobile.
£424.95 D
Fitted with UT-123 D-Star module. £579.95

HF Transceivers

IC-7600 FREE USB keyboard!

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.
£3379 D

IC-7800	Deluxe HF / 50MHz All-Mode 200W Transceiver	£7999 D
IC-7700	1.8-54MHz 200W with built-in PSK-31 + keyboard	£5499 D
IC-7200	HF & 6m DSP 0.005-3335MHz wideband receive with USB port	£799 D
IC-7000	160m-70cm 100W (hf) Mobile, portable or base station	£1089 D
IC-718	160m-10m 100W transceiver that brings HF to those on a budget	£519 D

Other Radios

IC-910H	£1249 D	IC-R20	£389.95 C
IC-910HX	£1449 D	IC-R1500	£449.95 C
IC-2200H	£199 D	IC-R2500	£559.95 C
IC-R3	£385.95 C	IC-R8500	£1379.95 D
IC-R6	£172.95 C	IC-R9500	£9799.95 D

NEW Alex-Loop HF Loop



Easy thumb tuning

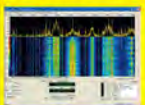
* 7-Band Loop Antenna
* 40/30/20/17/15/12/10m
* Manual tune in seconds
* 1m diameter loop
* Packs in case 40x27cm
* 20W QRP design
* Includes loop mast
* Easy handheld

£299.95 D

RFspace SDR-IQ Receiver

NEW

The SDR-IQ is a high performance receiver covering 500Hz to 30MHz. It is powered directly from PC USB socket and work with Windows or Linux systems. A highly stable unit with dedicated software.
£469.95 D


New **IF-2000** SDR IF feed for FT-2000 & FT-950. Feed your transceiver IF out into an SDR receiver at 10.5MHz £219.95

FlexRadio Systems — FLEX-3000 Special Offer!


*100W Transceiver *160-6m Great Audio *Auto ATU *Selectivity to 50Hz

The Flex-3000 experience! A 100W 160-6m software defined radio. The hardware package contains the receiver front end, band pass filters, transmitter driver, PA & ATU. But the main signal generation & signal processing is inside your PC. Any modern PC or laptop with Windows & a fire wire socket, will run it. You get superb audio quality, amazing razor sharp selectivity, & complete programming options. The live spectrum & waterfall display plus overall graphic interface combines with a transceiver that fits in a brief case yet punches well above its weight.

This Month Only Save £100!

Flex-1500 5W 160m-10m
Was ~~£1399.95~~ Now £1299.95 D

NEW Includes auto ATU! Firewire connection.

160m - 6m All Modes Transceiver 5 Watts of clean RF Power - USB connection - Selectivity to 25Hz! - Use with laptop for easy portable.
£549.95 D

Flex-5000A 100W 160m-6m
The ultimate SDR radio with amazing front end, extra RX option and 2m & 70cm options.

£2495.95 D

YAESU

Choice of the World's top DX'ers

NEW **VX-8DE**

* Triple Bander
* Upgraded APRS features
* Rugged and Submersible
* Powerful Li-Ion battery
* Beacon Function
* Built-in altimeter
* GPS option unit
* Increased Memory
* CW Trainer!

£399.95 D

HF Transceivers

FT-2000 £2299 D

FT-2000 classic HF & 6m 100W transceiver with PEP (performance upgrade) ready installed. Dual receive & fantastic filtering make this an impressive performer. We still have the largest, most up-to-date stock of Yaesu in the UK!

FT-2000D	200 Watt version of FT-2000 with built-in PSU.	£2899.95 D
FT-950	100W HF - 6m transceiver with DSP & Auto ATU	£1289.95 D
FT-450AT	100W HF - 6m with automatic ATU & latest updates	£699.95 D
FT-450	100W HF - 6m transceiver - great value.	£619.95 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	£8995.95 D
FT-857D	HF to 2m mobile. portable or base - up to 100W	£659.95 D
FT-817BHIDSP	Fitted with DSP module exclusive to W&S	£599.95 D

VHF Mobiles & Handhelds

FTM-10SE	50/40W 2m/70cms stereo FM	£299.95 D
FT-8800E	Dualband Mobile 50W / 30W	£299.95 D
FT-8900R	10/6/2m & 70cm Mobile	£359.95 D
VX-3E	2m / 70cm Handheld Wideband receive	£149.95 D
VX-7R	Waterproof dualband handy (silver / black)	£279.95 C
VX-6E	2m/70cms handy, 5W Wideband Receive	£229.95 C
FT-60E	2m/70cms, 5W handy Wideband Receive	£169.95 C

VX-3E


New Mobiles In Stock Now!

FT-1900E £129.95 D

55W 2m Mobile. 3 Watts of pristine audio, large LCD & 200 memories.

FT-2900E

75W 2m Mobile. No cooling fan needed! Large easy-to-read LCD.
£139.95 D

FT-7900E £229.95 D

50/45W 2m/70cm Mobile. 1000 Memories supplied with DTMF Mic.

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

Orderline

01702 206835

Online Catalogue

www.wsplc.com

UK's Lowest Prices

Zero Deposit
Zero Interest

JAYCEE OPEN DAY 2010 - SATURDAY 18TH SEPTEMBER 10AM-4PM - SEE DETAILS BELOW!

TEN-TEC

Experience TenTec performance with the Jupiter-538 HF Transceiver that "reads" CW

FREE MIC! On All Tentec HF radios! [not including kits]

Jupiter-538B	160-10m 100W	£1499 D
Jupiter-538AT-B	160-10m 100W + ATU	£1799 D
Omni-VII-588	160-6m + ethernet	£2499 D
Omni-VII-588AT	160-6m + ethernet + ATU	£2799 D
Orion-II-566	160-6m flagship radio	£3899 D
Orion-II-566AT	160-6m flagship radio + ATU	£4199 D

The Jupiter is TenTec's basic HF transceiver that delivers a cool, crisp 100 Watts of distinctive audio and breathtakingly quiet QSK CW keying. But it also has the ability to decode CW on the screen and if you plug a PC keyboard in the back, you can dispense with your CW key. But then TenTec is different from most, it is lovingly built by USA hams who know a thing or two about radio and your needs!

W&S Now Stock Wouxon Radios!

Wouxun KG-UVPD1P
2m & 70cms Transceiver

NEW

A 5 Watt 2m & 70cms handheld with DTMF, CTCSS and DCS. Also has WFM broadcast. This keypad entry radio with LCD display is supplied with LI-ion battery and AC charger.

£89.99 D

YAESU
Choice of the World's top DX'ers

NEW FT-DX5000 Series!

W&S First! We were the first to receive official CE stock from Yaesu UK. No grey imports or non-Europe spec stock here!
The new series comprises 3 options : FT-DX5000, FT-DX5000D & FT-DX5000MP. All offer 200W from 160m to 6m.

PW Readers Get £100 FREE Heil Goods! **DUE SOON - ORDER NOW!**

FT-DX5000	Basic Transceiver 200W HF-6m	£4999 D
FT-DX5000D	With Station Monitor SM-5000	£5349 D
FT-DX5000MP	With Station Monitor & Roofing Filters	£5799 D

JAYCEE OPEN DAY 2010!

Saturday 18th September
10am -4pm
W&S Scottish Branch @ Jaycee Electronics, Glenrothes, Fife.
Icom, Kenwood & Yaesu In Attendance
Come & Grab A Bargain At Scotland's Premier Event!

FAST SAME DAY DESPATCH SERVICE!
Orders must be received before 3pm.

WiNRADiO® Excalibur Receiver NEW

- ***9kHz - 49.999MHz***
- ***Software Defined Radio***
- ***USB Interface***
- ***3 Parallel Demodulator Channels.***

The WR-G31DDC "Excalibur" receiver heralds a new standard of performance at a very affordable price. The robust front end handles today's busy bands with ease. You will love the live spectrum display (up to 50MHz wide) and absence of significant spurious signals.

£649.95 D

Stock is very limited on this model due to component supplies.

KENWOOD

NEW TS-590E

W&S Exclusive! We are pleased to announce the new HF radio from Kenwood. Prices to be announced.

bhi
DSPKR

NES10-2MK3
New DSP speaker for any receiver or transceiver.
£109.95 C NEW

10 Watt integrated DSP speaker.
£154.95 C

NEIM-1031MKII

An in-line DSP module giving complete noise cancelling control
£139.95 C
www.bhi-ltd.com

HF Transceivers

TS-2000E **£1489.95 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 **£1749 D**

TS-480HX Ideal for mobile, portable or base station. Gives a massive 200W on HF and 100W on 6m. **£849 D**

TS-480SAT This model gives 100 Watts on all bands up to 6m, but adds a built-in automatic ATU. **£749 D**

Handhelds

TH-F7E	2m/70cm 5W (2-pin Kenwood) SMA +FREE Clip Mic	£229.95 D
TH-K2E	2m 5W 4-Key Keypad (2-pin Ken) SMA +FREE Headset	£159.95 D
TH-K2ET	2m 5W 16-Key Keypad (2-pin Ken) SMA +FREE Headset	£165.95 D
TH-K4E	70cm 5W (2-pin Kenwood) SMA +FREE Headset	£159.95 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	£429.95 D

Watson Cross Needle Meters

NEW

These are high quality, accurate VSWR meters with large, clear display featuring X-needle movements.

WCN-200 £69.95 C
* 1.8 - 160MHz * 0 - 30 / 300 / 3000W
* 600W max above 30MHz * 2x SO-239

WCN-400 £69.95 C
* 140 - 525MHz * 0 - 30 / 300 / 600W
* 2x SO-239

WCN-600 £89.95 C
** 1.8 - 525MHz * 0 - 30 / 300 / 3000W*
** 600W max above 30MHz * 2x SO-239*

Butternut Vertical Antennas

These antennas are extremely efficient and use no traps. The large, air-spaced coils are the secret, and resonant adjtments can be made at ground level.

HF-2V 80, 40m DX vertical. 9.75m, Easy erect. £289.95 D
HF-6V 80,40,30,20,15,10m self support 7.9m £389.95 D
HF-9V As HF-6V but adds 17,12 & 6m. 7.9m £449.95 D

Watson Power Supplies

Power-Mite-NF £69.95 C

Compact Cont. 22 Amp Switch Mode PSU variable voltage & noise offset.

Power-Max-25-NF

Slightly larger than the Power-Mite and ideal companion for any 100W radio. **£89.95 C**

Power-Max-45-NF

£129.95 C

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

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	£89.95 C

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

WATERS & STANTON

General Enquiries 01702 204965

UK's Lowest Prices

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(We also Blog and have a Facebook account ~ Just follow the links from our homepage)

Create Rotators

RC5-1 Medium Duty Rotator

*Rotating torque: 6kg/m *Braking torque: 80kg/m *Mast size: 48-63mm *Vertical load 400kg *Horizontal load 800kg *Rotation speed: 60-150sec/50Hz *Power requirement: 230V AC 80VA *Weight: 5kg *Cable: 7-core cable (not supplied) *Requires MC-2 lower mast clamp if mounting on pole **£499.95 D**

RC5-3 As above + preset control **£599.95 D**

RC5A-3 As above but heavy duty **£819.95 D**

Palm Portable Key German Engineering

Beautifully Enginnered Ultra smooth movement and balance. **£74.95 C**

This tiny straight key is manufactured in Germany & represents typical German design & brilliance. Ideal for portable or QRP & very popular for the users of FT-817 transceivers.

SGC Auto ATU

SG-211

SG-211 "Stowaway" auto ATU. HF + 6m Up to60W. Powered by internal battery. Not weatherproofed.

Was ~~£219.95~~ **£199.95 C**

Heil Sound Audio Equipment

Pro-set-4 & 5

Standard headset with a choice of NC-4 or 5 inserts. Requires AD-1 patch lead. **£114.95 C**

For Icom transceivers, choose the **Pro-Set-IC** with "Icom" Element **£129.95 C**

Pro-set-Plus

Pro-set Plus has the benefit of dual NC-4 / NC-5 mic capsules that can be selected. Requires AD-1 patch lead. **£189.95 C**

Pro-Set-PLUS-IC Icom Element **£194.95 C**

AD-1 Connector Leads One to suit any ham rig, tell us your radio. **£16.95 A**

GM-4 & 5

"Gold Line" mics contain the NC-4 or NC-5 capsule. Handheld or mounted on a stand. Requires CC-1 cable kit for rig. **£119.95 C**

CC-1 Cable Kits One to match every ham rig, tell us the radio you need it for. **£29.95 A**

Avair X-Needle Meters

Cross Needle Models - Even Lower Prices!

AV-20 200W 3.5 - 150MHz **£34.95 C**

AV-40 150W 144-470MHz **£34.95 C**

MFJ Radio Accessories

MFJ-998 W&S £649.95 C

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

MFJ-925	Compact auto tuner	**£169.95 D**
MFJ-927	200W remote auto atu	**£249.95 D**
MFJ-928	Basic auto atu	**£199.95 D**
MFJ-931	Artificial ground	**£112.95 C**
MFJ-932	Mini loop tuner	**£139.95 C**
MFJ-934	Artificial ground + ATU	**£199.95 C**
MFJ-935B	Portable loop system	**£199.95 C**
MFJ-945E	Mobile atu 300W	**£129.95 C**

MFJ-929 AUTO TUNER 1.8-30MHz 200W

LCD readout, 20,000 memories, long wire & coax, radio interface.

W&S £209.95 C

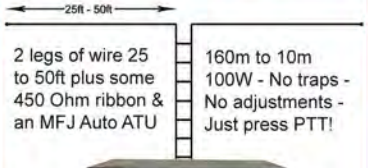
MFJ-991B	Auto atu 150W	**£209.95 D**
MFJ-994B	Auto atu 600W	**£339.95 D**
MFJ-962D	1.5kW ATU	**£289.95 D**
MFJ-969	160m - 6m 300W	**£209.95 D**
MFJ-971	Portable atu	**£118.95 C**
MFJ-974B	Balanced ATU 3.5-30MHz	**£189.95 D**
MFJ-986	3kW differential tuner	**£349.95 D**

MFJ-993B Rugged 300W Auto ATU

A true "Plug & Play" Auto ATU. Covers 160m to 10m. Capable of handling up to 300W - tunes almost any antenna, has X-needle meter & digital data display.

W&S £249.95 D

Build an All-Band Antenna Indoors or Outdoors - Do It Now!



MFJ-1260	Mic control 1 in/2 out	**£99.95 C**
MFJ-1263	Mic control 2in/2 out	**£109.95 C**
MFJ-1275	Sound card adaptor	**£109.95C**
MFJ-1625	Window Ant + Tuner	**£199.95 D**
MFJ-16B01	Dipole centre SO-239	**£21.95 A**
MFJ-16C06	6x dog-bone insulators	**£4.95 A**
MFJ-16E01	300Ω end fed SO-239	**£10.95 D**
MFJ-1796	40m-2m vertical	**£239.95 D**
MFJ-1798	80m-2m vertical	**£299.95 D**
MFJ-1908H	43ft fibre glass mast	**£239.95 D**
MFJ-1922	Digital screw driver control	**£99.95 D**
MFJ-1924	Prog. screw drvr control	**£129.95 C**
MFJ-1925	ATAS-100 controller	**£72.95 C**
MFJ-202B	Receiver noise bridge	**£79.95 C**
MFJ-250X	1kW dummy load (x-oil)	**£55.95 C**
MFJ-260C	300W dummy load	**£44.95 C**

Hustler HF & Mobile Antennas

Verticals

Hustler verticals are known around the world for their performance and sturdy construction.

6-BTV	6 band inc 30m	**£259.95 D**
5-BTV	5 band 80-10m	**£219.95 D**
4-BTV	4 band 40 - 10m	**£179.95 D**

Mobiles

Base Whip Sections

MO-1	137cm Folds 1/3rd Up	**£38.95 C**
MO-2	137cm Folds Halfway Up	**£38.95 C**
MO-3	137cm Non Folding	**£29.95 C**
MO-4	67cm Non Folding	**£26.95 C**

Resonator Top Section

RM-10	10m	150-250kHz	**£21.95 C**
RM-11	11m	150-250kHz	**£21.95 C**
RM-12	12m	90-120kHz	**£21.95 C**
RM-15	15m	100-150kHz	**£21.95 C**
RM-17	17m	120-150kHz	**£26.95 C**
RM-20	20m	80-100kHz	**£26.95 C**
RM-30	30m	50-60kHz	**£29.95 C**
RM-35	40-30m	7-10MHz	**£29.95 C**
RM-40	40m	40-50kHz	**£29.95 C**
RM-50	60-40m	5-7MHz	**£29.95 C**
RM-60	60m	5MHz	**£32.95 C**
RM-80	80m	25-30kHz	**£32.95 C**

Diamond HF Antenna

BB7V *The small space answer!*

* *HF 2 - 30MHz Vertical*
* *No radials needed*
* *250W PEP 6.7m length*
* *VSWR less than 2:1*
* *Weight 2.3kg*
* *50 Ohms SO-239*

£325.95 C

Tigertronics SignaLink Interfaces

Tigertronics 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**

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	**£10.95 C**
W-285	2m 3.4dBv L. 1.33m	**£14.95 C**
W-77LS	2m/70cm 0/2.4dBv L. 0.43m	**£14.95 C**
W-770HB	2m/70cm 3/5.5dBv L. 1.1m	**£19.95 C**
W-7900	2m/70cm 5/7.5dBv L. 1.58m	**£31.95 C**
W-627	6/2/70cm 2/4.5/7.2dBv L.1.6m	**£34.95 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.

£109.95 C

Ducker **£109.95 C**

HF Mini ATU for helical whips

TGM Compact HF Beams

MQ-24SR 4-Bands £499.95 D

This antenna covers 4-bands, 20-6m & up to 5.5dB gain.
* *Element: 3.58m*
* *Boom: 1.37m*

MQ-26SR as above + 17m & 12m **£599.95 D**

B-245 1kW 5-Bands £899.95 D

5-band compact beam antenna that will get you on 40m!
* *Element: 21ft 6in*
* *Boom Length: 10ft*

Watson Coax Switches

Premium grade Watson RF coax switches.

4-Way Switches

CX-SW4N **£59.95 C**
DC - 1.5GHz 1.5kW 5x N-Type Connectors.

CX-SW4PL **£56.95 C**
DC - 800MHz 1.5kW 5x SO-239 Connectors.

3-Way Switches

CX-SW3N **£49.95 C**
DC - 1.5GHz 1.5kW 3x N-Type Connectors.

CX-SW3PL **£41.95 C**
DC - 800MHz 1.5kW 3x SO-239 Connectors.

2-Way Switches

CX-SW2N **£32.95 C**
DC - 3GHz 2kW 3x N-Type Connectors.

CX-SW2PL **£26.95 C**
DC - 1GHz 2kW 3x SO-239 Connectors.

MFJ-269

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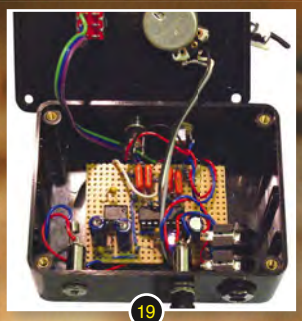
12



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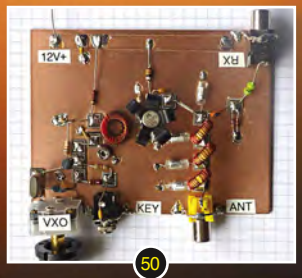

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Practical Wireless October 2010

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Main picture courtesy of Icom UK Ltd.

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Rob Mannion's

keylines

The Editor re-discovers old technology, gets a surprise and tries DF hunting on 3.5MHz.!

On Sunday July 18th **Phil Ciotti G3XBZ, Tex Swann G1TEX** and I drove to **Tim Walford G3PCJ**'s farm at Long Sutton, in Somerset to attend the QRP in The Country (QiTC) event. We weren't disappointed either as it was a truly delightful day out.

The weather had given Tim G3PCJ a lot of anxiety and almost right up to 'opening time' it was quite overcast. However, it turned out very well we had a day of glorious sunshine – in fact 'sun hats' were the order of the day!

Scattered around the field behind the Walford's farmouse, were a number of Amateur Radio related stands and several, large, old fashioned farm trailers laden with equipment – much of it in demonstration mode. As the theme of the day was QRP – everything of interest to keen low power enthusiasts was there to be seen, tried and was much appreciated. However, despite the juicy radio attractions both Tex G1TEX and Phil G3XBZ disappeared for an hour or so one of the advertised 'one hour (on foot) farm' walks, led by Tim's wife **Janet**. It turned out to be one hour out and one back! They had a great time and learned much about the Somerset Levels, and the great efforts the Walford's – as ethical farmers – are achieving to help look after this beautiful part of Somerset.

While the walk was underway, I was fascinated to see equipment such as the 17 Set, a Second World War very high frequency (v.h.f.) transceiver on display. Originally built for short range searchlight group working, it was working on 50MHz – but as usual on 6m there was nobody around to work! However, there was a vintage set-up working that was to remind me quickly just how effective the old technology could be – when I tried the 'Plank' receiver out on 7MHz (40m).

Tim G3PCJ, with the help and support of the **Yeovil Amateur Radio Club** (YARC) had arranged for the 'Plank' equipment (literally built on a wooden plank 'chassis') to be operational, while mounted one of the farm trailers. But, despite the fact I could have had a QSO or two, I concentrated on using the Plank receiver on the c.w. section of 7MHz. And – to be quite frank – I was truly astounded at how selective and sensitive the receiver was on the crowded band.

Even though in the past I've often built tuned radio frequency (t.r.f.) receivers using carefully controlled regeneration – I was most impressed with the performance. The receiver section was very easy to operate (all the exposed wiring – due to 'Health & Safety' considerations because of the high tension involved, had been temporarily covered by clear plastic sheeting).

I think there's something to be said for exploring the bands on such simple equipment. Although I enjoy using modern gear, with precise frequency displays and extensive crystal filtering, I urge any reader who has access to valves, and the necessary components to build a t.r.f. design to build one and try it on the 3.5 and 7MHz bands. If you do – you won't be disappointed!

Trying Direction Finding

The keen – and very enthusiastic – **Blackmore Vale Club** (BVC) members were there in force at QiTC and I was intrigued to see that visitors were being encouraged to try direction finding (DFing) out for themselves. So I stuck my walking stick under my arm and accepted the challenge and – using the neat little Japanese made 3.5MHz receivers (specially made for the job) – I set out to hunt down the milliWatt level beacons hidden in the field.

It was great fun – I found two beacons, but (infuriatingly!!) I didn't realise the beacons switched after each c.w. 'ident' and this truly foxed me at first! It was thoroughly enjoyable and – as the BVC members told me – anyone (especially youngsters) can join in. I've often thought that DFing has been neglected in *PW*, so please write in and tell us about your activities with this mode.

I think everyone that attended had a wonderful – low powered of course – day out. So, if you didn't attend this year – you missed the best 'real radio' rally of 2010. Make sure you join us in 2011!

Rob Mannion G3XFD/EI5IW

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

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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.

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

readers' letters

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

Star Letter

Radio Amateur Prosecuted – A Magistrate Replies

Dear Rob,
I read the letter from **Carl Johnson M3VWP** in the September Issue of *PW* and for information of readers append the relevant legislation.

The important part being sub para (4) where it specifically states ...other than a two way radio..... I understand though it is only exempt **if** it cannot be used as a mobile 'phone. I presume that the Police discovered this and went for the charge of Driving without due care and attention instead.

Amendment of the Road Vehicles (Construction and Use) Regulations 1986

2. The Road Vehicles (Construction and Use) Regulations 1986[2] are amended by inserting after regulation 109 -

Mobile telephones

110.

(1) No person shall drive a motor vehicle on a road if he is using -
(a) a hand-held mobile telephone; or
(b) a hand-held device of a kind specified in paragraph (4).

(2) No person shall cause or permit any other person to drive a motor vehicle on a road while that other person is using -
(a) a hand-held mobile telephone; or
(b) a hand-held device of a kind specified in paragraph (4).

(3) No person shall supervise a holder of a provisional licence if the person supervising is using –
(a) a hand-held mobile telephone; or
(b) a hand-held device of a kind specified in paragraph (4), at a time when the provisional licence holder is driving a motor vehicle on a road.

(4) A device referred to in paragraphs (1)(b), (2)(b) and (3)(b) is a device, other than a two-way radio, which performs an interactive communication function by transmitting and receiving data.

I must however take you to task with regard to your comments in Topical Talk in the same issue. A Police Officer's views are not taken as sacrosanct, all trial outcomes are decided on the evidence put before the bench. Just because the prosecution witness is a Policeman does not necessarily mean that the defendant will be found guilty.

The best advice I think really is – don't use anything which may bring up a charge of lack of 'due care and attention' and get a solicitor. The solicitor may have well been able to point out the discrepancies in the evidence, i.e. weather, position, etc. Finally – I don't think I have a baleful glare! Thanks for a great magazine.

Regards
David – North West England
Full name and address provided

Editor's comments: *I'm grateful for David's reply and comments on the rather unfortunate situation faced by Carl M3VWP. However, as he's is a serving Justice of the Peace and publishing his name and address could comprise his vocation as a Magistrate, I have agreed to publish his first name only. I should also say that David has an Amateur Radio Licence and that the style of his correspondence would certainly seem to remove any suggestion that he directs a 'baleful glare' from the bench!*

Dispensation No Longer Valid?

Dear Rob,
The fact that **Carl Johnson M3VWP** (Radio Amateur Operating Mobile Prosecuted, *Letters* page 7 September issue *PW*) was prosecuted for the use of a hand-held microphone – is evidence to me that it's no longer legal to use a hand-held microphone when driving. If this is the case, why do manufacturers produce and sell Amateur Radio and CB equipment for mobile use with a hand-held microphone?

It looks – to me – that the exception granted to Amateur Radio for mobile radio operating (using a hand-held microphone) is no longer valid. So, what happens when a Radio Amateur uses a mobile radio while parked at the side of a road (perhaps in a lay-by) with the engine switched off?

If M3VWP **was** wrongly convicted – as I think he was – his fine should be refunded and he should seek compensation.

Regards.
Mark Garton G8WJY
Catshill
Bromsgrove
Worcestershire

Editor's comment: *Thanks for your letter Mark. However, although the dispensation is (as far as my enquiries have confirmed) still in force – the catch is the 'Driving without due care and attention' accusation. Perhaps Carl M3VWP would have escaped conviction if he'd had legal representation, or perhaps not. My own advice is not to tempt providence – and operate with a 'hands free' microphone. Please join me on the* Topical Talk *page for further comment.*

Sunspots, Cold Weather & Propagation

Dear Rob,
Firstly, thank you – for this the September issue of *PW*, which arrived at the end of last week (August 13th). Getting into this month's magazine I noted the letter from **Doug Cormack G4ZVR** (Letters, page 8 and 9). Doug was querying whether or not there was any correlation between low sun spot activity and cold weather. In trying to answer his question, some years ago there was an article in the **Radio Amateur Old Timers Association** (RAOTA) *OT News* regarding the effects of sun spot count and propagation.

Included in the article was a chart plotting sunspot numbers from the early 1600s up to the date of the article. This showed a period from 1650 to 1710 when there were no sun spots recorded. This period – known as 'The Maunder Minimum', coincided with a 'Mini Ice Age'. Since then, the average count shows a steadily rising trend, with a marked dip in the 1800s. Thus, there is a clear link between sun spot activities and temperature, one of the several reasons why I'm a sceptic regarding man's responsibility for global warming.

However, the bottom line is (although not in our lifetimes I hope!) that the Earth will be swallowed up by the expanding, dying sun. Sincerely yours.
J W (Wally) Barker G3WAL
Southbourne
Bournemouth
Dorset

Alex's Mystery Photo & Readers' Help

Dear Rob,
I am writing to thank you and your readers for help in regard to my 'mystery photo' in the September issue. You were also kind enough to pass on a telephone number to get me in touch with **Mr John Barrington-Gray** from Northampton, and let me know of the E-mail from **Alan Ford VK2DRR**.

I had a 30 minute 'phone call with **John Barrington-Gray** and he gave me a lot of information on the radio, including that the headphones were made by Sterling, the loudspeaker was 2kΩ impedance, driven by an LS5 valve (which is a new one on me). Also, he advised me that the radio was operating between 90 and 200 metres. (John concluded this from the 'front' coil in the photo.) The other information agrees with what Alan said in his E-mail.

However, no one has yet managed to identify the chap in the photo. But I have my fingers crossed, although I'm not holding my breath!

Finally, I again thank everyone for their trouble, and must say that you've all gone the 'extra mile' in helping me out. With just about two years to go before my 50 years (unbroken collection

The Jet Stream & Radio Effects

Dear Rob,
I found the letter from **Doug Cormack G4VZR** (The Jet Stream & Radio Effects, *Letters* September *PW*) to be very interesting. As a keen listener – concentrating on the v.h.f. Amateur bands I feel sure that Doug has raised some interesting points. Living right on the south west coast of Cornwall I'm often able to hear some truly fascinating Marine Ducting on '2 metres'. I've been observing v.h.f. (particularly) since I retired and it always seems exciting to me when first the French v.h.f. f.m. stations appear on Band II, followed by Spanish and Italian stations – always seemingly in that order. This summer I've also received the Canary Island f.m. station that seems to carry a lot of English language programmes and announcements (I don't speak any Spanish).

It seems to me – from casual observation only – that even h.f. conditions on the higher bands such as 17, 15, 12 and 10m seem to improve when the Jet Stream that flows across the Atlantic is at its strongest. How do I know when the JS is at its strongest? Simple – from the comments being made by aircrew when they're flying from the USA and Canada to Europe and using the Shanwick Transoceanic h.f. frequencies. There's never much chit-chat of course – but occasionally aircrew will mention how far ahead of schedule they are. With my simple observation system I just make a note in my log and usually the stronger JS coincide with improved h.f. and usually v.h.f. conditions.

All my efforts are simple in the extreme – but **it is** fascinating to suddenly hear a station where there's usually nothing. I encourage *PW* readers to tune their Band II receivers – when conditions look promising weatherwise – to a quiet spot and it's likely that a DX station will pop out of nowhere. I always do this when my barometer shows a 'high' or is actually showing an increase and sure enough – up will come a DX station. It's then just a matter of then listening on '2m' to see what's happening there. Additionally, now that the Jersey repeater (GB3GJ on 145.6375MHz) in the Channel Islands is on the air I now have a good source to monitor. It's become a good indicator that conditions are improving if I hear it continuously for half an hour or so at a time. Thanks to Tex G1TEX and yourself Rob for a good magazine and also to the Art Department for their efforts in providing a really professional looking and easy-to-read product. Now we just need a few more article on propagation! Best wishes
John Holman
Goldenbank
Falmouth
Cornwall

Dear Rob,
My thanks must go **t**o John Cormack G4VZR **f**or his letter (September *PW* page 8) because I'm also interested in the possible connections between tropo weather and propagation on both v.h.f. and h.f. In fact, I think the rather special topic has been neglected, although I realise that unless someone writes an article on the subject *PW* can't publish it!

I hope you can find a suitable author and like you – I have recognised some sort of link between the day-to-day weather in the troposphere and conditions on h.f. Let's hope you can find someone to enlighten us. Best wishes.
Mike Hales
Dereham
Norfolk

Gordon King G4VFV

Dear Rob,
I was very sorry to hear of the death of **Gordon King G4VFV**, after reading your news item on the **Southgate ARC's** website. Gordon was an excellent technical author and I suspect that there will be a large number of your readers who – like me – have been helped by his remarkable range of books. Before I telephoned you I was under the impression that Gordon, as well as writing for *PW* for many years – had published 50 or so books dealing with literally every subject from, simple radio techniques up to complex television servicing guides. However, during our telephone chat you told me that Gordon had actually published **76 books** in total. What a truly remarkable and versatile man he was!

Although I originally come from Oxford myself – where Gordon was born and brought up – I was never able to meet him face-to-face. Despite this, Gordon's style was so friendly and technically aware, I always felt he was writing just for me. Indeed, when Gordon started writing for *PW* again regularly his style didn't seem to have changed and he was the ideal author for *PW*. We shall not seem the likes of G4VFV again.
Reg Giles
Shippon
Abingdon
Oxfordshire

Editor's comment: *Thank you Reg for your own tribute to Gordon G4VFV. I was privileged to know him and count this remarkable man as a great friend. His writing really did reflect his personality. Please see this month's news for G4VFV's Obituary.*

Dear Rob,
I was saddened to hear of Gordon King G4VFV's death and was very pleased to learn that you had been able to attend his funeral in Brixham, Devon. When I saw G4VFV's brief *Daily Telegraph* Obituary (technically mangled unfortunately) I thought it best to 'phone you, just in case you hadn't heard – but wasn't really surprised to learn that you had attended Gordon's funeral the day before.

The many books that Gordon produced, helped many professionals and Amateurs. His book on the PAL colour TV system helped me during my time as a service-bench technician and his antenna book certainly helped our resident rigger. Thank you Gordon – I enjoyed reading your books. Unusually for technical reading they were very 'readable' and enjoyable. Regards.
Greg Taylor
Manthorpe
Grantham
Lincolnshire

Dear Rob,
Seeing the brief Obituary in the *Daily Telegraph* and the news item on the **Southgate ARC** website came as a bit of a shock because – at one time – Gordon King G4VFV's many published titles seemed to dominate the technical section of my local library. It was, through reading G4VFV's books, together with his articles in *PW* – that helped me enjoy my radio hobby.

I wrote to him some years ago (via the *PW* offices) and very quickly got a friendly and helpful reply. In the reply he told me he first wrote for *PW* in the late 1940s. What a remarkable man he was! Regards.
Peter Carter
Hinton-in-the-Hedges
Brackley
Northamptonshire

Editor's comment: *As far as I can tell (by looking in our archives) Peter – 1949 was the first year Gordon wrote a full article for* PW *and I remember him mentioning the year himself. He had three articles published during that year – the start of a great career.*

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**

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of *PW*s),
I still say it must be the best radio magazine on the market! 73 everyone.
Alex Blyth GM4TAL
Longniddry
East Lothian
Scotland

Editor's comment: *Our pleasure Alex – I knew our readers worldwide would help. Thank you everyone!*

Thank You Carl GW0VSW & Colin G6MXL

Dear Rob,
I'm writing to say a grateful 'Thank you' to two of your authors – **Carl Mason GW0VSW** (*HF Highlights* author) and **Colin Redwood G6MXL** (*What Next?* and review author). I'm sincerely grateful for their help to my enquiries – and in fact their help and advice went far beyond normal working boundaries and I'm so pleased I wrote to them for help. Good health and DX to everyone.
Don Mclennan G3KGM
Aylesbury
Buckinghamshire

Shack of the Month?

Dear Rob,
I've just thought of an idea for *PW*. Perhaps you could run regular feature called something like 'One Man's Shack' or 'Shack of the Month', which would be a profile of the Radio Amateur in question and a description of their equipment, antennas,and the aspects of Amateur Radio that most interest to the Amateur who is featured..

Perhaps your regular contributors or other amateurs well-known in different fields might be good to start with. Mind you, there wouldn't be any point in doing my shack as it consists of a jumble of half-baked projects on a table in the corner of our back bedroom, with a 15m wire down the back garden for an antenna. Hope this helps! 73.
Ken Mayne GI4FLG
Bangor
Northern Ireland

Editor's comment: *A good idea Ken.... but there's a but! (please join me on the* Topical Talk *page for further comment).*

news & products

A comprehensive round-up of what's happening in our hobby.

New PowAbeam Website

Richard Mason G6HKS and Derek Hilleard G4CQM have announced that, "We are pleased to announce the official launch of **PowAbeam Antennas.com,** which also heralds the introduction of the **new** Paraclips." (PowAbeam claim that: "the Paraclip is the ultimate parasitic element mounting"). Made of tough UV stabilised polypropelyne, a material which is transparent to r.f. (and doesn't even get warm in the microwave oven test!) and is now replacing PowAbeams previous Netlons.

Specialising in the 144MHz band, PowAbeam Antennas press release states that they, "have a comprehensive range of **NEXTGEN** yagi kits offering costs savings compared to ready made antennas. In these difficult economic times this may well be a key factor."

Further details from **www.powabeamantennas.com**

Gordon King G4VFV – Silent Key & Keyboard

Rob Mannion G3XFD presents a tribute to his friend and author Gordon King G4VFV and writes, "I was going to write a separate tribute to Gordon G4VFV – but on reflection I thought that the following appreciation of his life, that I was honoured to read out at his funeral – in Brixham in Devon – as it expressed everything I wanted to say".

Rob's appreciation: "Why am I not wearing a dark suit and black tie? It's because **Barbara King** and family wanted a celebration of Gordon's life. And this is a celebration of a unique man. I'll start by mentioning that I'm probably unique among the many hundreds of thousands of Gordon's readers – in that I was originally taught by him via his books. As a young student keen on Amateur Radio – I really got 'stuck into' radio, TV, and electronics – and Gordon led the way through his many published titles."

Friend & Author

"Although I had read many of his earlier books – I first got to know Gordon when I read his classic book – on the PAL Colour TV system and wrote to thank him for his help in launching me on my own career as a technical writer. That first correspondence in the early 1970s led to a very special and unique relationship – where as well as originally being one of his keen students, I eventually became involved in the editing of several of Gordon's books and many later articles.

"Eventually, my own career as a medical, science and technology journalist, writer and Editor led me to become Editor of *Practical Wireless* 21 years ago. Gordon had written 'on and off' for *PW* for many years (*PW* was where he published his first articles) – and I was soon fortunate to have him writing for the magazine on a regular basis. His unique approach, his friendly, informal and exceptionally informative writing was unique in itself.

"Gordon was a delight to work with and on the occasions I made a mistake – Editors do make them! – I would get a friendly telephone call or E-mail from my friend to mention the problem. Although over 100 miles away from Bournemouth area where I worked – Gordon always seemed very close by. He was there when I was learning through his superbly presented book and through personal advice in his letters – and he was still there to help me when I was still learning – 21 years after becoming *PW* Editor. It was great to imagine having him – literally on tip-toes – looking over my shoulder. My stock phrase – that's become my motto nowadays – was often shared between us (when either of us made a mistake!) and it goes like this: *"I learned something today – and look back to yesterday when I knew so little, but thanks to my teachers and life itself – my ignorance is growing smaller each new day."*

"Thank you Gordon – you were and still are the 'King' when it came to helping myself and very many others to learn something new about the word of electronic technology. You provided the foundation of my radio/TV/electronics learning and became a great friend – and without you my own career would not have prospered. But I'm not saying 'goodbye' Gordon because your memory and your published work – itself a lasting tribute – will remain on my bookshelf for pleasure and reference. However, I hope that your heavenly Editor feels as grateful as I do to have you 'on the staff' and I know you'd think twice, or even three times, before sending warning thunderbolts and lightning towards this – **still learning on the job** – Editor. Thank you again Gordon – you never did miss a publishing deadline!"

Gordon King G4VFV operating his favourite mode – low power c.w. Gordon was an expert in hiding his antennas, preferring low profile Amateur Radio and chasing the DX – using less than 10W whenever he could.

Oxford-born Gordon was much loved by his family– wife **Barbara**, son Mike and daughter **Sue** and all his grandchildren. I met the entire family at Brixham's Berry Head Hotel after the Church service and left for home afterwards – feeling very privileged to have been invited to attend.

G3XFD

Transmission 2010 – You Can Join In!

The British Wireless for the Blind Fund invites your Amateur Radio Club to take part in ***Transmission 2010***, our annual competition to make as many contacts across the world as possible and raise money for a very worthwhile cause at the same time.

Their press release states: "The British Wireless for the Blind Fund (BWBF) is a registered charity providing specially adapted radios and audio equipment on free permanent loan to registered blind and partially-sighted people in need in the UK. Every year we receive requests for around 5,000 sets at a cost of approximately £750,000. All sponsorship money raised from Transmission will go towards continuing our much valued service. This year's competition will be taking place over the weekend of September 18/19th and I very much hope that your Club will consider taking part. By getting friends and family to sponsor the number of contacts you make, we are able to keep people with sight loss in touch with the world."

Join In

"Join the fun – make as many contacts as possible from across the world, compete against other amateur enthusiasts and try to beat last year's record of 802 contacts (individual category) or 1113 contacts (Clubs).

"To enter the competition, please either complete go to our new web-site at **www.blind.org.uk** and fill in the on-line form. Sponsorship forms and a poster can also be downloaded. Once your registration has been received I will send out QSL cards, a copy of the Rules and sponsorship forms.

There are trophies to be won for:-
Most contacts made by an Individual or a Club
Most money raised by an Individual or a Club
Young persons individual or group special achievement award

"I also hope to have prizes for each category. As soon as these are confirmed, I will put the information onto the web-site. I do hope you will decide to take this year and aim to raise sufficient funds to provide a radio set for someone in need in your area. The average cost of a set is £150.

"As an independent charity receiving no government funding or lottery money, BWBF are entirely reliant on the kindness and generosity of our supporters. Only with your help can we continue our work of supplying radios and audio equipment to people with sight loss."

Frances Fielding
Fundraising Manager
British Wireless for the Blind Fund
Registered Charity No. 1078287
10 Albion Place
Maidstone
Kent ME14 5DZ
Tel: **01622 754757**

Cray Valley RS Goes North American Indian Style For BWBF

The south east London-based **Cray Valley Radio Society** (CVRS) will be taking part in the **British Wireless for the Blind Fund's** (BWBF) Transmission 2010 charity event over the weekend of the September 18th and 19th using the callsign **GB2BF**.

The GB2BF station will be operated from the Margaret McMillan House field study centre, complete with its teepee encampment, near the summit of Wrotham Hill in Kent (JO01DH).

Active on h.f. and v.h.f. (70 and 144MHz)), members will try to make as many QSOs as possible over the weekend activity period. Every contact made will help raise funds for BWBF's work supplying specially adapted radio and audio equipment to the blind and partially sighted.

For further details about the event and ways to help support Cray Valley's fund raising please see **http://www.blind.org.uk/transmission_2010.html and www.cvrs.org**
Kevin Jenkins M0KSJ
E-mail **kevin@m0ksj.org.uk**

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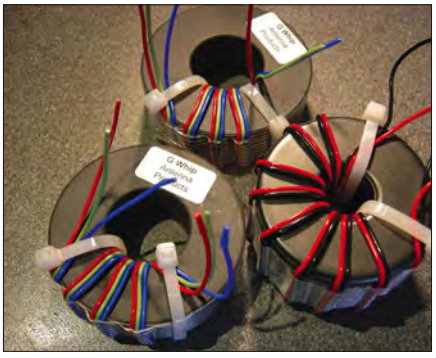
News From G Whips

Geoff Brown G4ICD of G Whip contacted *Newsdesk* with some interesting news: "Since making the sample Zepp, G Whip has now produced a 'no counterpoise half wave end fed Zepp' for all bands from 7 to 50MHz (40 to 6m).

"G Whip has also extended it's range of antenna products and can now offer professional Baluns and matching transformers in many formats including unbalanced-to-balanced and unbalance-to-unbalanced. Many ratios are available such as 1:1, 4:1, 6:1, 8:1, 9:1, 16:1 and power levels are available up to 1kW. Each balun, whether cased or uncased comes with it's own network analyser scan, prices start from £8.

"Other new products under completion in Aug/Sept is the '10 Bander', a garden size (5m long) base station antenna, centre loaded and helically wound with large tapped coil that will cover 28/24/21/18/14/10/7/5/3.5/1.8 MHz. A half size version of this antenna (i..e a 1/4 wave) will also be available as a mobile antenna covering 9 bands (no 5MHz mobile)."

Further details from Geoff Brown G4ICD, 17 Grove Gardens, Southampton, Hampshire SO19 9QZ.
Tel: (Mobile) **07971077317**. Sales E-mail **janetdbrown@btinternet.com** Technical help E-mail **g4icd@btinternet.com**
Website: **www.gwhip.co.uk**



Continued on page 15.

The Icom IC-T70E

Dual-Band VHF/UHF hand-held f.m. transceiver

When the Editor first invited me to review the latest hand-held from Icom, I was pleased to accept the commission. The next step, before starting work on the transceiver – was to look at what Icom say about the T-70E.

The press release states, *"The IC-T70E v.h.f./u.h.f. dual-band hand-held transceiver is the successor to Icom's best selling IC-T7H. The IC-T70E has many impressive features including 700mW loud audio, long-lasting power, rugged construction, plenty of memory channels, all at a competitive price. In short, the IC-T70E offers practical dual-band operation and ruggedness, updated for today's radio enthusiast.*

"The IC-T70E employs a new low consumption current f.e.t. module providing 5W of high power and long operating time for both v.h.f. and u.h.f. bands. For even longer operating time, 2.5W or 500mW of reduced output power can be selected. The IC-T70E uses a bridge-tied load (BTL) amplifier that doubles the audio output.

"The 36mm large speaker delivers 700mW of loud and intelligible audio even in noisy environments. Dust protection and water-resistance equivalent to IP54 provides reliable operation for practical outdoor operation. The IC-T70E is tested and has passed 11 MIL-STD 810 environmental tests. The 6-character alphanumeric display clearly shows channel name, operating frequency and memory number with bright illumination.

"An external d.c. power jack allows for operation and charge when used with an external d.c. power supply (10-16V DC). With 302 alphanumeric memory channels, including 50 band edges and 2 call channels, the IC-T70E gives you flexible scanning lists. With a maximum of 26 memory banks, you can pick and choose the desired banks for scanning from the 250 memories.

"The IC-T70E has an internal voice operated transmit (VOX) function for convenient hands-free operation when used with a compatible optional headset and plug adapter cable. Also, the VOX level and VOX delay time are adjustable. The CTCSS and DTCS tone facilities are built-in for quiet stand-by and repeater access. Pocket beep and tone scan are also possible. The tone scan allows the operator to detect the sub-audible tone that is used for repeater access. The IC-T70E supports various scan types for maximum reception and ease of use."

Tim Kirby G4VXE takes a break from preparing The World of VHF to try a new Icom dual-band transceiver

First impressions

Well, so much for the press release – next I'll go on to my first impressions. On opening the box, the main body of the rig, the battery and the antenna were all separate.

Marrying the rig and the battery was straightforward, though it's a good positive fit to assure the waterproofing. The antenna is attached using an SMA connector. Again, screw that down as far as you can without over-tightening to keep any rain out!

The IC-T70E comes with what the American call a 'wall-wart' charger. I set the rig to charge overnight to ensure a good first charge. When I came to unplug the charger in the morning it was quite warm, verging on hot – though not dangerously so.

The rig is rugged in appearance and I found it more appealing to the eye 'in the flesh' so to speak, compared to the adverts. It's a comfortable weight in the hand and feels of robust construction.

When switching on a rig for the first time, I'm always interested in how much I can do without reference to the instruction manual!

I expect to review the manual for the more detailed functions, but if you can switch the rig on, change frequency, set a repeater shift and continuous tone coded squelch system (CTCSS) tone without reference to the manual, then that's a good thing in my book! So, how did the IC-T70E fare?

Switching on was straightforward enough. Changing frequency was too, I was able to either punch the required frequency in on the keypad, or rotate the dial on the top of the rig. I found the frequency display was clear and in fact larger than on most hand-held radios.

Changing band, from 144 to 432MHz was just a question of hitting the **Band** key on the front panel as you'd expect. The **Dup** key allowed me to set the repeater offset as positive or negative and the **Tone** key allowed setting a variety of different options – in my case switching on a simple CTCSS tone. How to check the value of the repeater offset and CTCSS?

I was able to access the tone values by pressing the **Set** key on the keypad and to cycle through the options and values using the knob on the top of the radio. And in fact, the main knob navigates you between the different options, e.g. **Microphone Gain** to **VOX** and the concentric ring allows you to change the value) – simple and intuitive.

What I couldn't immediately find was the equivalent of the **Enter** key. I'd been able to change the CTCSS tone to 118.8Hz – but how to save it? I had to resort to the manual for a quick answer – it was the **V/M/C** key that acts as an enter key and saves the values.

So, all the parameters that I needed to access a repeater were in place – could I save them to a memory for easy access. The **S.MW** (Memory write) key looked promising. I held the key down and, as I expected, it offered me the chance to a free memory location to save the settings to, by using the knob on the top of the radio. Pressing the S.MW button again saves the settings into the desired memory number.

I was pleased to find that I'd managed to find nearly all the functions that I needed to set the rig up for 'basic' use, which, after all is what most of us want out of our handhelds without frustration or spending hours over the instruction manual.

Extra Loud Audio?

I was interested in Icom's claim of 'extra loud audio' because I occasionally I pop a hand-held in the car to listen to something. **Note:** Please don't be tempted to try and transmit using a hand-held radio unless you have a hands-free kit – it wouldn't make for an easy conversation with the Police) and quite often the audio level is insufficient to hear the rig properly.

I placed the IC-T70E on the passenger seat and tuned to the local 145MHz repeater – turned the volume up to 75% scale and set off. It was a hot day, so I had the windows open so there was plenty of road noise but even in that environment I could easily hear the audio from the rig.

I was keen to try the rig in action so, outside the car, I put a call through the Witney u.h.f. repeater, GB3WO and was pleased to be called by **David M0??** (sorry I've mislaid the rest of your callsign David) – who was by the River Thames in Windsor. David was able to confirm that my signal was strong into the repeater (I was using the 5W power output) and that the audio sounded okay. Interestingly, David was getting into GB3WO using the *Echolink* application on his iPhone!

I compared the receiver on the IC-T70E with my Icom E-92ED. On 433MHz I keyed up the Swindon repeater, GB3TD which wasn't terribly strong where I was. The T70E was at least as sensitive as the E-92ED if not slightly better! On 144MHz, received signals were almost identical between the T70E and the E-92ED.

On transmit, the T70E is switchable between three different power levels (5/2.5/500mW) on both 144/430MHz bands. I was impressed that on 430MHz, that even on 500mW I was readily able to access the GB3UK repeater on top of the Cotswolds, some 48km (30 miles) away. Having three different power levels is useful and should allow you to tailor your power to the contact that you're having – and of course the lower power you can run, the longer your battery will last!

Since the GB3WO repeater is *Echolink* connected, I wanted to try the IC-T70E's integral dual tone multi-frequency (DTMF) keypad. I decided to connect to the A47RS repeater in Oman and keyed in its node number. After a short delay I was connected, proving that the DTMF sequence had worked correctly.

In another QSO on the Swindon 145MHz repeater, GB3WH I worked **Richard Gosnell G4MUF** and **Richard Marshall G4ERP/M** both of whom know me well. They were able to confirm that the audio was good and sounded like me.

Being able to listen on the input of a repeater is always a useful facility and the **MONI** button, readily available on the front key pad makes this straightforward. Likewise, if you're operating away from home the ability to find out which CTCSS tone is in use is vital. The **T.SCAN** feature works well and again, is readily accessible.

London Tests & Battery

The majority of my tests with the IC-T70E were conducted in the rural environment around my home. However, I wanted to see if the receiver would produce any unwanted responses in a more heavily radio frequency (r.f.) populated area. I took the rig to Tower Pier in London, close to where I work and found the receiver free of intermodulation or any other unexpected signals on both 144 and 430MHz.

The supplied battery

pack, the BP-264 1400mAH NiMH, is quoted at roughly 10-11.5 hours of operating time. My tests seemed to confirm this – the charge held up nicely – it's always a real plus to find a handheld that you can charge once and use for several days (or weeks!) without having to re-charge it.

Incidentally, compared to more fully featured (and expensive) models, I missed the ability to be able to listen on both bands at the same time – but you can't have everything. In any case, you can get around this by scanning memory channels on both bands, so you're unlikely to miss much.

Bells & Whistles

There are several scan modes on the IC-T70E that I found useful. The most useful (to me) were the ability to scan between two frequencies, repeatedly (say the simplex and repeater channels) and also the ability to scan the memory channels, which is very flexible.

I also enjoyed the ability to be able to programme names into memories, so that I could display the repeater's callsign, rather than a frequency on the screen. However, I must say that some of the characters bear only a passing resemblance to letters you'd recognise!

The manual states that the UK version of the IC-T70E has extended receiver coverage between 136 and 174MHz and 400-479MHz. Despite this the feature wasn't available on the review model – so if this is important to you, you should check with your retailer that the extended coverage has been enabled.

Note: I was unable to test the VOX features of the rig, as I didn't have a compatible headset available, but they certainly appear to be useful.

Overall Impression

I enjoyed using the IC-T70E and my overall impression was that the transceiver did everything I asked of an 'entry-level' dual-band hand-held. Audio and r.f. performance was good and the rig is solidly built and water-resistant. You may have to dive into the instruction manual (which is well written) to use some of the more esoteric functions, but for day-to-day operation it's both simple to operate and a pleasure to use.

Finally I should like to thank the Amateurs mentioned in this review for their assistance and also to my wife, **Julie** – for the photography! – as well as, of course, Icom UK for the loan of the review model.

The IC-T70E should be available for £179 including VAT. ●

Icom IC-T70E Specifications

General	
Frequency coverage	
Transmit:	144 – 146, 430 – 440MHz
Receive:	136 – 174, 400 – 479MHz
Mode:	f.m. (wideband) n.b.f.m.
Number of memories:	302 (including 50 scan edges and 2 call channels)
Usable temperature range:	-20C to + 60C
Tuning steps:	5, 10, 12.5, 15, 20, 25, 30, 50, 100, 125 and 200kHz
Frequency stability:	±2.5ppm (-20C to +60C)
Power supply:	10-16V d.c. for external d.c. power, or specified Icom battery pack
Current drain (at 7.2V d.c.)	
Transmit	
High (typical)	v.h.f. 1.7A, u.h.f. 2.1A
Mid (typical)	v.h.f. 1.2A, u.h.f. 1.5A
Low (typical)	v.h.f. 600mA, u.h.f. 800mA
Receiver	Max output less than 450mA (Internal speaker) Less than 300mA (External speaker) Power save less than 40mA (Duty 1:8) Standby less than 90mA
Antenna connector	SMA (50Ω)
Dimensions	58(W) x 111(H) x 30(D) mm
Weight (approx.)	380g (with antenna and BP-264)
Transmitter	
Modulation system	Variable reactance frequency modulation
Output power (7.2 v d.c.)	High 5W, Mid 2.5W, Low 500mW (typical)
Max. frequency deviation	±5kHz (f.m. wide approx.) ±2.5kHz (f.m. narrow approx.)
Spurious emissions	Less than -60dBc at High/Mid Less than -13dBm at Low
External microphone impedance	2.2kΩ
Receiver	
Receiver design	Double-conversion superhetrodyne
Intermediate frequencies	1st 46.35MHz, 2nd 450kHz
Sensitivity (except spurious points)	1kHz/3.5kHz Dev. 12dB SINAD) Guaranteed freq. range: Less than 018μV Other freq range less than 0.32μV
Squelch Sensitivity (except spurious points 1kHz/3.5kHz Dev)	
Guaranteed range	less than 0.18μV
Other freq. range	Less than 0.32μV
Audio output power	(at 10% distortion/7.2V d.c.)
Internal speaker	More than 700mW with a 16Ω load.
External speaker	more than 400mW with an 8Ω load
Selectivity (at CH spacing 20kHz/in the Amateur bands)	
Wide f.m.	more than 60dB
Narrow f.m.	more than 60dB
Ext speaker connector	Three conductor 3.5(d)mm/8Ω
Spurious and image rejection ratio in guaranteed frequency range:	More than 60dB

New Chinese Hand-Helds From Nevada!

Mike Devereux G3SED, Managing Director of **Nevada Radio** contacted *Newsdesk* with his latest product news: "I'm writing to tell you about a new low cost Chinese made dual-band hand-held from Chinese manufacturer **TYT Electronics**, their TH-UVF1 which will sell at just £99.95. Nevada Radio has been appointed exclusive UK distributor for this model which we will introduce later this month (late August)".

"The TYT Company are a high quality manufacturer making radios at unbelievably low prices for the specifications and build quality. I believe it is easier to use with a proper external SMA connector and more logical in operation than other Chinese made hand-helds." Mike G3SED.

Product Information

The TH-UVF1 covers the 144 and 430MHz bands, has wide-band receive and is packed with features.

Power output switchable 500mW/5W.
Transmits on 145/433MHz.
Simplex or Duplex modes.
Fully adjustable Repeater shift function.
Frequency coverage 70-108MHz (receive only).
Receive Range 136-174MHz and 400-470MHz.
Antenna type standard SMA fitting.
Full direct entry keypad.
Wide/Narrow Deviation control.
Tone Scan feature.
Twin receive mode.
Multi colour choice for display lighting.
Built in CTCSS/DCS/1750Hz Tone-burst.
Memory channels (128 in total).
Complete with drop-in charger plus rubber duck type antenna.
The radio has full CE and ROHS European approvals.

Nevada
Unit 1 Fitzherbert Spur
Farlington
Portsmouth
Hampshire PO6 1TT
E-mail **sales@nevada.co.uk**
www.nevada.co.uk

Editorial comment: *This new transceiver will be reviewed in* PW *soon!*

Stop Press News!

Tennamast Winner!

Mr David Price G0DOI of Wellington in Somerset has won the Tennamast (Scotland) Ltd. prize in our joint competition. David has been notified and we'll have more news of the lucky winner next month. Our congratulations to G0DOI!

National Hamfest 2010 Is Coming!

The Lincoln Short Wave Club – organisers of the **National Hamfest with the support of the Radio Society of Great Britain – are keen to make sure you don't forget that October 1st and 2nd 2010 – 10am to 4pm at the **Newark Showground** in Nottinghamshire – is the place to be!

Chris Jones G0PIO
National Hamfest Publicity & PR
chris@nationalhamfest.org.uk

Changes at BARTG 2010

The **British Amateur Radio Teledata Group** (BARTG) have announced that they've recently made some fundamental changes to the way it operates – which they hope will bring some exciting changes to the RTTY contesting world.

The BARTG press release states that:

"**1:** The post of BARTG Contest Manager has been replaced with a Contests/DX/Software Sub-group, consisting of **Phil Cooper GU0SUP** and **Ian Moore GM4KLN**, assisted by **John Barber GW4SKA** and **Arthur Bard G1XKZ**. Thanks are due to **John GW4SKA** our BARTG President, for 20 years plus of excellent service to the contesting world, and for initiating many of the rules, concepts and so on that other contests have now also adopted. John's vast knowledge and experience is still available to us, as he is remaining within the Sub-group, but his work-load will be reduced

"**2:** The same applies to the post of Awards Manager. This has been replaced with an Awards/QSLs Sub-group, consisting of Phil GU0SUP and **Dr. Andrew Thomas M5AEX**, assisted by Arthur G1XKZ. Phil has also given years of service to the Awards scheme, but now being assisted by Andrew and Arthur, we hope to have some new designs and a more exciting range in the near future

"**3:** The rules of the existing BARTG HF and BARTG Sprint will be re-written to remove current ambiguities, clarify and update

"**4:** An additional contest – the Sprint75, has been introduced after its successful pilot this year

"**5:** Additional sections will be added to our contests: low/high power; single band; six hours operating

"**6:** New software is being developed that will allow quicker, easier log submission, accommodating a wider range of log formats consistent with the revised rules. Final adjudication will still be done by a human being!

"Please bear with us while we implement these major changes, and feel free to join us at **www.bartg.org.uk** and donations always welcome!

"**Please also note:** We are also in the process of updating our highly successful awards: why not check those out too. We hope soon to be able to automatically notify contesters whether they qualify for any of our awards shortly after each of our contests. Please also see the website for contact details changes."

The BARTG Sprint 75

"Following the success of the first 75Baud Sprint and many requests for a second, BARTG is running another this year. The second Sprint 75 is being held as follows: 18th September 1700 - 2100z. (3.5, 7 14, 21 and 28MHz (80, 40, 20, 15, 10m) RTTY 75Baud only rules / scoring as per Sprint rules that can be found on the BARTG Web site: **http://bartg.co.uk/**

The GB50ATG Special Event Call

The GB50ATG callsign made nearly 8000 QSOs during the BARTG Golden Jubilee Year which ended on June 30th Special QSLs and awards are available. Please check the web site for full details.

Further infomration from **Roger Cooke G3LDI roger@g3ldi.co.uk**

MFJ

LOOP ANTENNAS

MFJ-1788X **£469.95**
Frequency 40-15m, Size 1m, Power 150W, Auto band selection, Built-in cross needle VSWR/Wattmeter

MFJ-1786X **£429.95**
Frequency 30-10m, Size 1m, Power 150W, Auto band selection, Built-in cross needle VSWR/Wattmeter

MFJ-1782X **£375.95**
Frequency 40-15m, Size 1m, Power 150W, No auto band selection, no VSWR/Wattmet

The MFJ-1786 and MFJ-1788 Super Hi-Q Loop Antenna is ideal for restricted space locations. Rugged a l welded aluminium construction, it is fully weatherproof and does not require a separate control cable, the coax carries the signal and the DC control signals for tuning. You can remotely tune to the amateur bands in seconds. It has very narrow bandwidth which reduces harmonic interference and provides super front-end receiver selectivity

Miracle Antenna

MIRACLE-WHIP TX:3.5-460MHz, RX:0.6-500MHz, Power 25W, Length 1.44m **£119.95**

DUCKER-IL ATU for rubber duck, long wire or coax, Power 25W, Connection BNC Plug, Antenna socket BNC **£109.95**

DUCKER-PL ATU for rubber duck, long wire or coax, Power 25W, Connection PL259, Antenna socket BNC **£109.95**

MIRACLE-ADAPTOR Free-Style Adaptor Magnetic Mount kit for Miracle Whip Free-style adaptor magnetic mount, cable & PL259 Plug with 10m ground radial **£14.95**

MOONRAKER 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	**£17.95**
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)	**£24.95**
MRQ750	2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality)	**£34.95**
MR2 POWER ROD	2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass collinear)	**£24.95**
MR3 POWER ROD	2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass collinear)	**£29.95**
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**

DIAMOND ANTENNA Yagi Antennas

Diamond performance from the superb Diamond factory

A502HBR 6m 2 Elements, Power 400W, Gain 6.3dBi, Radial Length 3m **£89.95**
A144S10R 2m 10 Elements, Power 50W, Gain 11.6dBi, Boom Length 2.13m **£84.95**
A144S5RR 2m 5 Elements, Power 50W, Gain 9.1dBi, Boom Length 95cm **£45.95**
A430S15R 70cm 15 Elements, Power 50W, Gain 14.8dBi, Boom Length 224cm **£65.95**
A430S10R 70cm 10 Elements, Power 50W, Gain 13.1dBi, Boom length 119cm . **£49.95**

MOONRAKER 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)	**£17.95**
AMPRO-12	24MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-15	21MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-17	18MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-20	14MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-30	10MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-40	7.0MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-80	3.5MHz, Length 220cm, 38th fitting (slimline design)	**£19.95**
AMPRO-160	1.8MHz, Length 220cm, 38th fitting (heavy duty design)	**£49.95**
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**

MOONRAKER New Ground Plane Free Collinear 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 **£79.95**
SQBM1010N 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, N-Type fitting **£84.95**
SQBM225P 2/70/23cm, Gain 2.5/5.0/8.5dBd, RX25-2000MHz, Length 130cm, SO239 fitting **£74.95**
SQBM225N 2/70/23cm, Gain 2.5/5.0/8.5dBd, RX25-2000MHz, Length 130cm, N-Type fitting **£79.95**

Tarheel Motorised Mobile

The best USA motorised antennas available here from Moonraker the European distributor – All models in stock now!

Little Tarheel II 3.5-54MHz 200W max length 48" **£349.95**

MOONRAKER 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 £199.95!

NEW GP2500F fibreglass version now in stock **£249.95**

MOONRAKER Dual and Triband Collinear 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	**£64.95**
SQBM500N	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, N-Type	**£69.95**
SQBM800N	2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type	**£129.95**
SQBM1000P	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239	**£79.95**
SQBM1000N	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, N-Type	**£84.95**
SQBM223N	2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£69.95**

MOONRAKER 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**

MOONRAKER 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) **£49.95**
YG4-2C 2 metre 4 Element (Boom 48") (Gain 7dBd) **£29.95**
YG5-2 2 metre 5 Element (Boom 63") (Gain 10dBd) **£49.95**
YG8-2 2 metre 8 Element (Boom 125") (Gain 12dBd) **£69.95**
YG11-2 2 metre 11 Element (Boom 185") (Gain 13dBd) **£99.95**
YG3-4 4 metre 3 Element (Boom 45") (Gain 8dBd) **£59.95**
YG5-4 4 metre 5 Element (Boom 104") (Gain 10dBd) **£69.95**
YG3-6 6 metre 3 Element (Boom 72") (Gain 7.5dBd) **£64.95**
YG5-6 6 metre 5 Element (Boom 142") (Gain 9.5dBd) **£84.95**
YG13-70 70 cm 13 Element (Boom 76") (Gain 12.5dBd) **£49.95**

MOONRAKER 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 **£49.95**
ZL7-2 2 Metre 7 Ele, Boom 150cm, Gain 12dBd **£59.95**
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**

MOONRAKER 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**

MOONRAKER Halo Loops

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

HLP-2 2 metre (size approx 300mm square) **£19.95**
HLP-4 4 metre (size approx 600mm square) **£29.95**
HLP-6 6 metre (size approx 800mm square) **£39.95**

MOONRAKER 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 **£19.95**
G5RV-FSS Standard Full Size Enamelled Version, 102ft Long, 10-80 Metres **£24.95**
G5RV-DSS Standard Double Size Enamelled Version, 204ft Long, 10-160 Metres **£49.95**
G5RV-HSH Half Size Hard Drawn Version, pre-stretched, 51ft Long, 10-40 Metres **£24.95**
G5RV-FSH Full Size Hard Drawn Version, pre-stretched, 102ft Long, 10-80 Metres **£29.95**
G5RV-HSF Half Size Original High Quality Flexweave Version, 51ft Long, 10-40 Metres **£29.95**
G5RV-FSF Full Size Original High Quality Flexweave Version, 102ft Long, 10-80 Metres **£34.95**
G5RV-HSP Half Size Original PVC Coated Flexweave Version, 51ft Long, 10-40 Metres **£ 34.95**
G5RV-FSP Full Size Original PVC Coated Flexweave Version, 102ft Long, 10-80 Metres. **£39.95**
G5RV-HSX Ha f Size Deluxe Version with 450 Ohm ladder, 51ft Long, 10-40 Metres **£44.95**
G5RV-FSX Fu l Size Deluxe Version with 450 Ohm ladder, 102ft Long, 10-80 Metres **£49.95**

Accessories

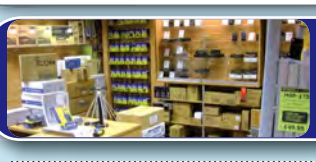
G5RV-IND Convert any half size G5RV to full with these great inductors, adds 8ft on each leg **£24.95**
MB-9 Choke Balun for G5RV to reduce RF Feedback **£39.95**
TSS-1 Pair of stainless steel springs to take the tension out of a G5RV or similar **£19.95**

MOONRAKER 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 di-pole with 4 legs)



Moonraker Head Office & Mail Order
Cranfield Road, Woburn Sands
Bucks MK17 8UR
Tel: 01908 281705

Moonraker Satellite Shop @ M5 Communications
Moto Services Area, Junction 30 M5 South
Exeter EX2 7HF
Tel: 01392 427269

MFJ Antenna Tuners

ew ower pr ces

See our website for full details.

AUTOMATIC TUNERS

MFJ-925 Super compact 1.8-30MHz 200W £169.95
MFJ-926 remote Mobile ATU 1.6-30MHz 200W £419.95
MFJ-927 Compact with Power Injector 1.8-30MHz 200W £249.95
MFJ-928 Compact with Power Injector 1.8-30MHz 200W £199.95
MFJ-929 Compact with Random Wire Option 1.8-30MHz 200W £209.95
MFJ-991B 1.8-30MHz 150W SSB/100W CW ATU £209.95
MFJ-993B 1.8-30MHz 300W SSB/150W CW ATU £249.95
MFJ-994B 1.8-30MHz 600W SSB/300W CW ATU £339.95
MFJ-998 1.8-30MHz 1.5kW £649.95

MANUAL TUNERS

MFJ-16010 1.8-30MHz 20W random wire tuner £69.95
MFJ-902 3.5-30MHz 150W mini travel tuner £99.95
MFJ-902H 3.5-30MHz 150W mini travel tuner with 4:1 balun £124.95
MFJ-904 3.5-30MHz 150W mini travel tuner with SWR/PWR £129.95
MFJ-904H 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun £149.95
MFJ-901B 1.8-30MHz 200W Versa tuner £109.95
MFJ-971 1.8-30MHz 300W portable tuner £119.95
MFJ-945E 1.8-54MHz 300W tuner with meter £129.95
MFJ-941E 1.8-30MHz 300W Versa tuner 2 ..... £139.95
MFJ-948 1.8-30MHz 300W deluxe Versa tuner £159.95
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL £179.95
MFJ-934 1.8-30MHz 300W tuner complete with artificial GND £199.95
MFJ-974B 3.6-54MHz 300W tuner with X-needle SWR/WATT £189.95
MFJ-969 1.8-54MHz 300W all band tuner £209.95
MFJ-962D 1.8-30MHz 1500W high power tuner £289.95
MFJ-986 1.8-30MHz 300W high power differential tuner £349.95
MFJ-989D 1.8-30MHz 1500W high power roller tuner £389.95
MFJ-976 1.8-30MHz 1500W balanced line tuner with X-needle SWR/WATT £469.95

MFJ Analysers

MFJ-229 UHF Digital Analyser 270-480MHz £199.95
MFJ-249B Digital Analyser 1.8-170MHz..... £259.95
MFJ-259B Digital Analyser 1.8-170MHz..... £259.95
MFJ-269 Digital Analyser 1.8-450MHz..... £349.95
MFJ-269PRO Digital Analyser 1.8-170/415-450MHz..... £379.95

LDG Tuners

LDG Z-817 1.8-54MHz ideal for the Yaesu FT-817 ..... £122.95
LDG Z-100 Plus 1.8-54MHz the most popular LDG tuner £143.95
LDG IT-100 1.8-54MHz ideal for IC-7000 ..... £159.95
LDG Z-11 Pro 1.8-54MHz great portable tuner £159.95
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 ..... £183.95
LDG AT-100 Pro 1.8-54MHz £194.95
LDG AT-200 Pro 1.8-54MHz £214.95
LDG AT-1000 Pro 1.8-54MHz continuously £509.95

AVAIR SWR Meters

AV-20 (3.5-150MHz) (Power to 300W) £34.95
AV-40 (144-470MHz) (Power to 150W) £34.95
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

WATSON Power Supplies

POWER-MITE-NF (22amp switch mode with noise offset) £69.95
POWER-MAX-25-NF (22amp switch mode with noise offset & cig socket) £89.95
POWER-MAX-45-NF (38amp switch mode with noise offset & cig socket) £129.95
POWER-MAX-65-NF 60 Amp cont 65 Amp peak switch mode variable volts supply with V & A meters & noise offset £239.95

MASTRANT High Performance Guy Rope

MASTRANT P3 3mm 200Kg £0.30ppm
MASTRANT P3 Drum 100m 3mm 200Kg £22.95
MASTRANT P4 4mm 400Kg £0.40ppm
MASTRANT P4 Drum 100m 4mm 400Kg £32.95
MASTRANT P6 6mm 850Kg £1.00ppm
MASTRANT P6 Drum 100m 6mm 850Kg £79.95
MASTRANT D2 2mm 200Kg £0.40ppm
MASTRANT D2 Drum 100m 2mm 200Kg £33.95
MASTRANT D3 3mm 400Kg £0.70ppm
MASTRANT D3 Drum 100m 3mm 400Kg £59.95
MASTRANT D4 4mm 800Kg £1.25ppm
MASTRANT D4 Drum 100m 4mm 800Kg £99.95

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
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 £1.20
RG213-DRUM Mil spec, 9mm, 50 ohm, 100m reel £99.95
H100 Mil spec, 10mm, 50 ohm, per metre £1.40
H100-DRUM Mil spec, 10mm, 50 ohm, 100m reel £129.95
WESTFLEX103 Mil spec, 10mm, 50 ohm, per metre £1.50
WESTFLEX103-DRUM Mil spec, 10mm, 50 ohm, 100m reel £139.95
TV100U Mil spec, 6.7mm, 75 ohm, per metre £0.60
TV100U-DRUM Mil spec, 6.7mm, 75 ohm, 100m reel £49.95
300-M Ladder Ribbon, best USA quality, 300 ohm, per metre £0.85
300-20M Ladder Ribbon, best USA quality, 300 ohm, 20m pack £14.95
300-DRUM Ladder Ribbon, best USA quality, 300 ohm, 100m reel £59.95
450-M Ladder Ribbon, best USA quality, 450 ohm, per metre £1.00
450-20M Ladder Ribbon, best USA quality, 450 ohm, 20m pack £17.95
450-DRUM Ladder Ribbon, best USA quality, 450 ohm, 100m reel £69.95
FW-M Original high quality flexweave antenna wire, 2mm, per metre £0.75
FW-100 Original high quality flexweave antenna wire, 100m reel £49.95
FWPVC-M Original PVC coated flexweave antenna wire, 4mm, per metre £1.00
FWPVC-100 Original PVC coated flexweave antenna wire, 4mm, 100m reel £69.95

Antenna Wire (50m)

Perfect for making your own antennas, traps, long wire aerials etc.

SEW-50 Multi stranded PVC covered wire, 1.2mm £14.95
SCW-50 Enamelled copper wire, 1.5mm £19.95
HCW-50 Hard Drawn bare copper wire, 1.5mm £24.95
CCS-50 Genuine Copperweld copper clad steel, 1.6mm £24.95
FW-50 Original Flexweave bare copper wire, 2mm £29.95
FWPVC-50 Original clear PVC covered copper wire, 4mm £39.95

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 £19.95
GUYKIT-HD10 Complete heavy duty adjustable guying kit to suit upto 40ft masts .. £49.95
GUYKIT-P10 Complete light duty/portable guying kit to suit upto 40ft masts £29.95
SPIDER-3 Fixed 3 point mast collar for guy ropes £4.95
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 £4.95
DPC-S Wire dipole centre with SO239 to suit cable feed connections £5.95
DPC-A Dipole centre to suit ½ inch aluminium tube with terminal connections ... £6.95
DPC-38 Dipole centre with SO239 socket with two 3/8th sockets to make mobile dipole £5.95
DOGBONE-S Small ribbed wire insulator £1.00
DOGBONE-L Large ribbed wire insulator £1.50
DOGBONE-C Small ceramic wire insulator £1.00
EARTHROD-C 4ft copper earth rod and clamp £19.95
EARTHROD-CP 4ft copper plated earth rod and clamp £14.95
G5RV-ES In-line SO239 replacement socket for 300 or 450 ohm ladder line £4.95
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 £69.95
TRIPOD-20L Free standing heavy duty tripod to suit masts 2 inch or less £59.95
TRIPOD-15L Free standing heavy duty tripod to suit masts 1.5 inch or less £54.95
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 £24.95
TK-18 Heavy duty galvanised pair of T & K brackets, 18 inches total length £19.95
TK-12 Heavy duty galvanised pair of T & K brackets, 12 inches total length £17.95
SO-9 Heavy duty galvanised single stand off bracket, 9 inches total length £9.00
SO-6 Heavy duty galvanised single stand off bracket, 9 inches total length £6.00
CHIM-D Heavy duty galvanised chimney lashing kit with all fixings, suitable for upto 2 inch £19.95
CAR-PLATE Drive on bracket with vertical up stand to suit 1.5 or 2" mounting pole .. £19.95
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 £16.95
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

AR-300XL Great entry level rotator, but strong enough for all VHF/UHF yagi antennas £79.95
Yaesu G-250 Entry level again from Yaesu, ideal for all VHF/UHF yagi antennas.... £139.95
Yaesu G-450 Medium duty rotator complete with 25m of control cable £319.95

bhi

NES10-2MKII noise eliminating speaker ... £109.95
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 (aluminium/fibre-glass opt)

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed £119.95
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 £129.95
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed £179.95
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed £199.95
TMF-3 Fiberglass mast * 6 sections 240cm each * 65-23mm * Approx 50ft erect 9ft collapsed £249.95

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
TRIPOD-P Lightweight aluminium tripod for all above £44.95

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... £29.95
MSP-150 4 section 1.50inch OD mast set... £39.95
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

Patch Leads

PL58-0.5 ½m Standard RG58 PL259 to PL259 lead £2.95
PL58-10 10m Standard RG58 PL259 to PL259 lead £7.95
PL58-30 30m Standard RG58 PL259 to PL259 lead £14.95
PL58M-0.5 ½m Mil Spec RG58 PL259 to PL259 lead £3.95
PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead £10.95
PL58M-30 30m Mil Spec RG58 PL259 to PL259 lead £24.95
PL213-10 10m Mil Spec RG213 PL259 to PL259 lead £14.95
PL213-30 30m Mil Spec RG213 PL259 to PL259 lead £34.95
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)

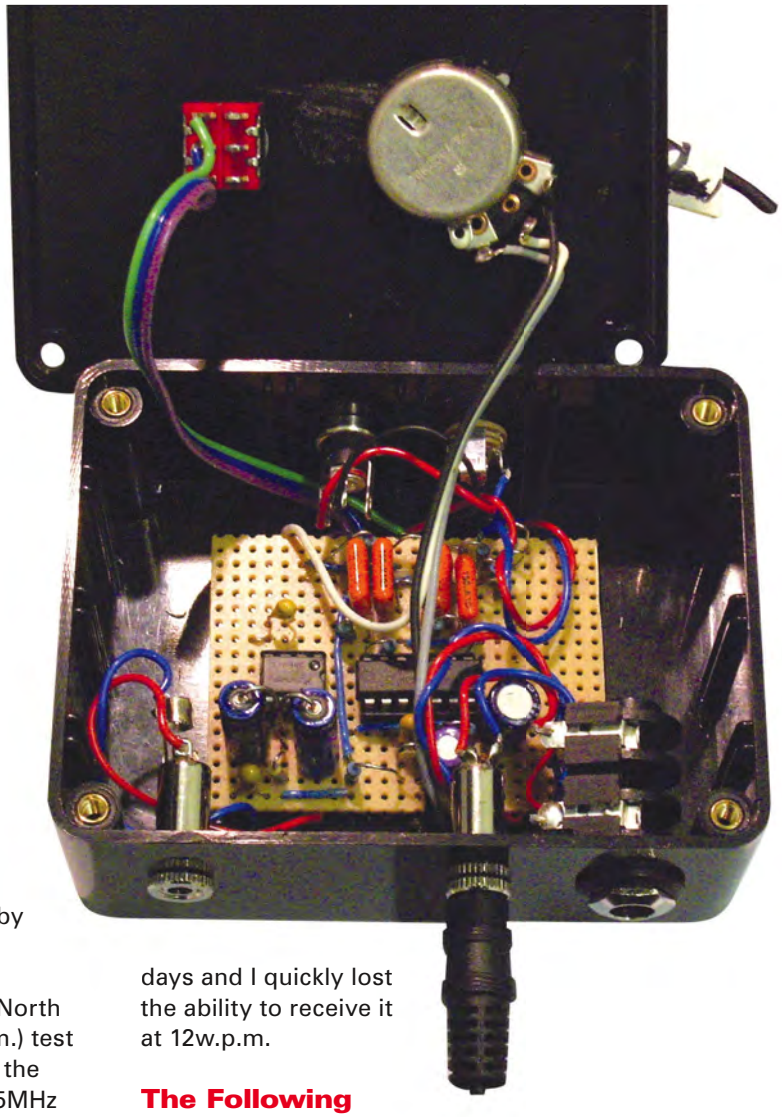
Connectors

PL259/6mm Standard plug for RG58 ..... £0.75p
PL259/9mm Standard plug for RG213 ..... £0.75p
PL259/7mm Standard plug for Mini8 ..... £1.00p
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 ..... £3.50
NTYPE/9 Compression type plug for RG213 ..... £3.50
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 £3.50
NTYPE/PL Adapter to convert N-Type to PL259 ..... £3.50
BNC/PL Adapter to convert BNC to PL259 ..... £2.00
BNC/N Adapter to convert BNC to N-Type male £3.50
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

ALL PICTURES ARE FOR REFERENCE ONLY

Project

Build An Add-on CW Audio Filter



After passing the Radio Amateurs' Examination (RAE) in May 1964, I then set about learning the Morse code (often referred to as c.w.). This was the difficult part for me, and in those days it was essential to pass the Post Office Morse test in order to get on the air. However, at 17 and studying A-levels, there was a great deal of conflict for me! Anyway, during the Easter holidays in 1965, ignoring my A-level revision, I buckled down to learn the code using the 'Rhythm Method' pre-recorded on LP size records (remember them?) by the late **G3HSC**.

A week later, I was taking the test at the Post Office Coast Station near Amlwch, Anglesey in North Wales. A pass in the 12 words per minute (w.p.m.) test enabled me to obtain the callsign **GW3UED** and the next 12 months was spent almost entirely on 3.5MHz (80m) and 70MHz (4m) using government surplus equipment.

Unfortunately, Morse code didn't feature in my amplitude modulated (a.m.) QSOs of those exciting days and I quickly lost the ability to receive it at 12w.p.m.

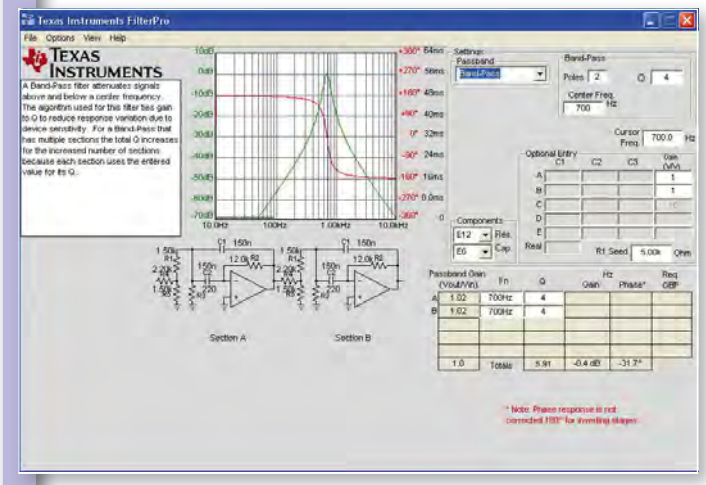


Fig. 1: A screen shot of the design tool used by Mike G3UED.

The Following 43 Years

Although Amateur Radio operations in the following 43 years – until my recent retirement – were somewhat limited due to career and family responsibilities, my interest in the hobby continued, with the help of *Practical Wireless*, of course! My retirement, however, brought the opportunity to spend more time in the shack. What's more, I've now developed an interest in Morse code, inspired partly by those recent encouraging articles by **Roger Cooke G3LDI**!

My first attempts to copy Morse received over the air proved to be difficult. This was partly due to my laziness and partly due to the fact that I was having some difficulty in isolating a single Morse signal on the 7MHz (40m) band.

My Icom IC-718 doesn't have the optional c.w. filter fitted and I had to rely on the 2.4kHz single sideband (s.s.b.) filter. Incidentally, an optional 500 kHz crystal filter for my radio is available for £170! This is just about half the original cost of the radio – but I'm sure the results would be excellent.

Mike Jones G3UED describes his c.w. audio filter and to set the scene he mentions his early days in the hobby.

Having always enjoyed experimenting and building small projects, I decided the only way forward was to design and build my own add-on filter.

Designing a Filter

I decided a band-pass filter was the way to go, but I didn't relish the thought of the mathematics required to design my own from first principles. Fortunately, there are many design aids available on the internet and the one I settled on was *FilterPro V2.0* which is a free design tool by Texas Instruments (TI) (See Web-sites below).

The illustration, **Fig. 1** is a screen shot of the design tool I used. It simply requires the selection of filter type (low-pass, high-pass or band-pass), number of filter poles (individual operational amplifiers), *Q* (Filter quality), centre frequency and some other parameters. Once these have been selected, an actual design consisting of a circuit diagram and component values is produced. By adding a few additional components, a complete add-on audio band-pass filter can be built for just a few pounds!

Design Parameters

I decided to centre my filter on 700Hz. This audio frequency seems to suit my hearing best for receiving c.w.

Although I selected E12 resistors which are 10% tolerance, I opted to use 1% components and my capacitors were 10% tolerance. The parameter 'R1 Seed' refers to the impedance of the source which, in my case, is 5kΩ as I use a low-level auxiliary audio output from my radio.

The lowest source impedance allowed by the design tool is 1kΩ. I have found that feeding my filter from the low impedance phones socket of my radio is not a good match and causes distortion and a wide pass-band. A high impedance output from the radio is therefore essential when using this design.

Using the auxiliary output also has the advantage of being able to turn down the audio output level from the transceiver to avoid conflict with the filtered audio in either headphones or external speaker.

Audio Frequency Measurement

I carried out frequency measurements using the interesting programme ***CwGet*** by **Sergei Podstrigailo UA9OV** (See Web-sites below). This programme actually decodes Morse code, but I refuse to rely on software and I'm determined to improve my own aural decoding!

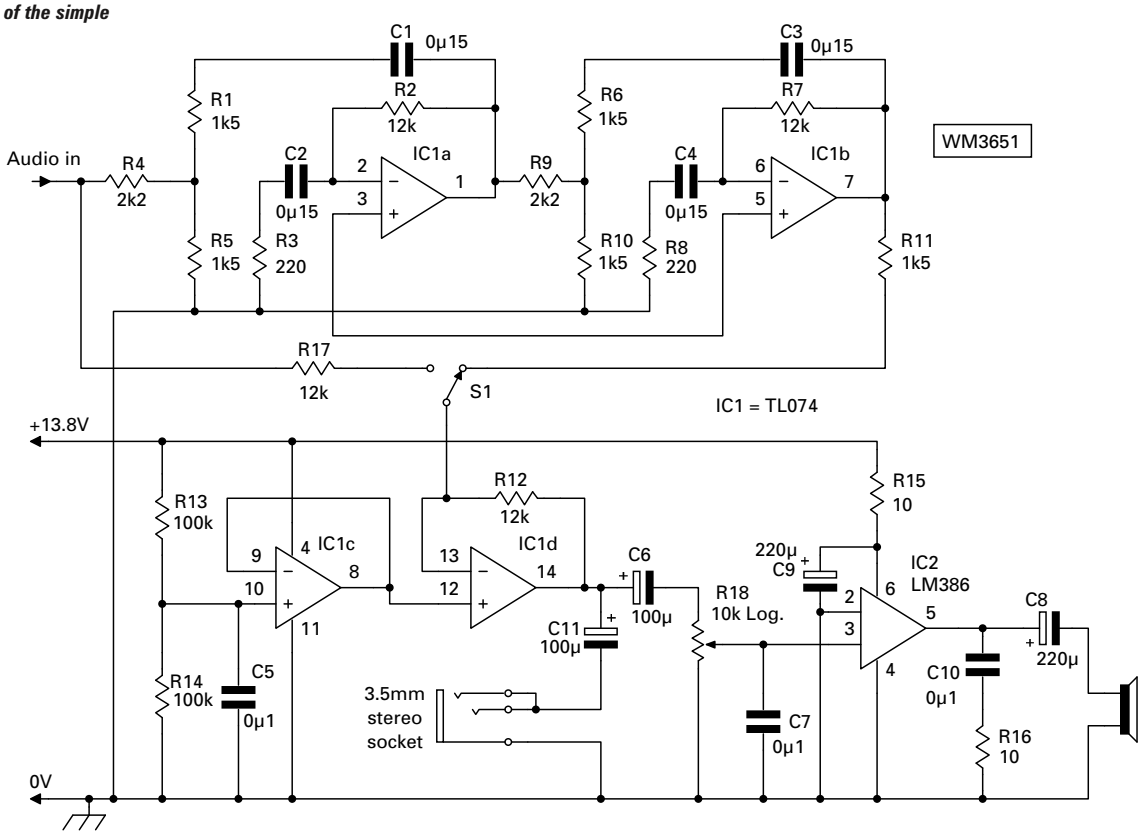
What I do find useful about this programme is its frequency spectrum display. This was very helpful in showing the effectiveness of my filter. The programme is free to use, but Registration costs £34.

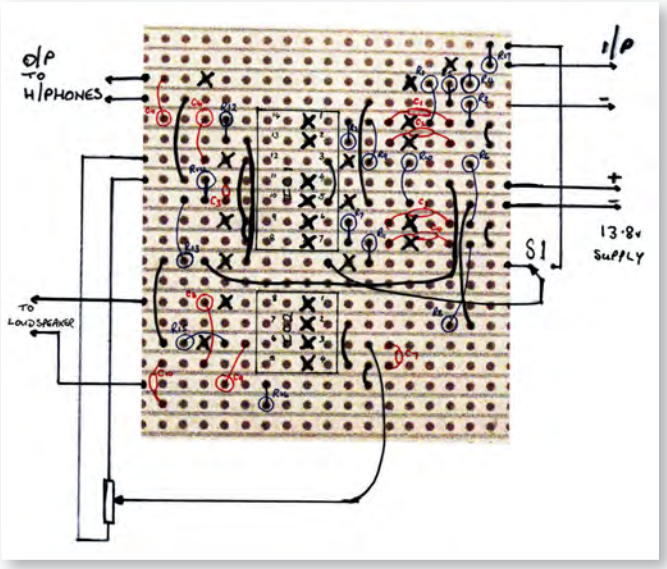
Complete Design

Once the heart of the filter was designed, it was necessary to add some additional circuitry. The diagram, **Fig. 2,** is the complete circuit diagram. I decided to use a TL074ACN which is a quad operational amplifier (op-amp) in a 14 pin dual in-line (DIL) package. IC1a and IC1b form the filter circuit.

Changes to any of the design parameters will change the circuit component values. The values shown in Fig. 2

Fig. 2: Circuit of the simple add-on filter.





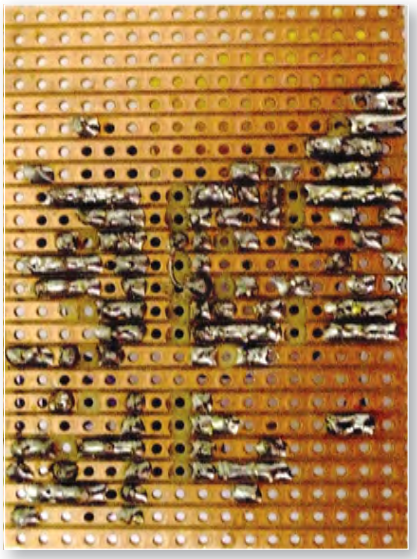


Fig. 3: Mike's sketch and photograph of the underside view of the layout of his version, built on Veroboard.

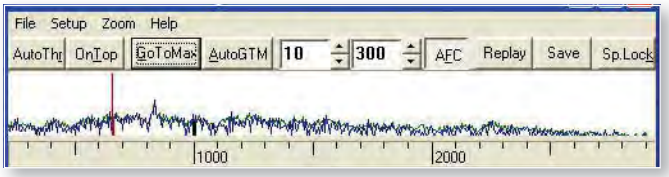


Fig. 4: The spectrum plot of the input to the filter. Contrast this with Fig. 5.

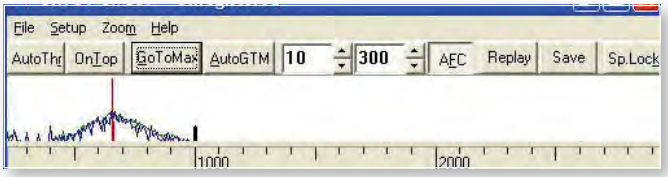


Fig. 5: And after the filter has done its work, the spectrum is much reduced.

are therefore only valid for my specific requirement.

For the op-amps to operate correctly in this circuit, a dual power supply is required. This can be obtained from a single supply by using the additional circuit IC1c as recommended by TI. The output of this op-amp feeds a voltage of half the supply to the non-inverting inputs of the other op-amps.

Circuit IC1d is included as a buffer amplifier to isolate the filter circuit from the output. Switch S1 was added so that the filter could be switched out easily allowing me to compare its effectiveness with a direct connection.

Both a ¼in mono jack and a 3.5mm stereo socket (both channels connected together) enables the use of headphones and a Laptop connection, the latter allowing me to examine the filter output using the ***CwGet*** programme.

Circuit IC2 is a standard audio output stage using an LM386 audio output chip. A small loudspeaker could be built-in, as shown in the diagram, but I incorporated an output socket for an external loudspeaker. This stage could be omitted if only headphones are used.

The Construction

When constructing circuits of this type, my preference is to use Veroboard, in this case, a piece 50x45 mm section. A 3mm drill bit is ideal for cutting the copper track where required.

Soldering component leads to Veroboard tracks needs care to avoid 'solder bridges'. I run a knife blade between the tracks after soldering to ensure there are no 'bridges' and then brush the tracks vigorously with a discarded toothbrush. This technique cleans up any remaining solder debris very effectively.

The illustration, **Fig. 3**, shows the underside of the Veroboard, track cut-outs and component locations (which are on the top side of the board). I opted to use integrated circuit (i.c.) sockets, but it's not essential to do so.

Finally, the whole thing was installed in a plastic box together with suitable input and output audio sockets and a connector for the 13.8V supply as seen in the heading photgraph. I used double-sided sticky pads to secure the circuit board inside the box.

The Results?

The results? I'm very pleased with the performance of my add-on filter. The filter band-pass frequency is nicely centred on the designed 700Hz. I connected the output of the filter to my Laptop and examined the audio response using the ***GetCW*** programme. The illustration **Fig. 4** show the frequency response with the filter switched out and **Fig. 5**, with the filter switched in.

These figures show the responses with noise only and by tuning a c.w. signal so as to centre it in the pass-band, the signal amplitude is enhanced whilst adjacent signals are suppressed. The effect is re-enforced by a significant improvement in signal-to-noise ratio, because noise-power outside the waveform peak is excluded.

The final design completely fulfils my requirement. It enhances my reception of c.w. enormously by producing a single c.w. signal and excluding other adjacent signals.

I'm unable to measure the effectiveness against the optional crystal filter available for my transceiver, because I find the £170 cost of this unit prohibitive. However, the figures showing the frequency response I obtained do, I think, illustrate the effectiveness of such a simple circuit for a fraction of the cost of a crystal filter! Now, back to my on-the-air Morse practice! ●

Useful Web-sites:

http://focus.ti.com/docs/toolsw/folders/print/filterpro.html
http://www.dxsoft.com/

Space has meant that the photographs of Mike's version are rather small, if you'd like more detailed pictures drop me an E-mail (tex@pwpublishing.ltd.uk) with "Add-on Filter details" as the subject text. **Ed.**

Time to get 'stuck into' Alan's 430MHz antenna design.

Alan Ford's

antenna workshop

Alan Ford VK2DRR present part 2 of his 70cm Yagi antenna and describes the construction stages.

Errors & Updates
Unfortunately, Murphy struck during preparation of Alan VK2DRR's Yagi article (Part 1) for printing! On p25 of the September issue, in column 1 line 10, the driven element is described as being made from '1.5 X 1/8in (approx 12mm x 3mm)' strip. Of course that should be '1/2 x 1/8 in', as per the copy. In other words 0.5 not 1.5. (Alan points out that 1.5in is a lot longer than 12mm and at over 38mm would make a very difficult bending job for the folded dipole!). My apologies for the problem working with Imperial and Metric mixtures is fraught with difficulties! **Editor**.

An 8-Element 430MHz Yagi Antenna. Part 2.

Welcome to Part 2 and I hope you found that my earlier article on the background to the Yagi type of antenna plus some workshop tips gave you an appetite to build one!

The tools needed are listed in the previous article. The full list of materials is at **Table 2. 1** and I'm dividing up this fairly ambitious project into five separate sections. The sections are construction of the parasitic elements, the boom, the insulating piece, the driven element and finally the balun.

Table 2.1

Boom	1,204mm length of 25.4 mm square section aluminium
Parasitic elements	Either 3/8" or 10mm round aluminium tube. Seven lengths per Table 2. Total amount of material is 2,450mm, but allow for cutting and for end waste too short for an element.
Driven element	676mm Either 1/2" X 1/8" or 12mm X 3mm aluminium strip
Insulating piece	110mm 15mm X 10mm plastic rectangular stock
Balun	Plastic sealable box BNC bulkhead (flange) mounting socket Short length of 50Ω coaxial cable
Miscellaneous	M4 bots, nuts, shakeproof washers, solder tags, plus suitable nuts, bolts and washers to mount bulkhead socket plus solder tags to suit.

Table 2.2

	Length	Spacing (to centre-lines)
Reflector	351	150* from start of boom
Driven element	324	138 from Reflector
Director 1	305	52 from driven element
Director 2	302	124 from Director 1
Director 3	298	148 from Director 2
Director 4	293	172 from Director 3
Director 5	290	193 from Director 4
Director 6	287	207 from Director 5
Boom excess		20* to end from Director 6

4:1 balun. 50Ω coaxial cable 227mm shield to shield, plus tails for connections.

Design frequency 435 MHz boom 25.4mm square section. parasitic elements 10mm or 3/8in tube. Driven element 12mm x 3mm or 1/2in x 1/8in strip all table measurements in millimetres – measurements marked * are not critical

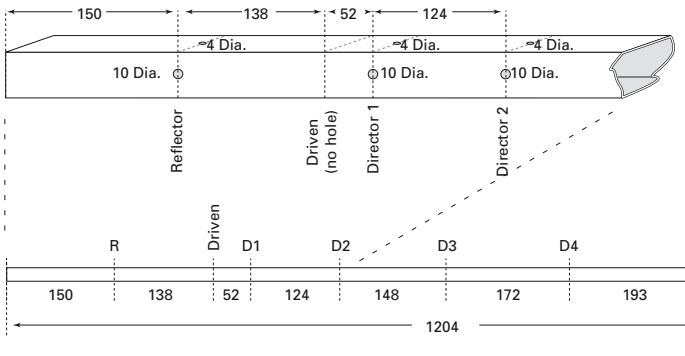


Fig. 2.1: The overall measurements for the antenna and how to apply them. See also Table 2.2.

The Easy Job

To build up confidence, let's start with the easy job, marking out and cutting the parasitic elements. From 3/8in (or 10mm) diameter aluminium tube or round stock. One by one, mark and cut the individual lengths according to **Table 2.2**.

Remember, the saw cut itself has a width, depending on the thickness of the saw blade plus the offset of the cutting teeth (typically a total of 1mm), so – don't mark all the elements at once — measure, mark and cut and then start again once the particular piece has been removed. De-burr the ends with a very light touch of the file – or emery paper. If you have large jagged ends after cutting, you are pushing down too hard on the hacksaw!

After you have finished you should have one reflector and six directors. Arrange these in length order in a safe place.

The Boom

Next, for the antenna boom, cut a piece 1204mm long from square aluminium stock, using a strong vice with wooden or plastic cheeks to avoid marking the aluminium. You'll then have a more manageable length than the two metre stock length you probably bought!

Now referring to the spacings figures in Table 2.2 and using the try square, mark out lines across the boom for the positions of the reflector, driven element and six directors, taking the lines round two adjacent sides of the boom section, and note that, with **the exception** of the driven element, these markings are for 3/8in (or 10mm) holes to accommodate the parasitic elements. To accept the parasitic elements, you'll have to mark a position for each hole exactly at the middle of the marked line on one side of the boom, using a steel rule, and not trying to judge by eye (See **Fig. 2.1**).

You should arrive at a number of crossed lines where the holes will be, and the centre-punch can then be applied to locate the proposed holes exactly. The diagram **Fig. 2.2** makes this clear. **Do not** centre-punch any holes for the driven element as the method

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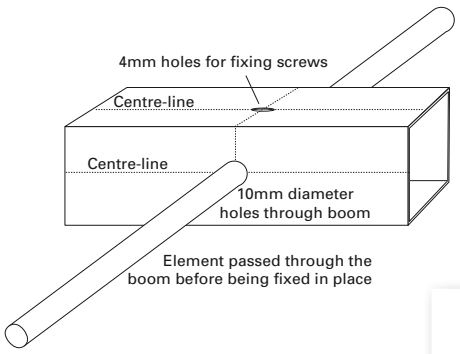


Fig. 2.2: How the parasitic elements are fixed to the boom. Their 'pass-through' holes have their centres on the horizontal centre-lines of the boom. The 4mm fixing screw hole is on the top centre-line of the boom.

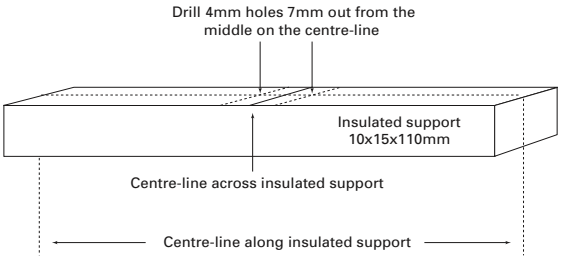


Fig. 2.3: The insulating piece that the folded, driven element is mounted on, is made from 10x15mm plastic material.

o mounting this element is different. You can either use a traditional centre-punch and panel hammer or one of the new automatic punches that have spring-loaded point.

Having checked all your dimensions at least twice, it's time to drill out the holes for the elements, drilling right through the boom. Assuming you have a drill press, you'll need to place a piece of scrap wood under the boom, and first drill small pilot holes – say 3mm – in each place. These can then be 'opened out' to 3/8in (or 10mm) with a 3/8in (or 10mm) drill.

You'll find that the 3/8in (or 10mm) parasitic elements will just fit into the holes drilled in the boom (we call this an interference fit) and in some cases you may need to very slightly ream out a hole (just a touch of this tool is enough). It helps to lay out the elements on the workbench in order (decreasing or increasing depending on which end you wish to start at). Then take the first element and slide or push it into the hole until it protrudes approximately equally either side of the boom. Check and adjust using a steel rule so that the protrusions are spot on, and then mark the position on the element.

One element at a time, and – with the element still in the boom – you will next drill a 3.5mm (**only**) hole through the boom, at 90° to the 3/8in (or 10mm) element hole. This hole will at the same time penetrate the parasitic element inside the boom, hopefully in just the right place. The interference fit of the element in the boom aided by just a little finger pressure, should be enough to keep the pieces in alignment. Now, having first removed the element, open out the hole in the boom to 4mm for clearance. In the element you should still have the original 3.5mm hole. After carefully withdrawing the element, insert the 4mm tap and cut the thread.

You should now be able to re-insert the element to the previously marked line and put a 4mm bolt through the boom, bolting it into the element (you may have to gently smooth the area around the new tapped hole). It can be helpful to hold the boom under a bright light so that you can glimpse the hole in the element through the hole in the boom. After the first one it becomes easier! When you've finished, you should have a row of neat directors, of gradually reducing length, plus a rather longer reflector at the other end of the boom.

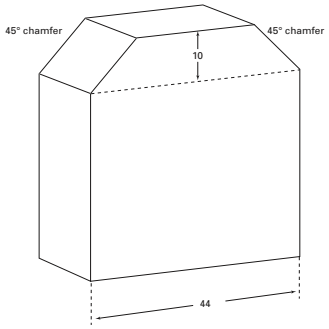


Fig. 2.4: The bending jig for the driven element.

Insulating Piece

We need to insulate the driven element from the boom, where the feeder is connected at the gap in the folded dipole. The unbroken piece has a theoretical zero potential at its centre and so could be bolted to the boom. However, the theoretical results are not always achieved and bolting to the boom would introduce losses, so we simply leave the centre point unattached.

From some 15x10mm rectangular plastic stock, cut just 110mm. Mark the centre line (55mm from each end). Then measure 7mm to each side of this line and centre-punch and drill 4mm holes, as in **Fig. 2.3**. On the boom, the position for the driven element has been marked but a gap left with no drilling yet.

Measure 7.5mm from the driven element (centre) line, and then place the insulating piece right against that line. Arrange the insulating piece centrally and mark through the 4mm holes already drilled in the insulating piece. Remove the piece from the boom and then centre-punch and drill the two holes in the boom to 3.5mm **only**. Finally, cut 4mm threads to those holes in the boom.

Driven Element

Without doubt the driven element is the hardest part of the antenna to build. Here I'd recommend a 'jig'. Beloved of all keen workshop users, a jig is a fabricated piece that is used to temporarily align or hold in alignment the piece we are working on – the 'workpiece'.

The jig consists of a piece of hardwood as shown in **Fig. 2.4**, round which we will be bending aluminium strip to turn it into the final folded shape for the driven element. Although the jig doesn't find its way to the final project, make it carefully as its accuracy will markedly add in the ease of creating the driven element.

The element itself is going to be a folded dipole made from the strip 1/2 x 1/8in (or 12x3mm). The overall length of the dipole when folded will be 324mm as in Table 2.2. To accomplish this, with an allowance for the ends of the fold, the bends and the gap at the feed point we'll need 676mm of aluminium, so cut this from your strip, as shown at **Fig. 2.5**. Then mark and centre-punch two holes at each end, one 10mm from the end and the second a further 20mm.

Drill those holes to 4mm.

You now need to mark the centre line, which will be 338mm from each end. **Note:** the most critical marks are what I've called the 'bending lines'. Clearly mark two bending lines 149.5mm back on each side of the centre line. Yes, I know half a mm is difficult (and we don't normally try for it), but try it this time as it represents the exact half-way point.

Next comes the hard part! Place the jig firmly in a vice with the bending line against the end of one the chamfers and bend to a right angle as shown in **Figs. 2.6a** and **b**.

If necessary, re-arrange the jig and strip in the vice and continue to bend the strip round the adjacent chamfer as in **Fig. 2.6c**. The strip tends to spring back a little after bending, so you will have to remove the jig now and 'persuade' (push gently!) the two ends of the strip so that you achieve a shape like **Fig. 2.6d**.

If you've marked out and bent the strip carefully, you should finish up with a gap about 30-35mm wide. This gap is not critical as long as bolts can be passed through the two end-most holes that were previously drilled, and not foul on the 25.4mm boom when assembled. In prototyping this antenna I had four tries at making the driven element, although only two of them made use of a jig. So don't be discouraged if your first effort looks horrible!

The driven element is going to be insulated from the boom, but secured to it via the insulating piece you have prepared. You'll need to place the insulating piece firmly in the vice, and then lay the driven element down on it as shown in **Fig. 2.7**.

Arrange the pieces carefully so that they are even and look like the figure (except that we're not fixing to the boom just yet). Then mark the insulating piece through the end holes (two) at each end of the driven element. Remove the driven element, centre-punch and drill 3.5mm **only** holes in the four positions. Tap these holes with a 4mm tap. Solder tags can now be fitted to the ends of the driven element plus the boom mounting bolts, and the insulating piece fitted as shown in the figure.

Mounting The Balun

The balun and connection point will be placed **under** the boom (to minimise weather effects as your Yagi is almost certainly for outdoor use). It's essential to use a good quality plastic box (not metal) with a well fitting lid, preferably one that has a good waterproof gasket.

I used a box approximately 65 x 57 x 35mm that has a neoprene weatherproof gasket. The first step is to drill two fixing holes on the lid. The box will be arranged lengthways – on the side of the boom where the gap is in the driven element – as shown in **Fig. 2.8** and the **photograph**, so mark out the two holes in the lid at suitable positions.

These measurements are not critical except that they should be in the centre of the lid measured from the narrow side. I drilled mine, 15mm from each end along this centre line. Arrange the lid squarely on the boom, about 10mm from the driven element, on the side carrying the reflector and next to the gap in the driven element. Then mark though the holes onto the boom, centre-punch and drill 3.5mm **only** holes and tap them with a 4mm tap. You can then secure the lid to the boom with two 4mm bolts. This will be the bottom of the boom if the antenna is used in a horizontal mode.

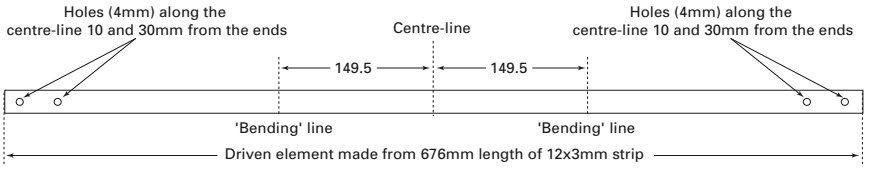


Fig. 2.5: The driven element is created by folding a 676mm length of 12x3mm aluminium strip as described in the article.

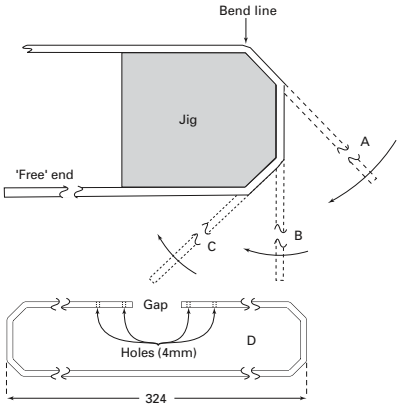


Fig. 2.6: Using the bending jig to carefully bend the strip into the correct shape.

The Balun

The balun is shown electrically in **Fig. 2.9a**, it's a standard 4:1 coaxial type. Turning now to the balun box itself, mark the centre of the large face of the box and drill to accept the BNC (or N type) bulkhead feed socket. This will be 10mm for BNC. Next place a bulkhead socket in the hole, line up the flange and mark through onto the box.

My BNC socket had four holes in the flange that were a little under 3mm. I had to drill them out very slightly – a tricky process that requires the flange to be held strongly, preferably in a machine vice and the 3mm drill **very** gently applied, being alert for signs of 'grabbing'. (You may be luckier with your bulkhead fitting!).

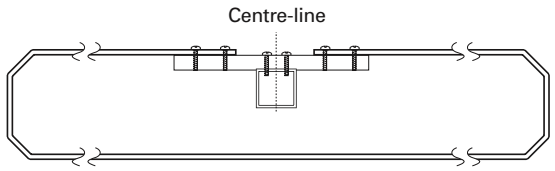


Fig. 2.7: How the driven element attaches to the boom, but is insulated from it.

We are going to need two 5-6mm holes at one end to accommodate 50Ω coaxial cable about 10mm from the edges of the narrow end. On the face of the box we'll also need two 4mm holes that will carry the driven element connection bolts and at the other end another 4mm hole for the earthing lead. These are all shown at **Fig. 2.9b** and the photograph **Fig. 2.9c**.

Next, fit 3mm bolts for the bulkhead socket, using shakeproof washers and solder tags where shown in the diagram. Fit 4mm bolts similarly, with solder tags **inside and outside** the box. Inside the box, bend up the various tags to right angles.

Cut a piece of coaxial cable about 250mm long. (You will need to strip the outer jacket of this coaxial cable back at each end, leaving 227mm between the ends of the jacket. Now thread the cable loop through the holes you have cut for it, strip and form the shield at each

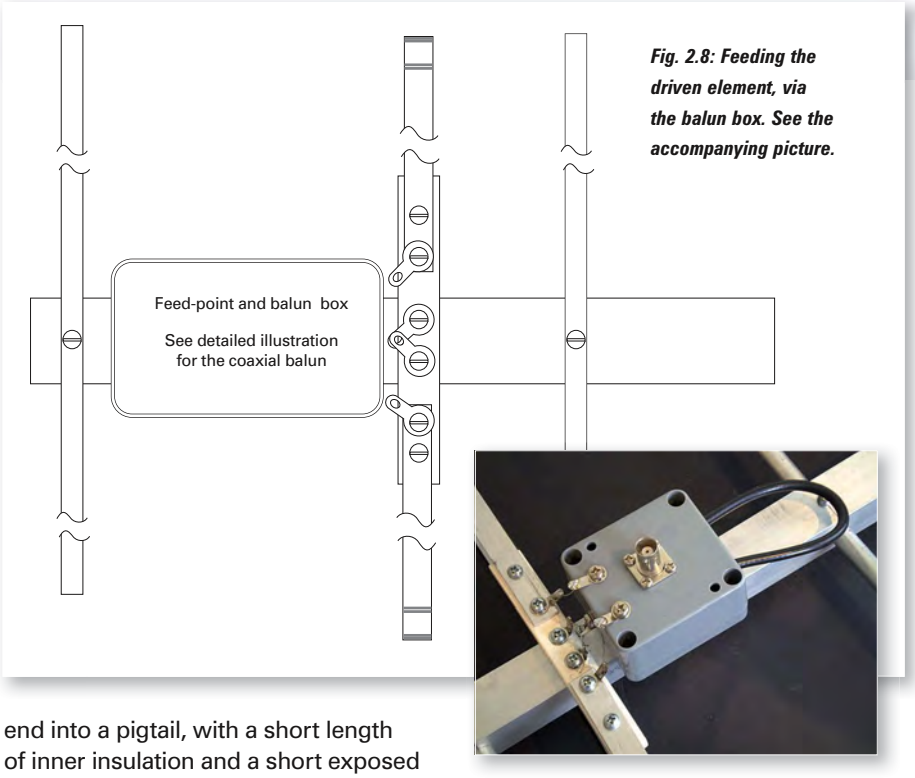


Fig. 2.8: Feeding the driven element, via the balun box. See the accompanying picture.

end into a pigtail, with a short length of inner insulation and a short exposed length of inner conductor.

Solder the connections with the connection from the centre tag of the bulkhead connector to one of the end connections (later to be made to the driven element). **Note:** It doesn't matter which one! Also solder a connection from the earth tag to each of the bulkhead tags that have the pigtails fixed to them.

Connecting Up

Next, bolt the balun box to the lid. You will then have a driven element with two 'floating' solder tags at the ends, plus a balun box with two 'end' solder tags on the face and another earth tag on the end.

Of course, each end of the element in turn is now connected to the balun, which can be achieved by two short lengths of tinned copper wire, or even hook-up wire (not too thin). Then the side mounted earth tag on the balun box can be soldered to two tags mounted through the insulating piece to the boom. Refer again to Fig. 2.8 and to the photograph.

When everything is finally checked and working it can be quite handy to fill the balun box with clear silicone to keep moisture out, but for experimentation it is probably enough to bolt the box to the lid firmly. Another weatherproofing measure for the Yagi is to fit plastic plugs to the ends of each element and the boom.

The Yagi is of course fed with a length of 50Ω coaxial cable terminated at one end with a BNC (or N) plug, with the other end to suit the transceiver. For low power work, BNC plugs/sockets are adequate, but an N type connector could be used, with the appropriate drilling required (by the way, the PL259/SO239 combination is much too lossy for 435MHz use).

The finished Yagi can of course be mounted horizontally or vertically. If vertically, do not use a metal mast in the centre as it will interfere with the antenna characteristics; this is why we have left a length for mounting at the reflector end.

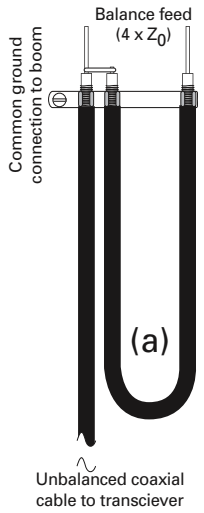
A Working Antenna!

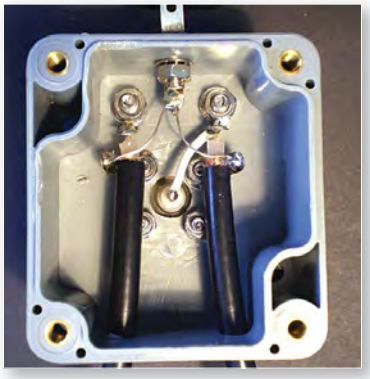
Phew! As is often the case, the whole process is much more complicated to describe than it is to make. But you should finish up with a working 430MHz antenna which can be mounted at the end – or if horizontally polarised or using a non-metallic mast – in the middle.

If at first your effort is not attractive, don't be discouraged as the materials are sufficiently inexpensive to have a second go.

After I had carried out a great deal of experimentation – during which the method of making the driven element using a jig was refined plus balun measurements tested, the final prototype gave encouraging results. The v.s.w.r. was below 1.5:1 from 433 to 437MHz, with less than 1.2:1 right on the design frequency of 435MHz.

Enjoy building yours! ●





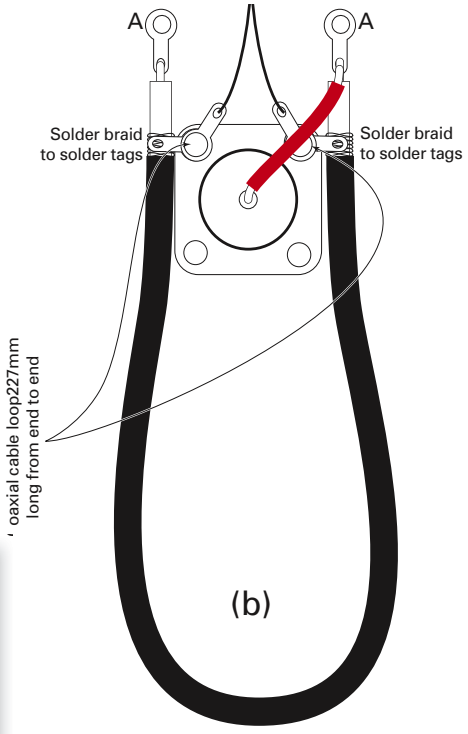


Fig. 2.9: How the 4:1 coaxial balun is formed, electrically (a) and mechanically (b). See picture for a view of the completed installation (c).

Mike Richards'

data modes

Mike Richards G4WNC continues his new series – and discusses Radio Tele Type – the original data mode!

Welcome to Data Modes (*DM*), where I can imagine some readers asking "Surely radio teletype (RTTY) is all but dead?" And my reply? Not true! Tune to 14.080MHz and you're almost certain to find at least one RTTY signal warbling away and at weekends there'll be plenty around. Despite all its shortcomings, RTTY remains a very simple and popular mode for short, plain text, QSOs.

You'll also find that some of the terminology and operating methods used in RTTY flow through into the more advanced digital modes. So, let's get down to the basics of RTTY.

The RTTY mode (**R**adio **T**ele**TY**pe) was based on the use of Teleprinter networks that became the standard for all manner of commercial and government communications through the first half of the last century. The Teleprinters themselves were rather noisy electromechanical devices with a keyboard for typing messages and an electromechanical print head for printing the received messages. Maintaining Teleprinters was a skilled job and something akin to a 'black art'!

The printers were a bit too noisy for use in the normal office, so much effort was put into the design of acoustic hoods and covers to try and reduce the noise. None of these were really good enough and many offices reverted to using a separate TELEX room for all the noisy equipment. The RTTY system is the method used to transmit teleprinter traffic over the radio.

Origins & Oddities

The RTTY system uses the International Telegraph Alphabet No2 (ITA2) often known as the Baudot or Murray code after the pioneers **Emile Baudot** and **Donald Murray**. The ITA2 is used to convert the key presses into a digital code that can be sent down a land-line or over a radio link. It's a fairly crude code and uses just five data bits to convey each letter of the message.

If you do the maths you'll see that five data bits gives just 32 combinations to cover all 26 letters of the alphabet plus numbers and punctuation (see **Table 1**). There clearly aren't enough codes to do this, so a trick is required to fit everything in! That trick was to allocate most of the five digit codes a double meaning with the changeover of meaning controlled by either a 'Figure Shift' or 'Letter Shift' character code.

I've shown the full ITA2 code in **Table 2**. The Letter and Figure shift characters act as a toggle to switch the printer between the two sets of codes. Although it's an ingenious solution, the use of shift characters is probably one of RTTY's greatest weaknesses. This is because if a shift character is lost due to interference, the following elements will print as garbage until the next correctly formed shift character is received.

Decimal weighting	**16**	**8**	**4**	**2**	**1**
Binary Digit	**1**	**1**	**1**	**1**	**1**
00000 to 11111 = 32 combinations					

Table 1 – ITA-2 Code combinations.

Combination number	Letter case	Figure case	Coding 1	2	3	4	5
1	A	–	Z	Z	A	A	A
2	B	?	Z	A	A	Z	Z
3	C	:	A	Z	Z	Z	A
4	D	(subclause 4.1)	Z	A	A	Z	A
5	E	3	Z	A	A	A	A
6	F	(subclause 4.2)	Z	A	Z	Z	A
7	G		A	Z	A	Z	Z
8	H		A	A	Z	A	Z
9	I	8	A	Z	Z	A	A
10	J	Audible signal	Z	Z	A	Z	A
11	K	(	Z	Z	Z	Z	A
12	L	)	A	Z	A	A	Z
13	M	.	A	A	Z	Z	Z
14	N	,	A	A	Z	Z	A
15	O	9	A	A	A	Z	Z
16	P	0	A	Z	Z	A	Z
17	Q	1	Z	Z	Z	A	Z
18	R	4	A	Z	A	Z	A
19	S	'	Z	A	Z	A	A
20	T	5	A	A	A	A	Z
21	U	7	Z	Z	Z	A	A
22	V	=	A	Z	Z	Z	Z
23	W	2	Z	Z	A	A	Z
24	X	/	Z	A	Z	Z	Z
25	Y	6	Z	A	Z	A	Z
26	Z		Z	A	A	A	Z
27	Carriage-return		A	A	A	Z	A
28	Line-feed		A	Z	A	A	A
29	Letter-shift	(subclause 4.5)	Z	Z	Z	Z	Z
30	Figure-shift		Z	Z	A	Z	Z
31	Space		A	A	Z	A	A
32	(subclause 4.7)		A	A	A	A	A

NOTE – In serial transmission, code element 1 is transmitted first.

Table 2: The full ITA2 code, Letter and Figure shift characters act as a toggle to switch the printer between the two sets of codes.

80m	3.580MHz
40m	7.040
	or 7.080MHz
30m	10.110MHz
20m	14.080MHz
15m	21.080MHz
10m	28.080MHz

Table 3 – Common RTTY Frequencies.

The same can occur if interference distorts an existing character into a shift character. One solution to the problem, widely adopted for telegrams, was to abandon the shift characters and spell out any vital punctuation and numbers.

The advent of software based RTTY de-coding facilitated another trick – 'Unshift On Space' (UOS). This simple fix forces a return to letter shift whenever a space character is received and works well for normal text – and you'll find that most RTTY decoders include UOS.

Explaining The RY Test

Another bit of RTTY terminology I ought to explain, is 'RYRYRYRY', which is often sent as a test in RTTY. Back in the 'old days' when TELEX and teleprinters were the mainstay of inter-office communications Telegraph signals were conveyed over great distances using land-lines and carrier systems known a Multichannel Voice Frequency Telegraph (MCVFT).

When sending telegraph signals over land-lines, the signals need to be periodically regenerated as the square edges gradually 'soften' due to the inductive and capacitive effects of the cable (in effect a low-pass filter). An essential component in the regeneration process is the Carpenter relay. This is a highly sensitive (polarised) relay that is used to regenerate the original signal with square edges.

The main relay contact was a changeover switch that would send out either a 'Mark' or 'Space' signal depending on which side the contact rested. However, the relay needed to

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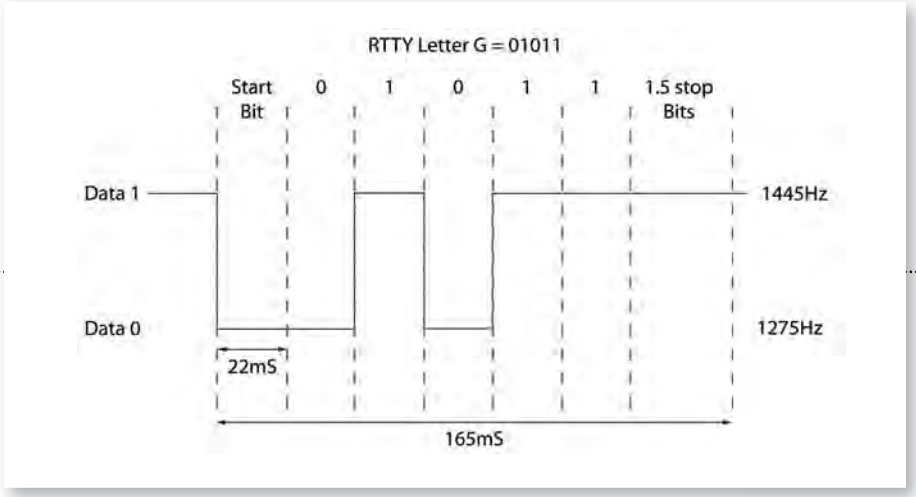

Fig. 1: Analysis of a RTTY Signal, corrected from last month's article.

be carefully adjusted to remove any bias or preference for one contact or the other. The method of adjustment required a Telegraph Distortion Measuring Set (TDMS). This would generate signal reversals (known as 'Revs' in the business) to drive the relay and a cathode ray tube (c.r.t.) was used to indicate any bias to one side or the other.

The Carpenter relay was then adjusted to produce the best square wave output on the TDMS. The use of multiple 'RY's came about because sending a repeating sequence of RYs is as close as you can get to generating a 1:1 square wave from the keyboard! So, it was used as a short-cut if the sending end of the link didn't have a TDMS to hand. For modern RTTY operating, sending RYs is still useful as a tuning aid as the two peaks of the signal become very easy to see especially if you're using an X-Y tuning display.

The standard transmission speed for Amateur RTTY signals remains at 45.45baud – so why use such an odd speed? The answers is straightforward – it was all down the type of teleprinters available to Amateurs in the early days. The 45.45baud rate is the rate produced by a 60 words per minute (w.p.m.) teleprinter. Commercial systems quickly moved on to 66 w.p.m. machines that operated at 50baud.

The slightly higher standard has remained and the few remaining commercial RTTY transmissions use 50baud, i.e. Hamburg Met. on 7.646MHz. However, Amateur RTTY has remained with 45.45baud, as this speed is more than fast enough for hand-typed QSOs. There's no point in trying to send any faster as the error rate just increases and the overall speed of the link is governed by how fast the operator can type – few Amateurs can type faster than 60w.p.m.!

Gremlins Attack!

Last month's column, I showed in Fig. 1 on page 19 of the September issue, an illustration of the letter G that had an 'attack of gremlins'. I showed the stop bit wrongly as a data-0. It should of course have been at a data-1 level. My Thanks to **Bev Ewen Smith** for pointing it out, and my apologies for the error, I've corrected it in **Fig. 1**, this month!

As explained last month, the signals for RTTY are asynchronous, which means that each character is neatly wrapped-up with its own start and stop bits to mark the beginning and end of each character. In between each character a steady tone (logic 1) will be sent.

One other oddity with RTTY is the number of stop bits used at the end of each character, variable between one and two! The original teleprinters require a slightly longer stop time to allow the mechanism to reset in between each character – hence the extended stop bits.

In **Fig. 1** this month, I've shown the correct construction of the letter G so you can see how the code really look. Each bit is 22ms long and each character takes 165ms to complete (assuming 45.45baud and 1.5 stop bits). In between each character, a constant logic 1 is sent. To send these signals over radio, the logic 1 and 0 levels are converted to two closely spaced carriers. The frequency spacing between these characters is known as 'the shift' and for Amateur use is standardised at 170Hz.

In the early experiments with RTTY, 850Hz shift was used but as decoding electronics progressed it became practical to bring the shift down to 170Hz and so reduce the overall bandwidth requirement of the mode to around 250Hz. Frequency Shift keying (f.s.k.) was the norm for early implementations of RTTY, but today most people use a PC to generate RTTY viaAudio Frequency Shift Keying (a.f.s.k.). In this system the logic 0 and 1 are converted into two audio tones, spaced 170Hz apart and applied to the audio input of a single side-band transmitter set to u.s.b.

Look back at last month's column for more details, but the resulting transmission consists of two r.f. carriers spaced 170Hz apart, creating the same effect as a traditional f.s.k. signal. See Fig. 1 to see how the tones are used.

The audio tones to be used in a.f.s.k. are important and there are a few standards kicking around but the main two camps are: European – 1275/1445Hz and the North American – 2125/2295Hz tone pairs. Both are fine, although (when I need to choose), I favour the 1275/1445 pair, simply because it keeps the RTTY tones well away from the phase distortion that can occur close to the edge of many i.f. filters.

However, the latest breed of Data modes software (e.g. *MMTTY* and *Ham Radio Deluxe DM780*) can operate using the full width of the receivers audio spectrum. This allows you to tune anywhere in that spectrum and the tones automatically adjust to suit, so they can be anywhere in the receiver's audio spectrum.

Getting Started?

If you're getting started with RTTY – it's very easy – providing you have a PC, a rig and a pair of audio leads to link between the PC's audio in/out and the rig's audio in/out! You'll also need some software that can process RTTY signals. There are a number of options available but for this article I suggest you go for *MMTTY* or *Ham Radio Deluxe*.

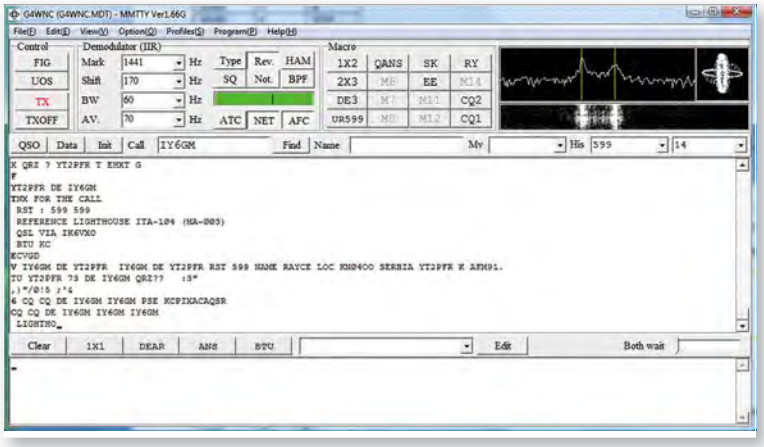

Fig. 2: Main screen of MMTTY showing Spectrum and X-Y tuning indicators (top right hand corner).

Let's start with *MMTTY,* **Fig. 2**, as this is a well established program with an active support group on Yahoo Groups (**http://groups.yahoo.com/group/MMTTY/**). You can download the latest version from the main *MMTTY* web site at: **http://mmhamsoft.amateur-radio.ca/pages/mmtty.php**

You need to download the full version and then double-click the downloaded file and follow the instructions to complete the installation. Once installed, the first step is to setup *MMTTY* to use your soundcard.

Open the Option menu followed by **Setup MMTTY > Soundcard** Tab. On this screen you can select the soundcard and input/output you intend to use. In most cases it will be the default soundcard and the Line-in.

After setting the input/output, go to the **TX** tab and enter your callsign. Now you'll need to enable the XY tuning scope as this provides a very accurate tuning indication. To do this go to the **View** menu and make sure **XY Scope** option is ticked, then set the size to **Big** and the quality to **Highest**. This should be enough to get you started so connect-up screened audio leads from the audio out of your rig to the line-in on the PC soundcard and from the PC's audio line-out to the microphone or data audio in on your rig, which should be set to u.s.b. or 'Digital'.

Once you get to enjoy the data modes you will probably need to get a radio interface to manage the connections between the rig and PC – more on those later. Next, tune your rig to 14.080MHz and tune up and down 10kHz listening out for the distinctive RTTY warbling tone – there's a useful, if short, typical sound to be found at: **http://kb9ukd.com/digital/rtty45.wav**

When you find a signal, tune through it slowly and you should see the two signal peaks move across the display and you should also see two ellipses in the XY scope which should make a plus sign when correctly tuned – see **Fig. 2.**

The XY tuning indicator is very sensitive so you need to tune very slowly to get it right. If you're getting a good signal, with the tuning indicators showing correctly, but garbage on the screen you probably need to reverse the tone set. This is a common problem and can be corrected by going to the **Option** menu then **Setup MMTTY>Demodulator** tab and click the **Reverse** option.

The *MMTTY* program includes an excellent automatic frequency control (a.f.c.) which will automatically alter the tones to decode any signal within its pass-band. You'll also see that there's an unshift on space (UOS) option and a button to force **Figs shift**.

As with all operating practice the most important rule is to listen first – so, let's get started. Weekends are the best time for RTTY and 14MHz (20m) is usually the best band to start with so spend some time listening around and making a note of the operating practice.

If there's a contest on you will see that QSOs are very brief affairs with minimal information exchanged. **Note:** It's common practice with data modes to make use of pre-stored text to save having to do too much 'live' typing. B~ut you need to beware as many stations (in all data modes) fall into the trap of carrying-out the entire QSO using stored messages. This is very convenient, but takes all personality out of the QSO. So please make sure you add some hand typed information to every QSO – the other operator may well want to have a chat!

My other pet hate is the use of '599' as the default signal report! This is just plain lazy as most software comes with the RST set to 599 and many operators don't bother to change it! Anyway, enough ranting, let's get on the air.

Before Transmitting

Before we start transmitting it's important to set-up the audio drive level correctly. The requirement here is to keep the transmitter well within its linear mode with no automatic level control (ALC). So, connect a dummy load to the transmitter output and set the rigs meter to show ALC. Next, press the **TX** button on *MMTTY* and open menu **Option Soundcard>Output Level**. You will see a *Windows audio mixer* with a separate slider for *MMTTY*. Adjust this slider so that the ALC just starts to kick-in then reduce it by 10% – that's it, job done!

However, before transmitting for the first time, it's worth familiarising yourself with the stored messages and customising them to suit you. These are shown in the **Macro** section at the top centre of the main screen.

To check the content of and edit a macro, just right-click over one of the buttons. Doing this, brings up an editing screen where you can amend the macro and change its name.

When you are new to a mode the Macros are a great help as they give you more time to both think and type. You'll need to check, or create the following:

His call de your call three times for answering a CQ call

His call de your call – for use at the beginning of the QSO

His RST report, Your name and Locator

Your equipment list – but please keep this brief – antenna, rig, power and software are the main items of interest.

His call de your call – for use at the end of the QSO.

Once you get started you can gradually refine your macros as you develop your own operating style. But **please make an effort** to include some typed conversation in every contact.

If you have problems getting *MMTTY* going, take a look at the *MMTTY* help file then the Yahoo User Group as they will have encountered most of the common problems. Please also feel free to drop me an E-mail to let me know how you get on.

That's it for this time, next month we'll move on to look at RTTY's successor PSK-31.

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technical for the terrified

This time Tony Nailer G4CFY turns his thoughts to antenna tuning units and their advantages!

Recently, my interest has turned to antenna tuning units (a.t.u.s) with a view to creating them as a new product line. There are many types already available, so why do we need another? When I purchased the G2DYM Antenna business, **Richard Benham-Holman G2DYM** suggested that my kit and ready-built manufacturing business would be well suited to the manufacture of a.t.u.s.

Richard had, as part of his business, manufactured stand-alone 1:1 ratio air-cored **bal**anced-to-**un**balanced transformers (**balun**) specifically for use with antennas fed with low impedance twin feeder. He also bought-in used a.t.u.s, refurbished them and retro-fitted them with 1:1 baluns.

Antenna Types

From the earliest days of Amateur Radio, through to today, the commonest forms of antenna have been a random length wire, a doublet (like dipoles) fed with wide-spaced open feeder line, and dipoles cut for specific resonance and fed with low impedance feeder.

Random wires could be any length from say one eighth of a wavelength (λ/8) up to several wavelengths. By definition an antenna longer than a full wavelength is called a long wire. On some bands it might be approaching multiples of half wavelength, when it will look very high impedance at the shack end, perhaps as high as 6kΩ.

A doublet antenna is similar to a dipole, but not specifically cut for resonance on a particular band. On some bands doublet antennas can be high impedance, maybe approaching 1000Ω, on others they could be just tens of Ohms. To cope with this wide range, the feeder is usually wide-spaced open line with characteristic impedance probably around 500Ω.

Dipoles and trapped dipoles are specifically cut and trapped to create natural resonance on several harmonically related high frequency (h.f.) bands. Depending upon height above a good ground this puts the feed-point impedance anything from 20Ω (at 0.1λ) to as high as 100Ω at (0.33λ). Notably at 0.22λ, 0.46λ, 0.74λ, and 0.98λ the feed-point impedance is 75Ω.

The dipole type of antenna can be fed with any low impedance feeder such as 65 or 100Ω twin feeder together with a balun at the shack end, or with 50 or 75Ω coaxial cable together with a balun at the centre feed-point. Coaxial cable being mechanically and electrically unbalanced picks up man-made noise and on transmit has an emitted electric and magnetic field making it liable to cause interference to radio and television.

Valves & Pi Networks

From the earliest days of amateur radio until about 1970, moderate to high power h.f. transmitters used valve output stages almost exclusively. The majority of Radio Amateurs used transmitters that produced less than 100W of radio frequency (r.f.) energy on any h.f. band and used an internal Pi-matching network to link to the Antenna, **Fig. 1.**

At 100W r.f. output and with valves running on a 600V supply rail, the load resistance set by the internal Pi network would be about 1800Ω. The commercial amateur equipment popular from the early 1970s included air-spaced capacitors at the input of the Pi-network to cope with the peak r.f. voltage of up to 1000V.

The low-impedance output capacitor often was much

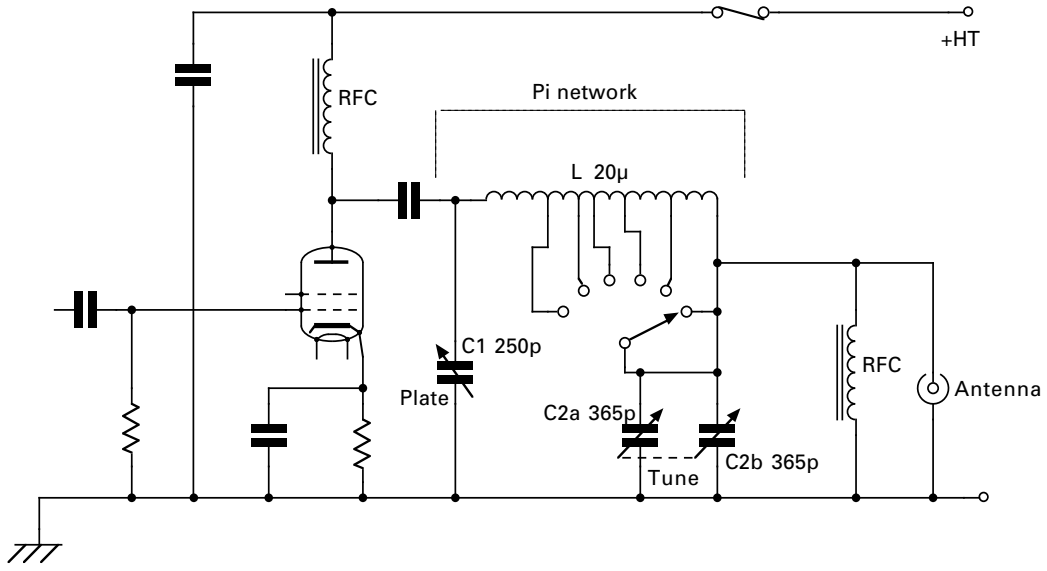

Fig. 1: The 'traditional' Pi-matching section that was commonly featured in many valved rigs.

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closer spaced which limited the maximum feed-line impedance to only a few hundred Ohms. In practice the output capacitor of the Pi-network, didn't have a large enough value to cope with a very low impedance, nor was it wide spaced enough to cope with the high r.f. voltage necessary to feed a random wire of 1000Ω or higher.

Harmonic Attenuation

As the radio spectrum was filling up with other users and Band I and III television was becoming very popular, there was increasing pressure on Radio Amateurs to reduce the level of harmonic outputs from their equipment.

The a.t.u. became an important accessory to match to the antenna and to reduce the harmonic output of the transmitter. This was really a bad move because the requirements for harmonic attenuation and those of matching were conflicting! Good harmonic attenuation often was achieved with poor matching efficiency and conversely poor harmonic attenuation was usually achieved with a perfect match.

Valved PA Tuners

An a.t.u. could be made quite straightforwardly by copying the component values used in commercial valved equipment but using a capacitor with wider spacing at the output side.

With the use of such a network there was no reason for the transmitter to be matched into 50Ω at all.

In most cases the matching would occur somewhere midway between that of the valve p.a. stage and that of the antenna. If the antenna is say 3600Ω impedance, there's no point in tuning the internal Pi-network to 50Ω and the a.t.u then from 50 back to 3600Ω. It is most likely that the transmitter could be matched into say 600Ω and the a.t.u then doing a 1:6 transformation.

Similarly when feeding low impedance feeder the transmitter could still be match to say 360Ω and the a.t.u. then doing a 6:1 transformation. Whatever network was used, a low-pass characteristic was necessary to reduce harmonic emission to better than 40dB below the main transmission.

Balanced Line Tuners

The KW EZee Match was already popular as a commercially available tuner before 1970 and the SEM EZ Match was another produced in the 1980s. The significance of these two were that they contained two open wound coils, each with link windings, that could be configured to drive random wires or coaxial cables or balanced lines, **Fig. 2**.

Looking at the circuit of Fig. 2, it's obvious that there are shortcomings with this design. There are separate output terminals for the lower frequency and higher frequency bands. So if a multi-band Antenna such as a trap dipole or G5RV is used, then it has to be disconnected from one pair of terminals and transferred to the other when moving between l.f. and h.f. bands.

To drive random and long wires or coaxial cables it's necessary to link one side of the appropriate link winding to the adjacent earth. So band and antenna changing takes some thought and fiddling about.

Another possible source of trouble is if two different

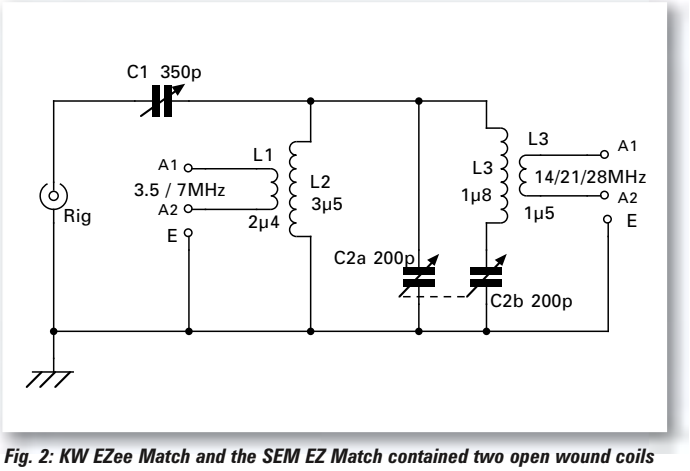

Fig. 2: KW EZee Match and the SEM EZ Match contained two open wound coils and could be configured to drive a variety of output loads.

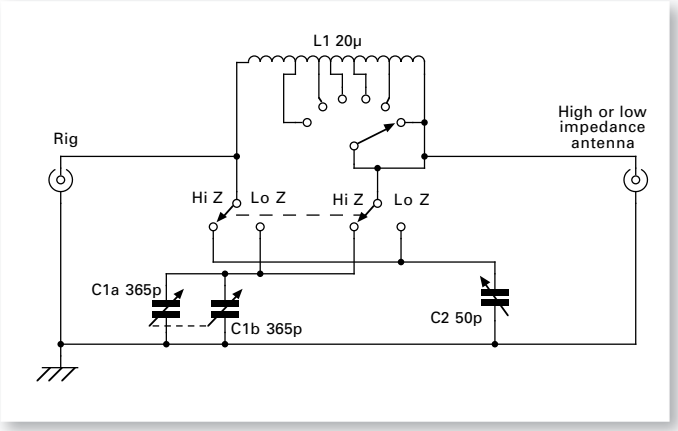

Fig. 3: The circuit of a switched-coil Pi-tuner.

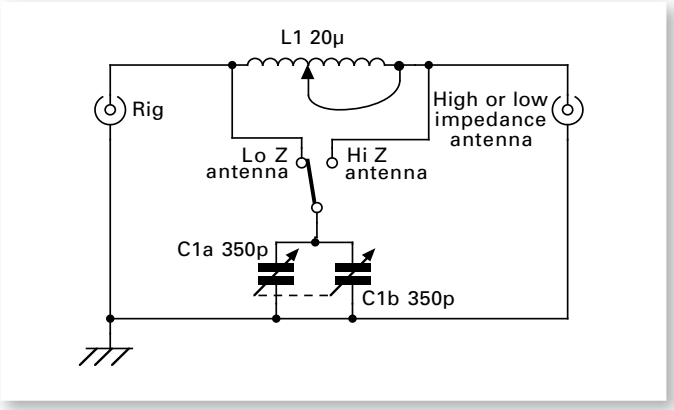

Fig. 4: The circuit for a switched L-tuner.

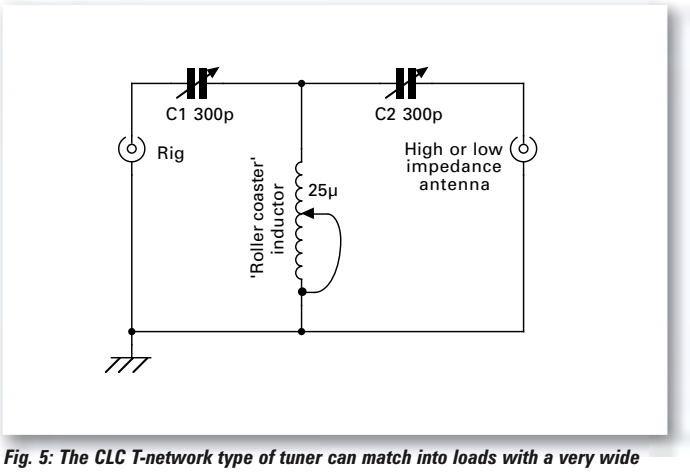

Fig. 5: The CLC T-network type of tuner can match into loads with a very wide impedance range.

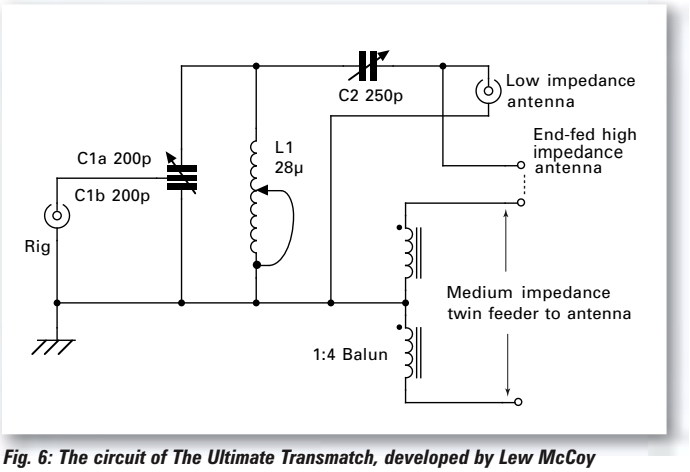

Fig. 6: The circuit of The Ultimate Transmatch, developed by Lew McCoy W1ICP and about the ultimate compromise between efficiency and harmonic attenuation.

antennas are in use and each are connected to the appropriate terminals they could interact causing unwanted coupling giving rise to difficulty in achieving a match or even tuning up on a harmonic.

Switched Coil Pi-Tuner

The switched-coil Pi antenna tuner obviously became popular because amateurs were already familiar with the network from the Radio Amateur Examination (RAE) syllabus and that it was used in almost every transmitter output stage. The ability to match into anything from a short circuit to an open circuit was further attraction.

The fact that the circuit could match into exceedingly low or exceedingly high impedances is actually a disadvantage. Tuning into an open circuit creates the liability of a flash-over in the output capacitor and across the coil.

Tuning into a short circuit has the tendency to cause the switch contacts related to coil taps to melt. Both tuning conditions mean the whole of the power generated by the transmitter has to be dissipated in the coil.

It can be shown that when matching up or down that only the inductor and one capacitor are doing most of the matching. The other capacitor is only required because the inductor is not infinitely variable. The large value capacitor is required at the low impedance end and a small value capacitor at the high impedance end. The circuit of a suitable tuner network is shown in **Fig. 3.**

Roller Coaster Tuner

A tuner using a roller coaster inductor only needs one capacitor to achieve a maximum efficiency match. The network then becomes just an L network. If the transceiver is 50Ω and the network is matching into a lower impedance then the capacitor is at the rig end. If the rig is still 50Ω and the network is matching to a higher impedance then the capacitor is at the Antenna end. The circuit for what is now a switched L-tuner is shown in **Fig. 4.**

The CLC T-Network

This type of tuner is shown in **Fig. 5** and can match into a very wide impedance range. The inductor still needs to be much the same value as used in the Pi-network but the capacitor values can be somewhat lower. Though shown in the circuit, as using a roller coaster inductor, the circuit works just as well with a switched inductor.

The CLC tuner isn't as efficient as the Pi-network but the reduced size of the matching capacitors means it is significantly cheaper. An obvious problem is that it's likely to provide a high-pass characteristic, which will do nothing to improve harmonic suppression. Currently though, where transmitters already include the necessary low-pass filtering this network would be an excellent choice for a tuner.

The Ultimate Transmatch

The Ultimate Transmatch variant of the T-network was developed by **Lew McCoy W1ICP** and published in *QST*, the journal of the American Amateur Radio Relay League (ARRL) in 1970 to be the ultimate compromise between efficiency and harmonic attenuation. The circuit is shown in **Fig. 6.**

The input capacitor was originally one with a single rotor and two stators. The alternative was to couple together two identical capacitors with one fully meshed and the other unmeshed. This meant that as the capacitance increased on one section it reduced on the other.

Clearly there were often situations where the best match occurred where C1a (upper part) was fully meshed and C1b (lower part) was unmeshed. Then the circuit became just a high pass T-network and lost its harmonic attenuation properties. At that time the requirement for harmonic attenuation was as important as the match.

After a decade of popularity, **Walt Maxwell W2DU** published calculations, which revealed that the ganging of C1a and C1b often would result in poor efficiency.

The SPC Transmatch

The SPC Transmatch network is so-called because it uses a series output capacitor ganged with a capacitor in parallel with the coil, **Fig. 7.** It was developed by **Doug DeMaw W1FB** in 1980, as an alternative to the Ultimate and to provide improved harmonic attenuation and efficiency.

The design was included in the ARRL Handbook for many years, from 1981 till 1999 when again its poor efficiency was highlighted. Though it looks similar to the Ultimate, the capacitors C2a and C2b are coupled so they both increase or decrease at the same time.

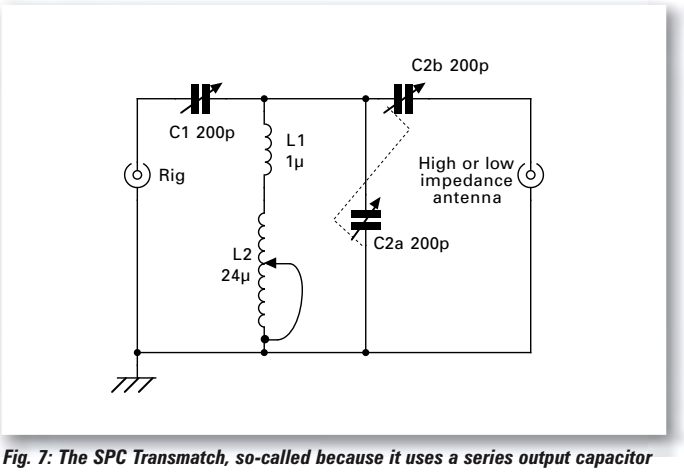

Fig. 7: The SPC Transmatch, so-called because it uses a series output capacitor ganged with a capacitor in parallel with the coil.

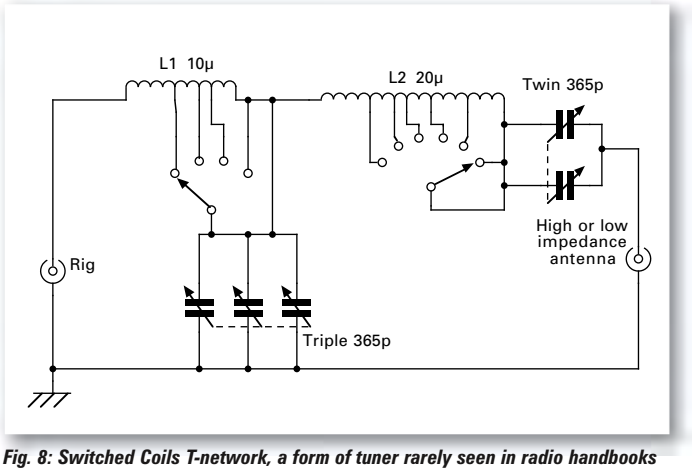

Fig. 8: Switched Coils T-network, a form of tuner rarely seen in radio handbooks and I found it years ago in October 1967 issue of QST*, the journal of the ARRL.*

Due to its long popularity with the ARRL, I was initially tempted to use this network for my a.t.u. as I was unaware of the poor efficiency under certain tuning conditions. Anyone now using such a network would be advised to rearrange the wiring so that C2a and C2b are in parallel. This would increase the matching range and the efficiency and the loss of harmonic attenuation is now not a problem.

Switched Coils T-network

The switched coils T-network form of tuner rarely seen in radio handbooks and I found it years ago in October 1967 issue of *QST*. The 'LCLc tuner', I found under the title *Band Switching Transmatches* by **Lance Q Johnson K1MET**, this circuit uses two switched coils in series with a shunt capacitor at the middle.

There is also a capacitor in series with the output to compensate for the coils not being infinitely variable. If a roller-coaster coil is employed in the circuit, the series capacitor would be unnecessary. The circuit is shown in **Fig. 8**.

In the article Lance describes both a 300W unit and a 1kW rated unit. Surprisingly, the 300W unit uses a triple section 365pF receiving variable capacitor in the middle and a twin gang 365pF receiving variable capacitor at the output. Presumably in the case of driving into a very high impedance antenna, the peak voltage is shared between the inductor and the capacitor.

Quite clearly, however it's tuned, it will always have a low pass characteristic. I suggest that its lack of popularity is due to having four major components instead of the usual three. Also the need for two ceramic switches instead of the usual one. On reflection though, receiving twin and triple gang capacitors are not difficult to find and ceramic switches are now readily available at very reasonable prices.

The 1:1 Balun

As a final entry I have included the wiring arrangement for a 1:1 balun. It can be constructed with three 1.2mm (18s.w.g.) wires wound side by side on a 35mm outside diameter plastic former and connected start-to-finish, start-to-finish. It should be housed in a plastic box such that no metalwork can come closer to the coil than 15mm.

An Ideal Network?

I have assumed for many years that there was an ideal

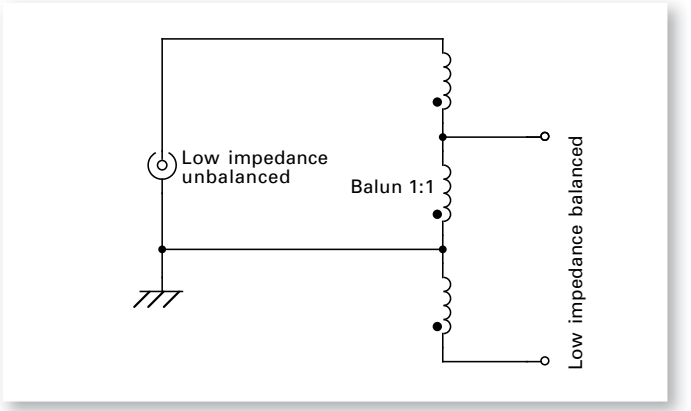

Fig. 9: If the balanced antenna impedance is similar to the coaxial cable's impedance you may just need a 1:1 balun.

network arrangement for an a.t.u. – for which I have clearly been mistaken! All types seem to have their merits and the Ultimate Transmatch and the SPC Transmatch can be easily modified into a CLC T-network to give increased efficiency.

Amateurs using a roller-coaster Pi tuner should always try to achieve a match with one capacitor at minimum, otherwise modify the circuit – as shown in Fig. 4 – to make it into a switched L-network. Likewise the switched coil Pi network which is normally built with equal value capacitors at each end would be better done as in Fig. 3.

The CLC T-network is not quite as efficient as the Pi but still a really useful network. It can be built using either a switched or a roller coaster inductor. It doesn't have the disadvantage of being able to tune into a short circuit or an open circuit like the Pi network.

Finally the LCLc T-network looks like it can be built using receiving variables and being capable of coping with the majority of stations who run well under 300W. It has a low pass characteristic under all matching conditions so will contribute to harmonic attenuation whether it's required or not.

This exercise has proved to me that in the quest for a match between rig and Antenna we are still spoilt for choice! My advice is – let the network you choose be dictated by the availability of suitable parts. I hope this has been as enlightening to you as it has to me! Cheerio until next time. ●

If readers wish to contact me, they can do so via E-mail to: **tony@pwpublishing.ltd.uk**

KITS & MODULES

NEW TRIBAND ACTIVE RECEIVE PRESELECTOR for 80,40, & 20m. Tuneable on 80m, fixed tuned on 40 and 20m. Can be configured for maximum gains of 16dB on 80m, 23dB on 40 and 20m, or 11dB on 80m 17dB on 40, and 18dB on 20m. Complete kit comprises amplifier and switch PCB's and components, 2 pole 3 way switch, polyvaricon, and 10K log gain pot. **£20.50**.

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. **1-9 qty 75p each plus £1 P&P**.

SPEECH PROCESSOR increases the average sideband power of SSB transmitters without driving the PA into clipping. Includes filtering to enhance the higher voice tones to increase intelligibility, and it sounds nice too. Panel control for clip and output level. Supplied with plugs & sockets to suit most popular rigs. Type **SP1000, PCB & Hardware kit £42.50, Ready built £60.00**.

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.**

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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**.

NEW SUPPLY OF DG MOSFETS

TYPE	Package	F MHz	Gfs mmhos	Idss mA	Nf dB	Price £
3SK45	TO72	200	14	17	2.2	2.00
3N201	TO72	300	12.8	15	2.0	2.25
40673	TO72	400	12	15	3.5	2.50
BF964S	SOT103	1000	18.5	10	1.0	1.50

P&P £1.00 any quantity

NEW PRODUCT

DUAL PEAK/NOTCH FILTER with Audio Amplifier. A successor to the original PW Arun Parametric Filter of 1986. It connects directly to the loudspeaker or headphone socket of the receiver and produces up to ½W of audio to a front facing loudspeaker. The unit can be used to notch out two unwanted heterodynes, or just one while enhancing the wanted audio frequency. Similarly it can be used sharpen otherwise dull speech or to dampen shrill audio. **PCB kit and all the potentiometers £35.75. PCB kit and all the hardware with drilled and labelled box £73.00. Ready Built £112.00.**

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**.

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.**

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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**.

NEW PRODUCT NAME

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~~POUNDBURY~~ 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.**

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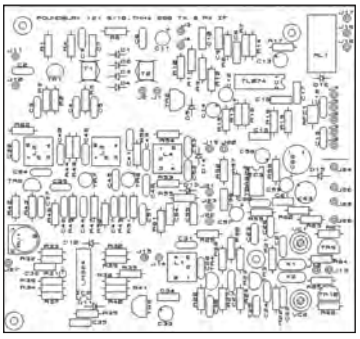
Single conversion superhet receiver for Top Band using a 4 pole ceramic IF filter LTW455HT. Stopband –40dB at + - 9KHz, -60dB at + - 100KHz. Ultra stable Colpitts VFO, and resonator-stabilised high-side BFO. Minimum discernable signal 0.1uV. Tuneable preselector and S meter. 500mW audio output. Supply 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.**

SYNTHESIZER CONVERSION CB to 10FM, suitable for the old style UK CB rigs with LC7136/7 or TC9119P synthesiser IC's. Puts the rig onto 29.31-29.70 MHz. Each board is aligned prior to despatch. State rig type when ordering. PCB size 64 x 40 x 17mm.
Type **SC29**. **PCB Built & aligned £26.50**.

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.



POUNDBURY (ver2) 9MHz SSB TX GENERATOR & RX IF. Speech processor and diode ring modulator with carrier suppression greater than 50dB. IN/OUT termination impedance 560Ω to match external SSB filter. Receive section FET and MOSFET IF amplifiers and a singly balanced diode product detector, discrete audio derived AGC, 0.5W IC audio amplifier. Includes USB and LSB carrier crystals, which are DC switched. PCB size 125 x 115 x 17mm. **PCB and components £66.00**.

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**.

G2DYM / G4CFY AERIALS

Guy — 7 1 rap — -piece — 7 1 rap — Guy

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. Regular duty 150W rated £157.00.
600W rated. £164.50, inc. carriage.

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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. £74.00 inc. carriage.

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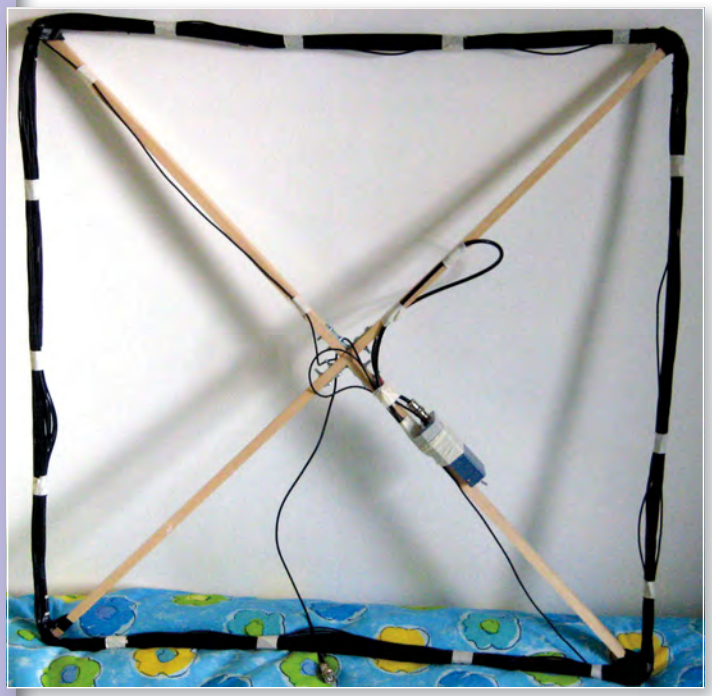
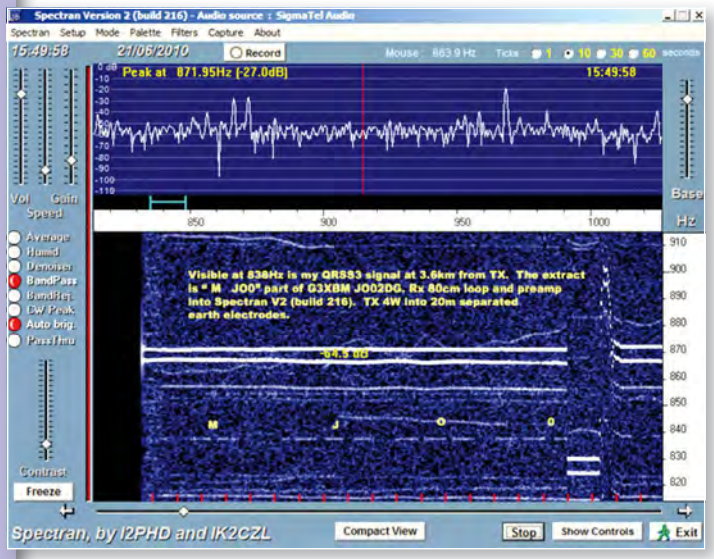
VISA MasterCard Maestro SWITCH

Feature

Amateur DXing Below 9kHz



The G3XBM v.l.f. receiver 800mm square, 30-turn, loop antenna, shown here with a v.l.f. – h.f. up-converter.



A screen-grab of the letters "..M JO0.." part of 'G3XBM JO02DG' received on the 30-turn loop antenna at a distance of 3.6km.

In the mid-1960s there were a couple of fascinating articles in *Practical Wireless* about communicating through the ground using the audio frequency (a.f.) electrical output from hi-fi amplifiers. The idea was simple! Just connect a small audio amplifier to a couple of ground rods and inject a signal into the earth. Then some distance away put in another couple of ground rods and connect these to another small amplifier and a pair of headphones.

If the distance wasn't too great, a signal would be received as a result of the signal spreading through the ground producing a potential difference between the remote ground rods. The same idea was used as long ago as the First World War to communicate in the trenches.

Earth-Mode Communication

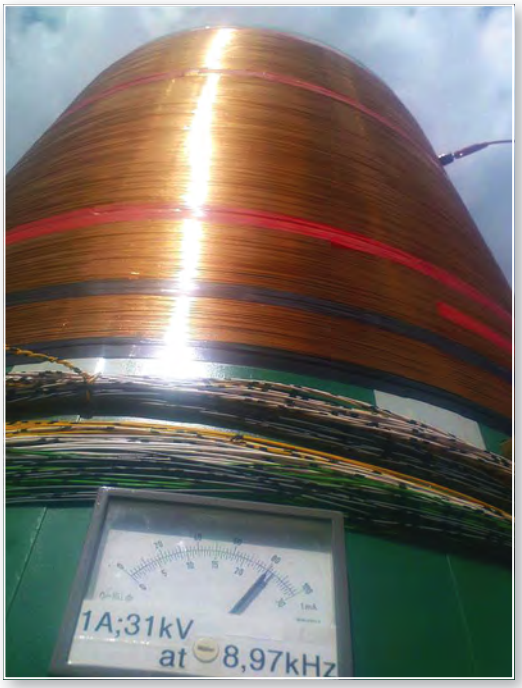
Many people have tried this mode (sometimes called earth-mode communication) with various degrees of success. I have tried this locally using about 4W output around 1.8kHz and was able to hear, by ear, my 10w.p.m. c.w. beacon at a distance of 500m with an electrode spacing of 20m at the transmit end and receiving the signal on a 800mm square, 30-turn, loop and amplifier optimised to reduce 50Hz mains hum.

When receiving the signal with a loop antenna, the main mode of propagation close to my home QTH is not by conduction but by induction. The two transmitter earth rods, their connecting wire and the ground between them form a loop whose size depends on the soil conductivity. The poorer the soil conductivity, the larger is the area of the loop formed within the ground and the better the range that can be achieved, as long as the transmitter is matched to the load presented by all the elements of the loop formed.

My system uses an audio transformer to step up from four to around 40-80Ω, which is the resistance of the earth electrode system in my back garden. With different soils and rocks beneath, the resistance will vary. Spacing the transmit ground rods as far apart as possible will increase the 'loop within the ground', thereby maximising range.

At the receiving end it is essential to have a sensitive a.f. receiver that also rejects extraneous signals. Frequency conversion is not essential as we are receiving signals that can be heard directly in a pair of headphones!

Roger Lapthorn G3XBM enjoys challenges using e.l.f. and he reports that signals have been heard at more than 850km away!



The huge loading coil used by Stefan DK7FC for 8.97kHz. Shown in his electrically quiet mobile location and close up.

In urban and suburban areas, mains hum is the biggest issue and this needs to be severely filtered out to have any chance of reception. Also, interference from v.l.f., l.f. and m.f. (very low frequency, low frequency and medium frequency) commercial signals can be an issue, so effective low-pass filtering is needed. Finally some narrow-band filtering around the chosen audio frequency will also help to improve the readability of the signal.

Using narrow-band QRSS3 c.w. (this is Morse code, which has a three-second dot period) and receiving the signal with the loop and pre-amplifier feeding into a PC running ***Spectran*** freeware software, the range of my system is about 1km by pure induction. Aided by the presence of buried pipes, my 4W earth mode signal has been copied well up to 5.25km away from my QTH in several directions, detecting the signal by laying the receiver loop horizontally on the ground.

Others experimenters have managed to cover 10km using high power amplifiers and greater transmit electrode spacing, but 50Hz mains hum, plus its harmonics and atmospherics from thunderstorms are real issues. Listening below 9kHz you'll hear naturally produced 'tweeks' and sometimes 'whistlers', as well as an assortment of man-made noises.

Beware of picking up signals from your digital watch! During my first attempts out in the fields I kept hearing a regular one second pulse and it took me some while before I realised it was the watch's clock oscillator pulsing away and being picked up by the loop antenna!

The same earth mode technique is used in caving to communicate between the surface and people in caves deep underground. Caving enthusiasts also use induction loop communications. Attenuation of signals through soil and rock reduces as frequency is reduced, so v.l.f. is ideal for this.

Maximum Ranges

When it comes to maximum ranges that you can expect, Earth-mode and induction communication systems are really only suitable for short ranges. This is because signals attenuate very rapidly with distance (18dB more attenuation for every doubling of distance with induction). Around 250W would be needed, all other things being equal, to double the range of a 4W earth mode transmitter.

Of course, by reducing the receiver bandwidth, using modes like *QRSS* or *WSPR*, increasing the transmitter's earth electrode spacing or the receiving loop's size, the distance may also be improved without increasing power. **Jim Moritz M0BMU** has worked out the theoretical best DX that could be achieved purely by induction using a couple of loops at each end.

Using *QRSS* weak signal techniques and 100W of power into a medium sized, single turn, transmitting loop he believes over 4km should be possible. No great distances then!

In many areas noise levels can be high, but the presence of water pipes, telephone and electricity cables can act as useful, if unintentional, coupling mechanisms, so greater ranges are certainly possible, as I have already found from my own QRP experiments on 838Hz.

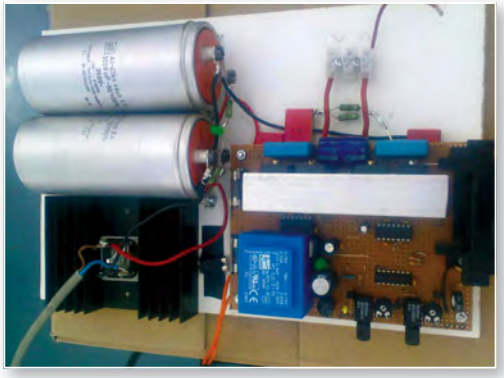
Real DX!

So, you'd think that working on v.l.f. might be fun, but real DX would be considered a few kilometres. Some have commented, calling the sub-9kHz area, the 'Dreamers Band', assuming talk of DX with amateur-level of power was nonsense. But think again…!

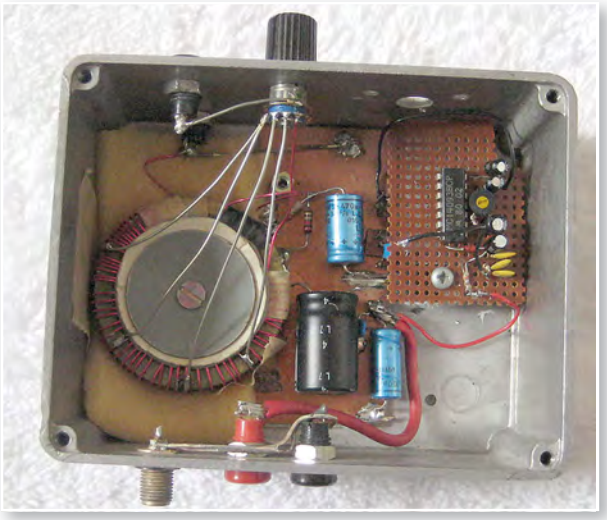
A few months ago some German stations started to consider the possibility of actually **radiating** a v.l.f. signal. With practical sized antennas at frequencies below 9kHz the efficiency is extremely poor and in fact the radiation resistance is usually only measured in micro-ohms only.

Resonating a practical Amateur sized Marconi vertical antenna, for example, requires a **huge** loading coil: the power losses in this and the ground system are many orders of magnitude greater than the power actually radiated. Nonetheless, a small amount of power **will** be radiated. However, at v.l.f. the attenuation of a radiated signal with distance is actually *less* than 6dB for doubling distance because of the effect of the ionospheric D-layer. So get a signal 'going' and it can go a long way.

Stefan Schaefer DK7FC, designed such a huge base loading coil and connected this to a kite supported very long vertical antenna and fed it with a few hundred watts



The transmitter used by Stefan Schaefer DK7FC.



Roger G3XBM's 4W earth mode transmitter and matching circuit.

of 'r.f.' on 8.97kHz using a very slow c.w. mode called QRSS. Across Europe, various stations listened and watched for his miniscule v.l.f. signal estimated at most as being only 1-2mW e.r.p. His signal was copied by Jim M0BMU near London and by **Paul Nicolson** in Yorkshire using weak signal detection methods.

Being received in Yorkshire, represented a distance of around 860km. On a later test, Stefan's 8.97kHz signal was copied in five different European countries. Although, no actual QSO took place on these occasions, just positive visual identification of his signal. Such long antennas high in the sky can be dangerous and such tests can only be undertaken with great care and with an eye on the weather forecasts.

Others, such as **Paul Cianciolo W1VLF**, are also experimenting on the Dreamers Band. Experts on the l.f.-reflector news group have been speculating what the ultimate amateur DX on 8.97kHz might be. With more power (up to 1kW), longer kite-supported vertical antennas (300m long) and very narrow data rates (QRSS600 or slower) plus software receivers and DSP processing (available on modern PCs with free software), there is a real possibility that an amateur v.l.f. signal may span the Atlantic in the not too distant future.

One thing that could compromise the QRSS600 tests, is noise levels and data rates slow enough for signals to be detectable within the noise. But, the bit rate mustn't be so slow that propagation disappears over the many hours needed so that a contact can be completed.

On June 4th **Walter Staubach DJ2LF** and **Marcus Vester DF6NM**, held what was probably the first two-way contact on 8.97 kHz. The distance between them was 20.2km and in each case the radiated power was about 5μW. They used a special QSO procedure using dual frequencies. To **receive** on 8.97kHz, or below, the antennas don't have to be large at all.

A very suitable small loop antenna and pre-amplifier designed by Jim M0BMU is shown on my website (see links). This has been used with a PC-based v.l.f. receiver to receive signals in the UK from DK7FC. An alternative approach to loop antennas, for receive only, is the so-called E-field voltage probe antenna using an f.e.t. as a very high input impedance stage followed by some gain.

The E-field probe works well, even with antennas just a metre or so in length. However, to receive these extremely weak QRSS signals buried in noise requires extremely narrow filter bandwidths as well as stable and very accurate frequency setting. It is essential to calibrate the PC's soundcard and to know precisely where to look for these weak and very slow messages.

Calibration is done by referencing to the frequency of v.l.f. commercial and military stations. It is very unlikely amateur v.l.f. true DX signals will be heard; rather they will be seen as faint QRSS traces on a PC screen.

UK &European Activity

It's not legal to transmit radio signals below 9kHz in the UK without Ofcom approval because of the Wireless Telegraphy Act. The Meteoroligical Office uses sub-9kHz to monitor atmospheric ('sferic') activity from thunderstorms, so it has to approve any non-military use.

Fortunately, Ofcom are sympathetic and they are in the process of seeking Met' Office approval for sub-9kHz Notices of Variation (NoVs) to allow some UK Amateur Radio stations to legally operate radio transmitters in this part of the spectrum.

Several applications are currently with Ofcom awaiting approval. My own low-powered signals will never get too far, but I'll be looking for the Germans and other UK stations carrying out tests on 8.97kHz and below. Interestingly, the German amateurs such as Stefan DK7FC are hoping to span the Atlantic on v.l.f. and they are seeking partners across the pond to collaborate in tests this winter. So, atch this space!

Well Worth Exploring

Whether just experimenting with earth mode conduction or induction communications or experimenting with true radiated radio signals on 8.97kHz, perhaps just on receive only, I hope you'll agree this is a part of the spectrum well worth exploring. ●

Useful Links

G3XBM's Sub-9kHz page	**http://sites.google.com/site/g3xbmqrp/Home/10khz**
G3XBM's Earth mode page	**http://sites.google.com/site/g3xbmqrp/Home/earthmode**
DK7FC's page	**www.qrz.com/db/DK7FC**
W1VLF's page	**http://rescueelectronics.com/9-Kilohertz.html**
Spectran software	**www.sdrham.com/**
QRSS introduction	**www.qsl.net/on7yd/136narro.htm#QRSS**
E-field probe antenna	**http://carc.org.uk//carc_ftp/G3GRO-PA0RDT-Active_Ant.pdf**

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

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DVS-6 Voice Memory Unit £44.90
MD-100A8X Desk top microphone £119.95
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MTU-160 External µ-tuning unit for the FT-2000 on the 160 meter band.Pr ce includes Base Unit Kit £529.95
MTU-30/20 External µ-tuning unit for the FT-2000 on the 30/20 meter band. Pr ce includes Base Unit Kit. £529.95
FP-1030A Microprocessor-controlled antenna impedance matching network designed to provide all-amateur-band transmitting capability with the FT-897/857 series of transceivers, when used with an end-fed random w re or long whip antenna. £175.95
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Yaesu CT-136 GPS Antenna adapter for FGPS-2 ..... £30.95
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Yaesu E-DC-6 DC Cable for Handhelds £7.10
Yaesu FBA-39 Dry Cell Battery Case £22.44
Yaesu FEP-4 Earp ece for BH-1 Bluetooth Headset £16.95
Yaesu FGPS-2 GPS Unit Requires CT-136 or MH-74A7A £82.95
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Yaesu MH-74A7A Waterproof Speaker Microphone £43.89
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AS REVIEWED IN PW December Issue 2009

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NEW AT-2KD The AT-1500DT and the AT-1KP have been combined into a new 2Kw Tuner **£429.95**
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AT-5K (3.5kW) Antenna Tuner **£999.95**
BT-1500A Balanced Antenna Tuner **£599.95**
PM-2000AM Power/SWR Meter **£159.95**

Palstar Dummy Loads
DL-1500 (1.5KW) **£119.95**
DL-2K (2kW) **£229.95**
DL-5K (5kW) **£349.95**

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**

Want to dabble in D-Star without the expense of a radio?

DV-AP-Dongle

NEW

The DV Access Point Dongle, (DVAP for short) by Internet Labs, provides a way to connect to the international D-Star network. The DVAP is used with a PC/Mac and an Internet connection. Unlike the DV Dongle, the new product allows amateur radio operators to walk away from the computer and transmit/receive D-Star voice and data using a two meter D-Star radio. Note that a D-Star radio is required to communicate with the DVAP and an Internet connection is required to communicate with the D-Star network

See web for more details. NOW IN STOCK! £219.95.

DV-Dongle

The DV Dongle connects to your PC or Apple Mac via a USB port and provides encoding and decoding of compressed audio using the DVSI AMBE2000 full duplex vocoder DSP chip. AMBE technology is used in all D-Star radios to provide efficient voice transmissions. It is also used in some HF digital protocols by vendors like AOR. The DVTool application used with the DV Dongle may be installed and run on Microsoft Windows XP/Vista, Mac OS X Leopard, or many flavors of Linux.

In stock, works with MAC or PC. £199.95

MyDEL **Power Supplies**

MP-9600 60A switch mode power supply. £179.95

PS-30SW11	Latest high performance switch mode PSU. 25amp	£84.95
SPS-8250	25A continuous, fully metered power supply	£79.95
MP-9626	120A, 13.8V DC power supply	£299.95
MP-8230	13.8V DC, 25A power supply	£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

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

EDITOR WANTED

We are looking for a freelance Editor to produce *RadioUser,* the UK's leading magazine for listeners.

The successful applicant will be responsible for commissioning new articles and sub-editing copy submitted by our regular columnists so an in-depth knowledge of radio and the listening hobby will clearly be a significant advantage.

He or she will understand the distinct segments in the hobby and know what appeals most to the people in each, allowing the magazine to publish a well-balanced range of articles spanning broadcast band listening, military and maritime monitoring, data decoding, DXTV, scanning and so on.

The job involves significant use of Microsoft Word, e-mail, ftp and the internet so proficiency in these is essential, as is previous writing or editing experience.

The person we're looking for will be organised and able to work to regular deadlines. They must be thorough, conscientious and have an eye for detail along with a high degree of self-discipline because he or she will be working independently as a freelance with no direct supervision. They will work from home and apart from a few days a month when they have to liaise directly with our Art Department during office hours, they will be free to choose the hours they work.

If you think you are the right person for the role, please send a copy of your CV and a covering message with Editor Application in the subject line to Roger Hall at

roger@radiouser.co.uk

Feature

Emerging Technology

Chris Lorek G4HCL reports on the latest innovations in the field of radio and electronic technology

Welcome to *Emerging Technology* (*ET*) where I'll start by looking at 'smart' antennas for portable use. In the recent past, so-called 'Smart' antennas, which are more correctly called 'adaptive arrays' have been developed and used in base station applications. Here, they can 'home in' on a signal across a horizontal arc of up to around 120° and electronically alter the radiation pattern of the antenna – to aim itself at the distant portable radio communicating with the base station. These are typically fairly large arrays made up of several phased antenna sections and coupled to sophisticated electronics.

Recently, researchers at the Montana State University (MSU) in the USA, in collaboration with Advanced Acoustic Concepts, have developed a new 'smart' antenna specifically for mobile and portable use. Apart from being much smaller, the MSU antenna can also rapidly process signals over a full 360° range, essential for mobile use, while most commercial smart antennas have a more limited range of a third or less of this.

The MSU antenna is termed a 'smart' antenna because it uses microprocessor circuitry to automatically aim the antenna's beam in the correct direction to the distant radio. This is unlike normal mobile and portable antennas for use on the move – as these are usually omnidirectional.

The antenna itself is a cylinder of around 70.5mm diameter and 300mm long, which lends itself to easy use on a vehicle or mounted onto a walker's backpack. As well as automatic aiming, it also chooses the most appropriate signal strength, optimises the strength of transmitted beams and adapts to the environment.

As well as being capable of communication with a base station, the antenna can also be used with other distant portable stations to keep in touch for direct communication – such as between rescue teams in remote areas not covered by repeaters. In this application, it can track and hold a signal when the sender or receiver is moving around, constantly recalculating the best configuration that's required.

The antenna's other advantage is that it can lock onto one signal and tune out unwanted signals, such as interference from other signals on the same frequency. Because of this, it gives the user a stronger, clearer, and more reliable signal than they'd otherwise have.

Aaron Traxinger holds an antenna developed by MSU researchers in collaboration with Advanced Acoustic Concepts, Inc. (MSU photo by Kelly Gorham).

Aaron Traxinger, Fig. 1, who is a research engineer at Advanced Acoustic Concepts and a graduate student at MSU says, "It's extremely easy to set up, and there are all sorts of ways to set up the software." Incidentally, this was Aaron's first assignment at his new job at Advanced Acoustic Concepts after earning his bachelor's degree from MSU, rather a nice project to have!

Maybe the days of omni-directional whips on our cars for bands such as 144MHz (2m) and 70cm (430MHz) could soon be 'old hat' for use in remote areas. Perhaps there'll be no need for a portable beam to be stashed in the boot, or strapped to a rucksack for hilltop operation when we need that extra bit of range. In fact the researchers themselves used their local rugged Montana terrain to test a prototype antenna under mobile use, with good results!

Cordless Charging For Portable Radios

In my previous *ET* column, which was in the August issue edition of *PW*, I detailed how cordless charging could easily be used for charging portable radios. Despite this – for some reason no manufacturer seemed to have taken this up over the years.

Well guess what? That very month Finnish manufacturers 'PowerKiss' launched their cordless charging technology for mobile phones in that country! It looks like my crystal ball was correct again! Remember again that you first read the news in the *ET* column in *PW!*

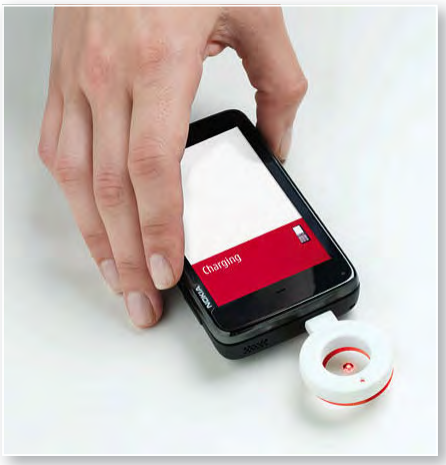
Right now the new system is already being used in the Helsinki-Vantaa Airport in Finland, and this installation is described as being the first wire-free charging airport in the world. Busy travellers can charge their cellphones wire-free with PowerKiss in the Café Alvar A, Seasons Café & Restaurant and the Via Lounge at the airport.

›

Also, for home use there's a Finnish manufacturers already selling tables with embedded PowerKiss transmitters. The system currently works with mobile phones from Nokia, Samsung, Sony Ericsson, LG, HTC, RIM (Blackberry) and any other device, cellphone or not, that supports microUSB, and they say they'll soon support many other products.

In the case of cellphone charging, the system works by the user plugging in a 'Ring' receiver into the phone's USB charging socket, and placing the Ring receiver in proximity to the charging transmitter, called a 'Heart'. It's based on resonating field induction to create an electromagnetic field around the Heart transmitter.

The Ring receiver converts the current produced by the field into a direct current (d.c.) charging supply to the 'phone.



Of course, inductive coupling of this kind has a very short range, so the transmitter and receiver must be fairly close together – but there's no physical wired connection needed. This means that the 'phone can simply be placed on a tabletop with a 'Heart' built into it, a red light indicating charging is taking place and this changing to white when it's fully charged.

The PowerKiss company is currently targeting public places like airports, hotels, restaurants and conference centres for the system, which makes a lot of sense, as well as targeting manufacturers to have the charging system built into portable devices such as cellphones and laptops.

However, if you can just use a simple plug-in coil for your portable device such as a hand-held radio transceiver (which of course is what a cellphone is) to charge it when you're out and about – who needs loads of different charging connectors between different devices?

Acoustic Clothing

Moving on now – we'll take a look at acoustic clothing of all things! Many of us know about the piezo-electric effect, for example where a crystal or ceramic resonator oscillates in response to an electrical charge being applied. Well, researchers at the Massachusetts Institute of Technology (MIT) in the US, who have been working on applying this to fibres as used in clothing, say they've achieved a significant milestone in their quest, and have now produced fibres that can both detect and generate sounds!

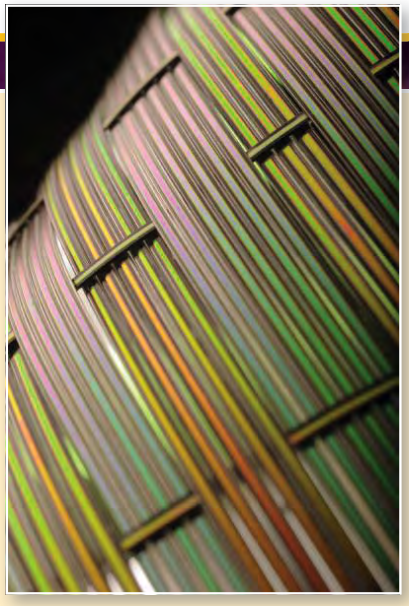
The heart of the fibres is a conducting plastic that contains graphite –which was commonly used in microphones – and by altering the plastic's fluorine content the researchers were able to make sure the molecules stayed in the right format and in correct alignment. (This means the fluorine atoms are lined up on one side and hydrogen atoms on the other).

More importantly, the atoms stayed like this even during fibre manufacturing processes such as heating and drawing. This is important because the fibres need to retain an elaborate and quite precise geometrical alignment of different materials, and it's this which gives the plastic its piezo-electric effect.

Noémie Chocat, who's a graduate student in the Materials Science department at the Institute, says "You can actually hear these fibres. If you connected them to a power supply and applied a sinusoidal current then they would vibrate. And if you make it vibrate at audible frequencies and put it close to your ear, you could actually hear different notes or sounds coming out of it!"

The achievement is a breakthrough for Yoel Fink, an associate professor of materials science and principal investigator at MIT's Research Lab of Electronics. For the past 10 years he's been working on this project to develop fibres with ever more sophisticated properties and to enable them to interact with their environment.

So what does the breakthrough mean to us? The answer is that we may undoubtedly soon be having caps or t-shirts with built-in stereo and even surround-sound speakers built into the fabric – maybe also a microphone included at the front!



However, another piezo-electric effect is the generation of electricity with movement. So, our clothing could also provide a re-charge facility for our portable transceivers, which could also be built into our clothing, using flexible electronics as I've detailed here in the past.

See you soon as I explore the future on behalf of *PW* readers. Chris G4HCL.

Chris G4HCL welcomes any feed-back from the *ET* column. He can be contacted by E-mail; g4hcl@rsgb.org.uk and by post to; PO Box 400, Eastleigh, Hampshire SO53 4ZF.

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Specification
- Diameter: 14.6mm
- Loss per 100m: 2.81dB @ 100MHz, 1.96 dB @ 50MHz

Price: £5.60 per metre, **£532** 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, **£251.75** 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, **£128.25** 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, **£161.50** 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 metre

Aircom Plus Connectors
- **PL259** connector (part: 7378) **£5.95**
- **N type** connector (part: 7367) **£6.50**
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Nevada Coaxial cables - 100m Drums

Westflex 103	Semi Air-spaced	**£139.95**
RG213U	Mil Spec low loss	**£99.95**
RG213TM	Economy low loss	**£89.95**
RG Mini 8 Super XXD	7.3mm Low Loss	**£64.95**
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TAF 450 Ohm Twin feeder		**£69.95**
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- Frequency offset setting
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- Voice companding function
- Wired clone function
- CTCSS/DCS auto scanning
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- Supplied with UK drop in charger and power supply, rubber duck antenna

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- Freq: 1.8-200Mhz
- Power 0-3Kw HF, 0-1Kw VHF
- Reads Average & PEP power
- Cross wire display

~~£119.00~~ **INTRODUCTORY OFFER £99.95**

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CAT-300
- Frequency: 1.8 - 60 MHz
- Power: 300W (SSB)
- Impedance: 10 - 60 Ohms

~~£189.00~~ **£159.95**

CAT-10
- Frequency: 3.5 to 50 MHz (in 7 bands)
- Power: 10W
- Impedance: 50 - 600 Ohms

~~£99.00~~ **£79.95**

HF Antennas

H-422	Rotary Dipole 40/20/15/10 metres	269.95
CHA-250B	Vertical covers 80 to 6 metres	299.95

HF/UHF Base Antennas

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

1.2GHz Beam

CYA-1216E	16 element 1.2GHz yagi	99.00

Multi Band HF Mobiles

UHV5	7/21/50/144/430MHz 100/200W	79.95
UHV6	7/21/28/50144/430MHz 100/200W 1.9m L	99.95

Handy Antennas

BNC-750	BNC HF whip 7-50MHz TX/RX	79.95
CH32	BNC 144/433/900MHz 45mm	19.95
CH99	BNC Tel Whip 70-1000MHz 195-1135mm L	19.95
RX5	144/430/900MHz 44cm L 8W SMA	29.95
SH95	144/430/1200MHz 37cm L 10W BNC	29.95
SMA3	144/430/900MHz 25cm L 10W SMA	24.95
SMA-501	144/430 MHz SMA	19.95
SMA-701	144/430/1200MHz SMA	19.95

Antenna Mounts

RS6	Roof Rack Mount - adjustable	19.95
RS550	Roof Rack Mount - deluxe adjustable	19.95
RS700	Gutter Mount adjustable	19.95
RS730	Trunk lip Mount adjustable	19.95
RMS	Magnetically mounted Gutter Clamp	29.95
WS1M	Window Mount deluxe SO239 plug	39.95
WS1B	Window Mount deluxe BNC plug	39.95
RS840	Trunk Lip ant mount	24.95
RS-020B	Trunk/Hatch back (Black)	21.50
RS-020S	Trunk/Hatch back (Silver)	21.50

Motor Bike Mounts

BMB-S	Motor bike bracket (Silver)	25.95
BMB-B	Motor Bike Mount (Black)	25.95

Car/Caravan Mounts

CAUBI	Trailer Mount - for HF whip antennas	49.95

Cable Assemblies

3K054M	4 metre cable SO239 to PL259 plug	24.95
3K054N	4 metre cable So239 to N type plug	25.95

Current Baluns

TFA-400	(1.3-500MHz) 400W	69.95
TF-1800	(1.3-500MHz) 1.8kW	79.95
TF-5000	(1.3-500MHz) 5 kW	99.95

Low Pass Filters

CF30H	Low Pass Filter 32 MHz 2kW	119.95
CF50MR	Low Pass Filter 57 MHz 1kW	49.95

Antennas and Accessories

Nevada Wire Antennas Covered Flexweave wire

G5RV	Half size (40 – 10)	£34.95
G5RV	Full size (80 – 10)	£39.95
Windom	Coax fed Half size (10/20/40)	£39.95
Windom	Coax fed Full size (10/20/40/80)	£44.95

Hard drawn Copper Wire

G5RV	Half size (40 – 10)	£24.95
G5RV	Full size (80 – 10)	£29.95

Heavy Duty – PVC flexweave

WDM3	Windom Half size 1kW	£69.95
WDM4	Windom Full size 1kW	£89.95

Moonraker Antennas

GP-2500	Vertical (80-6m)	£199.95
225P	2/70/23cms Colinear	£74.95
1010N	2/70/6metres Colinear	£84.95

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SYC-11	Polyester 5mm	295kg	**£49.95**
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KT3 Kevlar	Black 2mm	400kg	**£58.95**
KT-3 Kevlar	Olive Green 5.5mm	760kg	**£99.95**

MFJ Accessories

MFJ 269

MFJ 259B	HF/VHF Analyser	£279.95
MFJ 269	HF/VHF/UHF analyser	£349.95
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MFJ 949E	300W HF tuner	£179.95
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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

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- 144/430MHz plus wideband RX
- 200 Memory Channels
- VHF: 50/20/5W, UHF 35/20/5W

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30A Switching Power Supply
- Input voltage 230VAC
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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

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CN101L	1.8-150 MHz	~~£99~~ £89.00
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CN801S	900MHz-2.5GHz N types	£119.95
CN801V	140-520MHz (SO239)	£99.95

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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
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Z-817	QRP for FT817 & others	£119.95
FTL	Meter for FT857, FT897	£79.95

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Please check with the organisers that the rally is 'on' before leaving home.

rallies

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 *.

Send all your rally info to

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

September

September 12th
The Muckleburgh Collection Boot Sale
An amateur radio, vintage radio, militaria and general boot sale will be held at the Muckleburgh Collection military museum, Weybourne, Norfolk. For one day only, admission to the museum, restaurant and shop will be free, providing an unusual opportunity to visit the country's largest privately owned military museum without charge.

The North Norfolk Amateur Radio Group (NNARG) will also welcome visitors to their unique collection of all-service vintage military, amateur and other communications equipment in the Radio Hut at the museum. Radio clubs, individual amateurs, military enthusiasts and general stallholders welcomed. Pitches are £5.00 payable on the day – setting up is from 8.00am and free public admission is from 10.00am.
Bob Finch G0HYZ
Tel: 01263 838198
www.muckleburgh.co.uk
www.gb2mc.co.uk

September 12th
The Torbay Communications Fair
The Torbay Annual Communications Fair will take place at Newton Abbot Racecourse, Newton Abbot, Devon TQ12 3AF. There will be trade stands, catering, a Bring & Buy and facilities for the disabled.
Mike G3LQX
Tel: 01626 773934
Mike G1TUU
Tel: 01803 557941
E-mail: rally@tars.org.uk

September 18th
The Fog on the Tyne Rally
The Angel of the North Amateur Radio Club, in conjunction with STARS Radio Club, Fog on the Tyne Rally will take place at the Whitehall Road Methodist Church Hall (at the corner of Whitehall Road and Coatsworth Road – the car park entrance is in Whitehall Road), Bensham, Gateshead NE8 4LH. Doors will open at 10.30am and admission will be £1.50.
Nancy Bone G7UUR
Tel: 07990 760920 (Day)
Tel: 0191 477 0036 (Night)
E-mail: nancybone2001@yahoo.co.uk
www.anarc.net

September 19th
The Great Northern Hamfest
The 20th Great Northern Hamfest will be held at the Metrodome Leisure Complex, Barnsley S71 1AN. The doors will open at 11.00am and there will be trade stands, special interest groups, a Bring & Buy and facilities for the disabled.
Ernie G4LUE
Tel: 01226 716339
www.southyorkshirerepeatergroup.co.uk

September 26th
The Holsworthy Rally
The Holsworthy Amateur Radio Rally will take place in the Holsworthy Community College, Victoria Hill, Holsworthy EX22 6JD. There will be talk-in on V36 and S18.
Roger Williams
Tel: 07773 983691
E-mail: g8yrw@yahoo.co.uk

October

October 1st/2nd
The National Hamfest*
The second Lincoln Short Wave Club/RSGB National Hamfest will be held in the George Stephenson Pavilion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY (close to the junction of the A1, A46 and A17). There will be trade stands, a Bring & Buy, catering, special interest groups and facilities for the disabled.
Clive Catton
Tel: 01522 797 520 (office)
Tel: 01522 826 681 (home)
E-mail: clive@nationalhamfest.org.uk
www.nationalhamfest.org.uk

October 3rd
The Autumn Hangar Sale
The Autumn Militaria, Electronics and Radio Amateur Hangar Sale will take place at the Hack Green Secret Nuclear Bunker, French Lane, Nantwich, Cheshire CW5 8AL. The Bunker is situated just off the A530 Whitchurch Road, a few miles outside Nantwich, 30 minutes from Chester. From Junction 16 on the M6 motorway, follow the signs to Nantwich, then Whitchurch on the A530 (follow the brown Secret Bunker signs). The doors will open at 10.00am and admission will be £2.50.
Rod Siebert
Tel: 01270 623353
E-mail: coldwar@hackgreen.co.uk
www.hackgreen.co.uk

October 8-10th
The RSGB HF Convention
The RSGB HF Convention will be held at Wyboston Lakes Conference Centre, Great North Road, Wyboston, Bedfordshire MK44 3AL.
www.rsgb.org/rsgbconvention

October 17th
The Blackwood Rally
The Blackwood and District Amateur Radio Society Rally will be held at the Coleg Gwent Crosskeys Campus, Risca Road, Crosskeys, Gwent NP11 7ZA. The doors will open at 10.30am (10.00am for the disabled) and admission will be £2.00. There will be talk-in on S22, car parking, trade stands, special interest groups, a Bring & Buy and catering.
Dave GW4HBK
Tel: 01495 228516
E-mail: gw4hbk@talktalk.net
www.gw6gw.co.uk

October 17th
The Galashiels Rally
The Galashiels and District Amateur Radio Society Rally will be held in the Volunteer Hall, St Johns Street, Galashiels, Scottish Borders TD1 3JX. The doors will open at 11.00am (10.45am for the disabled), admission will be £2.50 and there will be trade stands, a Bring & Buy and catering.
Jim GM7LUN
Tel: 01896 850245
E-mail: mail@gm7lun.co.uk

October 17th
The Hornsea Rally
The Hornsea Amateur Radio Club Rally will take place in the Floral Hall, 7 The Esplanade, Hornsea, East Yorkshire HU18 1NQ. The doors will open at 10.30am and there will be car parking, trade stands, special interest groups, a Bring & Buy, catering with a licensed bar, a raffle and facilities for the disabled.
Rick M0CZR
E-mail: R106221@aol.com
Duncan G3TLI
E-mail: g3tli@hotmail.co.uk
www.hornseaarc.co.uk

October 30/31st
The North Wales Rally*
The 24th North Wales Radio Society Rally will be held at the John Bright High School, Maesdu Road, Llandudno LL30 1LF. There will be trade stands and car parking.
Liz Cabban GW0ETU
Tel: 01690 710257
E-mail: rally@nwrs.org.uk
Ron Roberts GW6ZDH
Tel: 01492 592884
www.nwrs.org.uk/rally/info.html

November

November 7th
The Foyle & District Rally
The Foyle & District Amateur Radio Club Annual Rally will be held at the Best Western White Horse Hotel, 68 Clooney Road, Derry BT47 3PA. The doors will open at noon and there will be trade stands, the RSGB QSL Bureau and special interest groups.
www.mn0aku.co.uk

November 7th
The West London Radio & Electronics Show*
The West London Radio & Electronics Show will take place at Kempton Park Racecourse, Sunbury-on-Thames, Surrey. The will be free car parking, the doors will open at 10.00am and there will be talk-in on S22 & V44, trade stands, a Bring & Buy, a flea market, catering, special interest groups and facilities for the disabled.
Paul M0CJX
Tel: 0845 1650351
E-mail: info@radiofairs.co.uk
www.radiofairs.co.uk

November 13th
The Rochdale Rally
The Rochdale and District Radio Society Traditional Radio Rally will be held in St Vincent's Church Hall, Caldershaw Road, Rochdale OL12 7QL. Doors will open at 10.30am (10.15am for the disabled) and entrance will cost £2.50 with concessions for seniors and children under 12. There will be a Bring & Buy and catering.
Dave G0PUD
Tel: 07710 243107
E-mail: dave.shaw1@sky.com
www.radars.me.uk

Please check with the organisers that the rally is 'on' before leaving home.

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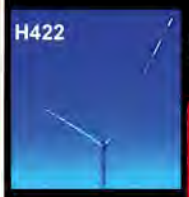

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The Rev. George Dobbs'

carrying on the practical way

The Rev. George Dobbs G3RJV describes "A Manhattan Transmitter" – without leaving the Greater Manchester area!

"Nothing is as simple as we hope it will be."
Jim Horning (American Scientist)

At the Rishworth QRP Convention last year I had to chance to meet several readers of this column. Thankfully, most of them were complimentary about my efforts! Although perhaps the most useful encounters were with those that asked questions or made suggestions for improvements or new ideas.

One of those I met at Rishworth, was a reader who'd built my Sudden receiver using Manhattan construction techniques. He was pleased with the results but suggested that there ought to be a matching transmitter. I agreed with him but it has taken me almost a year to get around to it.

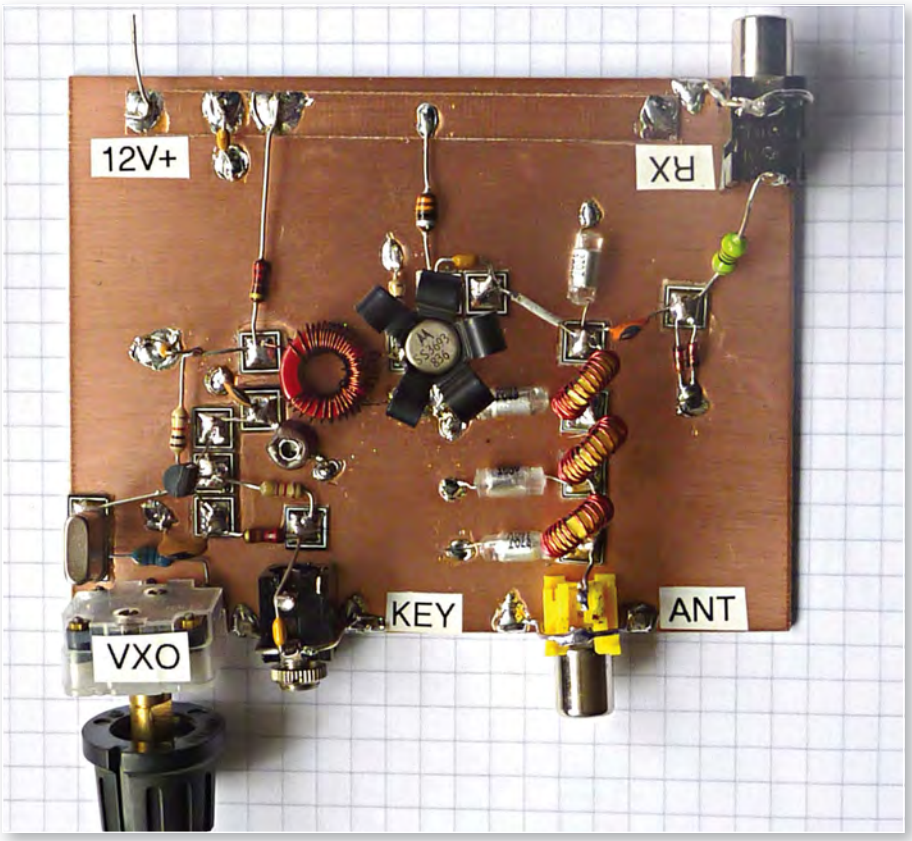
Perhaps I ought to explain the 'Rishworth QRP Convention' for those who have not heard about it. For the 18 years leading up to my retirement in 2008, there was a G QRP Club Mini-Convention at *St. Aidan's* Church Hall in Rochdale; the church I served for 24 years. Like many good annual events, it began as a one-off.

St. Aidan's Church has a very fine Father Willis, three-manual, pipe organ. Unfortunately, it required a complete rebuild (at several tens of thousands of pounds) so fundraising was at full speed! My suggestion was to run an amateur radio event in the church hall with the emphasis on QRP operating and construction. Thus the first G QRP Club Rochdale Mini-Convention organized and it continued to run for 18 years.

Convention – Not Rally!

The event was a convention, not a radio rally, in that, from the first instance, a programme of lectures was arranged throughout the day. The Editor of *PW*, **Rob G3XFD**, was a frequent speaker over the years.

On my leaving *St. Aidan's* Church, the convention was moved to Rishworth School in West Yorkshire about 10 miles to the east. The new venue has proved to be very popular, with its larger hall and a dedicated lecture theatre. Those of you, who'd like to attend can get information about the event from **www.gqrp.com** on the internet or announcements in radio magazines.



The Manhattan style building technique applied to the Universal transmitter.

The Manhattan Style

But back to the Manhattan-style transmitter! Manhattan-style construction is based on using small pads as connecting points for circuitry that is built over a conductive ground-plane, usually a piece of printed circuit board (p.c.b.) material. The pads are made from small bits of p.c.b. material, in either a round or rectangular shape.

Round pads can be made using a simple hand punch. Rectangular pads can be made using a hand nibbling tool, or snipped off from narrow pieces of p.c.b. material using side cutters or tin snips. The latter are probably the easiest pads to make. Using a hack saw cut strips of blank printed circuit board material about five to six millimetres wide.

A pair of tin snips may then be used to cut off square pads. It's a great advantage to clean the copper on the board before making the pads. Little pads are not easy to clean and solder flows better on a clean copper surface.

For this project I was fortunate enough to have a supply of **MeSQUARES**, which are panels with 300 square Manhattan construction pads that are easily snapped apart and then glued down. Each pad is pre-tinned and has a solder mask and silk screen outline. They are available from **Rex Harper W1REX**, at **qrpme.com**

The pads are attached to the ground-plane using any of the commercially available 'super glue'. These Cyanoacrylate glues set in seconds and offer a very durable bond if the surface is clean and free of grease or oil.

The method is similar to 'ugly construction', where the parts are

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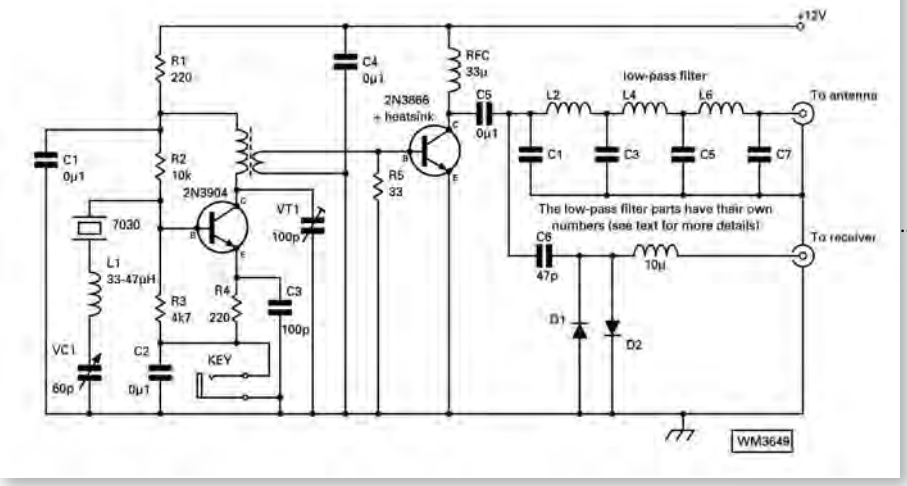
Fig. 1: The Manhattan transmitter circuit.



soldered together and to the ground-plane. However, it's more organised and easier to modify if the design needs changing, or to trouble-shoot if problems arise. A suitable layout is shown in the photograph but one great advantage of Manhattan construction is that individual builders can improvise with the layout as building proceeds.

The Manhattan Circuit

No, the 'Manhattan Circuit' isn't the 'Round Manhattan Island' boat circuit operated by New York's 'Circle Line' cruise boats – that I know a number of *PW* readers have tried on the way to the Dayton Hamvention! Instead, it's the circuit, for the Manhattan transmitter that's shown in **Fig. 1**.

The circuit is yet another variant of the W7ZOI Universal Transmitter from the fine, but sadly out of print, book *Solid State Design for the Radio Amateur* by **W7ZOI** and **W1FB**. I've used versions of the W7ZOI transmitter in several of my circuits in *PW* and have found it very reproducible and reliable.

The transmitter is genuine QRP at just 1W of output power but remember that that doyen of QRP operating, **George Burt GM3OXX**, has confirmed contacts with over 300 countries using a 1W and simple wire antennas. The diagram Fig. 1 is configured for the 7MHz (40m) Amateur band. This little transmitter alongside a Sudden receiver will give a lot of fun and plenty of useful radio contacts.

The transmitter of Fig. 1 is about as simple a circuit possible for a reliable QRP transmitter; a single crystal controlled oscillator drive a single stage power amplifier. Although crystal controlled, the oscillator stage is a variable crystal oscillator (v.x.o.). The crystal is a fundamental frequency crystal on 7.030MHz, the QRP calling frequency on the 40m band.

Notice that an inductor (L1) and a variable capacitor (VC1) have been added in series with the crystal and ground. These inductive and capacitive elements allow some shifting of the crystal frequency; adding capacitance shifts the frequency higher and adding inductance shifts the frequency lower. The combination of L1 and VC1 provides a useful frequency variation for the oscillator.

Inductor L1 is an off-the-shelf axial choke, I used 47µH but 33µH or similar would serve equally well. Capacitor C1 is a section of a polyvaricon variable capacitor with a maximum capacitance of 60pF. At the moment there are quite a few polyvaricon variable capacitors available with two sections; 140pF and 60pF. In my prototype this produces a frequency swing of about 7.008 to 7.027MHz.

The v.x.o. is link coupled, via T1, to a Class C 'power amplifier'. The inductor T1 has a tuned primary winding with VT1. The tuned winding (35 turns of 0.35mm – 28s.w.g. enamelled wire on a T50-2 core) requires VT1 to be about 80pF to resonate on the band. I was short of a 100pF trimmer so I used a Murata 5mm trimmer with a value of 60pF (brown) and added a parallel capacitance of 47pF.

There is a Murata 5mm trimmer with a value of 120pF (black) and this would be ideal. A five-turn link winding is wound over the centre of the tuned winding to couple the oscillator to the amplifier.

As with the original W7ZOI design, the oscillator is keyed and the amplifier is powered at all times. This arrangement has never presented me with problems when using the design although home constructors may prefer to key the amplifier stage via a transistor d.c. switch.

The problem here is that the oscillator will run at all times and hence be heard in the accompanying receiver. There are ways around this problem but they would just add extra complexity to a very simple circuit. A whole variety of devices could be used for the oscillator transistor but I used the common and inexpensive 2N3904.

The power amplifier is very simple. Resistor R5 provides a load for the signal from the link winding and drives the transistor into Class C. An r.f. load is produced by RFC, another off-the-shelf axial choke. Capacitor C5 couples the r.f. output to a seven element low-pass filter based on the W3NQN standard value capacitor (s.v.c.) filter data.

The capacitor C6 leads to the transmitter-receiver break-in circuit popularized by W7EL in his 'Optimised Transceiver' design. It's a simple method of sharing the same antenna by a transmitter and receiver without damage to the receiver or significant loss of signal from the transmitter. However, it does not mute the receiver so the operator simply keys the transmitter and turns down the gain control of the receiver. But it does have the advantage of being able to monitor the transmission with the receiver!

Building The Manhattan

Building the transmitter using Manhattan techniques proved to be simple. I opted to roughly follow the layout of the circuit drawing in Fig. 1. The ground plane is a piece of printed circuit board material 100 by 80mm.

The first placement was a buss-bar, some 75mm by 5mm, to carry the 12V supply. This strip of p.c.b. material, like all the pads, was held in place using super glue. It's a quick

and easy operation it but does really require the use of a pair of tweezers; ideally tweezers with pointed ends. After applying a little glue to the underside of the pad, it's carefully placed using the tweezers.

Pressing firmly on the pad for a few seconds should produce a reliable bond capable of handling the heat of a soldering iron. This method of construction does require a fair amount of heat from the soldering iron, so small irons with tiny bits are best avoided. I use my Weller TCP temperature controlled soldering iron with a larger than normal bit (type PTDD). Note: You'll soon know if the soldering iron is hot enough for the task as it will allow the solder to freely run over the surface of the pad.

My usual approach in Manhattan construction is to add the required pads as the building proceeds. A good plan is to build the v.x.o. first, test it and then add the power amplifier. The diagram, **Fig. 2**, shows how much of the circuit to build before testing the v.x.o. The circuit is completed as far as R5; the 33Ω load resistor on the secondary of T1.

The v.x.o. can be tested using the r.f. probe, suggested in Fig. 2. This r.f. probe could be built point-to-point ugly style with a thick piece of wire as the probe and a clip lead as the ground connection. Ideally, it should be fed to an analogue voltmeter via screened leads. Many readers will probably already have a suitable r.f. probe.

Connecting the probe to the test point should produce a voltage reading of some 2 to 3V when T1 is peaked using VT1.

The power amplifier and low-pass filter section is easy to layout, as there's plenty of space. The amplifier transistor is the common 2N3866 device, other candidates might include the 2N5859 (a rather old device) or the 2N3553. Leave enough space in the amplifier section to include a clip-on heat-sink to help dissipate the heat generated by this transistor.

I mounted the low-pass filter coils at a slight angle, **Fig. 3**, to save space and to produce a neat layout. Polystyrene capacitors are used in the filter. Ideally the filter capacitors should be High-*Q* types such as polystyrene or silvered mica

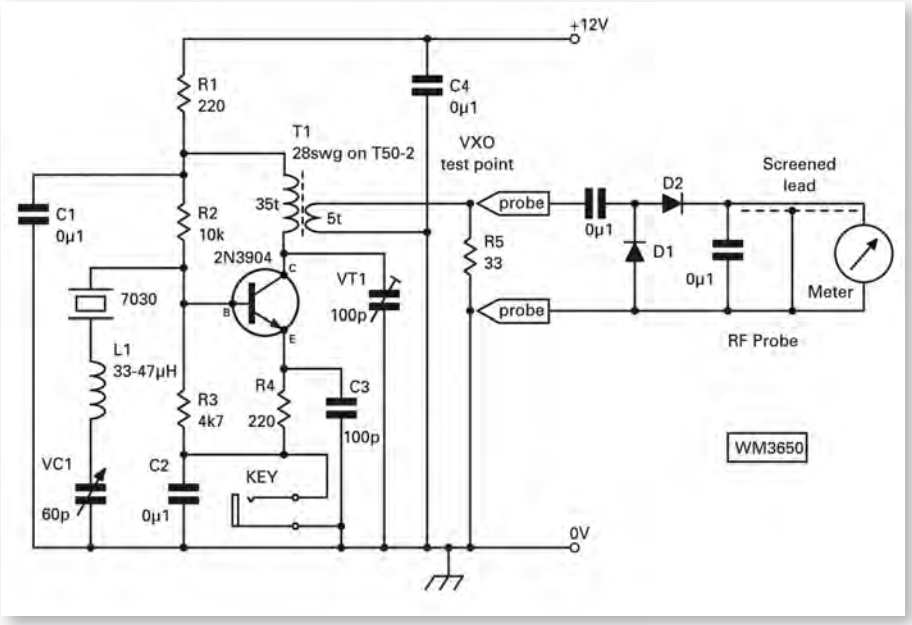


Fig. 2: Testing the VXO with an r.f. probe.

although in practice disc ceramics should do the job adequately.

Using the r.f. probe and meter, around 20V peak-to-peak should be detected on the output. One additional tip is to add a 'netting' switch so that the transmitter can be heard in the receiver without a signal being transmitted. This can be done very simply by adding a switch between the 'top' of the radio frequency choke (r.f.c.) and the 12V supply line. When this switch is open, the key will operate the VXO but the amplifier will be switched off.

Using the netting switch; the procedure is to switch off the amplifier and press down the key. Next, adjust the v.x.o. until it is at the frequency of a desired station.

Performs Very Well

The little transmitter performs very well and is capable of useful contacts on the 7MHz band. Naturally it could be build using any construction technique but it lends itself very well to Manhattan construction. Those who built the Manhattan Sudden receiver I described in November of 2009 of *PW* might like to add this transmitter to make up a simple station for the 7MHz band.

Fig. 3: With the coils at a slight angle, the space taken up by the filter is slightly less.

Tim Kirby G4VXE's

the world of vhf

Incorporating VHF DXer

Join Tim Kirby G4VXE as he provides an up-date on what's happening on v.h.f. Got some news? – make sure you tell Tim!

Welcome to the *World of VHF* (*WoVHF*). Firstly this month, I was sorry to hear, in a letter from **Graham Jones G4DPH** that **Dave Brooking G1KHX** had died from cancer on July 8th. Dave was well known to v.h.f. operators over the last 20 years from his Somerset QTH. Dave had been active on 50, 70, 144 and 432MHz – although Graham says that 70MHz was probably his favourite band.

Dave's funeral and service of thanksgiving was held on July 19th and many members of the **Weston-Super-Mare Radio Society** joined his family and friends to say 'goodbye'. Dave's soft Somerset 'burrr' and regular activity from Somerset will be missed on the air.

Autumn approaches

As autumn approaches, so does the v.h.f./u.h.f. 'tropospheric propagation' ('tropo') season. Some tropo openings can be lengthy lasting days, others can be quite short-lived, lasting a couple of hours, or just a few minutes! If you have a barometer in the house (a useful tool for any v.h.f./u.h.f. enthusiast) the trick is to look for when the pressure is falling away after a period of steady high pressure.

You'll normally experience some improved propagation or a 'lift' at this stage. Particularly in autumn, though, if you're around in the early morning – after a cool night and the day is starting to warm up – you may see mist forming. That's usually a great sign that there will be some tropo around.

If the weather forecaster on the TV/Radio mention widespread mist and fog, it may well be that the tropo will be extensive over the country. Or, it may be more localised, with signals improved over relatively short distances, perhaps 80 to 160km (50 to 100 miles).

I experienced a similar thing the other morning (I'm writing this at the end of July) when I was driving to the station. With light mist around I noticed that I could hear a weak repeater on 145.650MHz. I couldn't quite identify it, though I could tell it wasn't one of the 'usual' suspects on that channel.

However, I was pleased when **Ken Eastty G3LVP** from Cheltenham called in and said that he was hearing GB3TR from Torbay on 145.650MHz. Ken, having a better path to Torbay than me had managed to successfully identify the repeater.

One of the interesting things about this sort of propagation is that it normally only lasts for two to three hours whilst things warm up, so it does favour the Early Birds! Additionally, if you've got v.h.f. single sideband (s.s.b.) equipment, it's very often worth a couple of "CQ" calls on 144.300 or 432.200MHz before breakfast!

Try it! See what you can hear, either in one of the more extensive openings or a shorter opening, you may be surprised! And – don't forget to let us know what you have been hearing.

Perfect VHF/UHF Location?

A typical view of the perfect v.h.f./u.h.f. location is a house on top of a hill, with the ground falling away from you on all sides. So it was an interesting discussion that I had with **Richard Gosnell G4MUF** regarding an Es opening he'd experienced on June 11th while on holiday in Devon, in a location that was surrounded by hills.

The v.h.f. bands were quiet with very little activity, including Band II f.m. broadcasts channels. However, on the morning of June 11th, the 88 – 108MHz band was literally 'wall-to-wall' with Italian stations. We came to the conclusion that for Sporadic E openings, a 'bowl' QTH is really excellent, as you get very little terrestrial interference.

So, if you are living in a deep valley with hills all around you, v.h.f./u.h.f. may be a difficult furrow to plough. But for Sporadic E and Meteor Scatter (MS) you should be able to do quite well, particularly as you'll get little interference from tropo signals. So, if you are living in a 'difficult' v.h.f. QTH and are active, it would be good to hear about the results that you are achieving.

Band Reports

As usual, we'll start the band reports with 50MHz and **Mark Haynes M0DXR** writes, "One of my new years resolutions for 2010 was to get the v.h.f. antennas up and enjoy the various modes which make the normally 'line of sight' bands that bit more interesting. Well, the antennas have been up now for around three months and I'm not at all disappointed!

"I submitted my planning permission application at the beginning of the year (the guys at Harlow Council know me quite well now!). My neighbours are extremely supportive of my hobby and have no problem with the station. It's a 10m Altron mast with another 2m in the top. For 50MHz, I have a 5-element Tonna. I decided to go for Tonna as they are lightweight and fairly competitive in terms of price.

"My transceiver is the Icom IC-7400, providing 100W. It was good timing, as a Sporadic E season was just starting. I have had tremendous fun on 6m, working all over Europe, down in to Israel, the Canary Islands, Algeria, Cyprus and I even managed some contacts to Puerto Rico and the USA.

"The longer distance openings, which would have been multi-Es (using more than one Sporadic E cloud to make the journey) openings, I found to be fairly short and localised, but making the contact sure does give you a buzz! Over the

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Fig. 1: A picture of the G0FBB/P 50MHz VHF Field Day contest station, as mentioned in the text. Justin Snow, G4TSH is turning the beam using the 'strong-arm' method.

three months, I've managed 185 grid squares on the 'magic band of 50MHz."

Thanks Mark – having good neighbour relationships is very helpful! And it really does seem to have been one of the best summers for Sporadic E (Es) for some years. Certainly, during June, barely a day went by without some propagation. July was quieter, but still showed a significant number of openings. At **G4VXE** I decided to try and make some tropo contacts during the RSGB's VHF National Field Day on the weekend of July 3rd and 4th.

I had expected that success would be limited, as I have a vertical for 50MHz, which of course is cross-polarised to the majority of contest stations who would be using beams, as well as having a high local noise level on the band. In the event, though, I was pleased with the results. I worked G0FBB/P in JO01 and G4BRA/P in IO80 as well as some more local stations to me.

So, if you only have a vertical antenna for 50MHz, it may still be worthwhile coming on during the monthly RSGB UK Activity Contests and seeing if you can make some tropo QSOs. Of course, it's well worth coming on outside of the contests too, but it's just that some activity is guaranteed during the contest periods!

You can find details of these activity periods at **http://www.rsgbcc.org/vhf/** After the VHF NFD ended, I was operating mobile and found 50MHz going really well. I worked HB9HLM, 9A9AA and an IW1 station on a short drive across the fields from the village. I was also interested to hear SV9GLW coming in, on what was most probably a double-hop path from Crete.

The 70MHz Band

On to the 70MHz band now and – via the excellent 70MHz website (**http://www.70mhz.org**) – comes news that the United Arab Emirates have granted permission for 70MHz to be used on a secondary basis. The allocation is 70.000 to 70.500 with an output of 100W. My guess is that this should be quite an interesting path to explore on 70MHz.

The path to Bahrain has proved very fruitful on 50MHz this year and I'm hopeful that we may see similar openings on 70MHz, though perhaps somewhat less frequent, next year.

Prior to the 70MHz VHF Field Day session on July 4th, I heard EI9E/P from IO62 – which surprised me, given my poor receive set-up on the band!

During the contest, I made a number of relatively local QSOs, including G4BRA/P in IO80. It was nice to work some new UK locator squares on the band, as I don't generally make many UK QSOs on 70MHz, not having a beam antenna. Later on in the morning around 1130z, the band opened to 9A6R (JN83) and S51DI (JN76) providing plenty of interest for contest stations.

July 10th was the best day for a 70MHz Es opening here at G4VXE. At 0838z I heard a long "CQ" from IS0AWZ on 70.200MHz. Unfortunately, it was such a long "CQ" that his signal had come up, and faded away before he went back to receive! Still, as **David Powell G3XLW** said, he was on the air and making some activity.

Later on at 1106z, I was monitoring 70.200MHz when I heard some s.s.b. just off to one side. It turned out to be **Geoffrey Inns G3XGS** operating as EA5/G3XGS from IM98. Geoff was using 10W to a small Yagi, to my 7W with a vertical and signals were excellent. Interestingly, apart from me, the only other station that Geoff was hearing at the time was the GB3RAL beacon at Harwell on 70.050MHz showing just how localised propagation can be.

The 144MHz Band

For his 144MHz band report Mark M0DXR writes that he has an 11-element Tonna for 144MHz in his new v.h.f. array and continues, "I have not yet managed to catch a Sporadic E opening on this band, but I know many who worked all over Europe in June. A good friend of mine **Brian Oughton G4AEZ** works for a sister company of my employer, and he is very active."

"What an amazing thought – that you can actually make use of these meteors, or bounce your signals off a huge rock (the moon) with a round trip of half a million miles. Now, even for a true avid h.f. operator, there's no way this cannot be classed as cool! Brian kindly made up an interface for me to go between the rig and PC, allowing me to independently vary the TX and RX audio levels. I've had it for a couple of weeks now, using the WSJT software, and have managed 144MHz QSOs with S54AA in JN76EG and DJ2QV in JN58UA."

"As we move out of the Sporadic E season, more attention will pass onto meteor scatter for me. I have also

become very interested in the RSGB VHF UK Activity Contests which take place on a Tuesday evening at the civilised hours of 1900-2130 UTC. This is a great opportunity to work stations all over the UK and across to France, Belgium, Germany, Netherlands and other European neighbours.

"I also like to contribute to the **Cray Valley Radio Society's Club** score – there's a great battle going on between various radio clubs. Perhaps other h.f. only operators would consider VHF. It makes the hobby so varied to get on to these bands. You can't contact quite as far with the ease on h.f. but it sure does give you a buzz.

"Plus, antennas are smaller, so the for the ham like me with restricted space, you can be quite competitive. I hope to contribute monthly to the column with further details of my results with this new fascination."

Thanks for that Mark! Next, **John Blick MM6KSJ** reports that he continues to enjoy using his 144MHz hand-held and the MB7INA-L Echolink node in Largs to make QSOs far and wide from his home on the Isle of Bute.

At G4VXE my main activity was tuning around during the VHF National Field Day on July 3rd/4th. Plenty of stations were worked, but the more distant ones were GM4ZUK/P (IO86), MM0CPS/P (IO84), F6KCP/P (JN18), ON4AZW/P (JO10), MJ/PA1AW (IN89) and EI9E/P (IO62).

All nice contacts and proof perhaps – that even if you don't like contests – it's well worth getting on during them to see what can be worked. As you know there will at least be plenty of activity.

Graham Boor G8NWC is keen to improve his performance on both 144 and 432MHz, as one of his main interests is the RSGB's UK Activity Contests on 144 and 430MHz. Having restricted space on his mast, he has been looking for dual-band Yagis and has settled on the LAMFOX JS-270 from LAM Communications. This antenna has 3-elements on 144MHz and 5-elements on 430MHz. It will be interesting to see how you get on Graham – it looks a useful antenna.

Fig. 2: A picture taken during the overnight operation of G0FBB/P in a previous year's operation.

During VHF Field Day on July 3rd/4th there was plenty of activity and I was pleased to make a good number of contacts at G4VXE. The most distant one was PA6NL/P (JO21) who is always an interesting signal to monitor over the 24 hours of a contest, with the signals building and fading noticeably as the temperature changes across the North Sea.

The 1296MHz Band

Des Kiely G0RBD reports some interesting tests on 1297MHz f.m. Using hand-held equipment, in a built-up area, Des and **Jon Wheeler G0IUE** with others have been achieving ranges of several miles. Much further of course, when antennas are out in the clear.

Des and Jon are often monitoring 1297.500MHz f.m. in the Wiltshire area, so if you have mobile equipment for the band and are perhaps travelling along the M4 or are in the Cotswolds area, please try a call.

Thank You!

And now we have a 'thank you' to **Ivan Tallon EI-1166** from Macetown, County Meath, Eire, for taking the trouble to get in touch and saying that he'd enjoyed the column. I look forward to hearing more from you Ivan and it would be great to hear of your experiences of v.h.f. in your part of Eire.

Looking Forward

Let's look forward now – because although the Sporadic E will be dying off over the autumn period – there should be tropo openings on the higher v.h.f./u.h.f. bands. Also, 50MHz may possibly exhibit some Trans-Equatorial Propagation (TEP) to either Africa or South America, so keep listening on 50.110MHz!

If you're keen on the u.h.f. bands, then the IARU Region 1 contest on October 2nd and 3rd should provide plenty of activity on 430MHz and above. Be active and let us know what you find in your World of VHF, so cheerio for now and I look forward to getting your news soon! ●

I hope you have enjoyed *The World of VHF*. However, to make it really work well, I really need to hear from **you**, so I hope readers will take the opportunity to get in touch. You can E-mail me **tim@g4vxe.com** or find me on Twitter where my id is G4VXE. If writing a letter works better for you, then you'll find my address at the top of the article. I look forward to hearing from you!

Carl Mason's

hf highlights

Carl Mason GW0VSW presents his monthly round up of your activities on the h.f. bands as conditions improve.

Carl Mason GW0VSW presents his round-up of your activities on the h.f. bands. Information, reports and photos to Carl by the 15th of each month please.

Welcome to *HF Highlights* (*HFH*) and I'm beginning this month with some details of the **International World Flora Fauna Foundation** or WFF. I'm sure there are many of you who have either worked or heard stations on the high frequency (h.f.) bands giving WFF info after their call and wondered just what it was! Well, World Flora Fauna Foundation activities operate from various national parks, nature reserves and protected areas around the globe.

The WFF helps promote awareness to the conservation of our plants and fauna many of which are fast disappearing or are extremely rare. The foundation hopes to draw attention to the conservation of our natural and cultural heritage and encourage Radio Amateurs to visit the many national parks and nature reserves of the world and promote them using Amateur Radio.

The Programme was launched in 2008 and several awards are available for working stations within these special areas all of which are listed by the WFF Program. A QSO with a participating station is normally welcomed by the transmission of two figures '44' which means 'Forty Four or Flora Fauna' and represents the slogan of the WFF program *"Lets save the green Planet Earth."*

A reference number is also normally included which can be cross referenced with a list to identify the park, reserve or area such as FF-01, FF-02, FF-03 etc. New entries are added regularly and a full list is available at **www.wff44.com/en/forum/** There's also an on-line log search which allows you to confirm you are in a participating stations log, what points you have collected and any awards you can apply for which obviously saves a lot of manpower and time.

The database already has over 500 WFF expeditions from six continents in it and more than 1.2 million QSOs have been recorded so far. The WFF committee receives many eLogs for various expeditions and invites all those that participate or organise activities to submit their Logbooks in ADIF format so the programme can continue to grow.

The WFF list remains open and the addition of new numbers is possible after it has been established that a new or unlisted National Park/Nature Reserves meets all the programs requirements. There are planned 'annual' days of activity every year and these are March 20 - Global Day for Protection of the Earth, March 22 - Global Day for Protection of Water, April 1 - International day for Protection of Birds, July 1 - First Anniversary of the WFF Program Launching, September 26 - Global Day of the Sea, October 4 - Global Day for Protection of Animals and there is normally a special week of activity which is posted on the website.

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Suggested frequencies to look for activity on are (s.s.b.) 3.744, 7.144, 14.244, 18.144, 21.244, 24.944 and 28.444MHz and c.w. - 3.544, 7.024, 10.124, 14.044, 18.084, 21.044, 24.894 and 28.044MHz. The basic award is obtained by making 100 h.f. and/or v.h.f. QSOs with different WFF stations located on three continents and costs 12 IRCs.

Special Events

On to the DX news now and to celebrate the 100th anniversary of the Republic of China a couple of special callsigns will be in use from Chinese Taipei (Taiwan) AS-020. These will be **BP100** QSL via BX4AQ which will run until December 31st 2011 and **BV100** QSL via BV2KI which will run from October 10th until December 31st 2011.

Three awards are available, the Tri-Band Award, Dual-Mode Award and VHF Award and they are given to Amateur Radio stations or short wave listeners (s.w.l.s) who work or hears BV100 on s.s.b., c.w. or using digital modes. To apply for the free award simply fill out the registration form on-line. No QSL cards are required but your submission must clearly state

The GB1SKT special QSL card from John G0XIG.

The GB1SKT station set up.

Card from IB0CW who was worked by Martin 2E0MCA on 7MHz s.s.b.

Card from II2TRE – worked by Colin 2E0BSW on 14MHz s.s.b.

The QSL from SO1EKO, who was worked by George G3ICO on 14MHz c.w.

SP33ADS worked by George G3ICO on 14MHz c.w.

the Date/Time/Band and Mode used. Further information can be found at **www.bv100.tw**

Madagascar or the Republic of Madagascar is an island nation in the Indian Ocean off the south eastern coast of Africa. The main island is the fourth largest island in the world and was part of the French colonial empire from 1890 to 1960 when the current Republic of Madagascar became independent. It's from here that **Franck Pontabry F4DBJ** will operate again as **5R8HT** from Ivato until the November 28th where he will use the 3.5, 7, 14, 21 and 28MHz bands. The QSL route is via F4DBJ.

The Togolese Republic or Togo, is a country in West Africa bordered by Ghana to the west, Benin to the east and Burkina Faso to the north. It extends south to the Gulf of Guinea where the capital Lomé is located. The callsign **5V7TT** has been issued to the Italian team who will operate here between the October 10th to 23rd.

The Italian team plan to use s.s.b., c.w. and RTTY with three stations on all h.f. bands. More information and a band/mode survey can be found at **www.i2ysb.com** A dedicated forum to contact the pilot **Arturo D'aprile IK7JWY** is now up and running at **www.hamradioweb.org/forums** (QSL direct to I2YSB).

Finally, **Zrinko 'Zik' Zibert VE3ZIK** will be active once more as **9A/ VE3ZIK** from Bilice, Croatia until the September 27th. There will also possibly be several side trips to islands in the IOTA group EU-170 . The QSL route is via DO7ZZ while E-mail requests for bureau cards can be sent to **ve3zik@gmail.com**, *eQSL* and *LotW*.

Your Reports

On to your reports now and first news from **Tom Hutton G0HUT** and fellow members of the **Farnborough & District Radio Society** who enjoy participating in various contests throughout the year. A recent RSGB contest provided the G4FRS/P operators Peter M3OSP, Derek G3OFA, John G3KND, Fred 2E0BBY, Graham G3TJI and club President Colin G8BCO the chance to pitch their tents and set up a station on top of a hill at the Warren estate at Seale, Near Farnham in the 'next door' county of Surrey.

Using a Kenwood TS-2000E and 10W to a long wire antenna the club made over 180 c.w. QSOs on all the bands. The h.f. conditions were not brilliant but the weather stayed kind and a good time was had by all. For more information on the club and its latest activities visit **www.farnboroughradio.org.uk**/

In East Finchley, North London, the s.s.b. signals from **Martin Addison 2E0MCA** worked TM6OVE (France) on 3.5MHz at 0558. It's a special call marking operation 'Overlord' in June 1944 QSL (QSL via F4GAJ)

A move to 7MHz found slightly better conditions for Martin as he worked ON6WL/P (Belgium) 0538, TM3OPB (France) was worked at 0925 with a special call to mark the 30th Petit Balloon relay. Then came DL3SBA/P (Germany) 0940 on Burg (549m) in the North Rhine (Westfalia) SOTA DM/ NW-229, OE9KIDS (Austria) 1407. This was a special callsign during a childrens' day activities in OE9. Next came IB0CW at 2038UTC Ventotene Island EU-045 QSL via IZ8CLM. Martyn was using a running a Yaesu FT-2000 with a Heil Proset Plus and 50W to a G5RV.

Eric Masters G0KRT in Worcester Park, Surrey used a Yaesu FT-817 and ran just 1W to his home-brew modified W3EDP antenna 26m (84ft) long with counterpoises. He ended up working 7MHz c.w. stations S51DX (Slovenia) 0614, DK9OY (Germany) also QRP at 0914, PA1FRX (Netherlands) 1445, F8ALX (France) QRP at 2023 and OK2MKX (Czech Republic) QRP at 2037UTC.

The 14MHz Band

Eric also used higher power on the 14MHz band to find RK9JWC (Asiatic Russia) at 1610 followed later by K2MO (USA) in Kings Park, New York at 2321. He was using his Kenwood TS-570 and c.w. at 100W.

Later, Eric worked QRP stations DK6AJ (Germany) 0944, HA8LKM (Hungary) 1010, LA0CX (Norway) 1130, SM6EQO (Sweden) 1525 and RA4CQ (European Russia) 1544UTC. All made the log using the FT-817 – running just 1W.

On to **George Davis G3ICO** who lives in Mudford, Yeovil who said, "Hi Carl! You suggested that I try dropping my power from 10W to QRP levels for a while, with my 40m long doublet antenna and thought you would be interested in the results."

Well George tried several bands using both his Elecraft KX1 at 3W or K1 at 5W and listed TM9ES (France) 0921 QSL via F5GTW, OK1PL (Czech Republic) 0944, and DL1JEQ (Germany) at 1129. Then came RA1OGP (European Russia) 1225, SO1EKO/P (Poland) 1256. This call was Antoni Dyjas on his second trip to Portugal operating from a Special Protection Area called 'Bobolickie jeziora' SPFF-331 (QSL via DL1EKO). Next came LY600QT (Lithuania) 2029, EO2FFF (Ukraine) 2048 QSL via UT2FA and Edmund Holt GM0WED in St. Ola, Orkney EU-009 at 2100UTC. The results weren't bad going at all –considering band conditions aren't at their best – and he was using QRP power levels with home constructed equipment!

On to the log of **Colin Godwin 2E0BSW** in Malvern, Worcestershire who worked s.s.b. stations YL7X (Latvia) 1720 the contest call of YL2LY (QSL direct only), then came UP2L

The YL7X QSL – who was worked by Colin 2E0BSW on 14MHz s.s.b.

The QSL from YU9DX– who was worked by Martyn M3VAM on 14MHz s.s.b.

The GM4SSA QSL – he was worked by Martin 2E0MCA on 24MHz s.s.b.

(Kazakhstan) 2122 (QSL via UA9AB). Then came EA8CQS (Canary Islands) AF-004 at 2125, SQ6ODD (Portugal) 2136, F4ENK (France) 2140, EA4RCT (Spain) at 2145. This is the call of Radio Club EIT, based in the Universidad Politécnica de Madrid. Next into the log was II2TRE (Italy) 2153 a call celebrating the 30th anniversary of ARI club of Treviglio IQ2DN and ED9NA (Ceuta & Melilla) 2155UTC (QSL via EA9GW). All operations used an Icom IC-703 and 10W to a inverted G5RV antenna.

Also on the 14MHz band **Martyn Medcalf M3VAM** in Chelmsford, Essex using s.s.b. on his Yaesu FT-897 and Comet CHA-250BX. He worked OZ/G0GRC (Denmark) Alan Gibson on Fyn Island EU-172 at 0833 (QSL via G0RCI), DK2NE (Germany) 1412, YU9DX (Serbia) 1447 and LZ2LP (Bulgaria) at 2028UTC.

All Tom G0HUT's contact this month were on PSK31, who ran a Yaesu FT-450 at 30W to a Cobra 14MHz vertical antenna. He logged OZ1TMK/P (Denmark) EU-172 at 0939, 9A/DL7AFS (Croatia) 1039, PA100ROVER (Netherlands) a1132. This was a call celebrating 100 Years of Scouting in the Netherlands (QSL via PC2S).Then came HB9PP (Switzerland) 1321, TF3PPN (Iceland) EU-021 at 1406, EM700P (Ukraine) 1420, ES0OIC (Estonia) 1453 and LY700W (Lithuania) at 1515UTC.

Running another special event was **John Wakefield G0XIG** (based near Romsey, in Hampshire, as he operated **GB1SKT** South Knighton Telegraph in Devon. Conditions were described as "...generally were very poor and to add to the misery, the weather deteriorated into heavy rain and severe gales, resulting in me going QRT early. I made 367 s.s.b. contacts using my regular set up of a Yaesu FT-1000MP Mk5, ACOM 1000 amplifier and Comet H422 antenna in a 'V' configuration at 7m from ground in an east/west direction."

John continued, "This time I also installed WA2NAN's 'True-Talk G5RV' antenna in a north/south direction around twenty five feet from the ground and was able to operate on the 3.5, 7, 14 and 21MHz bands using 200-400W irrespective of the antenna."

John managed DL6NBR (Germany) 0724, 4X1DM (Israel) 0743, 9A9C (Croatia) 0746, LZ1CC (Bulgaria) 0758, 9H4CT (Malta) 0827 EU-023 on the island of Gozo. Then came HB9RDE (Switzerland) 0852, OZ3FS (Denmark) 0908 and K1UI (USA) 0952 in South Chatham, Massachusetts USA.

Next worked was LY1TR (Lithuania) 1214, VE1BB (Canada) 1234 in Still Water Lake, Nova Scotia, followed by ZS6BGH (South Africa) 1620, VP8LP (Falkland Islands) SA-002 at 1934 and 5B4YU (Cyprus) AS-004 at 2012UTC. John mentions that a special QSL card has been printed showing a model of the inside of the shutter telegraph as it was nearly 200 years ago – courtesy of the Royal Signals Museum at Blandford. (More information on the museum and its exhibits can be found at **www2.armynet.mod.uk/museums/royalsignals**/).

The 18, 21 & 24MHz Bands

George G3ICO was also involved in some /P activity on 18MHz when members of the Yeovil Amateur Radio Club (more details at **www.yeovil-arc.com/)** were invited to put on a demonstration station at 'The Noise' – a fete organised in a local park by the parish council of Brympton, which was once a village but is now part of Yeovil.

Using the Elecraft K2 and c.w. at 10W to a doublet 20 metres long George worked CT9/DJ0JE (Madeira Island) AF-014 at 1020, DL5ZP (Germany) 1021, OZ/DM4TJ (Denmark) on Bornholm Island EU-030 at 1226. Then came EW8O (Belarus) 1330, E73M (Bosnia & Herzegovina) at 1334 (QSL via E73Y OR K2PF), SP33ADS (Poland) at 1335. This was a special call marking the Burzyński Cup 2010 and Polish balloonist Zbigniew Burzyński (1902-1971) a pioneer/constructor of hot air balloons (QSL via SP5PSL). All were worked on the 18MHz band.

While 21MHz was not in great shape John GB1SKT made a few calls and eventually found 4O3A (Montenegro) at 1053, QSL via AI4U For USA & VE, UA3DX for Russia/CIS and YU1FW for everyone else, I3QET (Italy) 1109 and DL2SAO (Germany) 1121UTC all made the log.

The log of Eric G0KRT shows contacts with AN50UV (Spain) at 1523 using 100 watts s.s.b. while 24MHz provided a five watt c.w. contact with OK1LV (Czech Republic and a 100 watt s.s.b. chat with IK5ZPV (Italy) at 1457UTC while Martin 2E0MCA who was also operating on the band managed two stations, HB9MXY (Switzerland) 1501 and Hans Hassel GM4SSA on the Shetland Islands EU-012 at 1744UTC.

The 28MHz Band

There were odd openings on the 28MHz band and Colin 2E0BSW was pleased to work his first station here OP4K (Belgium) using s.s.b. again at 1415(QSL via ON4JZ). Meanwhile Eric G0KRT managed 100W contacts with 4X0A (Israel) 1333 using c.w. and also had s.s.b. contacts with IZ6BXV (Italy) 1957 and OM0AKW (Slovakia) at 2024 while Martin 2E0MCA worked HA3HK/P (Hungary) 0934 World Flora Fauna HAFF-010 and later C31PP (Andorra) 1734UTC.

Signing Off

Well that's it again for another month. My thanks to all our reporters and to **Maurio Pregliasco I1JQJ/KB2TJM** editor of the ***425 DX Newsletter*** for all the DX information. Until next month I wish you all good DX. 73.

Colin Redwood's

what next?

This month Colin Redwood G6MXL looks at techniques to erect the antenna and keep it erected safely!

Welcome to *What Next?* (*WN?*), where this month I'm looking at some techniques for mounting the v.h.f. and u.h.f. antennas that I discussed last time. I'll start by considering height above ground level.

Height really is important at v.h.f. and above, so that signals are not obstructed by local buildings and vegetation. The three techniques I will be discussing are mounting antennas on chimney stacks, wall-mounting and free-standing masts. These techniques are also applicable to some smaller h.f. antennas.

Chimney Mount Advantages

Chimney mounting can have advantages! This is because from the ground many very high frequency (v.h.f.) and ultra high frequency (u.h.f.) antennas appear to be similar in size to those used for terrestrial broadcast radio and television reception.

Radio Amateurs sometimes mount their antennas either using brackets attached to the walls of houses or on a chimney stack (**Fig. 1**). It's even possible to do this with a small high frequency (h.f.) beam. A chimney stack can also provide a useful support for a wire antenna for the h.f. or low frequency (l.f.) bands.

The advantage of mounting antennas on the chimney is that they are up in the clear and unlikely to provoke adverse reactions from neighbours – it's where most people have their television antennas! The disadvantages are that the antennas are at precisely the same height as the neighbours' television antennas and thus more prone to electromagnetic compatibility (EMC) issues, and that the antennas are not readily accessible for maintenance.

Safety Considerations

Safety considerations must be taken into account when working 'aloft'. Clambering around on a roof at chimney height is not something that everyone will feel comfortable doing! If you have any doubts, then I suggest getting your local specialist antenna contractor in to do the job. The good ones will already have some familiarity with Amateur Radio antennas and may be Radio Amateurs themselves. The type of job we're likely to offer them is the 'bread and butter' of a contractors business.

Wall Mounting

A good choice for a gable end is to use a pair of wall brackets to hold a vertical pole with an antenna system on the top. (**Fig. 2**). Make sure that the wall brackets are sufficient to get the pole clear of gutters. The two wall brackets should be well separated vertically (at least five courses of bricks as an absolute minimum, and at least a few courses of bricks below the top of the wall (**Fig. 3**). Make sure that the clamps and wall brackets are suitable for the diameter of the pole you are proposing to use.

Installing A Mast

If you decide that the chimney and wall brackets approach does not meet all your needs, inevitably thoughts will turn to masts. Installing a mast is not something to be taken lightly – they are certainly not cheap if bought new – but considerations need to be given to where to place a mast, planning permission, tilting arrangements, rotators, antennas, etc.

You'll need to consider how you will support the mast, and how you will tilt it over for maintenance work. There are a number of mast suppliers, including Tennamast who advertise in the Specialist Dealers section of *PW*. I strongly recommend looking at their web site and contacting them to get all the information you can before making a decision. (If you've entered the *PW* Tennamast Competition – the lucky winner should know he, or she, is by now).

Probably the most popular type of mast is one which can be tilted over for maintenance, and when vertical has one or more sections telescoped inside which allows the height to be increased. Tilting over ('luffing') needs to be done in a controlled manner, so that the mast and antennas do not come crashing to the ground. A longer mast, when it's luffed, the harder it is to control. This is why most tilt-over masts are telescoped in some way.

Mast Support

There are broadly two ways that masts are supported. One is to mount them close to a building and tilt them parallel to an outer wall or at 90° to the outer

Fig. 1: A compact 50MHz chimney-mounted Yagi antenna with a 145/433MHz dual-band omni-directional vertical. Note how the Yagi is mounted close to the rotator to minimise the strain on the rotator in high winds.

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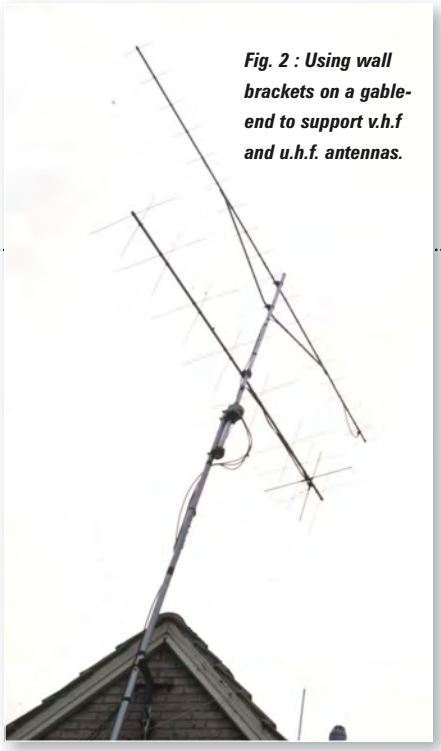

Fig. 2 : Using wall brackets on a gable-end to support v.h.f and u.h.f. antennas.

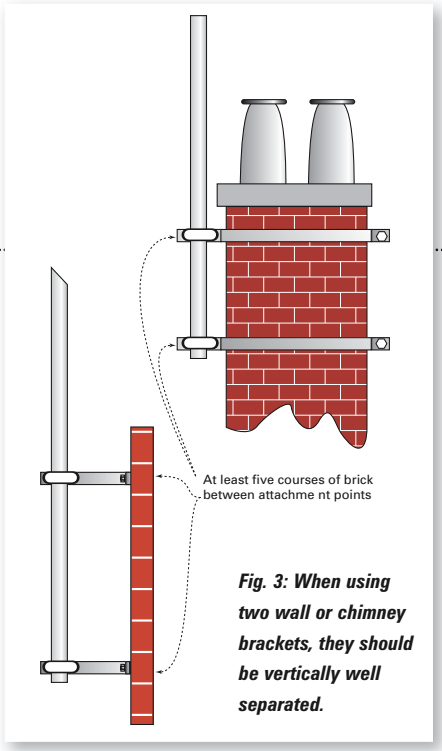

Fig. 3: When using two wall or chimney brackets, they should be vertically well separated.

wall. The mast is supported at the base and when vertical by some bracket arrangement on the building. The other is to mount the mast free-standing away from building with the base in a large block of concrete.

Which of the two options you choose may well be dictated by the particular circumstances of the property in question. If there's a choice, remember that the further away from the building the greater length of feeder will be needed, and at v.h.f. and above, feeder losses could become a significant factor. In contrast, the closer to the property the mast is located the greater the radio frequency (r.f.) fields and the potential for EMC problems to occur.

So, before considering the purchase of a proper mast, I suggest trying out the proposed location with a temporary arrangement. This could – perhaps – employ some aluminium scaffold poles or a portable mast.

Tilting Clearance

When tilting over a mast with a large antenna, bear in mind that the antenna will take up a lot of space near the ground. So you'll need to consider this in choosing where you site the mast.

If considering a mast close to a building, the clearances needed may prevent the mast being in the centre of a wall, unless you luff away from the wall rather than parallel to the wall. Even this may not be possible as many masts – when luffed – protude (quite a bit!) from the rear of the assembly.

We can all make mistakes and I remember when I put a mast up at a previous home, I forgot to consider a newly planted bush near the base of the mast – which was only 1m tall at the time. However, 20 years later the bush had grown to over 2m, and had to be pruned quite drastically in order to tilt the mast over (**Fig. 4**).

Having decided where you would like to locate the mast, you need to find a suitable mast. Contact the mast suppliers, and ideally visit them with a plan of your proposed location. Discuss the options available to you. Please also make sure that you get a full specification of the mast you are considering.

Ground Sleeve

One of the options available when buying a mast is a ground sleeve. In essence this means that the bottom post slides into a sleeve which is concreted into the ground rather than the post being concreted directly into the ground. So, if you're likely to move house, then a sleeve is certainly a good idea.

Planning Permission

Before you start the planning permission process, the **Radio Society of Great Britain** (RSGB) publish a really excellent booklet, which I can strongly recommend. It's available to RSGB members to download from the member's only part of their web-site.

A chat with the planning officer at your local town hall can certainly be recommended at this point as you are likely to need planning permission. You'll need to get them on your side if you possibly can! Explain what you want to do. Show them plans and show them photos.

In all your discussions with the

Fig. 4: When a mast is tilted over, it can take a lot of space. Vegetation growth also needs to be considered,

council officials describe your proposed mast as a mast and not a tower. The planners may suggest a slightly different location, which would make the mast less visually intrusive. If you hadn't considered this, I suggest that you take suggestion away and consider the implications.

Once you have got your ideas 'firmed up', it will be time to apply for planning permission. The council officials will have (no doubt) given you the necessary forms, etc. that you'll need to complete. They'll also want drawings and maps showing the proposed location.

One of the first actions that planning officials will take on receipt of your planning application will be to write to your neighbours, informing them of your application and giving them the chance to object. I therefore suggest discussing your proposal with neighbours before submitting the application.

Neighbours may have a preference on the location of the mast, which you can accommodate and turn them from objectors to supporters. At least you'll be able to demonstrate that you have minimised the visual impact of your proposal on your neighbours. Council planning officers will frequently want to impose conditions on any application that's granted and a common one is that the mast must be reduced in height when not in use.

Start Digging!

Having got planning permission, you can order the mast and while you're waiting for it to arrive, I suggest that you make a start on digging the hole to support the mast. For those not used to manual labour this can be hard work. The deeper you go, the harder it becomes! Lifting the soil out of a hole can really take its toll on a back if you are not used to this type of work.

Read the instructions and guidance that come with your mast carefully, it's frustrating if you have to remove freshly laid concrete for a problem that could have been avoided by reading the instructions!

It's quite likely that you'll need to make a hole roughly 1m x 1m that is 1m deep – quite a bit of digging!). I found a little digging each day was best and after a while you will get the hole to the size you require. (Be prepared for the spoil heap to look as there's much more soil than you originally dug out!).

When you get to the bottom of the hole, if the ground is soft (e.g. sandy soil), you may want to hammer some metal stakes into the bottom of the hole at 45°, so that they form metallic roots (**Fig. 5**). This will give some extra stability.

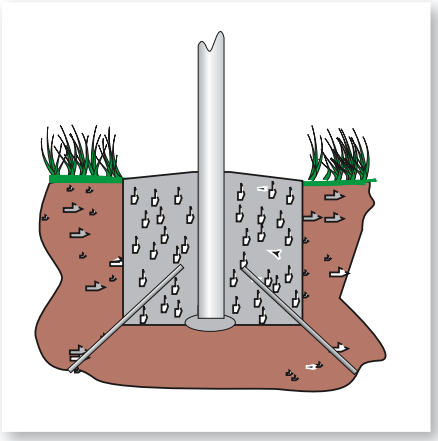

Fig. 5: Hammering some metal stakes into soft ground will form metallic roots for extra stability in soft ground.

Fig. 6: To keep the mast vertical while the concrete sets, Colin G6MXL tied string around the post in the form of guys to temporary stakes in the ground.

Whilst it can be very tempting to rush the preparations, once a cubic metre of concrete has set hard, you really don't want to have to remove it! (Hence my tip that you read the mast instructions very thoroughly!). To mix a cubic metre of concrete is a back-breaking task. I think it makes a lot of sense to arrange for a local company to deliver it pre-mixed, so that you just have to wheel barrow it from the road to the hole.

No matter whether you concrete the post directly or in a sleeve, it's absolutely essential that it is mounted vertically and that it remains vertical as the concrete sets. When I was installing my mast I tied string around the post in the form of guys to temporary stakes in the ground – to ensure that the post stayed where I wanted it as the concrete was poured (**Fig. 6**). It is a good idea to check that the post is vertical as the pouring starts and again a couple of times during the pouring.

Trying to move the post against a cubic metre of wet concrete is quite difficult – it's easier I think to check at every stage. Whilst a good spirit level will help, I found that checking the post is absolutely parallel with vertical walls of nearby buildings helpful.

Once all the concrete is poured, smooth it off, and make sure that it slopes away from the centre in all directions so that rain water doesn't collect and run into the hole if you are using a sleeve. There's no point in immersing your sleeve and mast in water when you don't need to! Then, after a final check that all is well, just leave the concrete to dry and harden off. Leaving it for a full week should be sufficient. In winter – don't forget protect the concrete from frost.

Assembling the mast is usually quite straightforward. Following the instructions, I needed few tools – just a couple of spanners. Make sure that you apply grease as instructed. Lifting the main mast on to the ground post will need at least three people, two to lift and one to insert the fulcrum bearing –obviously belonging to a club can help here as you'll have willing friends to help!

Very Heavy!

A tilt-over mast loaded with antennas and a rotator is very heavy. Initially, I suggest that practising tilting and telescoping are done without any antennas. Pay particular attention to the clamp that needs to be put in place before tilting the mast over.

The winch that comes with the mast will need to be locked in place and a ratchet on the winch will need to be released to lower and tilt the mast. Be very careful not to lose grip of the winch handle when you're using it. (I know of at least one Amateur who had his wrist broken by an out of control rotating winch handle). If you have young children who might have access to the mast, I suggest fitting extra pad-locked chains to prevent tampering.

Next month I will be looking at rotators and I suggest you wait and read next month's column before parting with your hard earned cash! This is because you also need to consider how you might mount a rotator when considering the mast. See you next time!

●

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

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Harry Leeming's

in the shop

Harry Leeming G3LLL looks back to his time in the Amateur Radio trade and shares some of his technical memories.

Welcome to *In The Shop* (*ITS*) where I'm remembering a particular problem that started with the question..... "Is the voltage correct?" It started when '**Derek**' had E-mailed me to say that he had a problem with the bias supply on his Yaesu FT-101, and he wondered as to what could be causing the –100V rail, to read just over –150V.

To try and find the answer, I told him that when a piece of equipment doesn't work properly one of the obvious things to do, is to go round checking a few voltages and see if any seem out of tolerance. However, with Yaesu equipment this can lead to confusion!

It seems that when Yaesu made their 'provisional development' drawings, they settled on 'voltage labels' as names for the various voltage supplies – just to identify them. Later, as the equipment developed into its final form, and was put into production, they retained these 'labels' such as '–100', '+8V' or '+6V' even though some voltages were altered. So, to put it mildly – this can cause problems!

When the FT-101 was developed early in the 1970s, the '–100V' line may possibly have been intended to carry this voltage, but on every model I've checked, the voltage is around –150V, and this is what it should be according to the list of voltages in Yaesu's service manual.

If you own an FT-757 (for example) and look at the block diagram of the rig, you'll find an '8V' supply which is derived from a stabiliser, and it is actually 8V. From this are derived the 'TX 8V' and an 'RX 8V' rail. Possibly at one time in the early development stages, it was planned to switch these supplies with relays, when they would have had the full 8V. Despite this, on all production models of the FT-757 they are actually switched by transistors. This results in a loss of voltage across the transistor, and so the 8V TX and RX rails have only 7.5V on them.

The conclusion must be – that when servicing Yaesu equipment – the answer is to refer to the voltages quoted in the **list of voltages in the service data**. You should not to go by the 'name' of the voltage rail.

The VFO '6 Volt' Supply

In the Yaesu FT-101E, there's a stabilised supply for the variable frequency oscillator, (v.f.o.), which is adjustable and labelled '6V' and all the early FT-101s had it set at this voltage. However, on later production units Yaesu started setting this at just over 6V and with some FT-101Es the performance of the receiver suffers. The transmit drive can also be reduced – if the adjustable '6V' supply rail is set at 6V as instructed in the manual. I've not found any reference to this in the service data, so I just set the voltage at around 6.5V or as low as it's possible to go without sacrificing performance!

The MFC6034A

I get quite a few E-mails asking where the MFC6034A integrated circuit (i.c.) can be obtained. The i.c. is a small regulator, used on the v.f.o. supply on some late FT-101Bs and early production FT-101Es. Unfortunately, they seem no longer to be easily available, and the answer is to use a 5V regulator i.c. and two or three diodes as per **Fig. 1**.

Depending on the characteristics of the silicon diodes used, the output voltage should be just over 6V. It can be adjusted suit the FT-101 in question by altering the number of diodes that are fitted.

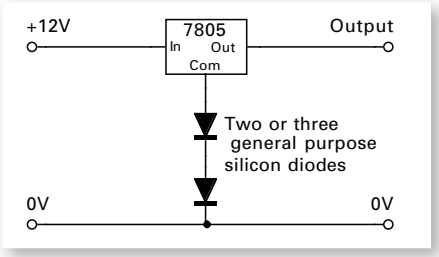

Fig. 1: Although nominally 6V the voltage on some FT-101Es needs to be somewhat higher so, use a 5V regulator i.c. and two or three diodes.

Too Cold To Start

You have probably noticed that equipment sometimes refuses to operate properly if it gets too cold and this often happens because an oscillator has failed to start. Normally, I just wait for things to warm up a little – and all will be well (I have a back that is a bit like this!) but with modern switch-mode power supplies, there's a danger.

'**Joe**' returned from his holidays, wanted to check his E-mails, switched on a rather cold computer and was greeted with a puff of smoke. The computer's switch-mode power supply unit (p.s.u.) had blown!

Switch-mode power supplies (s.m.p.s.u.s) chop the rectified mains input into pulses, then control the output voltage by adjusting the width of the pulses. This means that if the chopping oscillator fails to start (due, let's say, to a very low temperature) the p.s.u. can take one big 'gulp' of un-chopped input and destroy itself.

Electronic equipment is usually rated to operate over a range of temperatures and from time to time a few will be tested to see that they comply. However, it's not practical to test every item that leaves a factory at all extremes of temperature. So it's wise to try and keep equipment in an environment as near to normal room temperature as possible and not to switch on equipment containing a switch-mode p.s.u. if it is extremely cold.

Often, computer s.m.p.s.u.s come without the availability of a circuit diagram and a tendency to 'self destruct'. So, I think it's worth checking the rectifier diodes – but beyond that the big problem is that any fault seems to produce a chain reaction. This means that while you might find half a dozen blown components, you can be almost sure that if you replace them, some faulty item that you've not traced, will then blow all the new parts! Computer repair companies often consider

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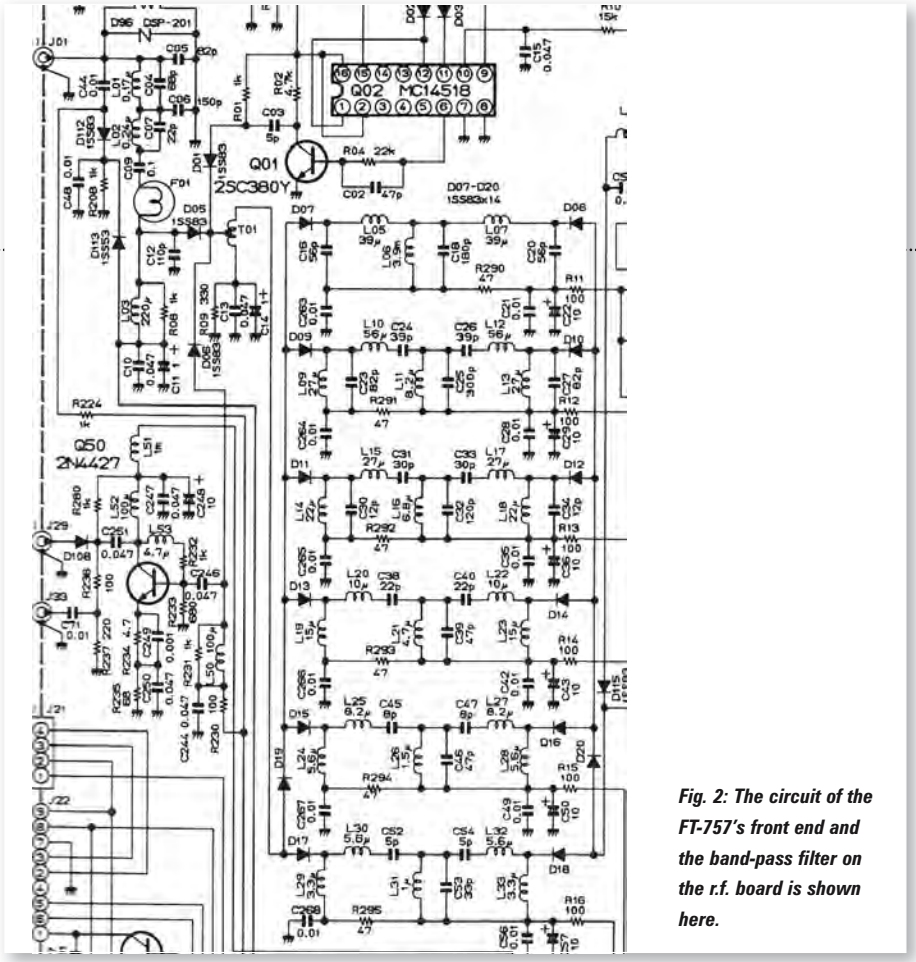

Fig. 2: The circuit of the FT-757's front end and the band-pass filter on the r.f. board is shown here.

that faulty switch-mode power supplies are 'throw away' items and I can well understand their attitude.

Editorial note: *Harry has suggested that an article – by someone who is thoroughly conversant with switched mode power supplies – would be of great interest to* PW *readers. Harry says that he would read it avidly himself! (Me too Harry!). I totally agree with the idea as I find this type of power supply to be a minefield of (my) misconceptions. Interested potential authors are invited to contact me at the office to discuss ideas.* ***G3XFD.***

The FT-757

The Yaesu FT-757 was the first solid state general coverage Yaesu high frequency (h.f.) transceiver that sold in large quantities. And, as I get quite a few enquiries about faults on this rig I'll discuss its most common troubles. But don't stop reading just because you don't have an FT-757, as similar faults occur in many more rigs.

When we first started selling the FT-757, it wasn't long before we started having complaints that users could hear their own voice in the built-in loudspeaker, that the squelch stopped working, and that that the receiver volume had to be turned down low during transmission or the rig 'howled'.

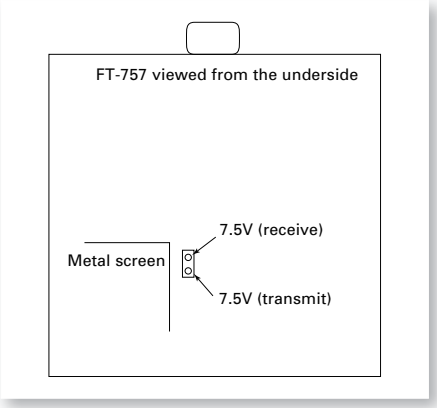

Fig. 3: Looking on the underside of the FT-757's main circuit board for the two test points for the RX and TX voltage lines, on a plug.

I 'phoned our supplier, and was told that somehow a voltage was leaking onto, either the receiver or the transmitter high tension (h.t.) rail when it shouldn't have been live. I was also told me that until they found out exactly as to what was going on – the 'cure' was to wire a resistor from the offending h.t. rail to chassis, to leak the voltage away.

The 'cure' worked, but then we received complaints that the receivers were excessively noisy! So, we returned a few units (which were still under guarantee) to the importers who then replaced the whole radio frequency (r.f.) board.

The circuit of the FT-757's front end and the band-pass filter on the r.f. board is shown in **Fig. 2**. And, as it will be seen, the band-pass filters are switched when changing bands by applying voltages to a large number of diodes. Diodes are also used to switch the signal path from transmit to receive and to bring into the marker oscillator into circuit.

Both the importer– **Amateur Electronics** in Birmingham – and ourselves thought that the fault must be caused by a 'leaky' diode, but tracing this diode was difficult as Yaesu had modified the board during production. One diode that proved to be troublesome wasn't on the layout diagram and was found tagged on underneath the circuit board. Checks with a meter showed that this was definitely 'leaky', but replacing it didn't completely cure the trouble.

I tried removing several diodes from the input side of the band-pass filters, and the transmit-receive input switching and found that some were leaky. Eventually, I decided that I was wasting my time trying to remove test and refit individual diodes and decided to swap the lot!

I removed about a dozen diodes and tested them all, nearly half were slightly leaky. I could have obtained the 'correct' replacements from the importers, but this seemed rather pointless, as I suspected that their voltage rating was not sufficient. The original diodes were high performance Schottky barrier types but – as I didn't have any of these with a higher voltage rating – as a temporary measure I tried replacing them with some cheap IN4148 switching diodes.

The rig then seemed to operate perfectly and so, I got a brand new FT-757 from stock and compared the

performance. I couldn't detect any difference and since then I have fitted the IN4148 diodes to many FT-757 rigs. The voltage rating of the IN4148 is much higher than the original diodes, and FT-757 rigs repaired using these diodes have proved to be reliable.

However, I did have a 'phone call from a customer who had been informed by a competitor – that "Harry has fitted the wrong diodes". So, I rang the competitor and asked him whether he wanted his rig to be reliable with the 'wrong diodes' – or unreliable with the correct ones. He quickly saw my point!

Noisy On Receive?

Does your FT-757 seems noisy on receive, have squelch problems, or you can hear your own voice in the speaker and, do you suspect that there might possibly be problems with the diodes? Unfortunately, as I've explained, removing them all and testing them one by one, only to find that they are all perfect, is rather making work. Fortunately though, there's a simple test that only requires the bottom of the rig to be removed and which, in 99%. of cases will give you a 'good' or 'bad' indication.

The underside of the FT-757's main circuit board is shown in **Fig. 3**, and the two test points, on a plug for the RX and TX h.t. lines, are also shown. When the rails are live they should have about +7.5V on them. But when they're not switched on – checking the TX rail while it's on receive, or the checking the RX rail when the push-to-talk (p.t.t.) is pressed – there should be a slight negative voltage present.

If there's not a negative voltage, or there's a slight positive one, then somewhere a diode is probably leaky! There's no point in trying to trace the offending diode – instead it's much easier to swap all those on the input side of the band-pass filters for IN4148s along with the the nearby diodes that switch the TX/RX paths.

Note: If a diode is mounted as an obvious factory modification under the board, be sure to make a drawing of its connections **before** you unsolder it! On the upper side of the circuit board, it's clearly marked with a square and a dot where each diode fits – but please note which way round the diodes go, before you remove them.

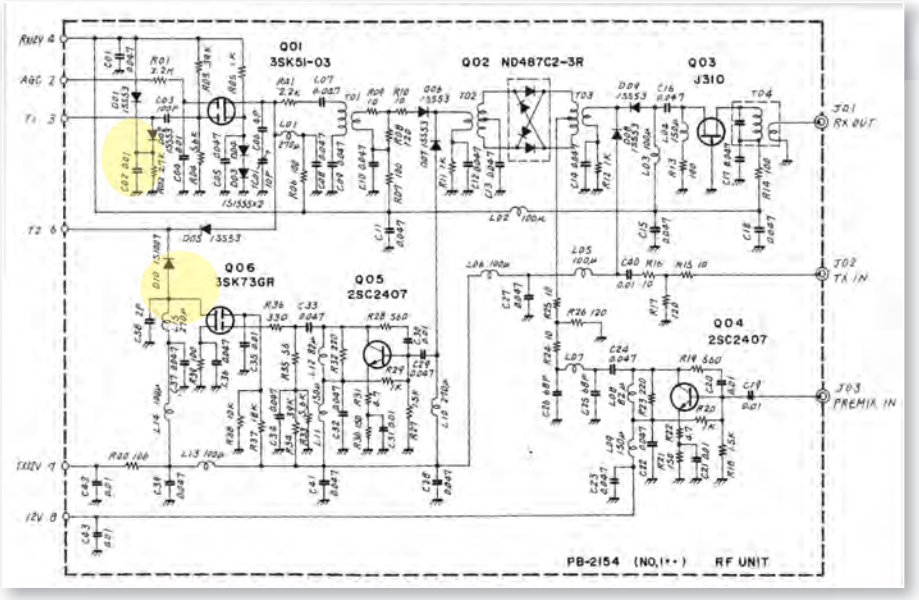

Fig. 4: The r.f. board on the FT-101ZD Mk3, note the diodes D01, D02, D05 and D10 (highlighted), which Harry discusses in text.

If you test the diodes afterwards with an ohmmeter, good diodes will be found to be open circuit with the test meter leads one way round and of low resistance when you reverse them. **Note:** Be careful not to touch the meter pods when you're doing the tests – otherwise you could end up measure your own conductivity and not the diodes'!

Diodes are used extensively for switching and they seem most prone to failure when they're close to the antenna input. The diagram, **Fig. 4**, shows the r.f. board on the FT-101ZD Mk3, where you can note the diodes D01, D02, D05 and D10. These all control the transmit-receive switching and I've had several of these rigs that had an excessively noisy receiver – due to one of these diodes having become leaky. Once again, IN4148 diodes seem to work perfectly and reliably.

If you have doubts about the noise level of the receive side of your h.f. equipment, it's not difficult to tell as to whether or not it's up to scratch without the need for elaborate test equipment. Try this simple test: Switch to 28MHz (10m) and peak up the pre-selector – the background hiss should then increase. Next, remove the antenna and the background hiss should reduce. However, if the background hiss doesn't reduce slightly when you remove the antenna – you should suspect a faulty diode or the r.f. stage field effect transistor (f.e.t.).

There Are Always Exceptions

'**Joe**' brought his FT-757 to me with the usual fault – so I swapped the diodes. But – a few months later – it was back with the same trouble, the TX/RX path switching diode D06 had failed! I replaced it, but a year later – back it came – another diode had gone. Obviously, something was blowing the IN4148s, but the chances of finding out what was actually causing the trouble seemed zero.

Yaesu have protected the receiver input of the FT-757 with a small pilot lamp fuse, and the fact that this was not blowing indicated that it was some kind of fast spike that was doing the damage. So, I 'phoned the importers service department and told them the story – but they had no ideas to offer. I eventually solved the problem but as I've run out of space you'll have to wait until next month for more details. See you then! ●

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).

Graham Hankin's

in vision

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Graham Hankins G8EMX drafts in 'a bit of help' to comment and question the future of Amateur Television.

Welcome to the world of Amateur TV, where this month I'm handing this month's *In Vision* over to **Bill Shepherd G0KPR**/ **PA3FDK** and **Trevor Brown G8CJS**, chairman of the British Amateur TV Club (BATC).

Bill and I famously (or infamously) posed some questions to Trevor at the club's annual meeting in 2009, because we felt that the club was neglecting the radio frequency (r.f.) side of ATV while promoting its on-line ATV streaming service. Bill and I have corresponded since that time and exchanged phone calls; he continues to feel passionately about many issues within the BATC and recently sent several questions by email for me to ask Trevor to answer via *In Vision*.

First Question

Bill's first question was about ATV contests began: "Published in *CQTV* 229 Feb 2010 were the results of the latest IARU ATV Contest. On examination it showed that 34 Dutch stations took part in contrast to five UK stations – despite the Netherlands having a much smaller Amateur Radio community. Noteworthy also was the fact that one Dutch amateur accumulated 3579 points with 70cm analogue TV. What can streaming by the BATC do to address the discrepancy in contest participation and to encourage on-air ATV in general?"

Trevor replied: "The BATC streaming site was set up to help ATV enthusiasts, one such application is 'look through', by being able to monitor the ATV repeaters you can use it to see your transmission and make adjustments. Remember, not all ATV operators have enough roof space to install an additional antenna for 'look through'. The live streaming of events has allowed people to see events they could not attend and the text even allows them to ask questions.

"If you missed a live programme it can often be found in the film Archive. The RSGB news can be seen at a time convenient to you. I hope the streamer has a wider appeal than the UK, for example, **Richard Carden VK4XRL** (Brisbane, Australia) was able to watch live the lectures at the recent BATC meeting in June noise free via the streamer."

Lecture Stream

Continuing, Bill then commented on the Lecture Stream at this year's BATC Bienniel General Meeting saying: "The programme at the BGM meeting concerned itself almost entirely with Digital ATV, streaming and 3D. This appears unbalanced since issues such as encouraging new participation, on-air content and generating local groups, etc., seem to be overlooked – is there a reason for this?"

Trevor responded: "We always try to push the frontiers at the BATC meetings, hence the look at 3D and compression. Anyone that wanted to come along and deliver a lecture at the meeting on whatever subject was more than welcome, nobody was turned away. The new technology camp just seem to want to turn up and and explain what they are doing."

Bill's third point concerned the future, if any, of analogue ATV on 70cm: "Although analogue ATV on 70cm requires bandwidth, in many areas of the country it's still viable without embarrassing others so long as adequate monitoring of the band beforehand and noting satellite pass times, so that they can be avoided. In the future when, digital on 70cm drops out, the facility of continuing on analogue would be still an option."

Trevor answered: "I am not aware of problems satellite communications, I understand that lots of ATV enthusiasts like using analogue. Whether or not that is an informed choice or not, i.e., they have tried DATV and returned, or just don't like change, I have no data, but BATC is a 'broad church' and support for all level of ATV technology exists amongst our members."

Bill's final question asked why there is no mention of ATV in the RSGB's exhibition trailer GB3FUN: "The RSGB has been successful, yet ATV still does not appear on the GB4FUN trailer despite it only requiring a dedicated BATC DVD suited to the younger radio enthusiast. Why hasn't the BATC taken this opportunity to recruit new interest and membership by producing a DVD?"

Trevor answered this one by, again, referring to the streaming service: "Carlos (**Carlos Eavis G0AKI**, the manager of GB3FUN) has always maintained that all equipment for the vehicle had been donated by the various special interest groups concerned. That must include the 'Hat cam' transmitter and the 23cm ATV receiver donated by the BATC."

"I hope it has amused the school children who've used it and gave a fun insight into ATV. If we had a DVD then would it not get better exposure in the Streamer Film Library, where it could be viewed on line anytime anywhere in the world not just when GB4FUN visits? Live ATV is more interesting and interactive and would be a better use of GB4FUN's limited space."

Summing Up To G8EMX

Trevor 'summed up' his position by saying to me (G8EMX): "Graham, I read your column and understand your concerns over streaming, but everyone must be allowed to enjoy the aspects of the hobby that they prefer, and not be 'press ganged' into r.f. transmission by closing the streamer. You cannot un-invent technology, if the BATC had not taken the lead by providing the site at no cost to members, then somebody else would have put a site together – but the BATC would not then be leading it."

I thanked Trevor for the time and trouble taken to reply, and he then concluded by saying: "I have tried to answer the questions you forwarded, and I hope it helps to explain some of the logic behind what we are trying to achieve within BATC."

So there we are In Vision readers! Do you, have any comments to make on this 'exchange of views'? ATV news, analogue or digital, on any band? If so, please write – they're always welcome!

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YAESU VR5000 absolute mint condition. Fitted DSP, very little use, boxed with handbook, psu etc. Reason for sale: past test and wish to purchase Tx/Rx. £300 ovno, plus postage. Tel: (01903) 859712 anytime (West Sussex).

60+ Xtals job lot from S120 to 150 + Jcom ones. Offers or WHY. Tel: (07976) 612641 (Clacton-on-Sea).

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).

EXCHANGE

SWAP YAESU FILTER XF-119SN fits FT-895 + FT-897 for amplifier RM-ICL144 2mtr filter value, £109 or twin needle meter or WHY. Tel: (07976) 612641 (Clacton-on-Sea).

Please make any cheques or Postal Orders for Bargain Basement advertisments payable to PW Publishing Ltd.

Bargain Basement order form

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B.B. Oct '10

TRADERS TABLE

The equipment for sale on this page is secondhand or ex-demonstration

Disclaimer

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NEVADA

023-9231 3090

TRANSCEIVERS

ALINCO DJ596 D/BAND H/HELD £89
ALINCO DJC7 HANDHELD TX £99
ALINCO DJV17 VHF/FM H/HELD £99
ALINCO DR635 D/BAND MOBILE £179
KENWOOD TS570D TRANSCEIVER £570
YAESU FT1802 2M MOBILE TRANS £119
YAESU FT60 5W TWINBAND H/H £149
YAESU FT8800M D/BAND TRANSCEIVER £219
YAESU HX280E MARINE HANDHELD £79

HANDHELD SCANNERS

ALINCO DJX2 AM/FM/WFM RADIO £79
BEARCAT 72XLT H/HELD £80
ICOM R5 HANDHELD SCANNER £145
RADIOSHACK PRO 82 HANDHELD £39

RECEIVERS

ETON MINI 300 PORTABLE £13
YAESU VR5000 WITH DSP £399

PMR/LPD RADIOS

INTEK MT5050 PMR446/LPD H/HELD £59

ACCESSORIES

ALINCO EJ47U DIGITAL BOARD £46
JIM M75 SCANNER PREAMPLIFIER £54
KENWOOD MC85 MICROPHONE £79
MFJ 969 ATU £119
SADELTA BRAVO PLUS BASE MIC £45
TOYO SA450 ANTENNA SWITCH £17
UNIROSS CHARGER & BATTERIES £12
YAESU MH35A2B SPEAKER MIC £19

B-GRADE ITEMS

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BEARCAT 72XLT HANDHELD SCANNER £89
GRE PSR214 DESKTOP SCANNER £59
ICOM R5 HANDHELD SCANNER £179
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
MIDLAND 38 MOBILE CB RADIO £49
TEAM ROADCOMM MOBILE CB RADIO £89
YAESU VX8 HANDHELD TRIBAND TX £279

SHORTWAVE SHOP LTD

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TRANCEIVERS

KENWOOD TS-870 ..... £825
KENWOOD TS-711 ..... £400
KENWOOD TS-440S HF £425
RCI – 2950 10mtrs Multimode £125
ICOM IC-756 HF/50 ..... £695
ICOM IC-M401Euro Marine £90
ALINCO DJ-V5 ..... £200
ALINCO DJ-195 ..... £100
ALINCO DJ-S11 ..... £75
ICOM PMR 446x2Water Resist/w.charg £200
MIDLAND CB 77-250K £50
MIDLAND CB 77-805UK £55
MAXON ALERT 7E CB £65
STANDARD HX260E Marine H/H New £99

RECEIVERS

ICOM IC-R8500 COMMS RX £695
ICOM IC-R72 ..... £325
RCA AR-88 With Matching Spkr ..... £POA
YUPITERU MVT 7100 ..... £135
YUPITERU MVT 7300 ..... £99
LOWE HF 125 with Keypad £150
LOWE HF 225 with Keypad £325
GRE PSR 275 ..... £45
UNIDEN UBC-800XLT Ex Demo/software £265
BEARCAT UBC-278 BASE Ex Demo £139
REALISTIC PRO 2042 Base ..... ££129
REALISTIC PRO 34 ..... £55
REALISTIC PRO 50 ..... £25
REALISTIC DX 394 HF Rx £85
AMI DIGI SAT RX ASR WS201 ..... £129
ALINCO DJX3 ..... £70
WORLD RECEIVER WR2100 ..... £80
GOODMANS GCD200 DAB Special Price £50
BPL WORLD SPACE £25

ACCESSORIES

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Air Ministry 1940 Straight Key £45
Military Straight Key Circa 1940 ..... £35
BHI NEIM 1031 ..... £55
BHI NOISE AWAY ANEM £55
ICOM AH7000 DISCONE £85
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ICOM HS-51 Special Bulk Price £29
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AKD WA3 ABS Wave Meter £25
AEA PK-88 PACKET CONTROLLER £35
WATSON W20SM PSU £55
WATSON W25AM PSU £75
WATSON HUNTER Freq Counter £50
CG SB-2000 DATA CONTROLLER £75
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DAIWA PS-304 30A PSU £65
ZETAGI HP1000 SWR METER £65
MFJ 948 TUNER £75
MFJ 1278B DATA CONTROLLER 65
KENWOOD MC-80 ..... £70
MFJ 986 3k TUNER £185
WELZ SP-220 SWR/PWR METER £65
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LOWE FX-1 GDO Complete £125
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WATERS & STANTON

01702 206835

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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
Eton	E1100	Compact Portable AM, FM stereo & 10 Shortwave Bands Receiver + Clock	£25
Alinco	DJ-X7E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 1000Ch + 8.33kHz step	£115
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
Microset	RV-45	2m 3-15W in, 45W(Max) out SSB / CW / FM Linear	£89
Icom	IC-718	HF SSB,AM,CW Transceiver with Gen.Cov. 100W 12V	£399
Optoelectronics	Model-2810	10Hz-3GHz Frequency Counter	£145
Yaesu	FC-707	3.5-30MHz 150W ATU with Dummy load	£109
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	£149
Microset	PT-105A	12V 5A (max) Protected Stabilized PSU	£29
Microset	PR-145A	2M 100Watt Version 16db Gain -0.9db NF	£79
Microset	PT-107	12V Stabilized 7A PSU	£39
Kenwood	TH-77E	2m/70cm FM H/Held Full Duplex Transceiver + Sp. Mic & Cigar Lead	£89
Kenwood	BC-10	Desk Charger for PB-5, 6, 7 & 8 Ni-Cd's with PB-6	£29
Ampere	APB-82A	2m Linear Amplifier 144-148MHz 10W in, 80W out 12V DC	£59
Roberts	R-861	Portable 150kHz-30MHz SSB , FM stereo RDS	£139
MFJ	MFJ-9320W	20m CW QRP 1W Transceiver Assembled 12V	£95
Maplin	XM19V	Regulated 13.8V output powersupply	£39
Microset	VUR-30	2m & 70cm 1-6W in, 20/30W out Max FM + GaAsFET Pre-amp	£179
Moonraker	FA-5000	80ch 4w UK/CEPT CB Mobile Transceiver	£49
Global	AT-2000	150kHz-30MHz SWL ATU with Q selector	£69
WT Key	No2 MKIII	M.O.D Army Key	£25
	Moorse Prac	Home Made Morse practice oscillator	£10
MAAS	KLS-120	Mobile Communications speaker with filter	£6
	1.1Balun	1.1 Balun	£5
Alinco	DJ-180	2m FM H/Held Transceiver	£69
Alinco	DR-435E	70cm Fm mobile radio transciver 35W	£119
Alinco	DR-M06	6m FM Mobile Transceiver 10W	£99
Icom	IC-2100H	2m FM Mobile Transceiver 55W 113ch. + CTCSS	£89
Yaesu	FC-20	1.8-30,50-54MHz Auto ATU 100W 50ohm	£129
Uniden	BR-330T	0.1-1300MHz (with gaps) AM, FM, WFM Hand Held Receiver 2500Ch. Alpha-tag + Close Call & TrunkTracker III	£119
Timewave	DSP-59	Multi-mode Audio Noise Filter with Gain Control 12V DC	£89
AirNav Systems	Radarbox	Real-time Aircraft Virtual Radar using ADS-B + Internet Networking via USB	£249
Yaesu	VX-7R-BK	6m,2m,70cm FM "Black" Transceiver 5W, Full CTCSS, Wide RX & WIRES + CD-15 charger & Sp. Mic	£219
Kenwood	TH-G71E	2m,70cm FM Palm Held Transceiver with CTCSS & Wide RX	£119
MFJ	MFJ-931	Artificial Ground	£69
Hi Mound	HK-706	Standard Straight Morse Key + Cover	£39
Watson	CX-201	0-1GHz 2-Way Coax Switch with SO-239 1kW	£12
Kenwood	AT-130	7.1-30MHz 150W Compact ATU with meter	£99
Icom	IC-R75	30kHz-60MHz All Mode Communications Receiver 12V with psu	£399
Yaesu	MD-200A8X	Deluxe Studio Quality Dynamic Desk Mic with VSP Control & Up/Down	£139
Yaesu	FT-857	HF,6m,2m,70cm All Mode Transceiver + Gen.Cov.RX 12V	£299
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Alinco	DX-70	HF,6m All Mode Mobile/Base Transceiver with Gen.Cov. & CTCSS 100W (10W 6m) 12V	£249
Yaesu	FT-920	HF, 6m SSB, AM, CW Base Transceiver with Gen.Cov. 100W 12v	£725
Yupiteru	MVT-7100	100kHz-1650MHz All Mode Hand Held Receiver 1000Ch.	£129
AOR	ARD-2	ACARS / NAVTEX Decoder with display	£215
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RADIOWORLD

01922 414796

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Icom AT-150 Auto antenna tuning unit	£169.00
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ICOM IC-2200H 144–146	£189.00
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Icom IC-740 HF Transceiver	£389.00
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Icom IC-910H 2m/70cms base 100w	£999.00
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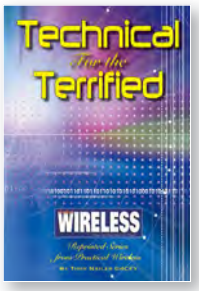

NEW!

TECHNICAL FOR THE TERRIFIED

This book started out as a series of articles by Tony Nailer G4CFY in *Practical Wireless* aimed at introducing the more technical aspects of the hobby to readers who, unnecessarily perhaps, felt that it was beyond them. It is aimed at bridging the gap between basic understanding, as gathered by students of the Intermediate and Advanced Radio Amateur courses and other – more project-based articles. Aimed at the less-experienced radio enthusiast, the articles are of a general nature, written to remove the fear of technology/techniques and theory.
As Tony says, when it gets technical, there's no need to panic!
New, easy-to-read design, spiral bound, 124 pages, £12.99.

AIRWAVES 2010

There have been a variety of changes to AIRWAVES since 2009. Quite a number of Military Discrete frequencies have been added, plus many existing frequencies have been reconfirmed. Further changes are likely in 2010, as it appears that the top of the Military Airband from 380 - 400 MHz will be handed over to the emergency services to increase the frequency management capability for the London Olympics. Some frequencies have already been moved out of this band recently, including three at Brize Norton. Seven London Military (East) frequencies have been moved to Scottish Military, which has been split into North and South areas and expanded. Manchester Area Control has closed and has been relocated to the Scottish Centre. All Upper Airways have been withdrawn from Shannon Control and the Oceanic Transition areas, leaving just Reporting Points, including many new ones.

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CALLSIGN 2010

The Military callsign database has surprisingly seen over 260 new callsign's or callsign ranges added to the text in the past year. The database contains just over 2000 Military callsign's, of which a large percentage have been confirmed in 2008 - 2010. Almost all of the entries in the Civil database have been cross checked against a variety of sources and also confirmed by our readers personal monitoring. The Airline world still remains uncertain with a number ceasing operations. However a number of new Airlines have started operations in the past year, with others planned for 2010

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£10.99

NEW MILITARY AIRCRAFT MARKINGS 2010
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AIR TRAFFIC CONTROL HANDBOOK

The complete guide for all aviation and air band enthusiasts.
This is a reincarnation of the Air Band Radio Handbook, an essential reference book first published over 20 years ago and a strong seller throughout its eight editions. The new title reflects not just the extent of overhaul and updating that has occurred for this new version, but also the fact that a larger proportion of the audience these days comprises air traffic controllers themselves (both trainees and fully qualified) as well as the traditional air band listening enthusiast. The expert author's accessible and comprehensive text explains the intricacies of air traffic control and its jargon, enabling the reader to locate and interpret what is actually going on in the airways overhead.

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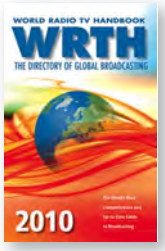

WORLD RADIO TV HANDBOOK 2010 EDITION

The 64th edition of the best selling directory of global broadcasting on LW, MW, SW and FM.
The Features section has a stimulating introduction to the art of FM DXing, reviews of the latest equipment and a fascinating account of visits to five All India Radio stations.

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and much more!

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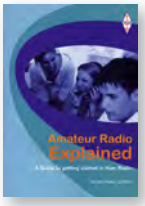

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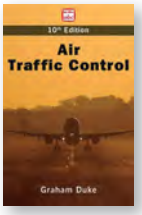

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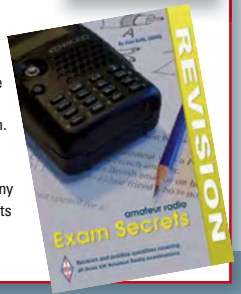

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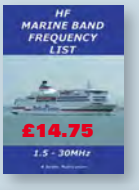

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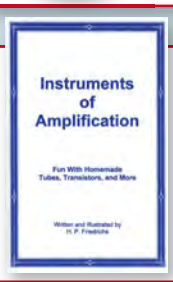

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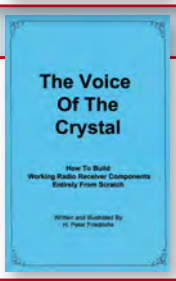

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Rob Mannion's

topical talk

This month the Editor discusses further points regarding possible legal problems for mobile operators and recent feed-back and suggestions from readers.

The (rather depressing perhaps!) letter from **Mark Garton G8WJY** (*Letters* this month) raises yet another possible problem for Radio Amateurs who operate in a mobile situation. However, even though I'm just as concerned about the possibilities as Mark is, I must say that we would be extremely unlucky indeed to meet a Police Officer prepared to report us when we're operating a car that's stationary – perhaps in an official lay-by or other parking area.

Despite the unlikely event of meeting an over-zealous Police Officer, whenever I'm 'parked up' and on the air, I ensure that my ignition key is withdrawn from the switch – making it clear that the vehicle is not 'under command' so to speak. I do this to try and remove any opportunity to attract the attention of such people because I know of occasions when drivers (who were eventually convicted for offences other than the specific charge under discussion) were considered to 'in charge of the vehicle' just because the ignition keys were actually in the steering column lock – ready to start the engine.

Obviously, as I know very little about the fiendishly complicated law in the UK (particularly the law involved in motoring) I cannot say with conviction (forgive the deliberate pun) that we could be considered to be breaking the law by sitting in our cars with the keys in the ignition lock. However, I do know that my own car's locking system will 'lock' the steering system efficiently when the key is removed. But, I think that only a professional legally qualified person could use that information in my defence if I fell foul of the law!

As I'm Editor of *PW* (and consider myself a sensible type) I feel that I must set a good example by avoiding hand-held microphones when actually 'mobile'. Another reason is that – if I take my left hand off the steering wheel – I'm actually driving with 'no hands'! But joking apart, whenever I'm operating portable I do my utmost to avoid any accusation of 'driving without due care and attention'.

For example, if I need to give my auxiliary battery a quick charge – I stop radio activities (if I'm adjacent/near a road) until I switch the engine off again. Then I take the keys out with two objects in mind; reducing problems of radio frequency (r.f.) problems to the vehicle central computer when I transmit, and to avoid any legal problems.

Whenever we drive our cars we enter a dense legal minefield and it's extremely easy to fall foul of road traffic law. So, my advice is that we all try to act sensibly – if you have to actually **operate** your equipment while on the move – I strongly recommend a complete 'hands free' system. However, even then there could be situations where we could get into trouble! With our complex legal system we need the commonsense, a little luck (avoiding an over zealous Police Officer) and also be prepared to fight our case. Belonging to a motoring organisation is helpful here!

Shack Of The Month?

Ken Mayne GI4FLG (*Letters* this month) has posed an interesting little idea – similar to the popular *Other Man's Station* (not so many ladies in our hobby those days!) in *The Short Wave Magazine* (Now *Radio User*). It was an interesting feature and I always enjoyed it. Unfortunately, I know from experience (this is the 'but' from my comment below Ken's letter) it's going to be difficult to get willing 'victims'. Even Ken appears to be a reluctant volunteer!

Despite trying hard – with some kid glove style diplomacy – I'm even finding it difficult to encourage some much admired Radio Amateurs to feature in our *Amateur Radio Personality* series. So, you can perhaps imagine it will be (as it actually is) just as difficult to persuade our camera shy friends to feature their shack. (If I received £1 for every Amateur Radio operator with their back to the camera I'd be a very rich Editor!). So dear friends – how about some volunteers for Ken's suggestion? We're ready and waiting for your story and photos!

Rob Mannion G3XFD/EI5IW

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