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Icom IC-E91
Reviewed
Brand New Icom Dual-Bander

Icom IC-7000
On Test
HF/VHF/UHF Transceiver

The Poundbury SSB Generator
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80m - 70cm
Plugs into FT-817ND
Tunes in seconds
Telescopic whip
Superb Engineering

£99.95 C Rated up to 10 Watts, 80m - 70cm, it plugs directly into the SO-239 antenna socket. Even works without a ground plane radial. Whip telescopes to approx 1.5m. Use with any rig up to 10W output. Single knob tune and low VSWR anywhere in range

New Miracle Free-Style Adaptor

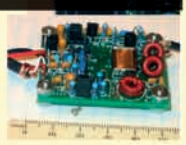
£15.95 A

Now use the Miracle Whip off the radio. You get magnetic mount, Miracle whip adaptor and 33ft radial attachment. Use on desk, car roof, anywhere! Improved radiation efficiency - great performance!

NEW SoftRock V6

80m / 40m Receiver
SSB CW AM inc Software

NEW



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

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Fits all handhelds & Mobiles in ANY Car!

Flexible Goose Neck
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- Adjustable spring grip holder
- Holder rotates 360 degrees
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NEW

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

- *Tx:144 - 146MHz, 430 - 440MHz*
- *FM, NFM, AM & GMSK (4.8kbps voice)*
- *5 / 5W, 500 / 500mW*
- *Wideband Rx 0.495MHz - 999.990MHz*
- *Memories 1304 with Alpha Tags*

£249.95 C

FUJIKON NOISE CANCELLING HEADPHONES

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

FUJIKON NC-2 **£19.95 A**

FUJIKON NC-4 **£24.95 A**

NEW

ICOM IC-7000

160m - 70cm
Up to 100W
(HF-6m) Digital Filtering

£999 D

6" External TFT Screen
£49.95 with built-in TV -
when purchased at same time as IC-7000 radio.

Check out www.wsplc.com
Code: TFT-7000
Normally £99.95

Icom HF Transceivers

ICOM IC-756 PRO III

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

£2099 D

IC-7800 £6400 D
Icom Flagship HF 200W transceiver. 200W max.

IC-7800-PACK £6995 D
As above plus 17" flat screen, keyboard & SM-20 mic

IC-7400 £1279 D
HF/VHF 160m-2m 5-100W. SSB CW FM AM. 12V DC.

IC-706 MkIIGDSP £769 D
160m - 70cm (up to 100W HF) Detachable head.

IC-718 £449 D
Quality budget class radio HF 160 - 10m

IC-703 *Lower Price* £449 D
160 - 6m of pure QRP joy!! 10W Max

Going HF Mobile?

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

Kenwood HF Transceivers

KENWOOD TS-2000

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

New Lower Price **£1295 D**

TS-2000X *Lower Price* £1779 D
Take the TS-2000 and add a superb 23cm module.

TS-B2000 £1469 D
HF - 70cm with PC software for direct PC control.

TS-570DG £799 E
Superb Budget Radio 100W from 160m to 10m.

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

PW Reader Offer

TS-480HX £799 D
200 Watts 160m - 6m

Get this 45 Amp Supply for £99, when purchased at same time as TS-480HX.

Yaesu HF Transceivers

YAESU FT-857

SPECIAL OFFER!
160m-70cm with up to 100W output, Multi-Mode HF/VHF/UHF Transceiver. With built-in electronic keyer and detachable front.
FREE YSK-857 Seperation Kit AND/OR ATAS-120 Active Tuning Antenna for £189

£579 D

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

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

FT-840 £399 D
One of our all-time best sellers. 100W 160m - 10m

SPECIAL OFFER!

FT-817ND £429 D
Up to 5W output 160m - 70cm. UK warranty.

FT-817bhiDSP £539 D
FT-817ND with fitted bhi DSP module.

Free YF-122C CW Filter with FT-817 while stocks last

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

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Freephone Orderline 08000 73 73 88

Icom
VHF/UHF Mobile/Base

ICOM IC-E208
LIMITED OFFER

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

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

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

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

Kenwood
VHF/UHF Mobile/Base

KENWOOD TMD-700E

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

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

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

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

Yaesu
VHF/UHF Mobile/Base

YAESU FT-7800E *SPECIAL OFFER*

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

FT-2800M *LOW PRICE* **£129 D**
*2m FM Mobile transceiver *High power 65W *Capable of VHF wideband receiver

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

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

FT-1802E **£129 C**
*2m FM Mobile with up to 50W RF Output

Icom
VHF/UHF Handhelds

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

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

IC-E90 *Limited Offer* **£194 C**
6m / 2m / 70cm handheld transceiver

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

IC-E7 *NEW* **£169 C**
New 2m / 70cm handy wide RX

Kenwood
VHF/UHF Handhelds

KENWOOD TH-F7E

• 144-146MHz Tx/Rx: FM
• 430-440MHz Tx/Rx: FM
Up to 6W out with Li-ion battery and **"scanner" style coverage from 100kHz to 1300MHz** including SSB on receive! This is a great radio to have at all times when you are on your travels.
£189 C

TH-D7E *Low Price* **£249 C**
2m/70cm dualband FM handheld transceiver with data communications

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

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

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

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

Yaesu
VHF/UHF Handhelds

YAESU VX-7R
LIMITED SPECIAL OFFER

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

VX-6E 2m/70cm 5W. **£189 C**

FT-60E *LIMITED OFFER* **£159 C**
2m/70cm 5W Handheld

VX-2E 2m/70cms min **£115 C**

VX-110 2m handheld **£94 C**

Alinco
VHF/UHF Handhelds

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

DJ-V5E *Lower Price* **£159 C**
2m/70cm FM 5W dualband handheld transceiver

DJ-193E *Lower Price* **£91 C**
2m FM transceiver no keypad, Ni-Cds & charger

DJ-195E *Lower Price* **£99 C**
2m FM transceiver with keypad Ni-Cds & charger

DJ-C7E **£124 C**
2m/70cm credit size FM handheld

W3FF
NEW Mini Buddipole

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

£189 D
Order as W3-MBP

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

SGC
HF Linear Amplifiers

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

Yaesu
HF Linear Amplifiers

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

Watson
Mobile Antennas

ANTENNAS

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

BASES

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

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

WATSON
Low Noise PSUs

WATSON W-25SM

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

£79.95 C

NEW STOCK & OFFERS

YAESU VX-120 & VX-170 *NEW*

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

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

£99.95 C **£109.95 C**

YAESU FT-DX9000D *NEW*

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

bhi
DSP Equipment

bhi NES10-2 MkII

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

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

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

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

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

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

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

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

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

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

WATSON
WM-S Hands Free

WATSON WM-S

Stay legal. Flexible boom microphone mounts under sun visor. PTT box mounts on gear changer. All powered from rig mic socket! **Includes detachable lead to match your radio.**

£39.95 C

To check compatibility, download PDF "WM-S Compatibility" in leaflets section of www.wsplc.com

FT-897D SPECIAL!

FT-897D	£649
FP-30U Internal PSU	£199.95
Total	£848.95

FOR JUST £749.95!

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

ALL FOR JUST £849.95!

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

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Enquiries 01702 206835
www.wsplc.com

Software Defined Transceivers

Flex Radio USA

This transceiver outperforms hardware designs that cost three times the price!

Software Defined Radio is the future. I am sold on it and so will you be. No, it is not like controlling your XYZ radio by computer. SDR transfers most of your radios circuitry into the PC - even SSB generation - offering ultra linear processing and unprecedented circuit stability. A £1000 SDR radio would cost you at least £5000 in hardware form. And it is more reliable with FREE updates via the Internet! No more cash outlays to get the latest version! I have never experienced the performance I am getting from the SDR-1000. It is awesome with its extremely low noise receiver, IF filter shape factors never before achieved, 99dB dynamic range, and transmit and receive audio quality impossible to obtain from analogue designs. I can even record 96kHz chunks of RF spectrum for later analysis and tuning - great for weak signal tests etc. You also get so many extras including live spectrum display, wave display and other tests equipment. **Peter Waters. G3OJV.**

Try it for FREE! Send us two first class stamps and we will send you a full software kit with manuals and an 80m wave file so you can actually run the receiver section live. You will be able to tune around the 80m band, receive signals, try different filters, IF shift, AGC settings, noise reduction, different tuning steps etc. Yes REALLY!

What the Reviewers say:

Practical Wireless
"I've not heard filter performance like this on any rig"

Monitoring Monthly:
"will extract weak and difficult signals where others fail"

ARRL QST:
"third order IMD is up there with the best radio we have ever measured."

RSGB Radcom:
"selectivity - I have never achieved this on any other radio except perhaps the TenTec Orion. - the receiver performance rates with the very best - more and more radios will engineered in this way in the future - the available features and functions is awsome and comparable to top end radios and more"

For more quotes and full reviews, please check out www.flex-radio.com

Key Specifications

Rx - 12kHz to 65MHz
Tx - 1.8MHz to 52MHz (Ham)
Power - 1W - 100W (500mW 6m)
IMD - 99dB
MDS - 130dBm (14MHz 500Hz)
Modes - SSB CW AM FM

*Realtime Panadapter
*Click on Spectrum Display Tune
*Filter shape factors 1.05:1
*No ring filters down to 25Hz
*AGC after brick wall filter
*Graphic Equaliser & Compander
*Variable bandwidth Tx filter
*Iambic Memory Keyer

Prices

SDR-1000 100 Watts	£995.00	**Delta-44** Soundcard	£99.00
SDR-1000 1 Watt	£649.00	**VFO Knob**	£59.00
SDR-1000 Receiver	£649.00	**Shuttle Knob**	£99.00
Auto ATU	£199.00	**Soundcard leads**	£24.95
		PC speaker adaptor lead	£4.95

Software Defined Receivers

The Soft Option!

Win Radio

Unmatched in value and performance

Choose either PCI version or external cased model

Software included

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

Software is included and requires Windows 98 or later with PC speed 500MHz or above.

Choose from internal PCI slot module or external module.

"i" = internal model
"e" = external model

WR-G303 Features

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

Specification

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

WR-G305 Features

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

Specification

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

WR-G313 Features

Real-time spectrum analyser; IF Shift & Notch Filter; 2nd IF totally SDR; IF spectrum record, USB connection; 3 scan modes; S-meter reading S-points - dBm or uV; Triple AGC speeds or manual; Extensive memory feature; Dual real-time spectrum scopes; Noise Blanker; Test & Measure features; Bandwidths variable 1Hz - 15kHz; 600 Ohms line output; SSB sens. typically: 0.25uV; AM Sens: 0.9uV.

Specification

Mode: AM AMS SSB DSB ISB CW NFM
Tuning steps: 1Hz **Image reject**: >70dB
IP3: +8.5dBm@20kHz **MDS**: -135dBm
Phase Noise: -148 dBc/Hz @ 100kHz
RSSI Accurate: 2dB **RSSI Sensitivity:** 1uV
Dynamic Range: 95dB
Scan Speed: 40chs per sec
IFs: 45MHz; 16kHz **Stability:** 0.5 ppm 0-60C
Antenna: 50 Ohm. **Supply:** 12VDC Unit or PCI

WR-G315 Features

Real-time spectrum analyser; IF Shift & Notch Filter, 2nd IF totally SDR; IF spectrum record, USB connection; 3 scan modes; S-meter reading S-points - dBm or uV; Dual Loop variable speed AGC; Manual IF gain; Unlimited memory; Audio filter: Dual real-time spectrum scopes; Multifunction squelch; Nise Blanker; Bandwidths of: variable 1Hz - 15kHz; SSB sens. typically: 0.25uV; FM Sens: 0.5uV.

Specification

Mode: AM AMS SSB DSB ISB CW NFM
Tuning steps: 1Hz **Image reject**: 60dB typical
IP3: 0dBm@20kHz **MDS**: -135dBm
Phase Noise: -148 dBc/Hz @ 100kHz
RSSI Accurate: 5dB **RSSI Sensitivity:** 1uV
Dynamic Range: 90dB
Squelch: Level, noise, voice, CTCSS, DCS
Scan Speed: 500chs per sec @1kHz steps
IFs: 109.65 MHz;12kHz **Stability:** 0.5 ppm 0-60C
Antenna: 50 Ohm. **Supply:** 12V DC or PCI

Prices

WR-G303i	HF PCI module	£385.95	**WR-G313e**	HF External USB	£809.95
WR-G303e	HF External USB	£454.95	**WR-G3133e180**	HF External USB	£999.95
WR-G305i WFM	HF-UHF PCI module	£469.95	**WR-G315i WFM**	HF-UHF PCI module	£1499.95
WR-G305e WFM	HF-UHF External USB	£539.95	**WR-G315e WFM**	HF-UHF External USB	£1699.95
WR-G313i	HF PCI module	£699.95	**WR-PDO**	Pro demod software	£69.95
WE-G313i 180	HF PCI module	£869.95	**WR-DNC3300**	3300MHz down converter	£174.95

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

august 2006 contents

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Cover subject

It's an Icom bonanza this month as we have two reviews on the latest rigs. **Richard G0RSN** enjoyed the E91 experience, while Carl **GW0VSW** found that the '7000 did almost everything except make the tea!

Design: Steve Hunt
Photographs: Courtesy of Icom UK Ltd.

features

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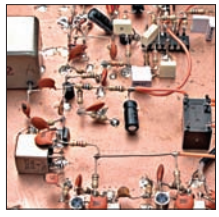
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regulars

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rob mannion's keylines

Rob Mannion G3XFD

Modern specialised publishing, of necessity, runs to tight deadlines nowadays and even tighter financial constraints. As time goes by, the facilities provided by our essential computers improve almost day-by-day if you can afford the improvements!

So, invariably, because of the efficient electronics and demands of the business, modern publishing is carried out with very few staff. It's amazing to think now, with so few of us in the office, that prior to the Second World War in the days of hot metal type and engravings for circuit diagrams, that the *PW* staff numbered over 70 people!

With fewer staff to assist in administration, the running of the popular ***Practical Wireless* & Kenwood Electronics (UK) Club Spotlight** magazine competition, became a great concern for me. This is because every moment away from my work of preparing the magazine, meant that I had to pedal faster to catch up. Unfortunately, this led to the Club Spotlight magazine administration falling by the wayside, much to the disappointment of everyone involved. However, despite the past difficulties, I'm delighted to announce we've found a way of being able to run the Spotlight competition once again.

David Barlow & Elaine Richards

The opportunity to re-launch the Club Spotlight magazine competition came about recently, thanks to an impromptu meeting between **David Barlow G3PLE**, **Elaine Richards G4LFM** and myself, at the **Royal National Lifeboat Institution** (RNLI) in Poole, here in Dorset. The opportunity came directly because PW Publishing Ltd. had a stand at the **Radio Officers Association** AGM at the RNLI.

During the brief time I was able to attend, David G3PLE (the Spotlight Contest was his idea originally) told me how concerned he was that the competition was not taking place. He then came up with a brain wave - suggesting that *PW* and our sister publication *RadioUser* magazine, edited by Elaine G4LFM could join forces. The wider radio subject coverage of *RU* could be to great benefit, perhaps bringing in more varied club magazines associated with the radio hobby.

Elaine and I thought David's idea was superb. I got to work soon afterwards, contacting the various adjudicators. Incidentally, during the brief meeting, it was thought a good idea to minimise the number of adjudicators, to reduce the amount of posting and postage required with adjudicators spread over the UK

The results of the suggestion now mean that there will be three adjudicators; David G3PLE, Elaine G4LFM and myself. **Dave Wilkins G5HY** of Kenwood UK will of course remain as the main sponsor. Here in the office, **Tex Swann G1TEX**, has kindly offered to assist me with his opinions when we both think it's necessary, due to his very active participation in the Poole Club!

In future, I will be directly responsible for the receipt of adjudication material, dispatch and liaison with the other adjudicators. Together, the Spotlight Contest team think we'll make the running of the contest much simpler and more enjoyable for everyone. I hope to make an announcement regarding the re-launch date soon and where the eventual winner's presentation will take place.

Articles For Publication

As many intending authors know, we far prefer them to have the information provided by our *Authors Guide*, so that they can help us, and themselves when preparing an article for *PW*. The *Guide* is regularly updated and authors can request a copy when they contact me to discuss article ideas.

Additionally, there's also a *Guide for Constructional Articles* under way. Tex G1TEX and I are working together on this guide, to help you prepare the article, together with the necessary drawings and photographs. We really do need more constructional articles, the new guide is aimed at encouraging keen constructors to share their experience! Don't forget though, although they provide essential reading, the guides are not meant to intimidate authors! Instead they are aimed at helping everyone involved enjoy having their work published in *PW*. You provide the ideas and we'll work with you to publish them in the best possible fashion.

Finally, I invite readers with ideas to contact me, as I'll be working on the 'framework' for 2007 very soon. And so I can make the process work smoothly, please provide a stamped addressed postcard, so I can immediately acknowledge receipt of your proposals/synopsis or completed article.

When a decision regarding the acceptance of your article has been made you will also receive final correspondence confirming whether or not we can use the article, or guidance, along with a *PW* File Number for reference. Good luck to you and get busy building and writing for 2007!

Rob G3XFD

practical wireless services

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

Subscriptions

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

Components For *PW* Projects

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

Photocopies & Back Issues

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

Placing An Order

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

Technical Help

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

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

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

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

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amateur radio waves

Speech Difficulties On The Air

● **Dear Rob**
Since first becoming licensed as **M3OVL** back in March 2005, I've become a regular reader of *PW* and find your letters pages very absorbing. The current edition (June 2006) is no different.

To **Peter Lewis MI0RTX**, I would say the following: I have spoken to several Amateurs over the past year who have a speech difficulty and I admire the way in which such people do not let their problems deter them from taking part in an excellent hobby. To begin with, I was convinced that the stations had a technical problem effecting the modulation, until one of them explained his difficulties.

I have since tried very hard to take the time to have a good QSO with operators who have a speech impediment. However, as I operate mostly mobile, the background noise can make this a very difficult task. As a result I often feel embarrassed, having to constantly ask for repeats, knowing full well the difficulty faced at the 'other end'. Despite this, I do politely persist and in any event, there's absolutely no excuse for bad manners.

I'm also writing regarding **Mike Hall** and his comments concerning M3s and power. My reply to this is that with a lot of power you can work virtually anyone without problems. However, many M3s have to rely on good antennas to get their 'fingers on a juicy bit of DX' with just 10W.

I must also say that it's nice to hear on-air discussions (mostly on 144MHz f.m.) between experienced Amateurs discussing the merits of various antennas with M3 operators. When I started, I was fortunate to be loaned a tri-band driven element (QTH restrictions meant a full 3-element h.f. Yagi was not an option). This gave me my first real insight into DX. I worked all of Europe, USA, Canada and South America on 5W from my FT-817, although the Far East and VK land have still eluded me!

However, I was delighted to work my first ZL very recently, using 50W (I now have a M0 call) and a WHF 20 mobile whip mounted on my lorry. I'm not sure if it's jealousy or annoyance when I hear stations using more than 500W splattering all over a band, but such activities often ruin a nice evening playing radio. Long live QRP Amateur Radio for the environmentally aware!

Finally, I would also like to comment on the letter, from **Ray Howes G4OWY**, regarding h.f. contesting. I should also say that I enjoy contests on both h.f. and v.h.f., but I have to agree that something needs to be done urgently to put limits on the band segments used in contests, and this applies to all modes.

The only way forward that I can see is with the active input of the **International Amateur Radio Union** (IARU). Thanks for reading my ramblings. 73.
Jon Hirst M0OVL

Amateur Radio needs more people with your attitudes Jon! Good luck to you in the hobby. **Editor**

Delayed Echoes - Mystery Solved?

● **Dear Rob**
In the July 2006 *PW*, I was interested by **Andy Foad G0FTD**'s letter 'Long Delay Echo Mystery Solved?', and your own comments in the Topical Talk column.

I'm writing, however, because I feel it necessary to clarify that what Andy and yourself were discussing are ordinary echoes and not Long Delayed echoes (LDEs), which appear to be a phenomena that has not been satisfactorily explained since they were first observed in about 1927. If anyone is interested, entering 'define: Long delayed echoes' in the Google search engine, will reveal a wealth of information on the Web about LDEs. One such URL is:
http://heim.ifi.uio.no/~sverre/LDE/

Actual LDEs are echoes that cannot be explained or attributed to the normal effects of propagation. Some people are convinced they are the result of alien activities and didn't someone actually claim to have heard the RMS *Titanic's* distress calls some time after the 1912 disaster?

Ordinary echoes are simply the result of signals propagating around the Earth one or more times. Each transit around the globe takes about 135mS. They are not really echoes, they are just called that because they sound like echoes. Nor are they delayed, they go as fast as they can, as do any radio waves!

Andy's findings regarding the Grey-Line might well be significant and may invoke others to investigate that aspect. However, propagation predicting software cannot be completely reliable as there are so many dynamic parameters to be predicted correctly.

As you said yourself Rob, in Topical Talk, vertical antennas are more likely to produce echoes, due to their low radiation angles. Other antenna configurations, even those with predominantly high radiation angles, may also have low angle components and - with good conditions - can produce echoes.

While operating in Malta as ZB1BX, my tri-band cubical-quad antenna regularly produced good 'echoes'. This is because a cubical-quad is effectively two stacked, 2-element Yagis and gives useful low angle radiation, even at low antenna heights.

Currently at **Newhaven Fort**, the **Worthing Radio Club's** Radio Museum station **GB2NFM**, frequently gets the strongest echoes I've ever heard on various DX bands, from its 3.5MHz (80m) doublet. This antenna is about 40m above sea level (a.s.l.), on top of the south coast cliffs. It runs east-west but at some points is only three or four metres above the cliff-top ground.

I agree that strong echoes can be disconcerting and interfere with reception on s.s.b. and c.w. Sending a Morse letter 'I' with a returned echoed dot appended, sounds as it's an 'S'. Very off-putting! I'm sure anyone who arrives at a real explanation of LDEs will stand to make a lot of money.
Denzil Roden G3KXF
Sompting
West Sussex

I stand corrected Denzil! It's a fascinating subject and I thank you for raising the interest further. **Editor**

Serious Radio Sport?

● **Dear Rob**
I recently came upon a quote from George Orwell; *"Serious sport has nothing to do with fair play. It is bound up with hatred, jealousy, boastfulness, and disregard of all the rules"*.

My contact with contesters over recent years has made me think - for 'sport' insert 'Amateur Radio contesting'. I just hope that this is not typical. It certainly didn't seem to be years ago when I used to help out on National Field Days (NFD). But now it's about big money as well.
Steve Cole G3YOL
Winscombe
Somerset

Wireless - Not Radio!

● **Dear Rob**
The **Rev. George Dobbs G3RJV** (writing in the July *PW* Carrying On The Practical Way), has done a valuable service in reminding us that originally the science and our activity was as 'wireless'.

If we had kept to the wireless term, instead of taking on board the Americanism of 'radio' there

probably would be less of the hype and hysteria we read in the national and local newspapers of the alleged dangers of the emissions from wireless masts. Clearly the protesters know nothing about, nor the difference between, ionising and non-ionising radiations. Wireless in all its shapes and forms has been with us now for 120 years and in that time there has not been one example of any harm to a living person from wireless emissions. You only have to look at the total number of carcinomas for example in *Whittaker's Almanac*) to see that there has been no significant increase in their occurrence over the last few years.

The obvious procedure would be to investigate those who have worked in a wireless environment with high power levels, whether in wireless or radar, to see if their lives have been affected. If anything, the opposite effect seems more prevalent. Several of my colleagues who have worked in wireless or satellite stations are still alive beyond the normal expectation of life.

I would imagine that the power density at ground level from some of the high powered TV stations would be in the same 'ball-park' as that from a Tetra transmitter, yet, if all other possible causes are eliminated, we don't hear of clusters of ill health in their locations. Statistically, on that basis, and if the Emley Moor (near Huddersfield) is anything to go by, there is a greater chance of a mast falling down than anyone becoming ill from the wireless emissions.

Of course, there's no chance of convincing the ignorant that there is no danger from Tetra masts when many Radio Amateurs are using higher powers on much the same order of frequencies. A local woman (responding to a letter I wrote to a local paper about a mast in a nearby village), said "He might know a lot about electromagnetic waves but he doesn't know anything about magnetic fields". (I refrained from further comment and didn't tell her we all lived in one!). Another protester said in the same paper that "it emits pulses". Whatever that may mean - it would be a strange transmitter that didn't.

And so it goes on, all because we prefer the term 'radio' to 'wireless'!
Stan Brown G4LU
Oswestry
Shropshire

I'll start 'radiating' my reply on this subject in this month's Topical Talk Stan! Please join me on page 65.
Editor

Closure of UK Ionosonde Stations

● **Dear Rob**
I'm writing to you regarding the impending closure of UK Ionosondes at Chilton (UK) and Port Stanley in the Falkland Islands. The UK's **Particle Physics and Astronomy Research Council** (PPARC) has decided to withdraw funding from the UK Ionosondes Programme. **The Rutherford Appleton Laboratory (RAL)** currently operates ionosondes at Chilton in Oxfordshire, and as already mentioned, at Port Stanley.

A notice on the website of The Ionospheric Monitoring Group based at RAL, states that both stations will close within three months of 30 June 2006, unless alternative funding can be found.

Ionosondes, or ionospheric sounders, send pulses of r.f. energy over a range of frequencies in the h.f. spectrum, straight up into the ionosphere. Received echoes are recorded and then analysed to provide important information about the height and concentration of the ionospheric layers that influence radio propagation. The Chilton ionosonde is important as it continues an unbroken sequence of ionospheric recording which began at Slough in 1931. The data from Chilton is of particular interest to those Radio Amateurs who are interested in near-vertical incidence skywave (NVIS) propagation. The website **http://www.ukssdc.ac.uk/ionosondes/ionosondes.html** will provide more information. I hope you publish this letter and help publicise the impending closures.
Philip Cadman G4JCP
Dudley
West Midlands,

This problem has also been worrying me Phil! Thanks for flagging it up in PW, please join me in the Topical Talk column, on page, 65, where I will air my own views! **Editor**

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

amateur radio rallies

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

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

July 16
McMichael Amateur Radio & Car Boot Rally
Website: **www.radarc.org**
The McMichael Amateur Radio and car boot Rally is being held at Reading Rugby Football Club, Sonning Lane, Sonning, Near Reading RG4 6ST. There will be Special interest groups, McMichael Radio display, Talk-in station (**GB6MMR**), indoor area, large car boot, bar and food.

July 29
Rugby Amateur Transmitting Society Rally
Contact: **T.M. Humphries G0OLS**
Tel: **(01455) 552519**
Email: **thumph3426@aol.com**
The Rugby Amateur Transmitting Society will be holding their rally at Stanford Hall, Lutterworth, Leicestershire LE17 4TR. Doors open at 1000 hours until 1600 hours. For more information contact G0OLS (details above).

July 30
Horncastle Rally
Contact: **Tony Nightingale G3ZPU**
Tel: **(01507) 527835**
E-mail: **Tony@radioman.e7even.com** or **g3zpu@hotmail.com**
The summer Horncastle Rally will take place at the Horncastle Youth Centre in the centre of Horncastle at Willow Road, Cagthorpe, Horncastle, Lincolnshire LN9 6HW. Door open at 1030 for visitors and traders will be able to get access at 0800. The cost to traders will be £4 per table or similar space outside. Power is free but bring long extension leads! There will be the usual Horncastle Bacon Butties, as well as other snacks available. All the rally is on one level and full facilities are available for wheelchair users.

July 30
Colchester AR & Computer Rally
Contact: **James M0ZZO**
Tel: **(01255) 242748**
E-mai: **cra2006@m0zzo.com**
The Colchester Amateur Radio and Computer Rally takes place at the St. Helena School, Sheepen Road, Colchester CO3 3LE. Gates open 0930 (Traders from 0730). Indoor Traders and Car Boot, Waters & Stanton, IOTA Station, Refreshments, ISWL and Talk-in on 145.550MHz.

August 13
Flight Refuelling ARS Rally
Contact: **Mike M0MJS**
Tel: **(01202) 883479.**
The annual Flight Refuelling Amateur Radio Society Rally will be held at Flight Refuelling Sports and Social Club, Merley, Wimborne BH15 4JU. All the usual traders, stalls, car boot and refreshments will be on-site.

August 27
Milton Keynes ARS Annual Rally
Contact: **Mike G3LFR**
Tel: **(07973) 264473**
E-mail: **rally@bletchley.net**
Website: **www.mkars.org.uk**
The Milton Keynes Amateur Radio Society Annual Rally will take place at a **new** venue for 2006 - Holne Chase Primary School, Buckingham Road, Bletchley, Milton Keynes MK3 5HP. The rally opens at 1000, with trading closing at 1600. Talk-in will be on 145.550MHz. The rally location is a five minute walk from Bletchley Park (well worth a visit).

August 28
Huntingdonshire ARS Rally
Contact: **Peter Herbert M5ABN**
Tel: **(01480) 457347** between 1800 - 2200
E-mail: **peter.m5abn@btinternet.com**
Website: **http://www.hunts-hams.co.uk/**
The Huntingdonshire Amateur Radio Society will be holding their annual bank holiday Monday rally at Ernulf Community School, Barford Road, Eynesbury, St. Neots PE19 2SH (near Tesco Superstore on A428). Doors open at 1000, admission £1.50. Hall and boot sale on hard standing, Talk-in on S22. Hot and cold refreshments will be available.

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

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

W&S Open Day

The **Waters & Stanton** team have informed the *PW* Newdesk that their Open Day on Sunday 28 May was, once again, a big success. In support of the event, representatives from **Yaesu, Kenwood** and **Icom** set-up stalls in the marquee and were on-hand to answer questions and to chat to visitors attending the event.

The Radio Society of Great Britain (RSGB) also had a presence with their **GB4FUN** vehicle running demonstrations throughout the day. A charity raffle was also held to raise money for Fairhavens Children Hospice, which raised £90.

All-in-all, a good day was had by all who attended and W& S are now looking forward to next year!

Introducing PROCOM UK

The PROCOM A/S concern is a Danish-based company, originally founded in January 1980, that develops and manufactures antennas, filters and accessories for professional and amateur use. **PROCOM UK Sales Ltd.**, operating from Herne Bay in Kent, were recently appointed as distributor of Procom products in the UK.

From Herne Bay, PROCOM UK Sales Ltd., will be supplying the complete range of communication equipment suitable for use with cellular, PMR, Tetra, Marine ground-to-air, radio navigation, satellite, emergency equipment and Amateur Radio. The Procom team aim to maintain, and hopefully improve, the reputation of the renowned Procom range of products.

For more information contact:
Gill Neighbour
PROCOM UK Sales Ltd.
Unit 9. Western Industrial Estate
Sea Street. Herne Bay
Kent CT6 8JZ
Tel: (01227) 743099
E-mail: sales @procomuk.co.uk
Website: www.procomuk.co.uk

Yeovil ARC Celebrates

The Yeovil Amateur Radio club celebrated its 60th Anniversary with an operations day at Eggardon Hill on 4 June. The club was supported by **Blackmore Vale Amateur Radio Society** and **South Dorset Radio Society**. A total of six stations were in operation during the day. The station had an array of antennas, which helped the Yeovil club members make over 100 contacts, on what was, the hottest day of the year so far.

Scarborough's Summer of Special Events

The **Scarborough Special Events Group** will start their series of summer special events by airing **GB4SSE** over the weekend of 22-23rd July. The Scarborough *Spa Express* is an established summer steam excursion train running between York and Scarborough, which has been hauled by the *Flying Scotsman* for the past two years. This world-famous steam locomotive (now nationally owned and based at the National Railway Mueum in York) is now undergoing a two year overhaul and will be replaced during the 2006 season by three 'giants of steam', the *Lord Nelson*, *Sir Lamiel* and *Green Arrow* locomotives. Each souvenir QSL card issued will feature one of the four locomotives.

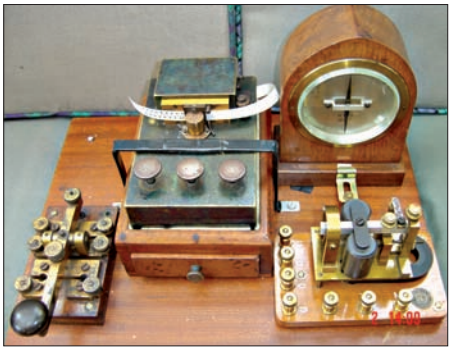
For more information on this event contact:
Roy Clayton G4SSH
9 Green Island
Irton
Scarborough YO12 4RN
Tel: (01723) 862924

Bob Heil K9EID Honoured

A new exhibition at the **Rock and Roll Hall of Fame** in Cleveland USA, will honour the extraordinary work of legendary sound engineer and Radio Amateur, **Bob Heil K9EID**. Bob was responsible for designing the pioneering sound equipment used by many of the biggest rock music acts of the 1970s, including The Eagles, The Grateful Dead and The Who. Bob's rise to fame in musical circles began one night in 1970 when the Grateful Dead arrived for a concert in St. Louis without any sound equipment. Bob came to the rescue, supplying the band with a public address (p.a.) system from his Ye Olde Music Shoppe in Marissa. The band was so impressed by the quality of the system that they took it on tour with them!

Later, Bob was asked to design a custom quadraphonic mixing board for The Who's 1974 Quadrophenia tour. However, perhaps his most famous invention was The Talk Box, a device that allowed guitarists to manipulate sound using their mouths. The Talk Box was used by **Joe Walsh** of The Eagles – also a Radio Amateur – during the legendary Mississippi River Festival in the 1970s. The Talk Box forms the centrepiece of the exhibition at the Rock and Roll Hall of Fame. Today, Bob continues to work in the music business through his company Heil Sound, which also supplies Amateur Radio equipment. *Congratulations from everyone on PW Bob!* **Editor**

Radio Museum at Sandford Mill



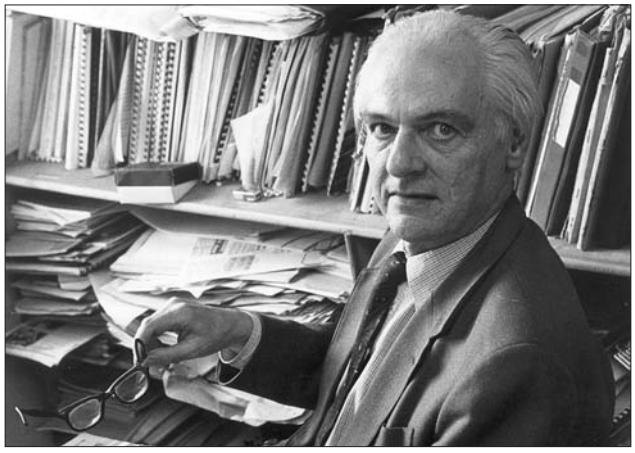
Just one of the many exhibits on display at the Sandford Mill Radio Museum. From left to right: An early German Morse Key, a hand operated tape punch, an early Galvanometer and a Telegraph Line Relay.

The Sandford Mill Radio Museum used International Marconi Day (IMD) on 22nd April to open its doors for the first time this year and to celebrate Marconi's birthday. In 2005, **Dr Geoff Bowles** (Keeper of the Museum), in a bid to attract new visitors, started to redecorate the interior of the Writtle Hut and with the aid of volunteers the interior of one of the rooms was cleaned up. The walls were then painted in the original colours using authentic materials. It has now been completely transformed and there are two painted topical backdrops, which can be viewed through the rear windows. With the addition of velvet drapes, the room now looks just like a 1920s sitting room.

The museum will be open again on Sunday afternoons during August and for the Science Discovery Day on Sunday 24 September. For more details contact:

Sandford Mill Museum
Sandford Mill Road
Springfield
Chelmsford
Essex
CM2 6NY
Tel: (01245) 475498

Pat Hawker G3VA Awarded the MBE!



Rob Mannion G3XFD, pays tribute to **Pat Hawker G3VA**, whose dedication to the Amateur Radio service has at last been fully recognised by the award of an MBE in the recent Queen's Birthday Honours Lists.

Rob G3XFD writes: The news that Pat G3VA's work on behalf of Radio Amateurs and the hobby in general had been recognised came as a particular delight to me. During the 1970s and early 1980s, I had the pleasure of working under Pat who (as a very senior colleague) was one of the most prominent and valued journalists/technical writers working in the much lamented Independent Broadcasting Authority (IBA). This organisation (formerly the ITA) successfully ran the Independent Television service in the UK before becoming 'privatised'.

Pat G3VA is perhaps most famous for his flagship series Technical Topics in *Radio Communication* magazine (*RadCom*) the monthly journal of the Radio Society of Great Britain since 1958. Never one to blow his own trumpet, he just gets on with his work, produces superb articles and is devoted to our hobby. His MBE is much deserved and my only regret is that, bearing in mind his very long service on our behalf, the recognition has taken so long.

Congratulations Pat, thank you for Technical Topics and your unstinting, perhaps often unsung, work on our behalf. **Rob G3XFD**

Photo courtesy of the Radio Society of Great Britain

amateur radio clubs

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

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

CHESTER
Chester & District ARS
Contact: **Derrick Summner M1SUM**
E-mail: **info@chesterdars.org.uk**
Website **www.chesterdars.org.uk**

Meetings of the Chester & District Amateur Radio society are held on Tuesday evenings, apart from the second Tuesday in the month, from 1945 hours at the **Burley Memorial Hall, Common Lane, Waverton, Chester CH3 7QN.**
Forthcoming meetings include: **July 18:** Show review of the Friedrichshafen Hamfest by **Graham G7NEH** and **Derrick M1SUM** and **25th**: Pie and Pint Night at the Shrewsbury Arms, Mickle Trafford. Please note the club will be taking its Summer break throughout August.

ESSEX
Chelmsford ARS
Contact: **Colin Page G0TRM**
Tel: **(01245) 223835**
E-mail: **colinpage@ukgateway.net**
Website: **www.g0mwt.org.uk**
On **Tuesday 1 August** the Chelmsford Amateur Radio Society is holding a Table-top Sale. All good condition Amateur, audio, electronic, electrical, photographic, computer and associated equipment may be offered for sale. Admission is free to buyers and viewers and tables for traders cost £3. The sale will take place at the **Marconi Social Club, Beehive Lane, Great Baddow, Chelmsford, Essex CM2 9RX**. Entry for sellers is at 1830 hours and for the public 1930 hours. Car parking is free and a bar will be available for refreshments.

SHROPSHIRE
Telford & District ARS
Contact: **Mike G3JKX**
E-mail: **mjstreetg3jkx@blueyonder.co.uk**
Website: **www.tdars.org.uk**
The Telford & District Amateur Radio Society meet at the **Community Centre, Bank Road, Dawley Bank, Telford, Shropshire TF7 2A** at 2000 hours every Wednesday (unless otherwiste stated). If you fancy joining in with a meeting, here's what's coming up: **July 19:** Quiz with Salop ARS with **G3JKX** in the chair; **26th:** Barbecue - paid-up members, £1.50. Non-members, £3; **August 2:** Open evening/h.f. on the air/committee meeting and **9th**: Portable in the park.

SURREY
Wey Valley Amateur Radio Group
Contact: **Andrew Vine M0GJH**
E-mail: **wvarg@dsl.pipex.com**
Website: **www.weyvalleyarg.org.uk**
The Wey Valley Amateur Radio Group meet on the first and third Friday of each calendar month at the **Guildford Rowing Club, The Boat House, Shalford Road, Guildford GU1 3XL.**

Meetings start at 2000 hours and meetings are not just for members - visitors are always welcome. Please note that car parking at the rowing club is limited but there is free parking after 1800 hours in nearby Millbrook (Yvonne Arnaud) Car Park. Meetings to look forward to are: **July 21:** Bring-a-rig night whether it's v.h.f./u.h.f. or h.f., hand-held or base, new or ancient, we want to see/hear it on air! and **August 4:** US Railroad Telegraphy - keys, sounders and galvos in action! - (with **Ken Tythercott**).

Keep your club news coming to **pwnews@pwpublishing.ltd.uk** and **please remember** to include the **postcode** of your meeting venue - it helps potential visitors to find you!

Museum of Communication Fife

Scotland has much to interest the traveller and also the visiting radio enthusiast. Rob Mannion G3XFD, shares his own love of Scotland by reminding readers that, if they divert eastwards for a little way while on their way to the Scottish highlands, they'll discover the Museum of Communications in Fife.

If I were to mention the Scottish county of Fife to most non-Scottish Radio Amateurs, they would probably think of the famous 'Silicon Glen', golf courses and the famous Forth Bridge, spanning the Firth of Forth between Edinburgh, the Lothians and Fife. However, despite these and many other attractions, Fife has two other notable claims to fame. The first is that it's the oldest kingdom within the United Kingdom and the second is it's the home of the **Museum of Communication** (MOC), which is located in Burntisland, a few miles up the attractive coast from the famous railway bridge.

The small town of Burntisland is undergoing an active period of regeneration. Even the museum, **Fig. 1**, is located in a building that had lain derelict for many years. This, admittedly unpretentious building hides a wealth of communications history behind those anonymous doors, which open onto the High Street.

Foundation Trust

The Foundation that runs the museum is an independent charity, with over 120 members from all over the UK and beyond, including Germany, France and Japan. No staff are employed at the museum and no public subsidies are used. Everything that's on display to the public is available through the generosity and keenness of the foundation members.

The Collection

The Foundation has an extensive collection of communications equipment, **Figs. 2** and **3**, from the 19th century to the present day.

The Foundation was established in 1992 to safeguard the collection. Since then it has held a number of temporary exhibitions at various locations across central Scotland.

Until recently, the Foundation didn't have a permanent home of its own. However, the collection is now being housed at the newly refurbished headquarters at 131 High Street. The building was launched into its new role in the summer of 2005, when an exhibition of communication developments during the Second World War was opened to the public.

The main collection ranges from telegraph, telephone and radio items onwards to information technology. It also includes radar, television and audio equipment with the exhibits presented in varying forms, from laboratory equipment to military items, as well as more familiar domestic electronics.

Fig. 3: The vintage loudspeakers always attract the attention of Radio Amateurs and non-technical visitors alike.

Members of the Foundation are kept in touch and informed by the quarterly *Transmitting* magazine. Interestingly, when I read through the Winter 2005 copy, which had been included with the museum information pack, I found a photograph of the cast of the BBC's *Dixon of Dock Green* programme from the early 1960s. Posed along with **Jack Warner** (PC 49) and other members of the cast, was my late aunt, **Moria Mannion**, who played the part of a woman police sergeant in the long running series!

The Future

The future is bright for this new museum. Burntisland is an ancient port and holiday town and has many historic buildings as well as being on the long distance Fife Coast Path. The museum's exhibitions and activities are planned to add further to the town's attractions. School parties are welcome, **Fig. 4** and the Foundation fully intends that the museum will provide a vital part in providing local opportunities for skill training in the fields of electronics and communications.

Fig. 4: Local students discovering how the multi-needle telegraph system works. Rather different from sending a text message!

I thoroughly recommend a visit to Museum of Communication when you visit Scotland. It's located in a stunningly attractive part of our beautiful Islands and even helps to provide a special 'something to do' when we get some of our famous British rain!

For further details on the Foundation, the museum and membership please contact the MOC Director, **Ken Horne GM3YBQ** on (**01592**) **265789** or by E-mail: **kenmarg.horne@btopenworld.com**

Fig. 1: Behind those unremarkable wooden doors, lies an Aladdin's Cave of radio and communications museum treasures waiting to discovered by *PW* readers!

Fig. 2: Part of the museum's collection of telephone equipment, from the ancient to the very modern!

AMATEUR & CB RADIO KITS & MODULES

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

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

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

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MASTHEAD PREAMPS 100W through handling for 2 or 4 or 6 meters. 20dB gain 1dB NF. RF switched & DC fed via the coax. Heavy duty waterproof masthead box, and a DC to RF station box with SO239 connectors. **RP2SM, RP4SM, RP6SM, PCB & hardware kit £38.00, Ready Built £57.00**. **New masthead fitting kit option £6.00.**

MASTHEAD PREAMPS 400W rated, for 2 or 4 or 6metres. RF switched. DC fed via a separate wire. 20dB gain 1dB NF. Heavy duty waterproof masthead box with SO239 connector. **RP2SH, RP4SH, RP6SH. New lower price. PCB & hardware kit £40.00. Ready built £62.00. New masthead fitting kit option £6.00.**

TWO TONE OSCILLATOR as featured in *PW* March 2005. Necessary signal source used together with an oscilloscope to set up AM, DSB, & SSB transmitters. **PCB & parts & hardware kit £25.00. Ready Built £52.50.**

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

PORTLAND VFO as featured in March 2006 PW. 7-7.2MHz as local oscillator for a 40m direct conversion receiver or transceiver. Otherwise as 7.9-8.4MHz to use in conjunction with a mixer-vfo system as local oscillator for a 4 metre receiver/transmitter with a 9MHz or 10.7MHz IF. Available with Buffer 2 for high drive output or with Buffer 1 suitable for the Poundbury project transceiver. **VFO PCB with Buffer 1 or Buffer 2 PCB and parts kit with potentiometer £14.50.**
PCB and parts kit with drilled box £23.50.

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

3N201 MOSFET equiv. 40673 £2.25 each, P&P 50p any quantity.

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Technical

FOR THE TERRIFIED!

This month Tony Nailer G4CFY takes a look at some of the mysteries and myths involving diodes and rectification. He takes a particular look at the old concepts of conventional current and electron flow.

Welcome to this session of Technical for the Terrified, where I'm aiming to remove the fear of the technical theory needed in Amateur Radio. In March 2006 I received an E-mail from *PW* reader **Bert Carey**, regarding the operation of diodes and how these work in power supplies and in ring mixers. It was clear from his E-mail that he's still as confused about this, as I was for many years. Bert made reference to diodes being like valves and only passing current one way, only 'positive current'.

Current Flow

Part of the confusion endured by myself and many others was due to the previously taught concepts of **conventional current** and **electron flow**. Originally, someone presumed that current flowed from positive-to-negative and that was how things were taught for a number of years.

Then, it became known that an electron was a negative charge. Atoms with surplus electrons in orbit were negatively charged, and atoms with a shortage of electrons were positively charged. Conductors were materials where electrons were randomly moving about from one atom to another.

Voltage Source

Now, we'll look at a voltage source. This is any device with two terminals, one of which has a large surplus of electrons, the other with an equal shortage of electrons. This is described as a potential difference (p.d.). When the terminals are connected to a circuit the electrons will flow from negative-to-positive.

Semiconductor Diode

Next, comes the semiconductor diode. Some naturally occurring materials contain a surplus of electrons whilst others have a natural deficiency, which makes them useful as semiconductors.

Materials, which whilst are naturally neutral (like silicon) can be 'doped' with impurities to create types with a surplus of electrons, *n*-type, and types with a deficiency of electrons, *p*-type.

Where *p* and *n* type are bonded together the surplus electrons at the junction move over to make up the deficiency on the other side of the junction. The junction then becomes a neutral zone. This is the creation of a semiconductor diode, where the *p* material is the anode and the *n* material the cathode.

If a voltage is applied to this diode one way round, all it does is to extend the neutral zone and no current flows through. However, if voltage is applied the other way round it reduces the size of the junction and at a bias point of around 0.65V removes the neutral zone completely. Current then flows through easily.

Valve Diode

Let's now look at the valve (thermionic) diode rectifier. It should be noted here that current is a flow of negatively charged electrons and that the concept of **conventional current flow** was an enormous mistake! **All circuits** (including valves and transistors) have current flow from negative-to-positive.

The sad fact was, that in the valve era conventional current flow was the rule and valve operation just cannot be explained or understood that way. A valve contains a metal cylinder called a cathode, which is coated with a material that has loosely coupled surplus electrons. When the cathode is heated in a vacuum, it then gives off a cloud of electrons.

By applying a potential between anode and cathode, with the anode positive, the electrons swarm to the anode to balance up the deficiency. Current then is seen to flow from cathode (negative) to anode (positive).

Half-wave Rectification

Half-wave rectification is next on the list! Rectification uses the half-wave principle, but is a bit confusing because at the output of the diode rectifier we expect to see a positive voltage. To help, look now at the simple rectifier circuit of **Fig. 1**.

When the secondary of T1 in Fig.1 has the top of the winding positive with respect to the bottom, nothing happens until the voltage reaches 0.65V and then the diode starts to conduct. The voltage across the load will be a slightly clipped half cycle, with a lower peak value than the applied voltage. The transformer end of the diode will be at least 0.65V more positive than the load end. During the next half cycle the

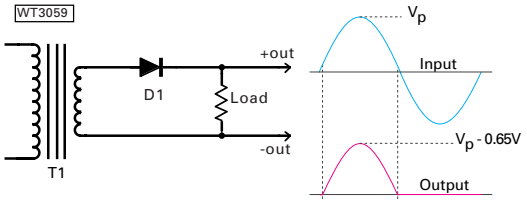

Fig. 1: A simple rectifier circuit (please refer to the text).

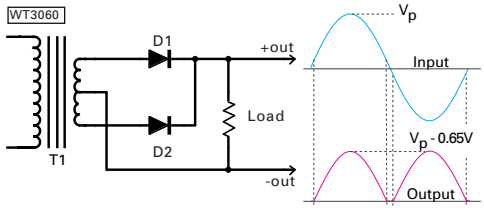

Fig. 2: A full-wave rectifier (please refer to the text).

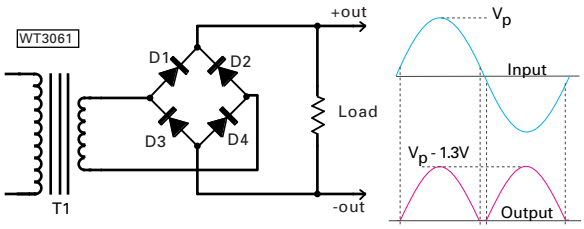

Fig. 3: A full-wave bridge rectifier (see text).

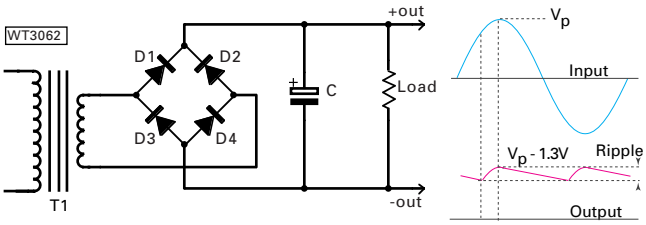

Fig. 4: A simple smoothing circuit (see text).

diode is biased off and so, no current flows.

In higher current power supplies the voltage drop across the diode can be even greater still. In my experience I think it's wise to assume this is about 1V.

Full-wave Rectification

Venturing on, we'll now turn to full-wave rectification. Looking at **Fig. 2**, you'll see it has two diodes, each with its anode connected to 'opposite ends' of the transformer. The load is connected between the cathodes and the centre tap of the transformer - this is called a full-wave rectification circuit.

Each diode deals with alternate half cycles of the drive voltage and in effect routes the flow to provide the half cycle with the same polarity across the load. Note that here, as before, each diode will not conduct until the voltage across it's at least 0.65V, so there's a period of no conduction between the half cycles across the load.

In practice, the centre tap of the transformer is usually connected to an earth or chassis, or as a negative rail. Note that during conduction of one half cycle, only half the transformer secondary is conducting. At this time the other section of the circuit and its diode are non-conducting.

Bridge Rectification

Next in line is the widely used bridge rectifier. The diagram, **Fig. 3**, shows a **full-wave bridge rectifier** circuit. This clever arrangement of diodes allows the whole of the secondary to conduct during each half cycle, except where the voltage is less than twice 0.65V.

When the top of the secondary is positive with respect to the bottom, the join of the cathode of D1 with the load will be at least 0.65V less positive than the junction of the anode with the transformer. Whilst the junction of D4 with the transformer will be at least 0.65V more negative than the junction of D4 with the load.

A similar situation with D2 and D3 occurs on the next half cycle. The result is full-wave rectification with an output that is two diode voltage drops less than the peak value of the driving signal. The whole secondary of the transformer conducts during both of the half cycles.

Smoothing Techniques

Time for some 'smoothing' techniques now! Smoothing is the term used to describe the techniques required because the stream of positive half cycles produced across a load with half and full-wave rectification is actually 'rough' direct current (d.c.). This is unsuitable as a supply for electronic devices that need a smooth or regulated supply.

The simplest smoothing is achieved by placing a capacitor across the load, as shown in **Fig. 4**. In this circuit the diodes charge the capacitor with the half-waves and then during the diodes' non-conduction periods the capacitor discharges into the load. This results in a 'saw-tooth' shaped wave (as observed on an oscilloscope) where the larger the value of the capacitor used, the smaller the 'tooth' size becomes. The tooth height is called the 'ripple'.

Feedback Appreciated!

I'm very grateful for the feedback from Bert, as Technical for the Terrified was tending towards becoming a 'mini' Doing it by Design! Exploring how diodes work brings the series back to its purpose of making this subject more accessible to all.

If you wish to correspond regarding this article or previous ones subscribe to the list

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by sending a blank E-mail with the word subscribe in the subject box. When you receive confirmation from the server you can send an E-mail to

pw-g4cfy@pwpublishing.ltd.uk and your comments will be answered by myself or the *PW* team. See you next time and keep those comments coming please! **PW**

The Icom IC-E91 Dual-Band Hand-Held

Richard Newton G0RSN, was about to go on holiday when the PW Editor pounced on him. "Just the job" he said - "you can enjoy using the latest hand-held from Icom. We don't know much about it, so try it and see". Richard's resulting opinions are published here!

Richard Newton G0RSN, enjoyed using the Icom IC-E91 hand-held transceiver while on holiday in Shropshire. In the background is the funicular railway that links the upper and lower parts of Bridgnorth, providing scenic view over the Severn Valley.

Timing is everything, or so they say. So, when the *PW* team contacted me on the eve of the family caravan holiday to Shropshire and asked me to review the newest hand-held from Icom, I thought what better way to put a rig through its paces than to take it away on a week long camping trip to the west midlands?

I discovered that the Icom IC-E91, **Fig. 1**, is the brand-new dual-band hand-held radio from Icom. It's truly dual-band, that's to say it has two independent operating bands. These can be monitored simultaneously, or you can monitor one band at a time if you want to.

The A band has an operating range of 459kHz to 999.990MHz. The B Band covers from 118 to 174MHz and 350 to 470MHz, an impressive receive range indeed! **Note:** the rig will only transmit on the 144 and 430MHz Amateur bands.

On the air, the Icom IC-E91 will receive in amplitude modulation (a.m.) and frequency modulation (f.m.), with the receiving operating as a double conversation superhet configuration. When operating on wideband f.m. (WFM), the receiver operates as a triple conversion superhet. **Note:** Wide f.m. is only available across certain portions of the IC-E91's coverage.

In transmit mode, the IC-E91 transmits in narrow band f.m. (n.b.f.m.) only. Output power is selectable between high power, 5W and low power, 500mW.

The rig is also capable of advanced digital voice and data communications. These are only available when using an optional extra, the UT-121 digital unit. Unfortunately, due to the rig being so new into the UK, Icom were unable to put the UT-121 in the review rig. So, we hope to be able to look at these features in sometime in the future.

Editorial note: *Richard offered a very good idea regarding the digital extras. We've now arranged for them to be made available as soon as possible and Richard will evaluate the modified rig as a follow-up article in the near future.* **G3XFD**

However, Icom were able to send along the optional RS-91 remote control software and serial cable with the review rig. As there's still a fair amount you can do with the software and the rig without the UT-121 digital unit, I'll be covering more about the use of the software later on in this review.

Means Business!

The IC-E91 looks and feels as though it really means business! The rig is beautifully finished, **Fig. 2**, in a very dark grey, almost black case, with a silver trim.

The transceiver is supplied with a 7.4V, 1.3Ah Lithium-ion battery pack and a wall charger. Also provided are a carry strap, belt clip and helical antenna, plus a very comprehensive user manual.

The unit will operate from an external 13.8V d.c. power supply. It also has speaker-microphone connections, together with a dedicated data socket for use with the optional control software.

Although some may think this rig is 'chunky' by modern standards, I very much enjoyed having a radio I could really hold! It measures 58.4mm wide, 103mm high and

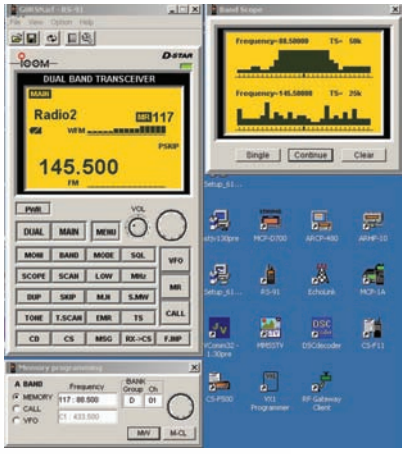

Fig. 3a: Richard G0RSN installed the IC-E91 software on a Toshiba Satellite Laptop with an 800MHz processor and 512Mb of memory. The software installed without incident, and then he plugged the E91 in and immediately communicated with it.

Fig. 3b: The Icom IC-E91 'virtual' version on screen. Richard then found that when he changed a setting, or tuned the virtual rig, the change instantly appeared on the real IC-E91 (see text).

Fig. 1: Richard G0RSN, discovered that the IC-E91 is truly dual-band, that's to say it has two independent operating bands. These can be monitored simultaneously, or you can monitor one band at a time if you wish (see text).

34.2mm deep and settles in the hand wonderfully well. In fact, whichever hand I held the rig in, the controls just seemed to fall at my finger tips.

The IC-E91 weighs a reassuring 300gm (approximately) with the battery and supplied helical whip antenna. It was my constant companion while on holiday, and sat on my belt with no discomfort at all.

Well Laid-Out

The controls on the rig are well laid-out and are of a sensible size. The control buttons themselves are all effectively back lit with a pleasing green backlight. This light also illuminates the rather impressive display screen, making night time operation a real 'breeze'.

When monitoring one band, the display on the rig enlarges so that the frequency and other display information fills all of the rather impressive screen. When monitoring both the bands, however, other information is condensed and is displayed one on top of the other, which I found to be clear and informative.

I am delighted to say that the IC-E91 passed my 'pick it up and use it' test with flying colours. Well done Icom!

Menu Settings

The IC-E91 uses a menu to set up the more advanced, or less used settings. On this transceiver, the menu is a one button affair, you can then navigate through the menus with absolute ease using the front panel buttons.

In practice the more frequently required functions such as power, scan, memory writing and recall and so on, are all on the front panel. The operator can either press the button momentarily to activate the primary function of that particular key or keep it depressed for the secondary function. It really could not have been simpler.

Receive Coverage & Tuning

As you'll have realised from what I've already mentioned, the IC-E91 offers a massive receive coverage, and it also offers a large range of tuning steps to compliment the wide operating range. Steps of 10, 12.5, 15, 20, 25, 30, 50, 100, 125 and 200kHz are available, but the rig also has additional 5, 6.25, 8.33 and 9kHz steps, depending on the needs of the band of operation. For example, when selecting the band starting at 495kHz the rig will include 9kHz steps in the choices offered. However, when receiving on the Air Band, the rig will offer the 8.33kHz steps and so on.

An Extraordinary Memory!

The IC-E91 has an extraordinary amount of memories, there are 850 memory channels in Band A, and 450 memory channels in Band B. In addition to this are two **Call** memories on each Band.

In effect, the total memory allocation on each band includes 25 pairs of band edge memories. These are for selectively scanning bands or portions of a band between two selected frequencies.

To help effectively manage the memories, Icom have assigned 26 memory banks to each band. These are labelled A to Z. Each of these memory banks is capable of holding up to 100 memories.

The Call channels are useful, because they can be recalled at the single touch of a button. In use they would normally be programmed with a local calling or hailing channel, or perhaps your favourite repeater.

The ability to have so many programmable scan edge frequencies is terrific in my book. I like to set these up to

scan between 145.200 and 145.5875MHz so I can scan the 2m band simplex portion. I also set another one up for the Repeater Outputs on the same band and then do the same for similar allocations on 430MHz band.

Optional Feature

The IC-E91 uses the **Call** button for another feature that's available when you use the Optional RS-91 software and serial cable. Using the software you can programme the receiver with the TV sound channels.

Using the software, the TV channels are then accessed by toggling the Call button and then tuning with the rotary control. I used this feature while on holiday much to my sons' amusement, (more about that later!).

Listening Newton

I love listening on the radio and was much encouraged as a child by my late Dad, **John G8EAM**. Becoming a shortwave listener is how I entered the hobby.

The IC-E91 offers the opportunity to have a first class 144/430MHz dual-band rig and also a wonderful general coverage style receiver - all in the same package! I set up scan edges for portions of the 50 and 70MHz bands and many others frequencies of interest.

While I was away in the caravan, I used the IC-E91 as a receiver as well as a transceiver. The first thing that really struck me about the rig was the quality of the received audio, whether on the Amateur Radio bands or when receiving a shortwave radio station in a.m., the audio quality was first class.

Another benefit, and a direct result of keeping an 'electronic eye' on conditions on the 50MHz band using the 'E91, was that I was able to identify a DX 'lift'.

I then tuned my own IC-7400 to the s.s.b portion of 50MHz and using the internal a.t.u. to tune my wire dipole (cut for 7MHz!) to work on 50MHz, I had a QSO with **Tomas SM6XMY**. Tomas was in Gothenburg and we worked on 50.162MHz. All thanks to the IC-E91!

Fig. 4: Thomas Newton M3TJN who is 12 and Oliver his brother, M3ORN who is 11, spotted an adjacent caravan with a television, and it was showing football. Even though it was a 'TV-less' holiday, Dad G0RSN tuned the IC-E91 into the television sound channels! (see text).

A Real Plus

Time to take a good look at the software facilities now! Being able to organise so many available memories into banks is a real plus. I organised mine into favourite shortwave radio stations, Band II v.h.f. stations, Marine and Airband.

I also organised the separate Amateur bands and then a mix of all my favourite frequencies. It's always interesting to monitor the licence-free low power u.h.f. channels on a caravan site!

This was when the RS-91 software and serial cable became extremely useful. They made programming of the rig simple and straight forward, especially the programming, labelling, and organisation of memory channels.

I installed the software on my rather old Toshiba Satellite Laptop with an 800MHz processor and 512Mb of memory. The software installed without incident, I then plugged the rig in and 'Hey presto'! I was immediately communicating with the IC-E91, **Fig. 3a**., with the inset 'screen grab', shown in **Fig. 3b**. It was then I found that if I changed a setting, or tuned the virtual rig, the change instantly appeared on the real IC-E91. No fuss, no bother - just perfect!

Band Scope

Another wonderful function on the IC-E91 is a 'band scope'. This facility provides a visible representation of the spectrum above and below a selected centre frequency. This is available on the rig and also as part of the software.

It's fantastic to see where signals are on the band! If the operator sets the tuning

steps appropriately, the band 'scope will give a very basic visible representation of the bandwidth and quality of a received signal.

Helical Antenna

The supplied helical antenna gave a very good account of itself across the whole spectrum of frequencies covered by the 'E91. It received the broadcaster Classic Gold on 828kHz and I could also receive shortwave transmissions on frequencies from 5 and up through to 17MHz. Obviously though, the reception was rather better when the rig was connected to a long wire.

As I've already mentioned, I took the IC-E91 away on holiday with the family in the caravan. We stayed just outside of Bridgnorth in Shropshire (locator IO82TM). The little rig proved itself to be an ideal companion for such a holiday.

I thought I would give Airband listening a go and used the **Band Scan** facility on the IC-E91 to scan only those frequencies. Within 15 minutes (just letting the rig scan through the band using the helical antenna) while I sat outside the caravan sipping a beverage, the rig found 14 active frequencies. It was a doddle to put these into memory channels as and when they were found.

Using the Icom IC-E91 we all enjoyed listening to **Steve Wright*** Sunday Love Songs on BBC Radio 2. But the really good thing is that while listening to Steve on band A of the IC-E91 I could simultaneously be monitoring for any activity on the Amateur bands by scanning the calling channels on band B, perfect!

Editorial note:** Steve Wright is a Licensed Radio Amateur himself and has occasionally mentioned PW during his programmes. However, even BBC Radio 4 announcer, **Jim Lee G4AEH**, a PW supporter, was unable to confirm Steve's callsign. All that was received at PW was a terse message from Steve Wright - saying we'd not find out that way! Yet another 'closet' Amateur. **G3XFD

No TV!

It's worth mentioning that we don't have a TV in the caravan, a conscious effort to get away from the 'goggle box' for a week! My sons, **Thomas M3TJN** who is 12, and **Oliver M3ORN** who is 11, **Fig. 4**, then spotted an adjacent caravan with a television and could see it was showing football!

Don't ask me what teams or what the match was, for I have little interest myself. However, the boys were incredibly impressed when I tuned the IC-E91 to the correct TV audio channel and they had sound to go with the picture!

On The Air

Well I suppose I had now better tell you about how this Amateur Radio hand-held transceiver actually performed on the air, when I spoke to someone on it! During these tests, I attached a high gain, dual-band mobile whip to the metal guttering the caravan, **Fig. 5**.

My first two contacts were made from the caravan, **Fig. 6**, using the IC-E91, while it was connected to the mobile whip on the caravan. I selected the rig's 5W power setting.

I heard two local stations chatting on 145.425MHz. I called "Break please" and they invited me into the QSO.

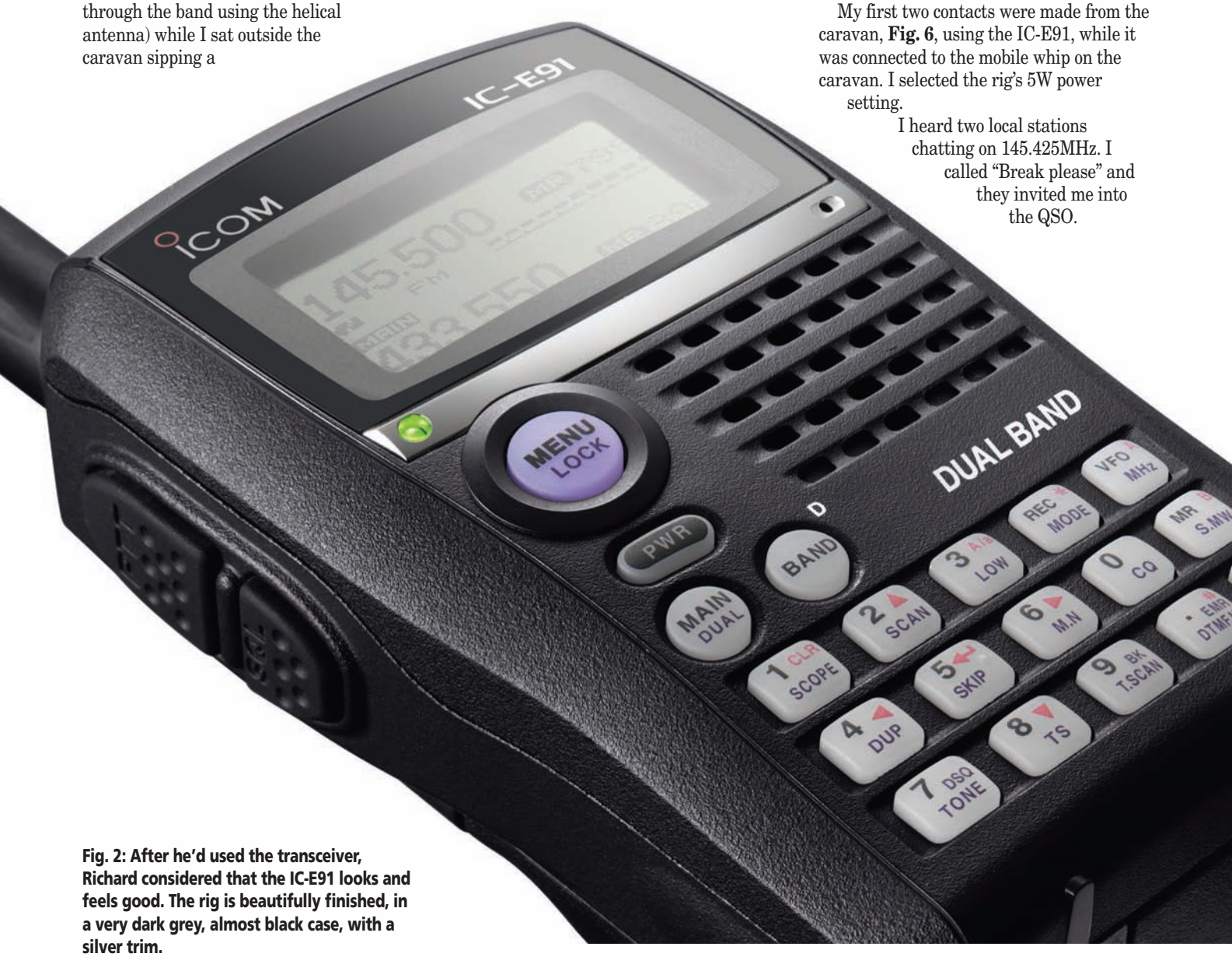

Fig. 2: After he'd used the transceiver, Richard considered that the IC-E91 looks and feels good. The rig is beautifully finished, in a very dark grey, almost black case, with a silver trim.

Fig. 5: During the on-air tests, Richard attached a high gain, dual-band mobile whip to the metal guttering of the holiday caravan (see text).

The other operators were **Bob 2E0LDY**, on the north side of Telford, about 20km (12.5 miles) away and **Steve M3STG**, on Cannock Chase at about 250 metres above sea level, and about 37km (23 miles) away in the adjacent county of Staffordshire.

Bob was using an Icom IC-910H, running 20W into a Diamond Collinear antenna. He gave me a 5 and 6 report and said that the Icom IC-E91 - "Sounded very nice, the audio is no problem at all Richard".

Steve, who was using a Yaesu FT-857 on 5W (and again a Diamond collinear antenna), gave a similar signal report saying; "Your signal and audio are superb Richard, I can't fault it"!

Steve also gave me a call on 433.425MHz and again we had a very comfortable contact. In fact the received signal at my end seemed a little better on 433 than it was on 145MHz.

Later, I was listening around with the helical antenna and heard **Dave G0BHD**, working on 144.325MHz. Dave was very local, in Bridgnorth itself. I called him, we had a lovely chat and Dave agreed to 'sked' with me a little later to give a full report on the IC-E91. I called him later on 145.5MHz, using the helical antenna, using low power and we then moved to a simplex frequency.

Dave commented during the QSO; "A good, full audio Richard, nice sound, sounds like a really good quality microphone"! In reply I told him I was just using the rig's own internal microphone. He then replied, "Very nice! Good Radio 5 audio, does not sound like a hand-held, sounds like a really good quality radio"!

I then went onto the mobile whip to finish the contact with Dave. We then went to 433MHz, just to try a u.h.f contact, again the rig performed extremely well indeed.

Wonderful Package

The Icom IC-E91 is a wonderful little package; it seemed to excel at whatever I asked of it. The rig offers all the scanning, CTCSS, DTMF and extended features I have come to expect of a modern hand-held - and more besides.

It would be interesting to see how much the digital option adds to the whole package but to be honest it is an impressive little rig just as it is. I look forward to trying the digital mode!

PW

Product
Icom IC-E91 Dual-Band, f.m., v.h.f./u.h.f. transceiver with extended receive coverage.

Company
Icom UK Ltd.

Contact
Sales on **(01227) 741741**

Pros & Cons
Pros

The Icom IC-E91 is a wonderful little package; it seemed to excel at whatever I asked of it. The rig offers all the scanning, CTCSS, DTMF and extended features I have come to expect of a modern hand-held and more besides. Comfortable to use with either left or right hands.

Cons

Helps in overcoming parental ban regarding 'No TV on holiday ban by receiving sound channels!

Price
£249.95

Supplier
My thanks for the loan of the review transciver, go to **Icom UK Ltd., Sea Street, Herne Bay, Kent CT6 8LD.**
E-mail: sales@icomuk.co.uk
Website: www.icom.uk.co.uk

Fig. 6: The operating position in G0RSN's caravan. The first two contacts were made using the IC-E91 while it was connected to the mobile whip on the caravan's guttering.

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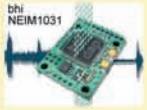

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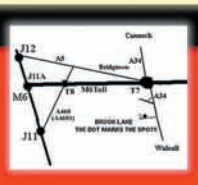

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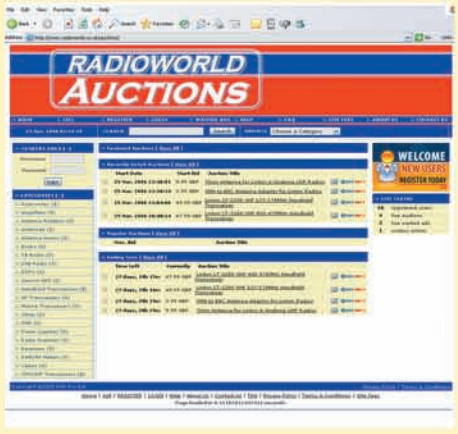

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In the Shop

with Harry Leeming G3LLL

This time, Harry G3LLL recalls a problem with a Yaesu FT-290 telescopic antenna. He also looks at a tone-burst, faulty displays, off-frequency checking and the accuracy of displays.

Peter brought a Yaesu FT-290 Mk1 into my repair shop, which wouldn't transmit. He told me that this had happened a couple of times previously and that each time a friend had replaced the power amplifier (p.a.) transistor for him. He had then been able to use the rig but had occasionally got reports of distortion when using it in the s.s.b. mode, until it stopped working again. I soon traced that the fault was once again due to a faulty p.a. transistor but I noted, however, that the telescopic whip antenna was missing and so gave him a call. It transpired that he'd damaged the antenna and had removed it.

On the FT-290 Mk1 the telescopic antenna is part of the p.a. tuned circuit and if the rig is used with an external antenna connected to the PL259 socket, it's essential that the whip is fitted and that it's pushed down into the rig. If this is not done the p.a. circuit will be thrown off tune and the p.a. transistor is likely to suffer. It is only necessary to have the bottom section of the whip fitted. So, I got Peter to bring the remains of his whip to me, so that I could fit a new transistor and correctly align the stage.

After I'd done that, everything seemed okay when transmitting on f.m. but the quality was poor when I monitored its output whilst transmitting in the s.s.b. mode. Like all transistorised sideband Amateur equipment, the power output stage should be biased in class 'B' as shown in **Fig. 1**. A quick check showed that the output stage was passing no current at all when the microphone was keyed and so the stage was biased below point 'C' and not at point 'B'. This resulted in all the lower levels of the voice being distorted, hence the poor quality. This is quite a common fault with the FT-290 and there are many sets around that are not set-up correctly, giving out 'gritty' audio in the s.s.b. mode. Exactly what current flows when there's no transmitted signal is not critical but there must be some. (I usually set it at about 10mA).

The simplest way to set the current is to connect a meter set to read around 1A full scale deflection (f.s.d.) in series with the rig's 12V feed and key the microphone in the s.s.b. mode. Providing that there is no sound going into the microphone and that the carrier suppression is set correctly, there should be no r.f. output from the rig. You can check this by using a power meter and also note what the d.c. input current is. Next, short the base of the p.a. transistor to chassis (be very careful that you select the correct pin or you may cause damage) and if the bias is correct, the d.c. input current should fall by 5-15mA. (If the reduction of current is not in this range the bias needs adjusting).

Late production FT-290s are fitted with a variable resistor near to the p.a. stage, to enable the current to be correctly set up but the bias on early models is pre-set and sometimes does not match the p.a.

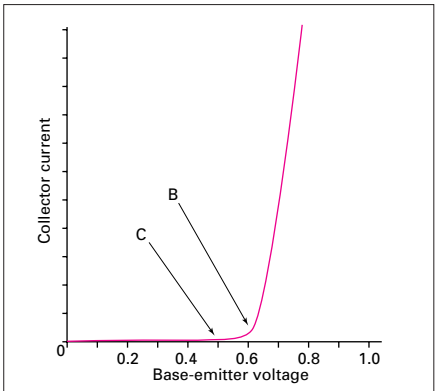


Fig. 1: The power output stage should be biased in class B in sideband Amateur equipment.

transistor that is fitted. Peter's unit did not have this control and so it was necessary to experimentally swap the fixed resistor R70, to correct the operation. (About 270Ω is usually okay, see **Figs. 2a and 2b)**.

The rig had been purchased second-hand, so Peter also asked if I would have a look at the tone-burst, which did not seem to be functioning. As originally marketed, the FT-290 Mk1 was a little difficult and somewhat dangerous to operate mobile. It didn't have an automatic tone-burst, leaving the operator fiddling to find the small press button whilst driving.

Several tone-burst modifications were introduced by different people to get over this problem, one of which I had published in the now discontinued magazine *Ham Radio Today*. This brought an automatic burst into play, only in the –600 position of the repeater shift control, and only when the noise blanker switch at the rear was switched on. Peter's rig had been modified in this way but the previous owner had failed to inform him of the modification. Switching the noise blanker on brought back normal tone-burst operation.

Faulty Displays

The problem with many rigs made in the last 20 years or so, is that they use dedicated parts, many of which are no longer available. For example, if the frequency display device gives up, this can be the end of the line for an otherwise perfectly good piece of equipment. Knowing this, many users 'throw in the towel' a little too easily when the display ceases to function correctly, without checking for a solution first.

The first thing to do when a display appears to be faulty, is to try a complete reset of the microprocessor. How you do this varies from rig to rig. First of all, you should follow the manufacturers instructions. If this fails to have the desired effect, the sure-fire way on all but the oldest Icom equipment*, is as follows:

Disconnect the set from the power source and then remove or unsolder the memory back-up battery. **While the equipment is disconnected from the power,** switch the power switch on and off a few times. Leave the rig for 10 minutes and switch it on and off again, still without the power connected.

Next, reconnect the back-up battery and the power and try again, you may just be lucky! If the rig is now up and running you'll have lost all your memories and may have to reset any repeater shifts. But you can't have everything can you?

If, having carried out the procedure, you find the display still isn't working and if the display is a liquid crystal type that

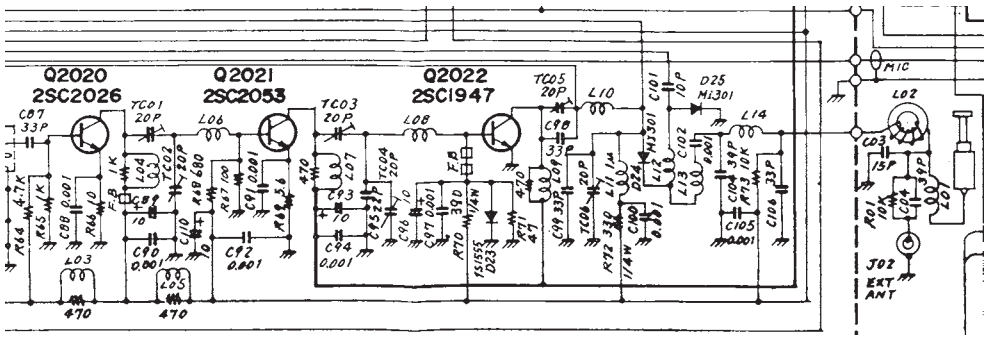


Fig. 2a: A small selection from the circuit diagram of the FT-290MkI r.f. p.a. stage. Early versions has two fixed resistors to set the bias point for Q2022, later models used a variable resistor.
(Copyright Yaesu UK Ltd.) **Editor**

only shows part of some figures, try applying a little pressure. Quite often these displays can be brought back to life when pressed on from behind. I have cured a few rigs by wedging a small piece of sponge rubber between the rear of the display and the nearest p.c.b. (If you are feeling really brave, the correct thing to do is to completely dismantle the display, clean all the contacts and reassemble it). But I prefer the lump of rubber!

If you really do need a display, or some other discontinued part, try a placing a wanted advert in Bargain Basement for a scrap rig. Alternatively, type the part number, or descriptive details into a search engine such as Google, you will be amazed what can turn up.

**** On some early Icom equipment, the whole operating program is held in memory by the battery. If you remove this battery, the unit will need returning to Icom for reprogramming.***
Harry G3LLL

Yaesu FT-757 Off-frequency

Messing about with the alignment of complicated rigs is not a practice that I would encourage, it's easy to do more harm than good. But things like the rig being a half a kHz off-frequency can be an irritation to some people and in the case of the '757, it's easy to correct without upsetting everything else.

A rough outline of the underside chassis of the FT-757 is shown in **Fig. 3**, this being covered by a metal screening grid. If you look carefully through the holes, you should be able to see TC2006 and it will probably be marked '06'. This is the rig's master oscillator, and adjusting this will effect the calibration on all bands.

The TC2006 oscillator should really be set with a frequency counter as part of the full alignment procedure. You **should not try** to correct large deviations of frequency with this trimmer. If, however, the rig is only a few hundred Hz off frequency, try adjusting it slightly until you get the best compromise in frequency accuracy both on l.s.b. and u.s.b.

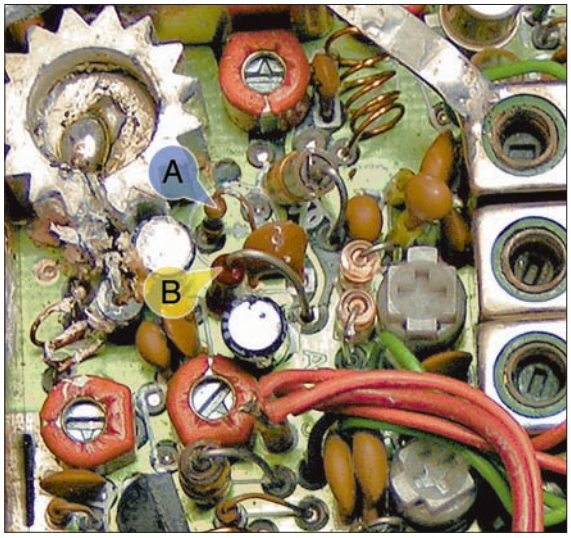


Fig. 2b: The r.f. p.a. transistor stage on an early version FT-290MkI r.f., the resistor shown as A is a fixed value, then the resistor shown as B should be adjusted to give about 10mA bias to Q2022.

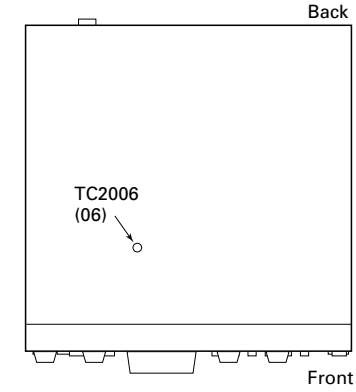


Fig. 3: A rough outline of the underside of the chassis of an FT-757.

Harry's waiting to hear from You!

As I am now retired, I like to hear about problems with older equipment, particularly pre-1990 Yaesu rigs. If you want a direct reply send remember to send me your E-mail address or enclose a stamped addressed envelope. Send your letters to: **Harry Leeming G3LLL, 'The Cedars' 3A Wilson Grove, Heysham, Morecambe LA3 2PQ. Tel: (07901) 932763, E-mail: harryleeming@tiscali.co.uk**

Remember the mains supply is potentially lethal. Unless you really know what you are doing, always pull the mains plug out, *do not just switch off at the wall socket*, when working on equipment.

Check Your Display's Accuracy

By far the easiest way to quickly check your transceiver or receiver's, display accuracy is to try zero beating with a few reliable shortwave broadcast stations. The BBC and most USA and European stations, are spot-on frequency and will be found to be broadcasting on exact multiples of 5kHz (7.275-7.280-7.285MHz and so on) in the short wave broadcast bands.

Try tuning in u.s.b. first, until the speech becomes clear and note the reading. Then carry out the same operation on the other sideband and the reading should be the same. If the readings are slightly different, take the actual reading of your equipment to be half-way between the two. Note this down. If you don't wish to realign your set, at least you will then be able to allow for the error. Note that any error **may increase** as you go up in frequency, so try it on a few bands.

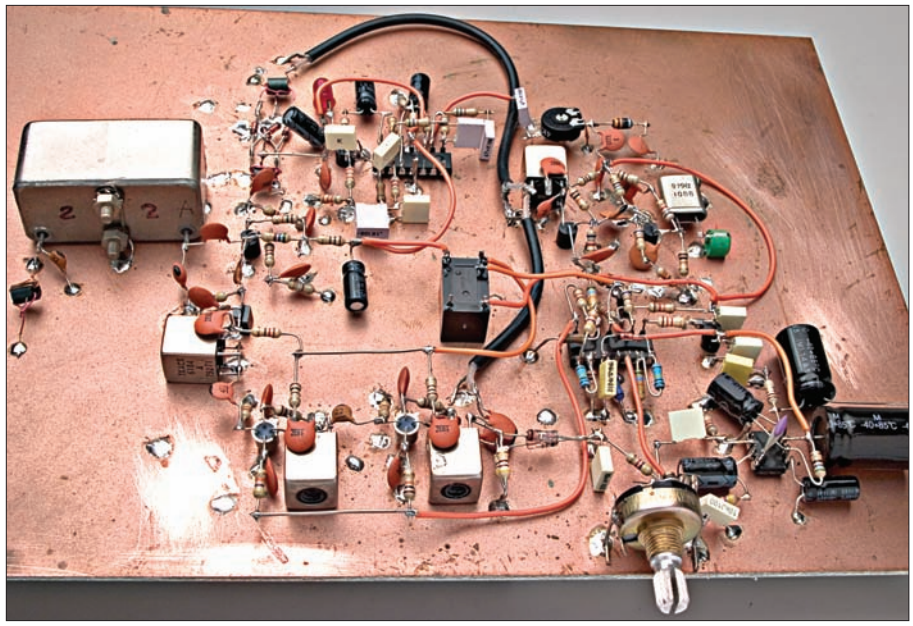
Keep your letters and queries coming in please and I'll do my best to answer them through this column or directly. See you next time in the October issue.

PW

The PW Poundbury Part 2

The SSB Generator, Receive IF & Transceiver Options

This month Tony Nailer G4CFY describes the various options available under the Poundbury 'Banner' and suggest some further ideas on the same theme. However, the main focus is on producing the 70MHz s.s.b. transceiver!



Welcome again to the Poundbury project. Due to the interest shown by a considerable following of 70MHz enthusiasts, I'll deal with a version for the 70MHz band first, as shown in **Fig. 1**. The Poundbury s.s.b. generator and receive i.f. unit can be operated on either a 9MHz or a 10.7MHz i.f. filter and carrier crystals are available for 9MHz (though I cannot supply the items for the 10.7MHz i.f.). **Note:** If the reader has a suitable s.s.b. filter for either of the 9 or 10.7MHz frequencies, I can supply the Mixer-VFO board with the appropriate mixer crystal to give the correct local oscillator frequency.

The Portland VFO uses the same range regardless which i.f. is chosen. Incidentally, as far as I can tell at this stage, there's no advantage of one i.f. frequency over the other for the 70MHz rig.

By the time you read this article, the Poundbury exciter unit should be ready. The Portland 'rock stable' v.f.o. project appeared in the March issue *PW*, and the Mixer-VFO was dealt with as part of Doing it By Design in the May issue *PW*.

The Tuned TX/RX Pre-amplifier will be derived from my commercially available transverter but provided as a stand-alone unit* Besides providing amplification, this unit prevents the image signal in the range 52 to 52.5MHz from mixing with the local oscillator signal to produce 'phantom' receive signals. It also attenuates the image signal on transmit prior to final amplification. This part of the project will be published in a future issue, either in DiBD or as a stand-alone article. The unit will give about 20dB receive gain and on transmit boost the 2mW output from the front-end mixer of the Poundbury up to about 400mW.

A suitable Tuned Power Amplifier, for 70MHz, for 400mW input and 25W output is already in existence as a TA4S3 and part of my 70MHz transverter. This is available as a p.c.b. board and heat sink combination, either as a kit of bits or as a ready built and commissioned unit*.

***Note:** Please see the Spectrum Communications advert on page 13. **Editor.**

Complete Project

On publishing the 70MHz tuned TX/RX pre-amplifier unit, all the parts will be available to make a complete project, with a good performance v.f.o. controlled 70MHz s.s.b. transceiver, complete with 25W output. The complete system will consist of the Poundbury Exciter, Portland VFO, Mixer-VFO, Tuned TX/RX Pre-amplifier and TA4S3. It will total about £235 in kit form with a suitable box and hardware costing approximately an additional £25.

The 50MHz SSB Transceiver

The same circuit blocks, as shown in Fig. 1, can be re-configured with coil, capacitor and crystal changes for use as a 25W s.s.b. transceiver on 50MHz (six metres).

Note: I have done the calculations for the Mixer-VFO system and find the v.f.o. range is still restricted to 0.5MHz (500kHz) swing to avoid 'birdies' in the band 50 to 51MHz.

Poundbury Local Oscillator

The local oscillator for a 9MHz i.f. Poundbury unit on 50MHz, has to cover 41 to 42MHz. This can be created using the Portland VFO tuning 7.5 to 8MHz and the Mixer-VFO board with switched crystals of 33.5 and 34.0MHz.

The harmonics of the v.f.o. are as follows: 5th - 37.5 to 40MHz, 6th - 45 to 48MHz and 7th - 52.5 to 56MHz. You should note these come close to the local oscillator and front-end range, but don't sweep across it.

Tuned Power Amplifier

A suitable Tuned Power Amplifier for 50MHz with 400mW input and 25W output, is already in existence as a TA6S3. It's available as a p.c.b. board and heat sink combination, either as a kit of bits or as a ready built and commissioned unit (see information panel).

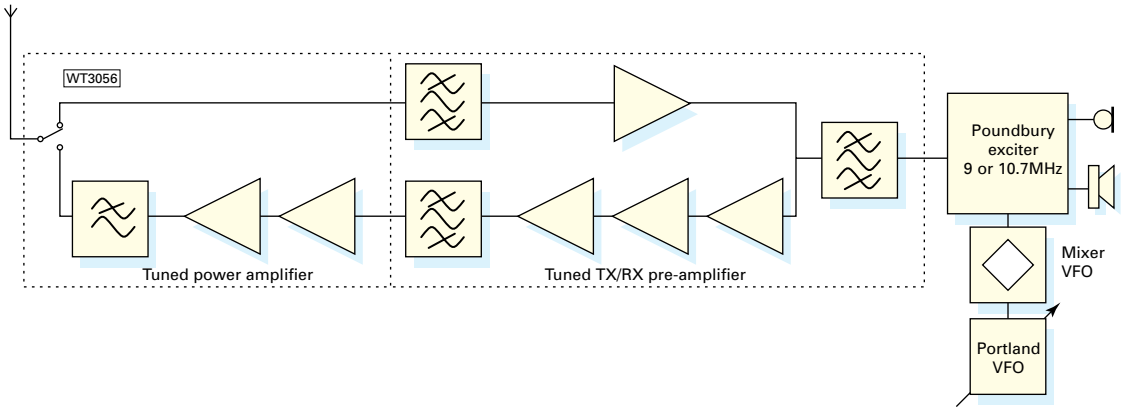


Fig. 1: Block diagram of the Poundbury s.s.b. generator and receive i.f. unit that can be operated with either a 9 or a 10.7MHz i.f. Filters and carrier crystals are available for 9MHz from G4CFY (see text for suggestions on 10.7MHz i.f.).

Note: As the 50MHz band is now readily available on commercially made rigs, there's unlikely to be the demand for this variant of the Poundbury compared to the 70MHz version. I will make the all the units available, if required, but the crystals for the Mixer-VFO may have to be purchased (cut to order) from **QuartSlab Marketing Ltd.** at £7.50 each.

On 28MHz

The Poundbury rig on 28MHz: I am including this for those who would enjoy building it, despite there being a large number of h.f. rigs with 28MHz s.s.b. available.

The arrangement can be the same as Fig. 1, with tuned pre-amplifier but using a wideband CB power amplifier (p.a.) followed by a low-pass filter.

A tuning range of 28 to 29MHz is chosen, which covers the main portion of the band where s.s.b. is to be found. The Portland VFO could tune 7.5 to 8MHz and then mix with 11.5 or 12MHz crystals in the Mixer-VFO to give a local oscillator of 19 to 20MHz. The 3rd harmonic of the v.f.o. tunes 22.5 to 24MHz, and the 4th harmonic tunes 30 to 32MHz, both are well clear of the local oscillator range and the input frequency.

Classic 20 & 80m Transceiver

A 'Classic' 3.5 and 14MHz transceiver: This is based on the simple concept from s.s.b. transceivers of the 1970s, using a 9MHz i.f. and a 5 to 5.5MHz v.f.o. (I believe some versions of the Drake transceivers used this arrangement).

The sum of the i.f. and the v.f.o. gives 14.0 to 14.5MHz and the difference gives 4 to 3.5MHz. **Note:** I've written it this way round, as on 3.5MHz the tuning is reversed. Only one carrier crystal is used, which gives upper sideband (u.s.b.) on 14MHz and due to the output frequency inversion, gives lower sideband band (l.s.b.) on 3.5MHz.

A block diagram of the intended system is shown in **Fig. 2**. The Poundbury is the only part of this that I've produced to date. However, I've experimented with a 5 to 5.5MHz v.f.o. but can't produce it as a version of the existing Portland VFO design. There's no suitable TOKO coil, which needs to be about 20µH for this frequency and would need to have a turns ratio of 4:1 from main winding to secondary winding. However, I have successfully used a toroid but on the other hand I know that there are a lot of constructors who hate these devices for some reason! Tuning was done with a 100pF Jackson variable made specially to order by Jackson/Mainline Electronics.

Tuned Pre-amplifier

The Tuned TX/RX Pre-amplifier is a nose-to-tail pair of dual-gate m.o.s.f.e.t.s with tuned inputs and outputs in conjunction with dual-band switching. Transmit-receive switching is hoped to be achieved simply by switching the supply rails.

I have the arrangement drawn up, but it's still a long way from being put into production. On receive it should provide 10 to 16dB gain and on transmit it should bump up the 2mW output from the Poundbury to about 50mW.

Main Transmit Amplifier

The main transmit amplifier is also hoped to be achievable in two stages, each stage is a push-pull. The first stage is likely to be a pair of 2N4427s in push-pull taking 50mW and amplifying it up to about 1W.

The second stage providing 25W output will either be a pair of 2SC2312 CB radio type plastic power devices or power f.e.t.s, as used in the CTE 737 CB power amplifier. This unit is also some way from production but I'm hoping the numerous circuits, data sheets and application notes accumulated over the years will assist in the development work.

Unfortunately, for the anti-toroid brigade, the push-pull amplifiers will use these devices in wideband arrangements suitable for use anywhere 1 to 30MHz. In the case of the classic transceiver there will be band-switched 3.5 and 14MHz low-pass filters (l.p.f.s) at the output. There will be more toroids (sorry folks but these devices really come into their own in these applications!).

Easing the burden: Don't worry, for those who don't like winding them, toroids will be available ready-wound as part of the kits!

Top Band SSB Transceiver

Version for Top Band (1.8MHz): This

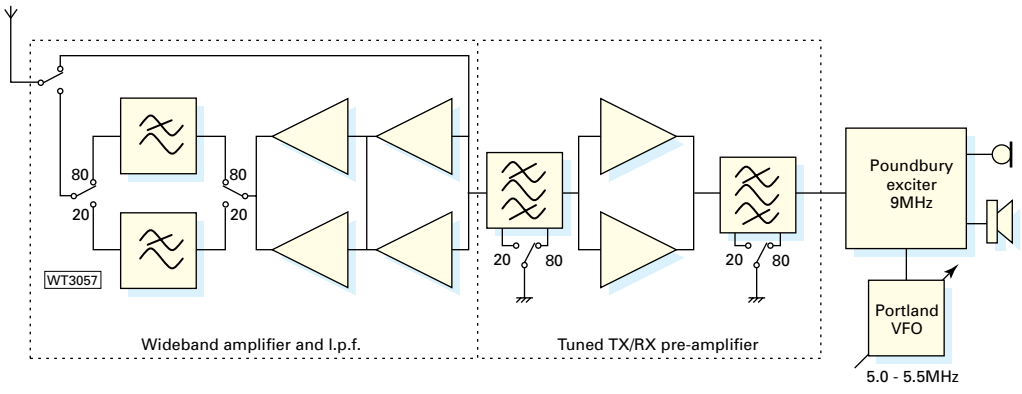


Fig. 2: Block diagram of a 'Classic' 3.5 and 14MHz transceiver. This is based on the simple concept from s.s.b. transceivers of the 1970s using a 9MHz i.f. and a 5 to 5.5MHz v.f.o. (see text).

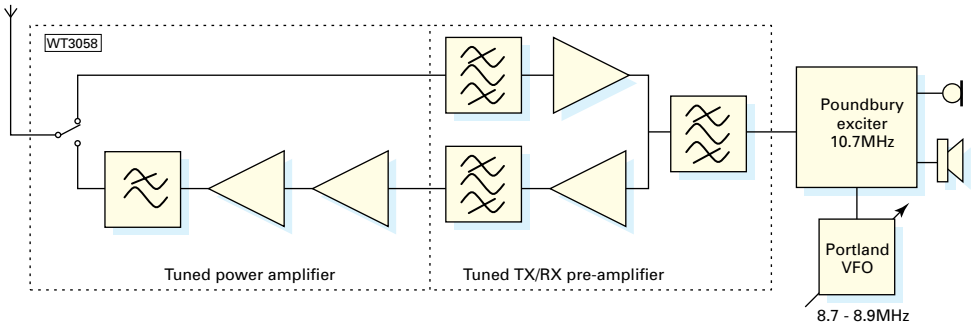


Fig. 3: Block diagram of a 1.8MHz - Top Band - s.s.b. transceiver (see text).

version of a Poundbury transceiver can be realised, as shown in **Fig. 3**, using tuned TX/RX pre-amplifier and tuned power amplifier but not requiring the Mixer-VFO board.

When calculating possible 'birdie' problems, I noted that five times 1.8 to 2MHz gives 9 to 10MHz. This would mean that at the bottom band edge, the harmonic of the transmit signal might get back into the Poundbury unit and generate intermod products. The solution in this case is to use a 10.7MHz i.f. and a Portland VFO tuning 8.7 to 8.9MHz.

The arrangement would give a backwards reading tuning scale and the u.s.b. carrier crystal would give l.s.b. on the band. The TX/RX pre-amplifier would use dual-gate m.o.s.f.e.t.s nose-to-tail as in the 3.5/14MHz metre version but for the tuned power amplifier on this band, I would choose power m.o.s.f.e.t.s to advantage.

Wide Variety Of Options

The Portland VFO, together with the Poundbury SSB exciter, makes possible a wide variety of transceiver options in addition to those dealt with here. The constructor will need to work out what local oscillator range is required and then, whether the v.f.o. harmonics are likely to fall in that range or the input range. Choice of main i.f. can avoid problems provided the v.f.o. range is 0.5MHz (500kHz) or less.

Other i.f. frequencies, such as 7.8MHz using CB multi-mode crystal filters and carrier crystals, can be used successfully. The p.c.b. board for the Poundbury will include tracks for the 9MHz filter available. For other filters, I suggest that constructors try to arrange drilling for fixing and wiring of the filter, so that lead lengths are as short as possible and run near the groundplane.

With hindsight it may have been better if this article had been the first one to launch the Poundbury transceiver concept! ***Note:*** *Such are the natural hazards of monthly magazine publishing Tony! Books on our subject take a year or so, whereas we achieve the same in a month or so.* ***Editor****.*

The various amplifiers will be the subject of future articles and may be chosen according to reader interest received by mail or E-mail and if you wish to correspond regarding this article or previous ones subscribe to the list **pw-g4cfy-on@pwpublishing.ltd.uk** by sending a blank E-mail with the word subscribe in the subject box. When you receive confirmation from the server you can send an E-mail to **pw-g4cfy@pwpublishing.ltd.uk** and your comments will be answered by myself or the *PW* team. Cheerio for now.

PW

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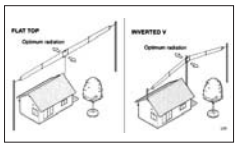

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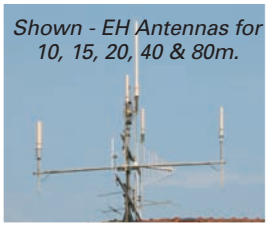

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The Icom PCR1500 wideband computer receiver connects externally to your PC via a USB cable. This provides compatibility with many computer models, even laptops. Incredible coverage is yours with reception from 10kHz to 3300MHz . Modes of reception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

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

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

Icom IC-7000 Bundle
The New IC-7000 bundled with the IC-5LD TFT 5" Display & a MyDEL MP-4128 compact PSU. (As shown) **Only £1069**

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

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

RRP £2768, ML&S £2299
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Only £1349
(Rig only: £Call)

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

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

Icom IC-910X The best 2/70 & 23cm dedicated all mode base. 23cm included.
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Basic Version (without 23cm) also available:
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Icom IC-703 IDEAL FOR M3 USERS
10W Portable/Base HF Transceiver with built-in ATU.
RRP: £703, ML&S: £449

Icom IC-E208 2/70 mobile 50/55W Transceiver with host of additional features. Remote head leads included.
RRP: £365, ML&S: £215

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

NEW Icom IC-E7E **The latest micro Twin Band Handie from Icom!** 2m/70cms. Lithium-Ion battery pack provides long battery life. The stylish appearance is a refreshing change of design in this category. If you want a quality handheld, this is for you. **ONLY £169 - or add a LC-161 for only £16.99 in stock now!**

kenwood

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

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

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

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

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

TS-570DGE Bundles
1. TS-570DGE 100W, with Auto ATU & DSP 'Vanilla' **£739.95**
2. TS-570DGE + MP-4218 23A PSU **£799.95**
3. TS-570DGE + MP4128 PSU & MC-60A Desk Mic **£909.95**
4. TS-570DGE + MP4128 PSU, MC-60A Desk Mic & SP-23 Desk Speaker **£969.95**

Kenwood TM-D700E
The unique 700E is not only a dual-band FM rig but has APRS and TNC built-in.
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2/70 Handie with Gen Cov RX. If you must have SSB RX on your dual-bander then buy one!
RRP: £289.95, ML&S SUPER LOW PRICE: £199.95

Kenwood TH-D7E Mk2
A 2/70 Handie with TNC and APRS capability.
RRP: £359, ML&S LIMITED OFFER: £249.95

yaesu

Yaesu FT-817ND Bundles

Bundle 1. FT-817ND 'Vanilla' - Basic FT-817 ..... **Only £399.95**
Bundle 2. FT-817ND + YF-122C 500Hz CW Filter ..... **Only £429.95**
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● And don't forget the Miracle Antenna or Miracle Ducker from Canada.
Pop this superbly engineered antenna straight on the back of your FT-817 and operate 3.5MHz & 70cm.
Only £99.95

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

FT-857D + ATAS-120 Bundle
Still only £759 for both **(Rig only £559)**

Yaesu FT-897D Bundles

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

Bundle 1. FT-897D 'Vanilla' Basic FT-897 HF-70cm Transportable. ..... **Only £649**
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Bundle 3. FT-897D, FP-30 7 FC-30
The most compact HF base with built-in mains PSU & Bolt-On Auto ATU ..... **Only £849**
Bundle 4. FT-897D, 2 x FNB-72, CD-24 & PA-26
The ultimate HF/V/U system with both batteries, charger & adapter ..... **Only £849**
Bundle 5. Ultimate FT-897D System!
As above but with MP-4128 23 Amp PSU & LDG AT-897 Auto-Tuner. ..... **Only £1079**

NEW!

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

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

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

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

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

NEW!

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

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

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

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

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

NEW PRODUCT!!! Icom IC-E91

VHF/UHF DUAL-BAND FM TRANSCEIVER

This model covers 0.495-999.990MHz with V/V, U/U receive capability. The supplied Li-Ion battery pack provides high power 5W (typ.) output in both bands for stable operation. The large dot-matrix LCD and 4-direction navigation system is perfect for easy to see, user friendly operation. Furthermore, by installing the digital unit, UT-121, you have D-STAR DV mode operation.

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

MAJOR FEATURES

- Wide band receiver with dual watch receiver capability
- Large dot-matrix display
- Total 1304 memory channels
- Simple bandscope
- Keypad navigation
- 5 Watts (typical) output in V/U bands
- Water resistant construction equivalent to IPX4
- Modern design trend follows on from the IC-E7
- D-STAR DV mode ready (Digital Voice + data) with UT-121
- One touch reply button (DV mode)
- Built-in voice recorder and auto reply voice message (DV mode)
- Optional PC remote control capability

REVIEWED IN THIS ISSUE!

Call for special intro price!

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

Key Product Features

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

£499.95 plus £10 P&P

As Reviewed in October 2005 Short Wave Magazine

BS-1100-Kit-A External Antenna

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

£110.00 p&p £7.50. (UK Mainland)

ML&S are appointed distributors for the SBS-1 and associated products.
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Full range of Palstar now in stock

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

EMTRON HF Linear Amplifiers

"The Best Built Amplifiers in the World"

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

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

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

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

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

New! Sommerkamp Linear Amplifiers

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

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

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

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

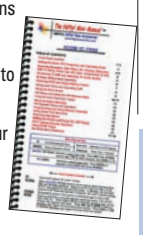
SLA-200 Increase your 2m output! 1-50W I/P 60-250W-PEP 2M LINEAR AMPLIFIER. **£229.95**

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

Nifty Equipment Manuals

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

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



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

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

See our web site under "Books"

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Ten Tec Orion 2

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

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

NEW!

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

MyDEL CG-2000 Remote ATU. Only £149.95

A simple to use remote end-fed wire ATU for 160m - 10m

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

NEW!

NEW MyDEL CG-3000. Only £199.95
High power version. As above but with 200W and 200 memory channels.

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

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

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

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

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

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

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

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

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

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

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

NEW PRODUCT!

FT-Meter. External meter.

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

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

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

The Icom IC-7000 HF/VHF/UHF T

Carl Mason GW0VSW, enjoys his Amateur Radio when he can get away from his intensive work as a TV news and sports cameraman. He was particularly delighted when offered the chance to review Icom's latest portable/mobile rig. Read on!

When the *PW* Editor called me to ask if I was interested - I have to say that I was rather keen to try out the new Icom IC-7000 h.f./v.h.f., u.h.f. all-mode transceiver!

It must be over 10 years ago now since Icom introduced the IC-706. In those days the '706 was advertised as "The Next generation h.f./v.h.f. compact transceiver capable of operating in both the home as a base station or as a mobile/Portable rig".

The IC-706 could be found on many a DXpedition, large and small. There's no doubt that it became a huge success and was followed by the improved MkII and MKIIG versions, which addressed some of the small problems found in the earlier model. One such gripe was the poor speech quality - especially on v.h.f! That's something that has definitely been addressed on the new model with the addition of various optional microphones to suit your operating environment.

Advanced All-Mode

The IC-7000, **Fig. 1**, is very similar to the '706 although the case is not quite as deep, measuring just 167(W) x 58 (H) x 180(D) mm and weighing in at 2.3kg. The IC-7000 must surely rate as one of the most advanced all-mode mobile transceivers available today.

Whether it's in the shack, in the car or used portable, Carl Mason GW0SVW thinks the Icom IC-7000 is a truly versatile package (see text).

The fitted digital signal processing (DSP) is at the intermediate frequency (i.f.) level and this is just one of several features of the impressive radio. In fact, the IC-7000 uses two DSP chipsets for improved processing on all the Amateur bands.

Altogether there are 41 bandwidths available as standard and you can even select a 'sharp' or 'soft' filter shape to suit your operating taste. A variable twin pass-band tuning (PBT) allows you to either reduce the i.f. pass-band, or to shift the entire pass-band to eliminate most QRM.

The 2.5in (63.5mm) colour thin-film technology (TFT) display, **Fig. 2**, is another interesting feature of the transceiver. Not only does this display provide the operator's current operating set up, showing items such as frequency readout, selected memory, filter in use and mode indicators, it also includes a two-mode band 'scope!

In the **centre mode** the 'scope is centred on the receiving frequency and in the **fixed** mode the bandscope sweeps a fixed range. Eight of the most used radio functions are controlled by dedicated function keys, and these are all arranged around the display. One quick push of a button turns that function on or off. A longer push will allow adjustment of that function's settings. A useful addition is an

Transceiver

By Carl Mason GW0VSW

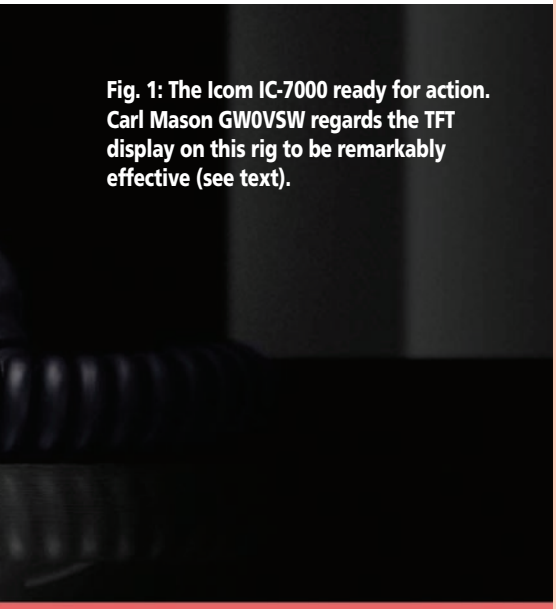


Fig. 1: The Icom IC-7000 ready for action. Carl Mason GW0VSW regards the TFT display on this rig to be remarkably effective (see text).

internal memory keyer, which provides four memories for station information or contest exchanges.

The keyer also performs automatic repeat and can also be set up to generate contest serial numbers. Added to this, there's a digital voice recorder that can record for up to 25 minutes, an RTTY demodulator with reader on the TFT screen, adjustable s.s.b. bandwidth, video output and a clock with timers. There's also a DTMF memory and full break-in with adjustable c.w. pitch and a detachable control head. (**Note:** The control head does, however, require an optional separation cable).

So, after the long list you'll get some idea of the amazing facilities available in such a compact package! Out of the box the IC-7000 came with the HM-151 backlit remote microphone, a d.c. power lead, spare fuses, ACC cable, 3.5 and 6.5mm plugs, microphone hanger clip, ferrite bead and the essential manual that runs to 156 pages.

Wide-Band Receiver

The IC-7000 covers all Amateur bands from 1.8 to 28MHz as well as 50, 144

Fig. 2: Close up view of the TFT display (see text).

Fig. 3: An unusual photograph, clearly demonstrating the TFT display's capabilities (see text).

Fig. 4: The supplied HM-151 microphone (see text for comments).

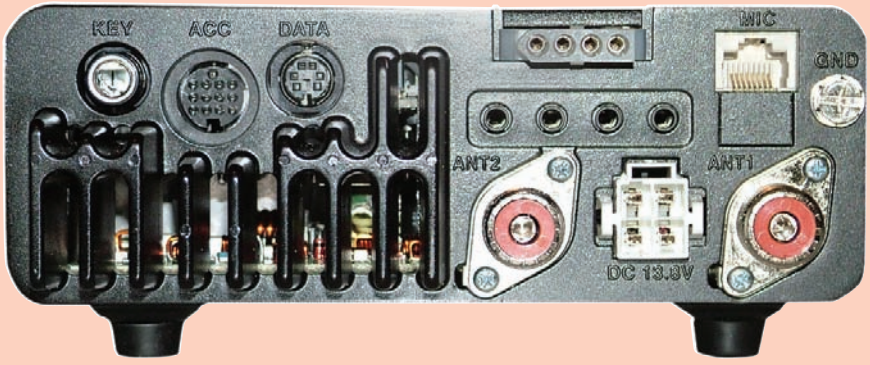
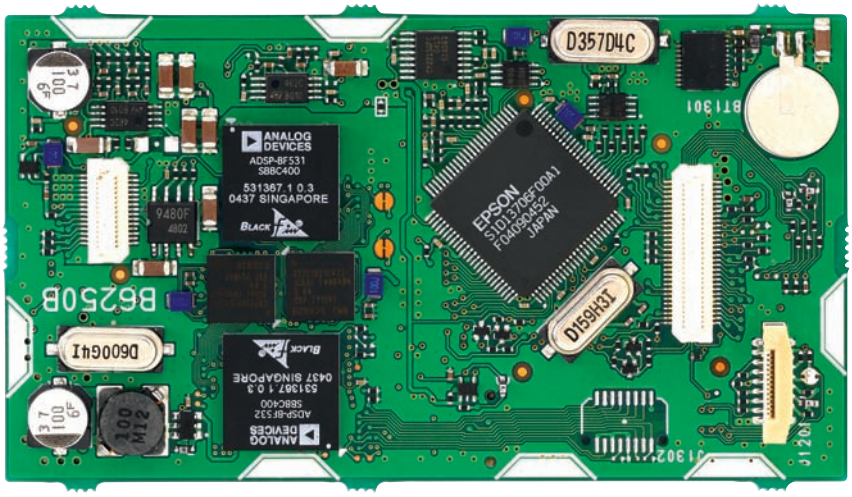


Fig. 5: Rear panel of the IC-7000 (see text).



No - it's a radio - not a computer!

and 430MHz and includes a wide-band receiver. Modes of operation include c.w. a.m., s.s.b. f.m. and RTTY. The receiver has wide-band f.m. (WFM) for listening to broadcast stations as well as TV audio.

The case, as already briefly mentioned, is quite compact and extremely well constructed. It should survive the rigours of mobile installations or rough use on DXpeditions with ease!

At the left of the front panel are the **AF/RF** Gain controls. Obviously, you can set the audio frequency (a.f.) volume to suit your taste and hearing. However, I must say that I found the audio quality from the IC-7000's speaker exceptional for its size.

The audio frequency (a.f.) gain and squelch levels are normally set to the '12 o'clock' position for normal use and the squelch is particularly effective when using f.m. This control can be set as an auto function using the internal menu and will operate as an r.f. gain control in either c.w., s.s.b. or RTTY modes, or as a squelch control in a.m., f.m. and WFM modes.

Beneath the AF/RF gain controls, is the **Power** switch followed by the **Pass band Tuning/Memory Channel/RIT** (receiver incremental tuning) control. The general PBT function electronically reduces the i.f. pass-band width by shifting the intermediate frequency slightly outside of the i.f. filter pass-band to reject interference and it's normally set in the centre position.

The limit of the variable range depends on the pass-band width and mode, which for most modes is in 25Hz steps. The operator has to push-and-hold the button for one second to select the menu group and again to select the menu. There are 501 of these memory channels in five memory banks.

Using the **Memory mode** can be useful for quickly changing to your favourite frequencies or bands. The RIT control allows you to adjust your receive frequency up to ±9.999kHz in 1Hz steps without moving the transmit frequency. Incidentally, it's one control I find I'm using more frequently these days - as operators seem less inclined to accurately tune into my signal during a QSO! Especially when using s.s.b. on a crowded band.

Next comes a series of four buttons running vertically. Select the Mode you wish to operate in. Those available on the IC-7000 are **SSB** (**LSB/USB**), **CW**, **CW-R** (Reverse), **RTTY**, **RTTY-R** and they are selected by pushing the button briefly. Pushing and holding for one second allows you to access **AM**, **FM** and **WFM**.

The **Pre-Amp**: This amplifies received signals in the front end circuitry to improve the signal-to-noise ratio and sensitivity. (I used this function a good deal and it was working well when copying weak signals on h.f.).

The transceiver is remarkably compact.

The **Attenuator:** The attenuator reduces the distortion or spurious signals you experienced from strong signals nearby or from broadcast stations. (Not something I needed to use much during the review period).

Next is a **Tuner/Call button.** An optional accessory for the IC-7000 is the **AT-180** automatic antenna tuner (a.a.t.u.) and the tuner button allows you to turn this on once it's connected. The antenna in use is then automatically tuned (once the s.w.r. goes higher than 1.5:1 for h.f.). However, for 50MHz the operator has to push and hold the Call button for one second for the tuner to match.

Note: When using long wire antennas the **AH-4** automatic tuner is recommended and this will enable operation with a wire 7m or longer on 3.5MHz and above.

Main Menu Group

The **Menu/Group** button provides access to the main menu group or to sub-menus. The operator can then select various functions such as **VOX**, **Automatic Gain Control**, **Split Frequency operation**, **Microphone Gain**, **Band Scope**, power levels and so on, using the F1-4 buttons under the screen as selectors or the main dial to set levels.

All told, you can adjust over 50 of the radio's settings using these memories. This all seems rather complicated when you first encounter it but those of you familiar with the IC-706, will agree that after a while accessing the menus becomes second nature and the functions very easy to select or set.

Main Display

Alongside the control keys is the 2.5inch (63.5mm) TFT main display, which on the IC-7000 is colour, was very easy to read in the variety of light conditions I encountered during the review. Contrast and brightness can be adjusted in 1% steps and the background colour can be changed from A - Black, B - White and C - Blue. The photograph, **Fig. 3**, shows just how good a display is possible on this unit!

The operator can decide on the font size they'd like displayed and whether they want it basic or italic. You can even set your callsign to be displayed in the opening screen when turning the power on!

Underneath the screen are four multi-function buttons marked F1 to F4. Like most electronic equipment these days, each button has several functions depending on the time they are pressed or the sequence used. It's something we all have to live with and in fairness to Icom I found that after a period of time, accessing these menus became much easier. Mind you, I always kept the manual near! (Just in case).

The display not only shows the

operating frequency and the various functions that have been set, it can also display a 'meter' for either **RF Power**, **SWR**, **ALC** or **Compression** levels one at a time, or all four simultaneously! Alongside this there's also a small bargraph to show the internal temperature of the transceiver!

More Buttons!

To the right of the screen are four buttons. In ascending order these select the **Noise Blanker**, **Noise Reduction**, **Manual Notch** or the **Auto Notch/Voice Recorder**. The Noise Blanker eliminates the pulse type noise such as that from car ignition systems, or electrical line noise (this feature is not available in WFM). The noise reduction function is designed to enhance a signal in the presence of noise by using the DSP circuitry, and the amount of this is adjustable. The default setting for this is level 4 but this can be altered to suit your taste from 0 to 15.

The manual notch filter can be used in either the selected s.s.b., c.w., RTTY or a.m. modes and can be turned on or off by momentarily pushing the button. Pushing this for one second accesses yet another sub menu where the filter width can be set from **Narrow**, **Middle** or **Wide**.

Auto Notch Functions

The transceiver has both an **Auto Notch** function in the s.s.b., a.m. and f.m. modes. This automatically attenuates up to three beat tones or tuning signals and so on, even if they are varying. The manual notch can be set to attenuate a frequency via the set mode in yet another memory. (A voice recorder can be selected by the same button and I'll cover that later in the review).

A **Tuning** Step button comes next, under which are two light emitting diodes (l.e.d.s) indicating **Transmit** (**TX**) and **Receive** (**RX**) and below that is a button for **Speech Lock**. Next is the **Main Tuning** knob, which is very smooth in operation.

Tuning can be carried out in steps of 0.1, 1, 5, 9, 10, 12.5, 20, 25 and 100kHz to suit your taste and are all independently selectable for each mode. Friction on the tuning knob can be adjusted by a small lever to the right hand side and it can even be set to feel like a ratchet with a very positive 'click' as you turn it! The **BAND Up** and **Down** buttons are positioned in the right hand corners.

Folding Stand

There's a small folding stand on the base of the IC-7000's case, as found on previous models and the speaker and fan units are to be found on the top of the case. There are several different brackets including the MB-105 and separation cables like the OPC-1443 available, should you decide to remove the front panel and mount it away from the main body.

Manufacturer's Specifications & Features

Type:	Icom IC-7000 Amateur h.f/v.h.f/u.h.f transceiver
Frequency range:	TX: 1.8-28, 50,144 and 430MHz
	RX 300kHz - 200MHz/400-470MHz
Modes:	a.m., c.w., s.s.b., f.m., RTTY, PSK31
RF Power output:	h.f./50MHz 144MHz 430MHz
	2-100W 2-50W 2-35W
FM/SSB/CW/RTTY/AM:	1-40W 2-20W 2-14W
Voltage:	13.8V d.c.
Current drain	RX: 1.3-1.6A TX: Max 22A
Impedance:	50Ω, 2 x SO-239
Dimensions:	167W x 58H x 180Dmm
Weight:	2.3Kg

Other features:
DSP, Digital IF filters, Two point manual notch filter, Memory keyer, Auto repeater functions, Multi-function meter Power/SWR/ALC and Compression, 100-step noise blanker, 24 hour clock, CTCSS, DTCS tone squelch, 2.5in TFT display, Back-lit buttons, IF-DSP, 508 memories, Voice recorder, Detachable control head, CI-V, Pre-amp, Digital RF speech compressor, Remote control microphone, RTTY demodulator, Adjustable SSB TX bandwidth, Band-scope, Built-in voice synthesiser, DTMF memory, Audio equaliser.

Microphone HM-151

The microphone supplied with the transceiver is the HM-151, **Fig. 4**, and it has a variety of functions controlled from a keypad. Using the keypad the operator can change band, mode, select a filter, check transmit frequency or programme the function keys to suit personal requirements. Two microphone sockets are provided. (One just under the front panel, and another at the rear) though you can only use one of these at any one time

Rear Panel Connections

The rear panel, **Fig. 5**, on the IC-7000 has the same facilities as are provided on the IC-706. There are two antenna sockets with one for h.f./50MHz and the other for 144 and 430MHz. There's also a 6.3mm type stereo jack for connecting a c.w. paddle or key, and an internal keyer is provided.

Also provided are four sockets, and these include the **Video Out** jack, **Icom CI-V** remote computer interface. However, I must say I was disappointed that there wasn't a USB connector as nearly all of us now have those on our home computers! It would make interfacing far simpler.

Next is an RTTY socket, and one for an external speaker. There's a 13-pin ACC socket for connecting external equipment like a linear amplifier or automatic antenna selector. Also included is a 6-pin data socket where you can connect a soundcard or TNC, plus a microphone connector, ground terminal and the d.c. power socket for use with the supplied cable.

The Morse Mode

For GW0VSW, the 'Morse mode' is the main interest and the IC-7000 does not disappoint. A 6-60 words per minute (w.p.m.) keyer has been included, having four memories and contest serial numbers can also be set. Incidentally again, the instructions to set this up are quite complicated and would take a while to get used to.

Keying speed is, again, set-up in the menu, although I would have preferred something a little easier and quicker to adjust the speed. Going through the memory to change this could be tedious, especially in the heat of a contest for example.

The relay can be heard clicking away when c.w. is being used, but if you're like me and tend to wear headphones - this shouldn't be a problem. I tried a paddle and straight key during the short review period and both worked very well.

Operating On Sideband

Let's now look at operating on s.s.b. And to begin, for sideband operating it's important that you have the IC-7000 set up correctly. So, practising what I preach, I followed the instructions in the manual, adjusting the microphone gain to a suitable level indicated by the ALC meter on the screen

Fig. 6: Denzil Evans GW3CDP/M helped to evaluate the IC-7000's performance on v.h.f. (see text).

and had no problems. In fact, comments on the audio quality during the review period were very complimentary.

As mentioned earlier, the operator can adjust the s.s.b. transmit bandwidth (**TBW**) and I had tried this before on the last version of the IC-756PRO. The filter attenuates frequencies on both the high (500Hz, 2700, 2800 and 2900Hz) or the low side (50Hz, 100, 200 and 300Hz) and you are able to store three combinations of these settings.

Defaults are already set and are 100-2900, 300-2700 and 500-2500Hz. I used the widest settings for all my s.s.b. activity and had no complaints!

The supplied microphone is okay with all its 'bells and whistles', but there's no doubt that my IC-SM6 base station microphone out-performed the fist microphone at all times. I did try this with the OPC-589 adapter I acquired for my IC-706, but used the supplied microphone for the rest of the review!

In fairness to Icom, they clearly state that the supplied HM-151 microphone is more tailored to mobile operation with it's slightly restricted audio response. However, I'm sure that anyone who buys and uses the 7000 for a while, will be able to set up any microphone to work just as they want it to, using the variable settings in the transceiver.

Keyboard Modes

The IC-700 incorporates RTTY and digital (keyboard) modes. However, I'm no expert when it comes to RTTY and digital modes so, it was interesting to find that the IC-7000 has a RTTY decoder already built in. An external TNC is not needed when you wish to receiver a Baudot signal. An RTTY tuning indicator makes tuning that much easier and a tuning meter is automatically displayed on the TFT screen when the decoder is turned on.

Once again menus can be tailored to suit individual needs for the keyboard modes. For instance, you can select the

Fig. 7: Find the IC-7000! The transceiver (see text for Carl's comments) seems to be 'lost' in his shack. But size isn't everything as he found out!

new line code of the internal decoder which by default is CR, LF or CR+LF (CR = Carriage return, LF = Line feed). But to be honest, I'd really need to have the transceiver a while to assess this properly and get to grips with operating using this mode.

Working VHF & UHF

The IC- 7000 is fully equipped for working on the v.h.f. and u.h.f. bands. For me this was useful in a base station but not so much for when working portable or mobile. I tend to use both of these higher bands for local rag chewing only and not for long distance contacts.

With the help of **Denzil Evans GW3CDP** - who monitored my transmissions - I managed to try out both bands from my car. This was achieved by using a small vertical antenna on a magnetic mount on the roof of my car, **Fig. 6**, at locations around our homes up to 24km (15 miles) apart.

The signal strength remained good at 5W and the audio quality was once again crisp and clear, despite some strong local interference. However, I have no doubt that there are those amongst you that will push the rig to its limits and achieve far better results - bearing in mind the limits of such a small transceiver.

One limiting factor of the IC-7000 for the keen v.h.f. operator, is not being able to receive on more than one band at a time and listen for a satellite or local repeater. You can however, set the variable frequency oscillators (v.f.o.s) to transmit on one band and receive on another.

You can of course, also store your favourite repeaters in the internal memories with a standard offset and tone setting. The receiver in these bands is reasonably sensitive, and I had no problems listening to Band II v.h.f. broadcast stations. I particularly enjoyed this when the bands were dead, or when monitoring the control tower at Swansea airport or some of the local maritime channels.

Digital Voice Recorder

The IC-7000 has a built-in digital voice recorder with up to four channels for transmitting, where 90 seconds can be recorded. On receive, there are up to 99 channels available, where a maximum message length of 120 seconds can be recorded, with a total message length for all channels of up to 1500 seconds. This is a very useful addition, especially for those who are interested in contesting or DX operations where consecutive calls are being made.

One touch recording is possible if you are listening to a signal, and this is activated by pushing the **ANF/REC** button for one second to begin the recording and pushing it again for one second to stop. This recording is automatically stopped after 120 seconds or when the total recorded time reaches the maximum allowed.

With conditions so poor during the period when I was doing the review I did record a "CQ" call and used it often. This saved my voice and made for a less stressful operating period!

Built In Clock-Timer

The transceiver has a built-in 24-hour clock, which is always displayed and includes a **Power Off** timed function. This automatically turns the IC-7000 off when no operation has been carried out for a set period between 30-120 minutes in 30 minute steps. A second clock is available so you can have, let's say, both local time and UTC displayed or even the time in another country.

Mobile & Portable On HF

The IC-7000 is designed as a portable rig and I was keen to try it out in my car (E certification is pending and should be approved very soon) to see just how well it would work on h.f., I tried various Pro-AM mobile whips, but conditions only really allowed contacts to be made on the 7MHz band.

Despite several calls to Icom requesting a loan of the AT-180 unit, there wasn't one available in time. I was somewhat disappointed as it would have

been nice to have used the auto tuner in a mobile/portable environment to see just how well the pair worked. However, I decided to use my old MFJ-971, which did the job well and had no problems matching my whips.

The bands were in very poor shape and I did struggle to make any contacts. On 7MHz **DR2006O** operated by **Marcus DF1DV**, she was able to control his large pile-up to pull me out of the noise giving me a 5 and 7 report 'in the clear'.

I heard several other Europeans but was unable to work them. A change to 14MHz was greeted with just one s.s.b. station audible, **Bill M5VIM** near York, who gave me a 5 and 5 on his G5RV before he faded away. A few minutes later *PW* HF Highlights reporter **Chris G1VDP/P** in Cornwall was heard at 5 and 7, but despite several attempts to work him he could not quite get my suffix and he slowly disappeared in the noise!

Lower down the band there were a few c.w. stations operating and I managed a very difficult QSO with **Thaddy HB9DNB** in Lucerne, Switzerland. He was RST339 with me and I was RST559 with him.

The QSB and QRN allowed me to use the IC-7000's filters to good effect, and with the help of the pre-amplifier another call made it into the log. All told I managed to work most of Europe with both voice and the key and copied many DX stations around the globe.

The skip conditions were slightly unusual during the short review period and I monitored quite a number of G stations on 14MHz drifting in and out from well over 59+ to unreadable! My best contact was on this band was with **Toni SV8/HA4DXI** (A Hungarian Amateur working from Greek territory) on EU-174 with 55/59 being exchanged.

Stateside calls finally came in late afternoon with some very strong signals but I wasn't able to achieve a QSO. However, I'm sure with more time and better antennas it would be possible to have worked some of DX stations.

Incidentally, during the mobile period I only needed to consult the manual on a few occasions to adjust settings when I lost track of where I was in the menus! So, I think that with due care and attention to the installation the IC-7000 would perform very well in the car on both h.f. and the higher bands.

Base Station

As a base station, **Fig. 7**, the IC-7000 takes up very little space and looked lost amongst all my other equipment! In fact, the SP-21 speaker I have dwarfed the '7000, but did provide a slight improvement on audio quality although, I prefer to use headphones for most of my operating.

Using a manual a.t.u., it wasn't long before I was working stations on my G5RV on bands from 3.5 to 18MHz. I managed EA6 (Spain), K (USA), OE (Austria), ON (Belgium), DL (Germany), OK (Czech Republic), OH (Finland) and SP (Poland) with little difficulty one afternoon using both c.w. and s.s.b., although conditions could have been better.

I feel the transceiver wasn't as sensitive as the IC-737 I normally use, but it was good enough to work everything I heard. In time I could probably live with it as my 100W rig, when not operating with my usual QRP transceivers.

Exceptional Transceiver

In rounding off the review, there's no doubt in my mind that Icom have produced an exceptional transceiver in the IC-7000. For a multi-band rig in such a small package, that can be used either mobile or portable or as a base station, it's ahead of its class.

The TFT screen is superb and contains just the right amount of information and is easy to read in a variety of lighting conditions. The menus seem complicated at first, but after a while their use becomes second nature. Besides, once you have set up most of these to suit your own particular operating style you won't have to adjust them again!

The number of facilities built into the IC-7000 are truly amazing and it's impossible to do it justice in such a short review. Despite this, I do hope that I've managed to give readers a taste of what is on offer in this remarkable package. It has something for everyone, whether you are an operator or short wave listener. If you want just one transceiver to do everything this one has to be it! For the money I am sure you will not be disappointed. **PW**

Fig. 8: Underside view of the chassis.

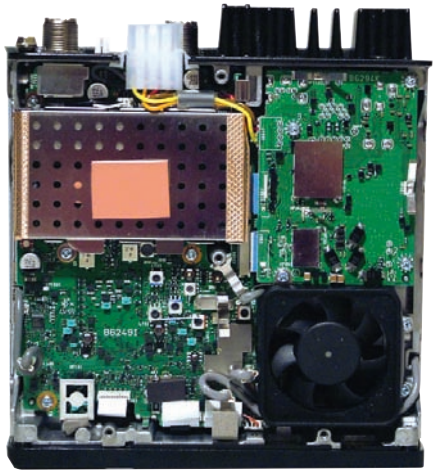


Fig. 9: Top chassis view, with the cooling fan on the right.

Product

Icom IC-7000 all-mode mobile/portable transceiver

Contact

Icom UK Ltd
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E-mail: info@icomuk.co.uk

Pros & Cons

Pros: There's no doubt in my mind that Icom have produced an exceptional transceiver in the IC-7000. For a multi-band rig in such a small package, that can be used either mobile or portable or as a base station, it's ahead of its class.

Cons: No USB socket for home computer use, and no a.a.t.u. (optional accessory) available for review.

Price: £1049.95

Supplier

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Antenna Modelling for Free

Paul Wilton M1CNK, explains how to using a free computer program could dramatically improve your antenna system. Try it for yourself!

In his April 2005 Data Burst column, **Robin Trebilcock GW3ZCF**, presented a good introduction to antenna modelling using the free demo version of ***EZNEC***. Written by **Roy Lewallen W7EL**, *EZNEC*, is a very capable commercial antenna modelling program widely used by Radio Amateurs (and others) to design and evaluate a wide range of antennas. The demo version is very cut down though and only really enables you to model antennas comprising of a couple of wires. To model anything larger, you need to purchase the full version, which isn't unreasonable!

However, if you look around on the Internet, it's possible to obtain free fully functional antenna modelling packages for a PC running *Windows*. One reason for this is that the basic 'engines' used by most of the affordable antenna modelling packages are already available for free. It's these engines that actually model the antenna elements, whereas the user interface, editing the antenna design and displaying the results, are handled by other parts of the software. Therefore, the differences between antenna modelling packages revolve around the user interface – the underlying calculations are done using a standard engine.

There are three main antenna modelling engines available today and all three have a common ancestry, a program called the *Antenna Modeling Program (AMP)*. It was developed at **Lawrence Livermore University** in California during the 1970s and was developed into *Numerical Electromagnetics Code 2 (NEC2)*. This was a program that was originally written in ORTRAN for use on mainframe computers.

A simplified version of *NEC2*, for use on early personal computers, written in BASIC called *MININEC* was also produced. Later, a more advanced version, *NEC4*, was released.

Free Download

The source code for *NEC2* and *MININEC* has been made Public Domain, which means that anyone can freely download, compile, modify or incorporate it into other products. The later *NEC4* package is not Public Domain and it's sold as a commercial product by Lawrence Livermore University.

Having originated in the USA, *NEC4*, is subject to export controls too. Unless you have deep pockets, you're unlikely to want to purchase an *NEC4* engine. It's just as well that *NEC2* generally does most of what you would want *NEC4* for!

Of the two packages mentioned by Robin, *EZNEC* uses the NEC2 engine whereas *NEC4WIN95* uses *MININEC*. In the past, the main advantage of using *MININEC* was its speed – as it's simpler, it runs quicker. However, with the huge processing power of modern PCs, generally *NEC2* runs fast enough for you not to worry about it.

The *MININEC* program does have a couple of other minor advantages over *NEC2* under some very specific circumstances, notably designs with tapered elements. But generally *NEC2* is the better choice as it models 'real world' situations better – especially those that include the ground.

There are two antenna modelling programs that are easily available as freeware – *MMANA* written by **Makoto Mori JE3HHT,** which uses the *MININEC* engine and *4nec2* written by **Arie Voors**, which uses the NEC2 engine. I have been using *4nec2* for a few years now and have found it to be very a useful piece of software. **Note:** It runs under any version of *Windows* since *Windows95*.

To cater for older machines, there are two versions – the basic *4nec2* and the extended *4nec2x*, which has an additional 3D graph capability but which requires *DirectX7* or better. As a guide, I have regularly run *4nec2x* on a 600MHz Pentium3 under *Windows 2000*. It is, perhaps a little 'clunkier' than *EZNEC* but its features and power more than make up for this. Also, for the price, it's pretty unbeatable!

As I explained earlier, *4nec2* uses a

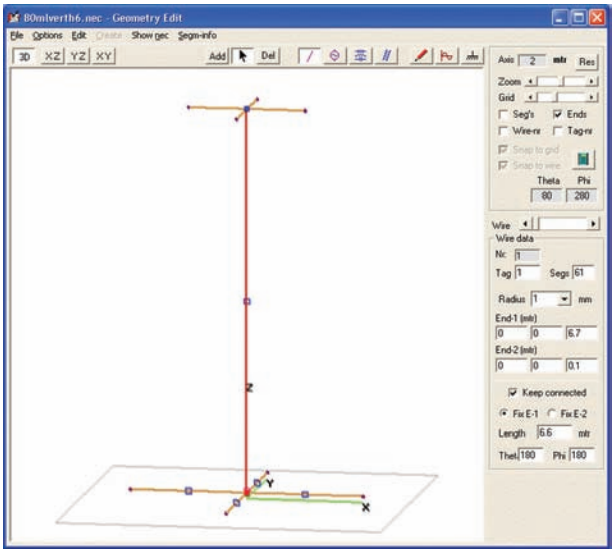

Fig. 1: The Geometry Editor

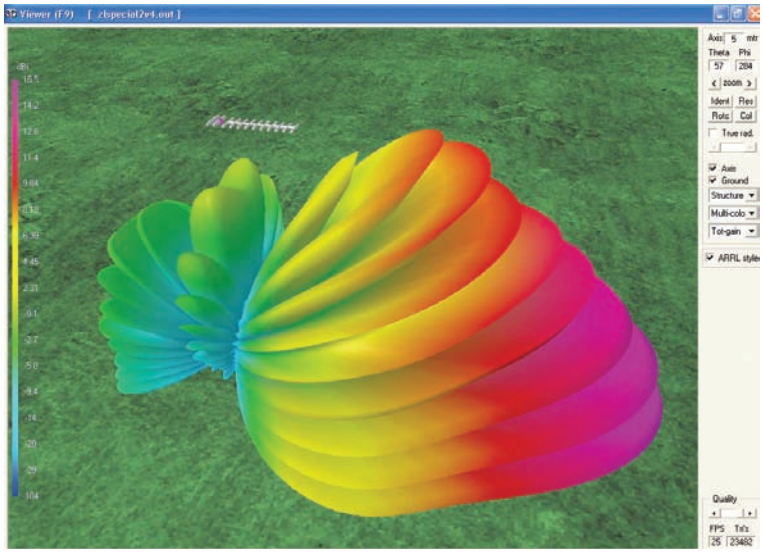

Fig. 2: 3D view of a far-field pattern for a 144MHz ZL Special Yagi.

derivation of the original NEC2 engine like *EZNEC*. Whereas this is hidden in *EZNEC*, in *4nec2*, this separate engine is very clear – indeed it actually brings up a DOS box whilst running the *NEC2* engine. The *4nec2* program can run a number of different *NEC2* variants, but if you are running *Windows XP* and can't afford *NEC4*, you only have a choice of one engine.

Beginning & End

To enter a design, you need to split your design up into separate straight wires that are, in turn, split into a number of segments. You need to specify the beginning and ends of each wire as co-ordinates with three dimensions – x, y and z. (Robin's article gave an excellent introduction on how to do this, so I won't repeat it here).

Needless to say, I would recommend starting with something easy such as a doublet or inverted-V and building up from there. Once you have worked out the coordinates of your wires, you need to enter them into the program. Since the program acts a pre-processor for *NEC2*, it uses the standard *NEC2* notation. This notation at first appears a little mysterious since it's based around the FORTRAN concepts of 'cards'.

Back when *NEC2* was first developed, one of the main ways of entering data into a computer was to use a punched card. Each card had a grid of characters, which you punched out, thereby allocating a character per space in each line of data entry. So, each element of the antenna model was allocated a separate 'card'. These days, the separate cards are allocated individual lines in a text file and hence are far easier to use!

There are three ways of building-up a model in *4nec2*. The first is to use a text editor such as *Notepad*. In this mode, the program offers no assistance and since you need to know about *NEC2* cards it's not recommended for beginners. However, with experience, it can be the easiest way to conduct some operations such as combining different models.

The next method is the built-in NEC editor. This helps you insert the individual *NEC2* lines by giving you a list of what they are and showing you what the syntax is for each line. Whilst perhaps slightly intimidating at first, with some practice it rapidly becomes quite familiar. It's also the method that gives you maximum use of all of the options offered by the *NEC2* engine, together with some additional features that *4nec2* has introduced. Such features including: insulated wires, alternative loads and symbolic entry (more on that later).

When starting out with this editor, the easiest option is to take an existing file (*4nec2* comes with an extensive list of example files) and modify it.

The third (and newest) method of element entry is to use the graphical geometry editor (see **Fig. 1**). This enables you to draw your design on a three dimensional drawing pad, which can make it far easier to see exactly what is going on. You can alter dimensions and see the effect directly.

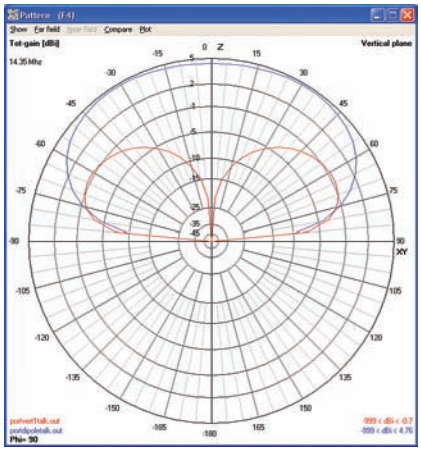

Fig. 3: Far-field for vertical (in red) and inverted-V doublet (in blue)

Spreadsheet-Style

Finally, there's also a 'spreadsheet-style' option, where you can enter the end coordinates of the lines. In this mode, it looks quite similar to EZNEC. The real beauty of having the above methods is that you can easily switch between them. You can draw a rough design in the geometry editor; re-open the design in the NEC editor to add some symbolic information.

Then you can re-open the file in *Notepad* to easily patch in another antenna building block and go back to the geometry editor to see the result! Having the right tool for the job can be a real time saver.

One of the really powerful features of *4nec2* is that you can define your antenna in terms of symbols and equations. Thus, if you want to see the effects of changing the antenna height, one method would be to change the value of the z co-ordinates for each point in the antenna. For a simple dipole, this would involve changing (perhaps) four values.

For something a little more complicated, this could rapidly become more tedious. In *4nec2*, you can define a variable 'h' at the beginning of the file to represent height and set it to the value you want to try. Then, for each z-co-ordinate in the model, you can enter 'h' and the program will use the value defined at the beginning of the file. So, you only need to change the value once.

More powerfully, you can also enter simple equations. These equations can include functions such as sine and cosine. Thus, for an inverted-V antenna, you can define the end-points in terms of simple equations based upon height, element length and angle of the V. Then if you wish to model the effect of altering the angle of the V, you only need to change it in one place.

A final powerful feature concerning these symbols, is the built-in optimiser that will, by varying the values of the symbols, carry out tasks in order find the 'best solution' for an antenna. The 'best solution' can include best match, best gain, best front-to-back variation and so on.

So, by taking a basic antenna, you can get *4nec2* to tweak it to match your requirements. For example, if you have a loaded dipole with a loading coil some way down the antenna, you can get *4nec2* to try out different values of coil inductance to find the best match for a given frequency. Going beyond that, you can then get it to vary the coil position as well and then find the best match *and* gain.

Design Danger

As with all computer optimisations some care is needed since there is always a danger of designing antennas that can't be made - your compact dipole might turn into a 10km Beverage antenna if you ask for too much gain! Thus you can set limits for when the optimisation will stop.

In order to calculate the antenna properties, the *NEC2* engine imposes some rules on the geometry of the model, such as the size of the segments in an element. If these rules are broken then the accuracy of the modelling cannot be guaranteed. To help prevent such problems, *4nec2* runs validation checks on the model. If these checks find problems then the program has features to help identify and correct the them. Also, since most of the issues typically revolve around the number of segments you can also get the program to automatically choose the best number of segments.

Once you have your model, you can produce plots of its s.w.r., impedance, gain and front-to-back ratio. You can also plot the far-field and near-field patterns. These patterns can be either plotted as conventional 2D polar plots or as more impressive 3D plots where you can pan tilt and zoom around plots of the far-field pattern, the antenna structure and current distributions on the antenna.

I have given an example in **Fig. 2** that shows a model of a ZL-Special Yagi array. You can also export your antenna model to a freeware propagation modelling package, such as *ItsHF* and produce both area coverage plots and point-to-point graphs. This enables so you to see where in the world your antenna should get to for a given date and time, assuming a given propagation path and solar conditions.

The *4nec2* program allows you to plot the

Continued on page 44

results for different antennas on the same graph. I used this when trying out some ideas for a portable 14MHz antenna based upon a 7m long fishing pole. The first antenna I modelled was a vertical with three ground radials. As expected, from the far field pattern plot, this had what looked like good low take-off angle performance.

I then modelled a 13.4m doublet set up as an inverted V. Given the relatively low mounting height this had what appeared to be a poorer low angle take-off performance. However, when I compared the two of them modelled over a 'real' ground I found that overall the doublet had more gain and hence was actually better at most low angles! See **Fig. 3** where the doublet is shown in blue and the vertical in red.

To find out more about antenna modelling, I recommend the website of LB Cebik W4RNL. It's full of really helpful articles on various antenna types and how to model them. Enjoy modelling you next antennas - but don't forget to actually build them as well!

I hope that this article has given you a flavour of *4nec2*. There are other features I haven't mentioned, but I'll leave you to find them. Go ahead and download it and give it a try. The biggest risk is in becoming addicted to modelling antennas!

PW

To download 4nec2 go to: www.si-list.org/swindex2.html
LB Cebik's excellent website is: www.cebik.com

PW Photo Feature

Remarkable Turkish Collection of

Rob Mannion G3XFD/EI5IW writes: If an interviewer were to ask the average UK Radio Amateur about Turkey and what they know of the country, it's very likely that the reply would include; "Sunny holidays, wonderful climate, beautiful scenery, dried figs, that they're very keen to play in European football and join the EU" and so on. But *PW* author and keen photographer **Henryk Kotowski SM0JHF**, knows much more and has discovered another hidden aspect of this Asian (with a small European section) country when he enjoyed a trip to a remarkable radio museum. Henryk recalls the visit, that was hosted by the Turkish National Amateur Radio Society's President, by presenting a photo feature.

Originally from Poland, I now live in Sweden and travel the World enjoying all aspects of the radio hobby, occasionally being able to send *PW* some interesting photographs to share with readers. While on one very special trip visiting Istanbul in Turkey, I was taken to see a remarkable privately owned museum by **Aziz Sasa TA1E**, the President of **TRAC** (**Telsiz ve Radyo Amatörleri Cemiyeti***) the Turkish Amateur Radio Society. This is the member society of the **International Amateur Radio Union** (IARU) representing Turkey.

It was on a Saturday when my kind host, Aziz TA1E and I were driving past an industrial complex where I noticed a three band h.f. beam array. Knowing what was there, on the spur of the moment, Aziz drove into the complex to provide me with an impromptu tour of a remarkable radio museum!

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Turkish Amateur's Museum

The owner of the museum, **Cetin TA1AC**, wasn't available during the time of our surprise visit. But despite this, Aziz TA1E, re-assured me that he knew the janitor/caretaker and we'd soon be inside! True to his word we were soon entering the complex and I was admiring the 'classic' equipment installed at the main station, **Fig. 1**. The equipment on show included some beautiful Hammarlund rigs and other American made radios, all operational and everything was in first class order.

At this point I have to make a confession, I'm not an expert on older radio equipment. Indeed, some of the radios I saw during my visit were very special, although many of the names meant nothing to me. However, I was assured that everything worked and was in first class order!

Before we went on, into the main museum, I was told by Aziz, that Cetin TA1AC spends much more time in his workshop, **Fig. 2**, restoring the vintage equipment than he does on the air. I feel his dedication showed up very well in the beautifully prepared and displayed equipment. It was a truly 'working' museum and **Figs. 3** to **10** will graphically demonstrate that I had a good time thanks to my friends in Turkey.

Perhaps, if you go on holiday to Istanbul, you might like to make contact with our Amateur Radio friends there and prove, like I did, that there's much more to Turkey than beautiful weather, seaside holidays and scenery! **PW**

Fig. 1: The main station at TA1AC, showing some truly classic American made Amateur Radio equipment. This installation was just the 'tip of the iceberg' during Henryk's visit and much more was to come!

Fig. 2: Perhaps this (unusual for an enthusiast's work bench) tidy and well equipped workshop bench also reflects the owner's dedication to restoring radio equipment to working order. Is your workbench as tidy?

Fig. 3: After restoration and testing, the historic radio equipment enters the museum itself. This photograph shows part of the main collection display, with examples from all over the world, including sets from the UK, America, Germany and Holland. Everything on show is in working order.

Fig. 4: A selection of more modern equipment (rear) with contrasting styles, reflecting the different ages of radio equipment in the privately owned Istanbul museum.

Radio Equipment

Fig. 5: The museum has a truly eclectic collection! On show here is an early model American made Juke Box, together with an old horn-speaker wind-up gramophone. Also on show are a modern 'stool' type 1950s gramophone, with three late 1930s radio-gramophones lining the wall.

Fig. 6: An example of early stereo broadcasting receivers? Needless, to say, both models are in full working order.

Fig. 10: A superb synthesised Harris Receiver and transmitter h.f. base station. Made in the USA, the Harris RF-550 receiver and its associated transmitter. This version was (possibly) made in the early 1980s and tunes from 10kHz to 29.9999MHz in 100Hz increments. The receiver includes c.w., a.m. , l.s.b., and u.s.b. It can also receive and demodulate independent sideband (i.s.b.) - differing inteligence on each sideband. It was designed for special, highly congested tactical condition working 'in the field'.

Fig. 7: This selection of equipment is mainly from the 1950s. The Amateur Radio receiver (top, centre of photograph) interested the PW Editor very much. Rob G3XFD thinks it could be a later Hallicrafter receiver? Do you recognise it readers?

Fig. 8: A surprisingly modernistic looking broadcast receiver from the 1930s. Perhaps borrowed from Hercule Poirot's flat in London?

Fig. 9: A contrast between beauty and contemporary functionality!

Antenna Workshop

Roger Cooke G3LDI, says that a wire antenna may be better than you think. Read on to see his reasons why!

A good friend of mine, now sadly a Silent Key, once said that to me "the problem with this hobby is that you need antennas". And that statement has stuck in my mind! He was, and still is, correct of course, and for antennas read 'the higher and bigger the better'. However, if you don't have a place with high towers and huge beams, but you do have a few trees around, there are possibilities. Or, if you can put up a pole or two, perhaps taking a look at some wire antennas with gain would help!

Many new operators generally go for the ubiquitous G5RV as their first wire antenna, as it can be used on several bands. However, now is the time, with the sunspots at minimum, to try other antennas if you wish to increase your country score on the h.f. bands. You can experiment with wire antennas quite cheaply and with surprising results. So, let's have a look at a few wire antennas and see if there is one or more that you could use. Bear in mind though, that ideally, you'll need two supports, either trees or poles, around 10-15m high.

The antenna I'll start with is the Double Extended Zepp. But you may ask, "what is a Zepp anyway"? Well, the single Zepp (short for Zeppelin) antenna, is any resonant length antenna that is end-fed by ladder line. A Double Zepp antenna is a centre-fed λ/2 antenna. The extended double Zepp antenna is a dipole type antenna consisting of two collinear 0.64λ elements fed in phase, as shown in **Fig. 1**. This double extended version provides 3dB gain over a dipole (dBd) on the band it's designed for. Each element, or leg, is about 5λ/8 long.

To work on 3.5MHz, with the extended Zepp, you'd need a fairly large garden but for operation on 7MHz, the leg length is a more manageable 25.7m. Feeding the antennas with open wire feeder of around 450Ω (with a tuning unit) will provide multi-band use too.

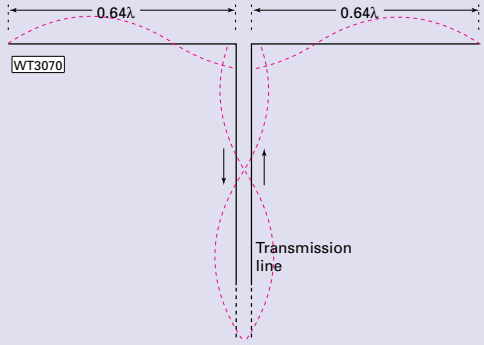


Fig. 1: The simplified lay-out of an extended double Zepp antenna. With the appropriate current levels.

Collinear Array

The simple collinear antenna array is a very effective antenna for the l.f. bands. However, you will definitely need more garden space for this one. Two collinear λ/2 antennas in line are shown in **Fig. 2**, a pairing that will produce gain when they're separated by λ/2. The elements should be fed with equal lengths of transmission lines, when a gain of 3.3dBd can be realised. In **Fig. 3**, a three element pre-cut array for 7MHz operation is shown. This antenna is fed with 300Ω ribbon

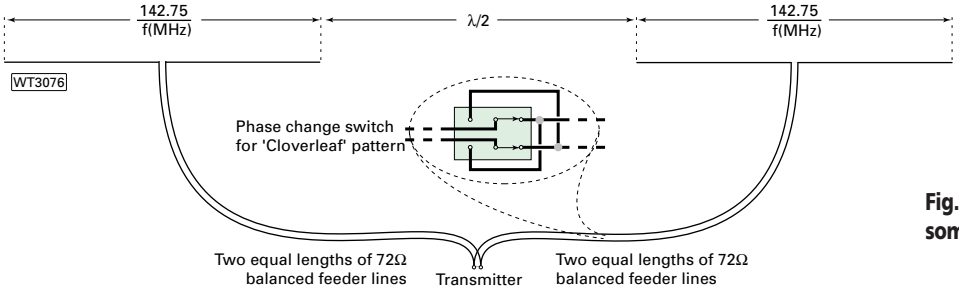


Fig. 2: By in-line spacing two λ/2 antenna by λ/2, some directivity and gain can be achieved.

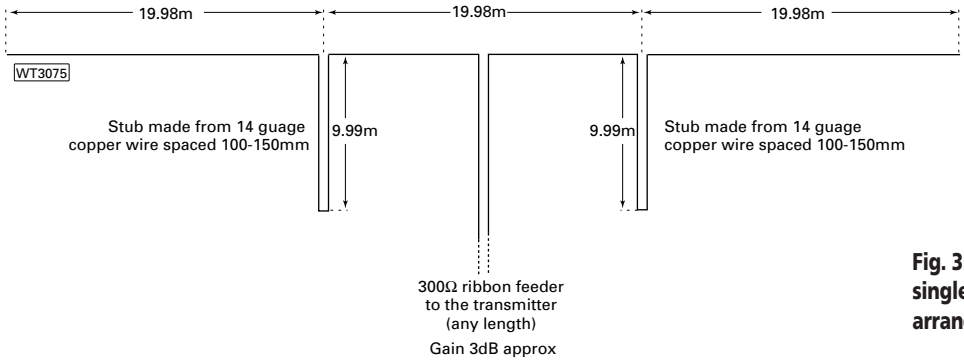
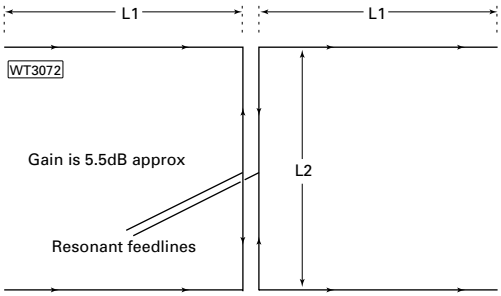


Fig. 3: A modification of in-line spacing allows a single twin feeder to be used, unlike the arrangement of Fig. 2.



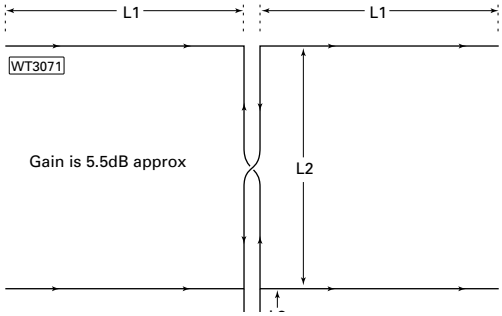


Fig. 5: When using a λ/4 stub to feed the Lazy-H, then the upper element is fed via crossed-over feeder.

Fig. 4: The Lazy-H antenna fed in the middle of the pair.

feeder, and may be matched to a 50Ω output from the transmitter by means of a 4:1 balun at the shack end of the twin feeder. The antenna again has roughly 3.2dBd gain and a beam width of 40° at the half-power points.

There are numerous variations on the theme of collinear arrays, including using 'stacking' to achieve even higher gains. Antennas such as the Franklin antenna, which uses two or more λ/2 radiating sections separated by resonant quarter-wave tuning stubs, to produce the necessary phase reversal between sections, would give a gain of 4.5dBd. But, such an array would require almost 100m of garden space for the lower h.f. bands.

Lazy-H antenna

The stacked Lazy-H antenna, however, only requires around 42.7m length for operation on 7MHz. And you'd need around 22m of height. However, with only a couple of 12m supports, this antenna is more suited to operation on 14MHz. It also provides a useful gain of 5.5dBd. The Lazy-H can be fed at the centre of the phasing section, **Fig. 4**, or at the bottom **Fig. 5**. When it's fed at the bottom, the phasing section must be twisted through 180°.

Looking at the next few figures, you can see that the higher the gain, the larger the garden space you're going to need. In my youth, antennas such as the Sterba Curtain or Rhombic were just dreams, something to read about and put on the wish list. However, the gain from a large amount of wire can exceed a beam, so don't discard the idea.

Wire antennas may look complex to construct but actually they're not, although some free space is required to lay them out to make the necessary measurements. They're fun to experiment with, as they are relatively cheap to install and, the gains obtained can be quite respectable. However, their only problem is that you cannot rotate them, so try to ensure that the direction of maximum gain is the one you want.

Maximum gain direction is, unfortunately, often determined by the size of your garden or the direction it runs, or both. If you're lucky enough to have a very large garden, you can have the best of both worlds, a rotating beam plus some directional wires. This can be an advantage in hunting for DX, contesting or nets, where you might wish to change directions fast and frequently.

The illustrations of **Fig. 6** show variants of one of the ultimate wire antennas, the Sterba Curtain. The illustrations show only basic arrangements, some installations have numerous elements producing huge gain figures, but these will be mainly commercial installations.

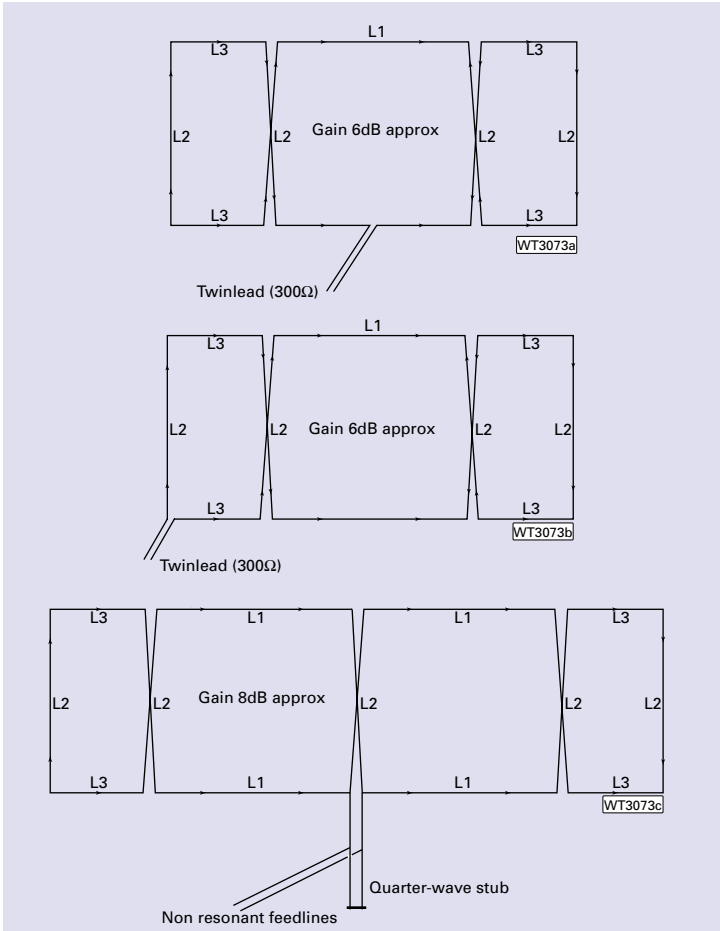


Fig. 6: Just a few combinations of the number of elements and feed arrangements for the Sterba Curtain antenna.

Should you wish to be adventurous, **Table 1** gives you some measurement and gain figures for the Lazy-H and Sterba Curtain antennas at several points throughout the h.f. and v.h.f. bands. Whatever wire you decide to put up, **do experiment** and I feel sure you'll gain a lot of enjoyment and satisfaction. **PW**

F (MHz)	L1 (m)	L2 (m)	L3 (m)
7.0	20.78	21.35	10.68
7.15	20.43	20.97	10.48
14.0	10.39	10.68	5.34
14.2	10.27	10.55	5.26
21.0	6.94	7.09	3.56
21.25	6.86	7.02	3.53
28.0	5.19	5.4	2.67
29.0	5.03	5.19	2.59
50.0	2.93	2.98	1.5
51.0	2.87	2.95	1.46
52.0	2.82	2.87	1.42
144.0	1.01	1.03	0.56
145.0	1.0	1.025	0.54
146.0	0.99	1.02	0.52

WT3074

Table 1: Some dimensions for Sterba Curtain and Lazy-H antennas on differing bands. Use this table with the illustrations of Fig.s 4, 5 and 6.

Carrying On The Practical Way

This month the Rev. George Dobbs G3RJV has an 'Ugly' project for you. However, despite the accusations towards its appearance, the Pippin transmitter works well. But that's after G3RJV ventures into the world of philosophy and tea making!

"When weaving a blanket, an Indian woman leaves a flaw in the weaving of that blanket to let the soul out".
Martha Graham. American Dancer and Choreographer

In ancient Japan, **Sen no Rikyu** desired to learn The Way of Tea. He visited the Tea Master, **Takeno Joo.** Joo ordered Rikyu to tend the garden. Eagerly, Rikyu set to work. He raked the garden until the ground was in perfect order.

When he had finished he surveyed his work. He then shook the cherry tree, causing a few flowers to fall at random onto the ground. He thus introduced the concept of wabi-sabi, or elegant simplicity. The Tea Master Joo admitted Rikyu to his school and in due course he became a great Tea Master.

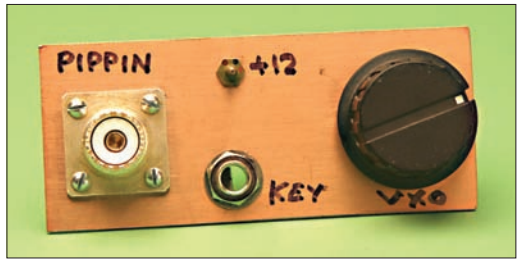
The very opposite of the Greek ideals of beauty and perfection in the Western world, the Japanese concept of wabi-sabi is a beauty of things imperfect, impermanent, and incomplete, modest and humble. It's the idea that true beauty always contains imperfection and that ageing can bring about improvement.

Deep cracks in an ageing pine table or green corrosion on a bronze figurine are both examples of wabi-sabi. Antique dealers call it 'Patina'. It's why clothes shops can charge more for a distressed pair of jeans; blasted with sand to give the effect of age and wear!

So, (you may be thinking) "What has this to do with Amateur Radio"? In reply, I'll now try and answer.

This column deals with the building of items of Amateur Radio equipment and I find it rather disappointing how few Amateurs ever attempt to build anything as part of their hobby. Some are discouraged because they think they lack the technical expertise and some because they think they lack the necessary equipment and facilities. In reality, none of these is a good enough reason. There are plenty of simple projects that anyone could build and no specialist facilities and equipment are really needed. That's the COTPW reason-for-being!

Usually, what we're doing is building a one-off project to use and please ourselves. The method of construction can suit the project and few small one-off projects merit a printed circuit board (p.c.b.). It matters little what the completed project may look like. In fact, the readily built project has a wabi-sabi beauty of its own and can attract more attention than a fine row of commercial equipment. So, this month I'll describe a very useful little QRP transmitter that anyone can build and also offer some advice on how it might be constructed.



This month's project - the Pippin, originally developed by the late Dr Mike King G3MY, is a useful little transmitter and can be built ugly fashion.

The Pippin

The Pippin is an elegant little transmitter, originally described by the late **Dr. Mike King G3MY**, in the G QRP Club journal *Sprat* for Autumn 1989. Mike produced many useful QRP designs in his retirement (he was a much respected former surgeon who had helped many Radio Amateurs back to full health) and the Pippin has survived as a good little project that can be built simply in a couple of hours. The Pippin circuit is shown in **Fig. 1**.

The circuit begins with a Colpitts type crystal oscillator, with the output taken from a low value collector load resistor and directly coupled into the base of a *pnp* amplifier transistor. The small amount of forward bias developed for the amplifier makes it easier to drive, but is less than the voltage required to bias the stage 'on'.

Keying is achieved in the emitter circuit of the oscillator stage and when the key is open - and no current is being drawn - there's no forward bias on the amplifier. The isolation of the amplifier from the oscillator (by taking the drive from the low value oscillator collector load) is good and there's virtually no 'pulling' of the oscillator even if the amplifier output is briefly shorted to ground. Suggestions are also given for both devices which should be capable of producing about 1W of r.f. output.

The oscillator is configured as a variable crystal oscillator (VXO) using a fundamental crystal with C1 and a small inductor. Using the capacitor (C1) alone will produce a few kilohertz of frequency shift and adding an inductor of about 47µH will allow more frequency shift. (This depends upon the band and individual crystals).

My prototype Pippin was built for the 7MHz (40m) band. The collector load of the p.a. stage is a home-wound radio frequency choke (r.f.c.). The photograph, **Fig. 2**, shows how the choke is made by winding six turns

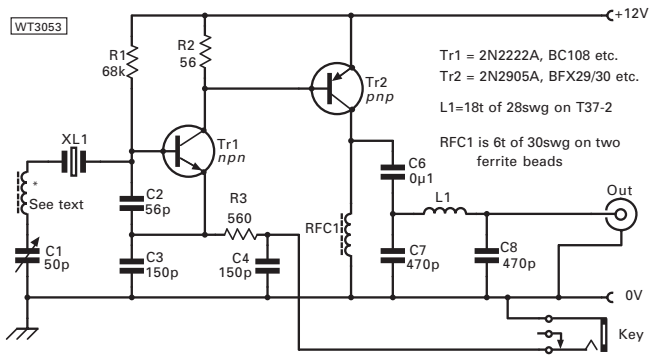


Fig. 1: The Pippin transmitter circuit. This month G3RJV - who built his version ugly style - describes the ugly technique to those readers who have not tried it yet (see text).
Note: C5 is a feed-through capacitor on the H2V line and is not shown on the circuit.

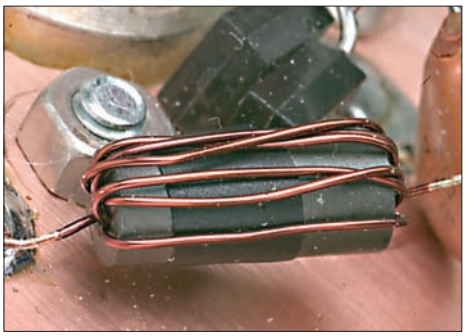


Fig. 2: Detailed illustration of the home-brewed radio frequency choke (r.f.c.) required for the circuit (see text).

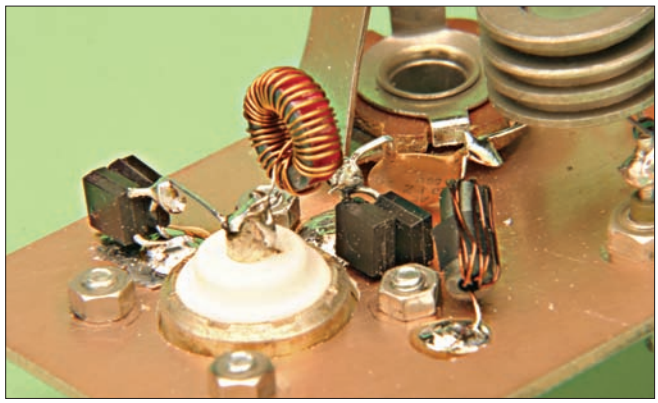


Fig. 4: The ugly lay-out around the transmitter output socket (see text).

of 30s.w.g. enamelled wire through two ferrite beads mounted in tandem. Before winding the choke, the two ferrite beads can be joined with a small piece of *pvc* tape. **Take care not to scrape** the enamel from the wire on the sharp corners of the ferrite beads, because of the risk of shorting turns.

Three Element Filter

The original Pippin used the three element low-pass filter shown in Fig. 1. The values given are for 7MHz. The circuit could be improved by substituting a better low-pass filter, and **Fig. 3** shows a better, seven element, low-pass filter following the design criteria of the W3NQN standard value capacitor filters.

In the same illustration I've included values for the bands from 3.5 to 14MHz, although I have only tried the Pippin on 7MHz. **Note:** The *pnp* amplifier does require a heat sink for reliable operation.

Wabi-Sabi Style?

The Pippin is a delightful little transmitter – so how can we build it wabi-sabi style? The basis of any circuit construction is to have a reliable method of component interconnections and provide rigidity for the components. In r.f. circuits it's also desirable to have short interconnections and keep input signal away from output signals.

In many cases a p.c.b. is far from ideal for high frequency projects. In fact, I know many experienced constructors who would not dream of using a p.c.b. for a variable frequency oscillator. Seasoned readers of this column will know that I often use 'ugly' construction techniques. Some of my corespondents have commented that I appear to assume readers know how to do this without further explanation. So, what follows is a rough guide to building the Pippin ugly style.

Starting Point

The starting point for ugly construction is a piece of blank copper clad board. This is the material, which is usually etched to produce a conventional p.c.b. The board becomes the mounting surface for all components, which are connected to ground; the earth or negative supply point of the circuit diagram.

All grounded components are directly soldered to the copper surface, the other wire on the component becomes the anchor point for further connections in the circuit. Other fixed anchor points can be provided by mounted components, such as input and output sockets, the power input connection and mounted controls.

In my example of the Pippin, I used an off-cut of copper clad board roughly measuring 110 by 50mm. The board acts as a front panel for the transmitter with all the parts mounted behind the panel. The 12V power supply enters via a feed-through capacitor (C5) on the panel. Other fixtures on the panel are the VXO's variable capacitor (C1), the key jack socket and the output socket. The heading photograph gives an idea of the relative placements of the sockets and controls.

To give readers an idea of how to proceed, I've shown the output section by physical layout, **Fig. 4**, the low-pass filter and the amplifier output sections parts of my board. My starting anchor point in this project was the output socket. In my case this is an SO239 socket to match my PL259 plug from my antenna tuner unit (a.t.u.) but any appropriate r.f. socket could be used.

Mounting the low-pass filter is simple. The capacitor C8 connects between the output socket and ground. One side of C7 is soldered to the board near the socket with the un-grounded lead pointing upwards. This provides the anchoring points for the inductor (L1) between the output connection and the free lead of C7.

The capacitor, C6, the capacitor that couples the signal from the amplifier to the low-pass filter, is connected to the junction of C7 and L1. It's mounted with both leads facing upwards from the board, bent at 90° to the board. This gives enough rigidity to connect the r.f.c. and the collector lead of the *pnp* amplifier transistor. The emitter of the amplifier transistor is connected to the feed-through capacitor (C5), which brings the supply to the board.

The spacing of C5 and the output socket is quite important to ensure that the component leads can reach each other. When planning an ugly lay-out, it can be a good idea to make a small sketch of the component placements.

Laying the actual parts over the sketch will help to determine the best locations for the fixed items. I must confess to not doing this myself! In fact, I began with the output socket mounted centrally on the panel and drilled the mounting hole for C5 after I had completed the wiring as far as the *pnp* transistor.

Proceeding Onwards

Describing this section of the construction in detail should give readers an idea of how to proceed with the rest of the transmitter circuit. The key socket and the variable capacitor (C1) provide other anchor points, together with the remainder of the grounded components. The photograph shows the general layout of all the parts.

The Pippin is a useful little transmitter and a worthy memorialto Mike G3MY and the pleasure his designs brought to many QRP constructors. If built simply, as described, it's also a fine example of the wabi-sabi principle!

PW

Band (MHz)	C01, 07 (pF)	C03, 05 (pF)	L02, 06 (turns)	L04 (turns)	Core	Wire (mm/swg)
3.5	470	1200	25	27	T37-2	0.38/28
7.0	270	680	19	21	T37-2	0.5/26
10.0	270	560	19	20	T37-6	0.5/26
14.0	180	390	16	17	T37-6	0.56/24

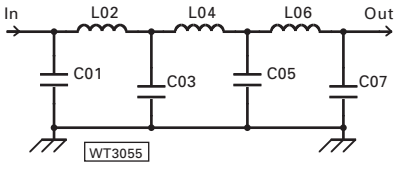


Fig. 3: Circuit of the improved low-pass filter for the project and (inset) the table of different values for the various Amateur bands (see text).

Valve & Vintage

Chinese take away radio

Ben Nock G4BXD had an interesting Chinese 'take away' radio delivered recently - in perfect condition after being sealed and packed 46 years ago. This set, along with a survival 'Search & Rescue' transmitter-receiver, provides a fascinating column this month!

A big 'hello' once again from the G4BXD workshop here in Kidderminster. It's been an interesting few weeks, I've not attended many rallies but there's still been quite a few new additions to the ever groaning shelves here at Number 62.

The Internet may be a wonderful thing but it's too easy an option to find new and interesting items that I really don't have space for. The shelves really are groaning!

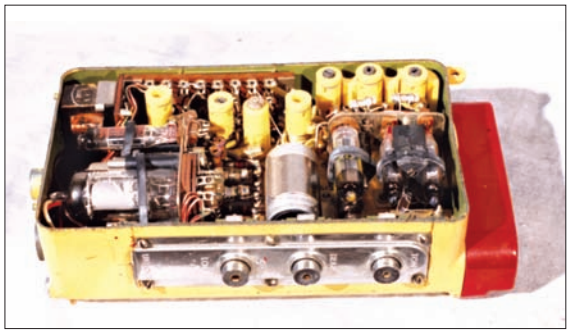


Fig. 2: Inside the RT-159A Survival set. The receiver on the left and the transmitter is on the right (see text).

Chinese Set

The first 'off the shelf' this month is a Chinese set, **Fig. 1**. For the demand of the ongoing Korean war in the early 1950s, the Chinese developed this military field radio for its army. It was also largely used, apparently, during the Vietnam war by the Vietcong.

Fig. 1: The Chinese 102E station with transmitter (bottom) and receiver (top). There is a strong resemblance to the American GRC-9 radio styling and construction (see text).

The radio was designed and built as a primary long-range radio for communication between regiments and divisions. The complete radio station consists of a Type-81 transmitter, a Type-139 receiver, an accessory set that includes a dipole antenna, a long wire antenna, a full set of spare tubes and a multimeter. There was also a fire heated soldering iron for field emergency repair, a screwdriver, pliers, headsets, a telegraph key and a very nicely made microphone.

The transmitter works on c.w. or the amplitude modulation (a.m.) mode. When operating on c.w. it transmits no less than 15W and emits no less than 4W on a.m. It has a frequency range of 2-10 MHz in three bands and the receiver works 2-12MHz, also in three bands. The transmitter also has full variable frequency oscillator (v.f.o.) and provision for crystal control. The station with the transmitter and receiver in separate cases is also given the designator Type 102E radio set, as in Fig. 1.

Together, the transmitter and receiver weigh about 23kg (50lb), not including battery and all the other accessories. The transmitter was powered by the supplied hand-cranked generator, while the receiver was designed to be powered by a set of dry cell batteries. The set arrived in Kidderminster as if it had come straight from the factory; sealed waxed boxes unopened since 1960. It even came with a complete English manual!

Needless to say, upon slowly applying power to the set from a variable high tension (h.t.) supply, both the receiver and transmitter worked. The set, is in essence, a copy of the American GRC-9, even the control knobs are similar. The receiver is very sensitive and the modulation from the 46 year-old, unused carbon microphone was very encouraging when I tried it out. I am planning more tests for this set.

Survival Radio

Another recent addition here is the survival radio, the RT-159A/URC-4. This is a small, very compact receiver transmitter, **Fig. 2**, designed for use by downed pilots and the like. The set receives and transmits on both 121.5MHz v.h.f. and 243MHz v.h.f./u.h.f. It uses one miniature and five sub-miniature valves in a very simple, compact design. Dual pull-out antennas can be used as a single whip, or a double horizontal antenna on either frequency, **Fig. 3**.

In use the set ran off a battery pack, providing 1.5V for the filaments and 117V for the h.t. The receiver is a super-regenerative detector type, with an audio amplifier that doubles as the modulator stage on transmit. The transmitter is a crystal controlled oscillator, multiplier and provides an output with a.m. speech or tone. The official military manual is designated TM 11-510 and the set saw service in the Korean conflict.

After looking at the circuits I decided to see if the set could be operated on the 144MHz band. The receiver tuning is actually achieved by a single coil. Using a 144MHz hand-held transceiver as a signal

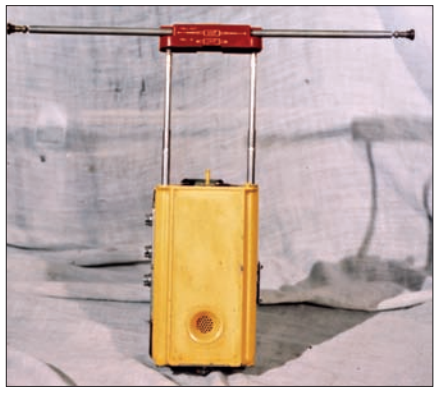


Fig. 3: The RT-159A with the antenna extended for u.h.f. operations. When operating on v.h.f. the two whips are fully extended (see text).

Fig. 4: The cute little 'baby' Eddystone 870A receiver, it would still look smart on any voyage (see text).

Fig. 5: The Redifon GR-410 marine transceiver, showing its very clean styling and simple controls (see text).

source, the coil slug was adjusted until the survival unit's receiver covered the 2 metre band.

The transmitter originally had a 30.375MHz crystal, which was doubled and then doubled again to provide 121.5MHz. This was changed to a 36MHz crystal I had in the junk box and the cores of the oscillator and multiplier stages adjusted until output on the 2m band was present. The signal was very close to band edge and quite weak but despite that, I do now have the set operating on 144MHz. So, if anyone cares to try a 2 metre a.m. QSO I'm ready and willing!

Baby Eddystone

Yet another 'Baby Eddystone' (870A) arrived recently. I already have a couple of these but this one was in a red case which, of course, makes all the difference. The 870A, **Fig. 4**, is a five valve single conversion superhet design. The frequency coverage is 150kHz to 24MHz in five ranges, domestic reception only, so no beat frequency oscillator (b.f.o.) is provided.

Produced around 1962 to 1963 at a cost of £34 the 870A and the 870 before it (produced between 1957 to 1959 at around £30), were classed as ship's cabin receivers, for those grand days of the P&O (Pacific & Orient Company) 'around the world cruises'. Though of little use on the Amateur bands, except, of course, for the a.m. revival channels, they are good domestic receivers, which have a certain style and elegance not found in your modern DAB set.

The 870A Specifications are: 279 x 162 x 208mm (11 x 6.375 x 8.22in), weight 5.2 kg (11.5lb). Valves: 12BE6 detector, 12BA6 intermediate frequency (i.f.) amplifier, 12AT6 a.f. amplifier/2nd detector/automatic volume control (a.v.c.), 19AQ5 a.f. output and 35W4 rectifier. The 870A tuning ranges are: 150-380kHz, 510kHz-1.4MHz, 1.3-3.5, 3.2-7.5 and 7.5-24MHz.

While on the Eddystone nostalgic note, it's sad to know that *Lighthouse* the excellent magazine of the **Eddystone User Group** (EUG) is no more. The last issue went out in April and there are no plans for a replacement. However, one positive note is that there's a new website dedicated to the EUG, which can be found at: **www.eddystoneusergroup.org.uk**

Power supplies

There's one drawback in playing with valved equipment - I seem to be building a never-ending string of power supplies! Every time a new rig appears, it needs another unit knocking-up. No matter how many power supplies you build, the next radio needs a supply that is a little different. The Chinese set needed 1.5, 6, 90 and 500V. The 6 and 500V I could have got from existing units but to get a regulated 1.5 and 90V, required yet another supply.

The 6V supply needed to be regulated, as it also provided the carbon microphone polarising voltage, any hum would have appeared on the modulation. So, it seemed best to start afresh.

Five attempts later I had a stable 6V supply! The first attempt worked, but the BD140 pass transistor was getting hot at the 2A being drawn. I then found a 'four leg' UA78H type regulator. "Great" I thought, got busy, built it, only to find the device was not working! I found another one, but it too was inoperative. A single TO-3 pass transistor bolted to the case was also getting too hot.

Finally, I found a good heat sink, which had two OC35 transistors fitted, this was wired in, and at last it ran cool enough. Now all I needed to do was get the other voltages sorted.

Some time ago, I had built a 'universal' power supply with (what I thought!) were enough voltages to cope with the demands of my collection. It gives, 6, 12 and 24V a.c., 12V d.c., 150, 400 and 800V h.t. and a -100V for bias. However, even this fails on many of the new arrivals! It never ceases to amaze me just how many components are needed to replace those long-gone batteries!

Finally

In connection with on-going projects I wonder if anyone has any information, circuit diagrams, etc., for either the Redifon GR-410 h.f. s.s.b. transceiver or the VRC/PRC-247A h.f. multi-mode? The GR-410, **Fig. 5**, with three 6146 valves in the output stage should go quite well. Modes of operation appear to be c.w., a.m. and s.s.b. The receiver and transmitter excepting buffer and p.a. is solid state, but using the old germanium type transistors. This type of transistor has a tendency to slowly decay, rather than just 'die', so performance gradually declines. Hopefully, if I can find information on this set I'll be able to get it on the air once again, and report on its performance in a future V&V.

The VRC-247A I have here is working, but there are various factors I'd like to modify so, I need the circuit diagram! The set is a multi-mode 2 to 30MHz transceiver but has a strange automatic gain control (a.g.c.) characteristic, which really shuts the receiver down on large signal 'spikes', taking a while to recover. Obviously, I'd like to alter this. Various other little things could be done to make it more usable on the Amateur bands, but more information is needed. Can you help me please?

Well that's about it for now. More items have just arrived for future discussion, including a big Plessey receiver, a rather odd receiver covering 4GHz and equally odd Canadian set. As always I can be contacted directly at: **62 Cobden Street, Kidderminster, Worcestershire DY11 6RP**, or via my E-mail address - **military1944@aol.com** Have a nice summer holiday. **PW**

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VHF DXer

REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

DAVID G4ASR HAS REPORTS OF SPORADIC-E OPENINGS ON THE 50, 70 AND 144MHZ BANDS

It really is amazing how quickly propagation can take a turn for the better on the v.h.f. bands. Last month, I reported that there was only one day during April when Sporadic-E (Sp-E) was reported on the 50MHz band. Within a week or so, all this had changed as the summer Sp-E season kicked off into overdrive.

At the lower end of the v.h.f. spectrum, the 50MHz band was really humming, with many European openings being reported by UK stations, especially during the last two weeks of May. During this period there were also eight days of transatlantic multi-hop openings to stations located in the Caribbean and other areas of North America.

The 70MHz band was also similarly affected by Sp-E propagation, with DX contacts being reported throughout Europe to countries that have this rare allocation. The first of the summer Sp-E openings was also reported on the 144MHz band and on one occasion during May the maximum usable frequency (m.u.f.) was calculated to peak at 172MHz.

In addition, two auroral backscatter openings and eight auroral-Es events were reported on the 50MHz band and some decent tropospheric propagation was noted to Scandinavia on the 430MHz and 1.3GHz bands. All-in-all, the month of May proved to be a terrific start to the summer v.h.f. DX season.

THE 50MHz BAND

Although there were isolated reports of Sp-E early in the month, it wasn't until May 9 that daily E-layer propagation openings started to be reported on the 50MHz band. Nearly every DXCC country in Europe was workable from the UK at some time or other, often with very little power and simple antennas. Among the more interesting European and nearby African and Asian stations worked were those of CN8IG (Morocco), CT3MD (Madeira Islands), CU3EQ (Azores), EA6BB (Balearic Islands), EB8AHT (Canary Islands), EA9IB (Ceuta & Mellilla), ER1SS (Moldova), SV3EXU (Greece), TF3GX (Iceland), ZA/IK0OKY (Albania), ZB3B (Gibraltar), 4X4FR (Israel), 5B4FL (Cyprus), 7X0AD (Algeria) and 9H1JJ (Malta).

However, all that Six Metre activity pales into insignificance compared to the real DX that was on offer. During the reporting period there were eight days when transatlantic multi-hop Sp-E enabled c.w. and s.s.b. contacts to be made with stations in the North American region. It all started off quite slowly with only one station, K2MUB (USA), being reported at 1752UTC on May 17, but it didn't take long for the band to get really into shape.

There were two openings during the evening of May 19. The first, between 1755-1815UTC was to the station of HI3TEJ (Dominican Republic) who worked many G and GW stations. Between 2030-2200UTC more Caribbean operators could work stations over much of the UK. The DX included FM5JC (Martinique), WP3UX (Puerto Rico) and 8P6SH (Barbados). The 9Y4AT beacon (Trinidad & Tobago) was audible towards the end of the opening.

Rather strangely, the 9Y4AT beacon was copied at the beginning of an opening on May 21. It was a bit of an 'in-and-out' type event with signals appearing and disappearing between 1135 and 1500UTC. Only stations in Puerto Rico were worked from the UK and these included KP4SQ, WP4HSZ and WP4KJJ.

Propagation was much better on the evening of May 22. Between 1945-2330UTC, the 50MHz band, was once again, open to the Caribbean area with G, GI and GW operators making contact with the stations of FM5JC, KP2HC (Virgin Islands), KP3CW, NP3CW, WP3UX, KP4EIT and 9Z4BM (Trinidad & Tobago). Around midnight through to 0230UTC on May 23 the station of MM0AMW (IO75) copied the beacon stations of OX3VHF (Greenland), VE4SPT, VE4VHF and VE8BY (Canada). At 0214UTC the station of VE4SA (EO15) was heard peaking 53 on 50.109MHz.

An opening on May 24 between 1910-1925UTC was a much briefer affair but it did allow a few G, GM and GW stations to work WP3UX, who was the only DX station audible on the 50MHz band. However, an opening on the following day May 25 was much more intense. Between 1100-1400UTC stations over much of the UK were heard making c.w. and s.s.b. contacts with FG5FR, FM5JC, HI3TEJ, HI8ROX, KP2HC, NP3CW, N4IS and NL7AU/4. Later in the evening, between 1900-2200UTC, another superb opening occurred with many UK operators contacting North American stations such as, FM5JC, HI3TEJ, VA3DX, K1TOL, K2PS, K3TKJ, N4BAA and K8MFO to name but a few.

Daran Josey 2W0CDJ (Carmarthenshire IO71) has been active on the 50MHz band for some time and is now using a Kenwood TS-480 transceiver running 50W into a 5-element Eagle Yagi. On May 17, he participated in an excellent 50MHz opening by working 108 stations in Croatia (9A), Denmark (OZ), France (F), Italy (I), Portugal (CT) and Spain (EA). He also caught his first opening to North America on May 25, contacting the s.s.b. stations of HI3TEJ, KM1E, AC2AA, W3BXT and VA3DX. The stations of TF8GC and 7X0AD were also worked both with 59 signals.

The last two events of the month were much less intense. On May 26, the 50MHz band was open between 1900-1930UTC to FG5FR and FM5JC and finally on May 30 between 1240-1315UTC, to the station of W1JJ. That was a tremendous start to the DX season. Let's hope there's more to come!

THE 70MHz BAND

Propagation on the 70MHz band was quite superb, with 13 days of Sp-E openings being reported between May 16-26 and May 30-31. The first Sp-E opening of the month occurred on May 16 between 1130-1150UTC and enabled stations in Scotland to make DX contacts into Slovenia (S5). Stations in Slovenia have access to the same band as in the UK so, you'll find c.w. and s.s.b. activity around 70.200MHz and f.m. activity around 70.450MHz.

On May 17, there were two separate openings, the first of which occurred at 1030UTC from southern England to the stations of S51DI (JN76), S54M (JN86), S57A (JN76) and S59MA (JN76). Later in the afternoon between 1420-1530UTC there was a good opening from the UK to S5 and Portugal (CT). Incidentally, you'll find CT stations between 70.610-70.625MHz and the CQ5FOUR beacon (IM59) on 70.608MHz. Replies are normally made around 70.100 or 70.200MHz using c.w. or s.s.b.

The first opening of the month to Croatia (9A2SB in JN95) occurred on the following day, May 18, between 1010-1040UTC. Croatia also have the same access to the 70MHz band as in the UK so, you'll find all the usual modes in exactly the same sub-bands as we do. Ten minutes after the opening to Croatia, the band opened up between 1050-1200UTC to Slovenia, with stations in Scotland making f.m. and s.s.b. contacts. Between 1335-1615UTC there was an extensive opening to Portugal, allowing many UK stations to make c.w. and s.s.b. DX contacts.

Fig. 1: Paul Waldock M0LRE worked SV2DCD/P who was using an 3-element Vargarda Yagi antenna

Joe Kraft CT1HZE reports, that from 1330UTC on May 18 the 70MHz band was open for several hours to the UK. The beacons GB3ANG (Dundee 70.020MHz), GB3BAA (Hertfordshire 70.016MHz), GB3CFG (N.Ireland 70.027MHZ) and GB3MCB (Cornwall 70.025MHz) were heard with 599 signals for a long time. As it was a weekday afternoon, very few UK stations were active at the time, although contacts were made into England, Isle of Man and Wales. Joe mentions that he is always listening on 70.200MHz u.s.b. and can also switch to 70.450MHz f.m. but he can only transmit on 70.615 or 70.620MHz. He listens around 50.180MHz for QSO coordination and can also be found on the ON4KST 70MHz Internet chat page at **www.on4kst.com**

Denmark (OZ) also have access to the 70MHz, although their band plan is somewhat fragmented, with a c.w. and s.s.b. sub-band around 70.100MHz and an f.m. sub-band around 70.450MHz. The first summer Sp-E opening to Denmark occurred on May 20 between 1220-1300UT. Operators in England and Wales reported making c.w., s.s.b. and f.m. contacts with the stations of OZ1BCG (JO55), OZ1DJJ (JO65), OZ2M (JO65), OZ2LD (JO54) and OZ3ZW.

One of the most extensive 70MHz openings occurred on May 21 lasting for much of the day. **Paul Waldock M0LRE** (East Sussex JO00) mentions that he was very lucky to make the first ever 70MHz contact from the UK with Greece. By chance his 3-element Vargarda Yagi was pointing in the right direction when the station of SV2DCD/P appeared at 0738UTC on 70.200MHz. Paul, using a Yaesu FT-847 transceiver and a 50W Spectrum TA/RP4SB amplifier, received a 59 report. The Greek portable station was also running an FT-847 transceiver into a 3-element Yagi (**Fig. 1**) and was peaking 55. The station of SV2DCD/P (KO01) was operating from a mountain-top at 1830m a.s.l. and he went on to work the stations of G4IGO (IO80) and G8HVY (IO90). A few hours later at 1025UTC the band opened up to Portugal, staying open for over six hours before fading out at 1710UTC. Contacts were made all over the UK with the stations of CT1HZE (IM57), CT1FFU (IM59), CT1JAD (IM57), CT1FJC (IM57) and CT1QP (IM58).

Daran 2W0CDJ was also active on the 70MHz band, using a Kenwood TS2000 transceiver driving a Spectrum transverter running 30W into a 3-element home-made Yagi. He reports that conditions were particularly good on May 21, with an early 50MHz opening that started at his QTH around 0600UTC. At 1005UTC, he spotted a report on the DX Cluster that the station of CT1HZE was working into the UK on 70.625MHz. Daran heard him quite weakly at first but by 1025UTC the signals were up to 59+25dB. Working split frequency to 70.200MHz he made a quick s.s.b. contact with CT1HZE before going on to work the stations of CT1FFU, CT1FJC and CT1JAD. In the afternoon at 1430UTC he also managed to work the station of CT1QP at 59 both ways.

Further Sp-E openings in the UK occurred on May 22 at 1910UTC to Portugal, May 23 between 1615-1815UTC to Denmark, May 24 at 1425UTC again to Denmark, May 25 between 0810-0840UTC to Slovenia, May 26 between 1250-1430UTC to Slovenia and later in the day between 1640-2010UTC to Portugal. At the end of the month on May 30 the station of SV2DCD (KN00) reported hearing at 1320UTC the GB3ANG (70.020MHz) beacon. Finally, on May 31 between 1910-1930UTC the band was yet again open to Portugal.

THE 144MHz BAND

The first 144MHz Sp-E opening this summer was reported between 1515-1600UTC on May 17 and although it didn't quite reach the UK, it came very close. Operators in Belgium, France and Netherlands reported making s.s.b. contacts with stations in Spain, including those of EA1FBF, EB1TT, EB3DYS, EA4EOZ, EA4KR, EA5AFP, EA7AJ, EA7BHO and EA9HA (Ceuta & Mellilla). The Sp-E propagation must have been over our heads because at 1537UTC the station of EI5FK (Eire IO51) made contact with 9H1XT (Malta JM75) on 144.300MHz, the s.s.b. calling frequency. A few minutes later the Dutch station of PA2DB (JO22) measured the maximum usable frequency (m.u.f.) peaking at 172MHz.

By the time you read this in the middle of July, the summer Sp-E season on the 144MHz band will essentially be over. However, my records show that 144MHz openings will still occur after July 14 each year but less frequently. In 2000, there were three openings late in the season, in 2001 there were five openings including a lengthy one on August 27 and in 2002 there were two events.

In 2003, I recorded three openings after July 14 (all in July) but only one in 2004 (August 1) and only one last year on July 15. It's all a bit sporadic so, you need to keep monitoring 144.300MHz in case the band suddenly opens up. Sporadic-E propagation on 50 and 70MHz will continue for around the next six weeks so make the most of it now before it all disappears.

DEADLINES

That's it again for another month. Thank you for your reports and please keep sending them in by the last Saturday of each month. Good luck with the Sp-E DX and I'll see you again next month.

73, David G4ASR

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HF Highlights

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

GX0KAC/P Operators Cpl Keileigh Burns, Sgt Tom Girdley and Flt. Sgt Emma Costello all belonging to 455 (Morecombe & Heysham) Squadron ATC.

CARL GW0VSW ROUNDS UP ALL THE LATEST FROM THE HF BANDS WITH THE HELP OF YOUR REPORTS

Once a year, every 'Wing' of the Air Training Corps (ATC) holds a Wing Training Day (WTD) to demonstrate their skills and get assessed on various skills, including shooting, drill, publicity, aircraft recognition and aircraft Modelling/Flying. This year was no exception and on the 7 May Cumbria and North Lancashire Wing held their WTD in the grounds of Kirkham Grammar School near Blackpool. Over 20 cadets and staff attended from each of the 20-plus squadrons in the Wing.

Although, Amateur Radio is not a competitive sport at this level, it has become customary for the Wing to put on a display of radio operating in some form or other. This year the accent was on digital communications with an h.f. station, **MX0KAC/P**, running BPSK31 operated by members of staff and qualified cadets. During the day the station was on 14.071MHz and worked into Bulgaria, France, Italy, Romania, Portugal, Russia, Svalbard Island, Ukraine and the USA. Incidentally, M0KAC (Kendal Air Cadets) is a callsign held by regular *PW* reporter **Roy Walker 2E1RAF,** who does a great job as the Wing's radio officer and was in charge of this event.

NEW ENTITY

It looks like we may have another 'new' DXCC entity joining the growing list as the population (267,000 plus) of Montenegro voted in May to end its union with Serbia. A call for independence began to gain momentum in the early 1990s! It would now appear that Montenegro will probably be added to the DXCC List shortly and you can find some interesting information on the origins of Montenegro at **www.montenet.org/history/prehys.htm**

DX NEWS

In Qatar, **Juma Rashid Al Kuwari A71EM, Ali Ali Al-Mohannadi A71BX** and others will operate on all h.f. bands and all modes using the call **A72OO6** (Alpha Seven Two Oscar Oscar Six) until 31 July in anticipation of the 15th Asian Games that will be held in Doha later this year in December. You can QSL via **EA7FTR Francisco Lianez Suero, Asturias 23, Aljaraque, Huelva 21110, Spain.**

A QSL Card from A71BX.

On the Fiji Islands, an archipelago of over 330 islands in the South Pacific, will be **Didier Bonhommeau F4ELJ**, **Andre F0ELK** and **Christophe F0ELI** who will use the callsign **3D2BD** from Rotuma OC-060, an island that measures just 13km in length and 4km in width. Rotuma is rugged, carpeted with lush vegetation, fringed by white sand beaches and coral reefs and the team will be active from the 5-17th August. On their way back home they will stop and be active from Fiji's capital Suva OC-016 on the south east corner of Viti Levu, between the 18- 21st August. Equipment will include an Icom IC-706, Kenwood TS-50 with amplifiers for 500W and the antennas will consist of a five-band spider beam for 14 - 28MHz and G5RV.

Look for them on the usual IOTA frequencies. All QSLs will be via F4ELJ, either direct to **10 rue de Keranquere-G.S. Paul Eluard, Brest, 29200, France**, or through the bureau, but there will be **no** eQSLing. Further updates will be posted at **http://3d2bd.free.fr**

Closer to home, **Manuel Marques CT1BWW**, **Juan Carlos Herrero EA2RC** and **Joan Torta EA3GHZ** will operate from the Azores this month as **CU7X** from Faial Island EU-175 until 16 July, **CU6X** from Pico Island EU-175 on 17th-21st July and **CU5X** from S. Jorge Island (EU-175) on 21st - 25th July. They will have two stations active on 1.8 - 28MHz s.s.b. and c.w. plus digital modes. QSL will be via EA3GHZ, either direct to **PO Box 51, Sant Carles Rapita E-43540, (Tarragona), Spain** or through the bureau. Further information can be found at **www.geocities.com/carlesrapita**

While on the island of Corsica, EU-014, **Gherardo 'Gerry' Pannoli IZ1DSH**, will be active as **TK/IZ1DSH** from Porto Vecchio between the 3rd to 15th August, with activity planned on 7/14MHz using s.s.b. only. QSL via his home call to the ARI Bureau.

DXCC FEES GOING UP!

The award chasers amongst you will be interested to hear that the **American Radio Relay League** DXCC Desk has just announced that DXCC program fees will rise 'slightly' when a new awards fee schedule goes into effect this month. The fee for a basic DXCC application, which includes a certificate and pin, on initial applications only (120 QSO maximum) and for your first endorsement applications within a year, will increase to $12 for ARRL members and to $22 for foreign non-members. Second and subsequent endorsements (120 QSO maximum) within a year will be $22 for ARRL members and $32 for foreign non-members. The $10 fee for a basic DXCC application (120-credit maximum) was established in 1990 and the current overall fees have been in effect since 1998.

YOUR REPORTS

On to your reports now. The 5W QRP of **Leighton Smart GW0LBI** in Trelewis, Mid-Glamorgan reached LY2OU (Lithuania) at 2100 using s.s.b. While c.w. found DK2VA (Germany) 2115 and F5NTN (France) at 2120UTC using a Yaesu FT-100 with 50W c.w. to a 54m long wire antenna with counterpoise.

THE 7 & 10MHz BANDS

On 7MHz and using a Ten Tec Omni 5 at 70W to a G5RV was **Ted Trowell G2HKU** on the Isle of Sheppy in Kent. Now Ted has not been too well of late, but he still managed to operate on the odd occasion. In the evening he logged A61Q (Qatar), OY3QN (Faroe Islands) EU-018 and 3B8MH (Mauritius Island) AF-049 around 2100UTC.

Eric Masters G0KRT received this card for his contact with the Russian Space centre on 7MHz s.s.b.

In Worcester Park, Surrey, **Eric Masters G0KRT** also tried QRP, working c.w. stations F6FBN (France) two-way QRP at 1551, DL2FN (Germany) 1602 and HB9OCR (Switzerland) at 1912UTC using a Kenwood TS-570DG set at 5W into an 25m end-fed wire antenna with a loading coil attached and tuned by an SGC-230 auto tuner.

In Guildon Sutton near Chester, **Gary McKelvie G7USC** used PSK31 again, and worked an amazing number of stations, including 9A6PJZ (Croatia), HB9PP (Switzerland), DG1BOR (Germany), I3DUB (Italy), OE6CQG (Austria), UR5ERQ (Ukraine), RA6FK (European Russia), F1EUS (France), OK1DOH (Czech republic). Also worked were: VE2AH Canada), KI4CBF (USA) Chris in Pembroke, Virginia, SV1GFM/4 (Greece), S51OG (Slovenia), EK1KE (Armenia), SM7DLZ (Sweden) and YU7HC (Serbia & Montenegro) between 0910 and 0030UTC. All of this was achieved using a Yaesu FT-857D with DSP fitted and a Tigertronics SL1 soundcard interface with a 7MHz delta loop antenna, which is about 7m above ground.

In Cumbria, **Roy Walker 2E1RAF** operated with c.w. working ON6FT (Belgium) 1404, DQ2006K (Germany) a special call for the World Cup at 1732, GU3DN (Guernsey) EU-114 at 1737, SM3AF (Sweden) 1903 and EI/YL2KL (Ireland) at 1916UTC. Roy was using a Yaesu FT-897 transceiver and 50W into an 3.5MHz wire loop just above ground.

In Tamworth, Staffordshire, **Geoffrey Powell M1EDF** operated on 10MHz and lists in his large log, QSOs with S51WO (Slovenia) 1032, F9OQK (France) 0745, RK6HO (European Russia) 1615 and I2HTT (Italy) 1647. Also worked was, YO4BEW (Romania) 1840, EA1BK (Spain) 2019, UT2ZZ (Ukraine) 2020, TK/F5NHJ (Corsica) 2030, VP8CMH/MM near the Falkland Islands SA002 at 2130, SP9GFI (Poland) 2039 and KR4BG (USA) Matthew in Afton, Virginia at 2148UTC.

Using an Elecraft K2 transceiver at 5W and a Hygain TH3 beam **Brian Waddell GM4XQJ** in Laurieston, Falkirk enjoyed some QRP c.w. activity. He was pleased to work VU4AN (India) at 1925UTC.

THE 14MHz BAND

On 14MHz in Middlesborough, **Keith Winward 2E0JKD** used his Yaesu FT1000MP Mark V Field to a 'Cobweb' antenna at 9m for this month's report. Voice contacts included 9A1AYZ (Croatia) 1721, CT1IZU (Portugal) 1838, TA2MW (Turkey) 1934, OE6RLF (Austria) 2000, CN8IG (Morocco) 20001, IZ4UU (Italy) 2054, EA5BYP (Spain) 2101, EA6UN (Balearic Islands) EU-004 at 2140 and J43P (Greece) the Radio Amateur Associations club call in Patra (QSL via SV3GKE) at 2255UTC.

The P40L QSL Card received by Martin M3JUQ/ 2E0MCA.

There were four contacts for Brian GM4XQJ on the band. They were 4N150AE (Serbia & Montenegro) 0819, VU2RYE (India) 1828, A61Q (United Arab Emirates) 1959 and TB0DX (Turkey) on Kosrelik Island AS-123 (A new activation) at 1919UTC.

Martin Addison 2E0MCA in East Finchley, North London, used a Yaesu FT-840 and ran 10W to a folded half-size G5RV antenna. He also had voice contacts with SV8/DL8MCA (Greece) on Skiathos EU-072 at 0624, TB0DX (Turkey) at 0639, 9A1CI (Croatia) a light house on Dugi Otok EU-170 at 0916, W8GEX/KP2 (US.Virgin Islands) NA-106 at 1022, HF80JS (Poland) a special call for 80 years of Amateur Radio at 1103, R45G (European Russia) This was a special call celebrating the 45th anniversary of Yuri Gagarin's space flight at 1459. Then he worked LZ06KM (Bulgaria) with a special call to celebrate the founders of the Cryillic Alphabet at 1723 and HZ1ZH (Saudi Arabia) at 1956UTC.

In Biggleswade, Bedfordshire, **Owen Williams G0PHY** made s.s.b. contacts with TB0DX (Turkey) 1153, OX3KQ (Greenland) NA-018 at 1435 and R1ANF (South Shetland Islands) AN010 at 2045UTC using his Yaesu FT-757 and 100W to a dipole antenna.

THE 18 & 21MHz BANDS

On to 18MHz now, where **Tom Kelly EI2AJ** in Blanchardstown, Dublin used his Icom IC-706 at 50W, working c.w. to log SV1DOJ (Greece) 1006, PY1KO (Brazil) 1009, UE9BW (Asiatic Russia) 1048 and RX3AMW (European Russia) at 1100UTC. The antenna was a Carolina Windom up at 7m.

Also, on 18MHz, was **Andy Foad G0FTD** in Whitstable, Kent with his 'shopping trolley' portable station mentioned in the March column. A 6m vertical made from an old CB antenna was used and fed from an LDG Z100 auto tuner. The transceiver is a Icom IC-706. Two contacts were reported AC8G/KP2 (US Virgin Islands) and W9WPV (USA) Bradley in Pensacola, Florida but no times were given.

Ted G2HKU managed a short c.w. session around 1600UTC, finding J68AR (St. Lucia) NA-108, TB0DX (Turkey), VA5DX (Canada) and 9M2CNC (West Malaysia).

THE 21 AND 24MHz BANDS

The 21MHz s.s.b. log of **Jim Pedley GM7TUD** lists VU4AN/VU3OHA (India) 0849, BA7NQ (China) 0942, KH7TV/KH) (Mariana Islands) OC-086 at 0945 XV2PS (Vietnam) 1012, SO1R (Western Sahara) 1037, 3B8CF (Mauritius Island) AF-049 at 1157, YB9YKI (Indonesia) 1206 and YX0LIX (Venezuela) at 1749UTC. Moving to 24MHz, Jim managed OM3EY (Slovakia) at 1012UTC on what was a "very quiet band" with all QSOs made using a Kenwood TS-450S and Cushcraft MA5B antenna.

SIGNING OFF

Well that is it for another month. The higher bands once again have been very poor with little or no activity!

My thanks go as usual to all our reporters for sending in their logbooks. Thanks also to **Tedd Mirgliotta KB8NW** editor of the *OPDX Bulletin* for the DX information. Until next time have a good DX filled month.

73, Carl GW0VSW

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In Vision

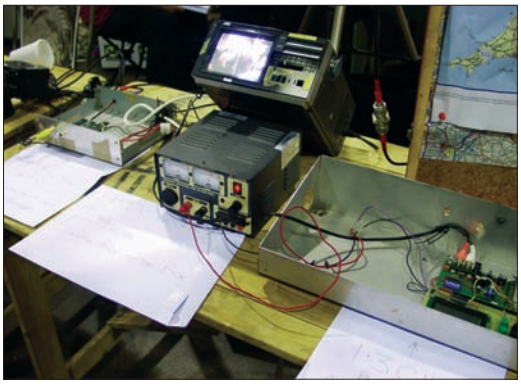
GRAHAM G8EMX REPORTS ON HOME COUNTIES ATV, 60 YEARS OF THE BBC AND PROVIDES A BATC UPDATE

Another E-mailed appeal for Amateur Television news around the British Amateur Television Club (BATC) committee, brought a brilliant response from **Giles Read G1MFG**: "Work continues on the GB3IV repeater on the Isle of Wight. Howard G3NZL has improved the receive capability dramatically by changing over from a temporary Alford slot to a plate aerial. The net effect is to improve the repeater sensitivity by 10dB. This has given at least a one P-grade improvement to all stations. Many previously receive-only stations are now able to get into the box, so there are a lot more faces coming out of the woodwork"!

Giles continues: "On Tuesday 23 May at the Home Counties ATV club at Binfield near Wokingham, **Mike G8LES** gave a detailed and well-received talk about improving the performance of the well-known Comtech modules. Drawing on his own considerable experience and some additional information provided by G8CKN and G1MFG, he outlined ways of improving the receive sensitivity, selectivity and colour performance. On the transmit side, he demonstrated how to get a proper frequency response, CCIR pre-emphasis and how to increase the sound subcarrier level from its normal -30dBc to something nearer the ATV standard of around -20dBc.

"For anyone who has yet to visit a Home Counties ATV meeting then you may be in for a bit of a culture shock. Members come from quite long distances and many straight from work. So, the first part of the meeting is usually given over to the 'Home Counties Gentlemen's Dining Club'. After that, it settles down into good-natured anarchy. Lectures by HCATV club members are definitely not a spectator sport; everyone joins in and puts their two penny worth into the debate".

Finally, Giles assures me that Repeater linking is alive and well: "In the South this continues to gather momentum. At present there are links between GB3BH, GB3HV, GB3FT and GB3TV, with plans in due course to add GB3IV to the party. It will then be easily possible to work an ATV link from Bournemouth to Cambridge, although, talkback on 2m will present something of a challenge. There is a move to standardise on an 80m or Top Band frequency for national ATV talkback. Thanks to ex-B licensees gaining acess to h.f., this has now become a possibility. Not everybody has a large enough garden for a Top Band dipole, but 3.5MHz is quite a busy band. Anyone got any bright ideas"?



The BATC occasionally visits rallies to demonstrate ATV.

FIRST TV SERVICE

Back in 1936 the BBC's first electronic television service, using 405 horizontal scanning lines, came on air from Alexandra Palace, North London. Transmitting around a 40MHz frequency, this brought the wonders of clear television pictures to the population of Greater London. On an interesting historical note, the service was closed down at the outbreak of the Second World War, mid-way through a cartoon. After the hostilities, the BBC resumed its TV service by continuing with the animation from the point at which it had been cut off!

Now, over 60 years of development later, with the launch of satellite delivery of High Definition channels announced in May, and the BBC sourcing many programmes in HD, the British Heritage Television Project (BHTP) is planning a reminder of how things used to be. The BHTP plans to mark the 70th anniversary of that first TV service by transmitting historic and archive programme material from a studio on the north London site. The organisers of the project have received encouragement and support from BBC Heritage and the National Museum of Photography, Film and Televison in Bradford. The pre-war programme *Picture Page*, on the original studio floor is to be re-created by the BHTP. Originally, the signal from the cameras was fed to a video recorder: the aim now is to go one step further and actually broadcast similar material using the original transmission standards.

Once suitable space at Alexandra Palace has been arranged, the BHTP will approach the Ofcom regulator to see whether exceptional permission can be obtained, on the occasion of this important anniversary, to transmit the programmes on Channel B1 in Band 1 (45.0/41.5 MHz). If so, a vintage television receiver switched on anywhere in the London area would work once again!

The rest of the country has not been forgotten and it's hoped to stream a 405-line feed on the Internet. Full information on this exciting project can be found at **www.405-line.tv** and the organisers welcome offers of help and support from BATC members. (Thanks to the BATC website for this news).

HIGH DEFINITION TV

We are rapidly heading towards High Definition TV, so here's a quick reminder of what this means. Present standard – 625 lines, interlaced. HD standard – 720 lines progressively scanned or 1080 lines interlaced. Receivers must have one of two special ports, either an HDMI (High Definition Media Interface) or a DVI (Digital Video Interface). The 'HD Ready' logo indicates a TV without an HD receiver, it just has the ports. The 'HDTV' logo indicates a TV set or set-top box incorporating an HD receiver.

The BBC announced a start date of 9 June for trial transmissions! I must admit to being somewhat concerned at the two differing line standards; I did read somewhere that the BBC only recognised 1080i as true HD television; however, its 'High Definition Questions' website mentions both systems. Go to **http://www.bbc.co.uk/reception/digital_tv/hdfaqs.shtml**

Maybe a final decision has yet to be made! Information to date, is that 1080i will be the 'de facto' standard for broadcast HD.

GENERAL MEETING OF BATC

The BATC seems to be remaining on course to stage its 2006 General Meeting at Stow-cum-Quy near Cambridge. An alternative suggestion, of joining the Donington Rally near Leicester, has been put forward but is not gaining much support within E-mail exchanges at the time of writing. But, with the BATC, you never know!

As the next In Vision doesn't appear until the October issue (on sale 14 September) I can only suggest you keep watching the Internet, go to **http://www.batc.org.uk** That's all for now so, until next time, keep 'in vision' and remember to send me your news, queries or interesting ATV updates.

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rob mannion's topical talk

In this month's topical discussion pages, Rob Mannion G3XFD reflects on the hysteria surrounding the media-hyped fear of radiation. He also laments the possible closure of Ionospheric Sounding stations by the UK's official science facilities.

When I first read **Stan Brown G4LU**'s letter this month (pages 8 and 9), I ended up laughing! Mind you, I wasn't laughing at Stan. Instead, I was amused by the apparent media-hyped hysteria demonstrated by many people when the scary word 'radiation' is mentioned.

I can understand anyone's fear when the reasons are apparent, and one incident often comes to mind when I witnessed unreasonable hysterical reactions. The event took place some years ago, when I was at a petrol pump filling a (legal) plastic container, used to carry fuel for my lawnmower. The lady attendant, sitting in her glass-walled cashier's office, looked at me with horror, before rushing out, shouting that I was "breaking the law, the container could dissolve and an explosion could take place".

However, she froze on the spot when I literally screamed at her not to come any closer, as the lit cigarette in her hand was very near the recently filled container and could ignite the petroleum vapour. It was a case of reacting to one rational, justified concern, whilst totally forgetting the other danger associated with what she was doing (smoking) at the time.

I feel that the petrol station attendant's reaction can be compared to the vociferous objectors who, although allowing their children to clamp mobile telephones to their ears for hours at a time, object to the associated service masts being erected anywhere near schools. And like Stan G4LU, I have discussed the 'mobile mast' situation with someone who objected very strongly to a local mobile telephone installation.

When I politely asked what her objection was, she replied, "Oh well, it's radiation isn't it? I can't allow my daughter to be bathed in radio waves - they're dangerous"! I then asked if her daughter had a mobile. It turned out that, of course, she did, so that mother and child could sensibly keep in contact.

The look of surprised horror on the mother's face, when I'd explained the mobile telephone was in fact a radio transmitter receiver, told me she had no idea at all how the system worked. "It's just a telephone, I didn't know it used radio waves", was the rather bemused reply. The realisation that her daughter often held a radio transmitter against her ear for an hour or so at a time was just dawning!

Unfortunately, try as we might (as radio/wireless enthusiasts), there are times when attempting to explain the subject to the non-scientific you can actually make matters worse! This happened to me when a middle-aged lady at the supermarket cashier's till in front of me, objected to the laser barcode scanner's 'radiation'. (It was laying ready for use, with the low power laser beam visible, but not posing any danger) .

I explained that as long as she didn't look into it directly, she would be safe. She then told me, in that very confident manner often adopted by people who've made their mind up without knowing the technical facts, that "All radiation is unsafe and it's being beamed at us from everywhere"!

I then asked if she liked sitting in her garden, as she had a pleasant sun tan. It appeared she did, and enjoyed sunbathing

My comment that she was "bathing herself in radiation - from the sun itself" - were wasted as she turned towards to the car park. With a parting comment she said, "But the sun's radiation is natural, isn't it"?

"Oh well", I thought, "At least those youngsters I help start off in radio, will have a better understanding of what goes on in the electromagnetic wave spectrum"!

Closure Of Ionosonde Stations

Phil Cadman G4JCP (a regular *PW* author and supporter) is rightly concerned about the possible closure of the UK Ionosonde stations. I urge everyone who shares Phil's concerns to write to the **Particle Physics and Astronomy Council** (PPARC). My own letter is on its way - and we may even be able to help them maintain the service.

Please write to PPARC at; **Polaris House, North Star Avenue, Swindon, Wiltshire SN2 1SZ.** **PW**

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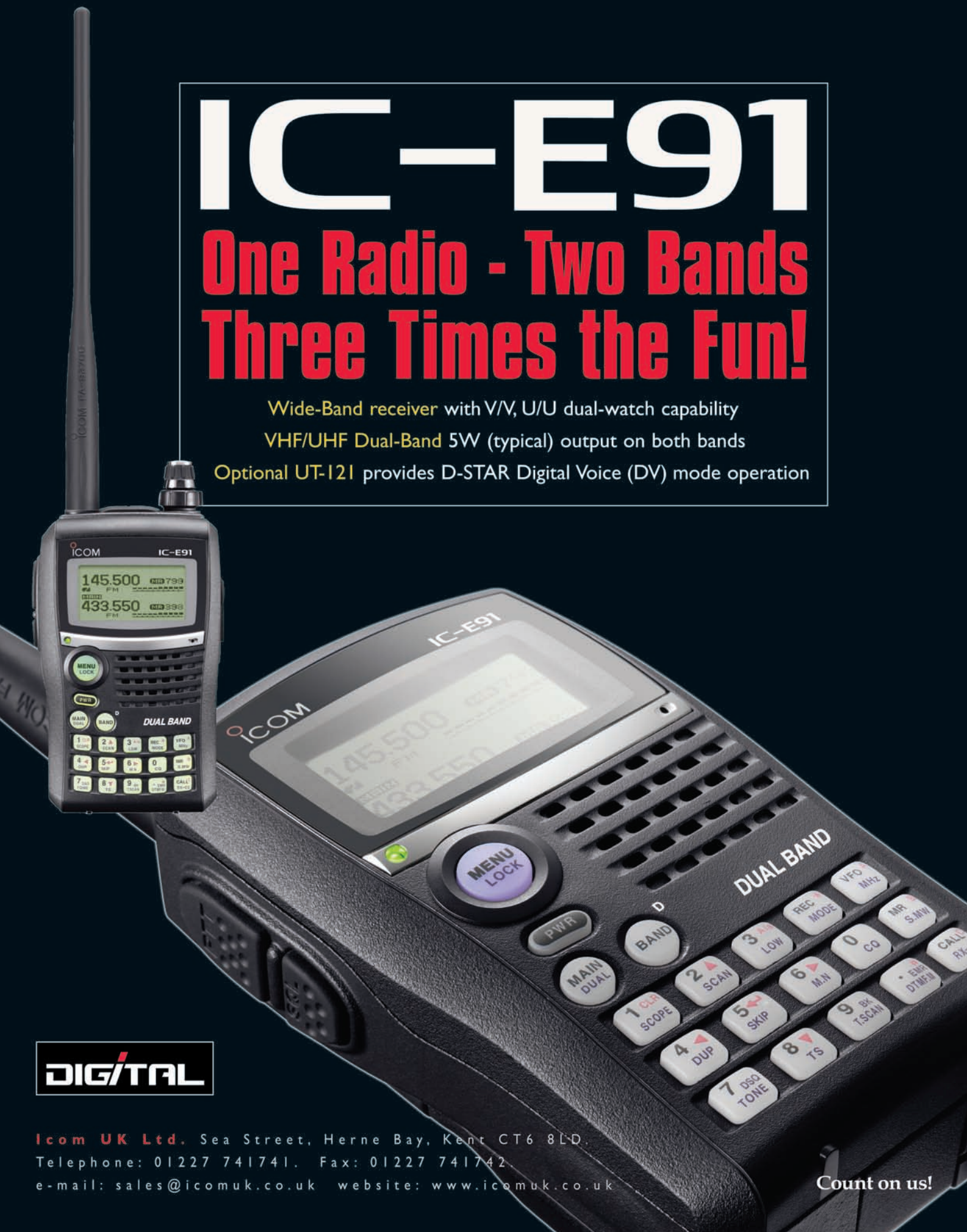

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