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Radio Communications Equipment Guide 2007

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

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(+ £1.75 UK P&P)

AFT (Tonna) Antenna's

Model	Freq.	El.	L. (m)	dBi	Price +P
20505	6m	5	3.45	10	£89.95 D
20804	2m	4	0.93	8.9	£47.95 C
20808	2m	2x4	1.03	8.9	£69.95 D
20809	2m	9	3.47	13.1	£57.95 D
20089	2m	9/P	3.47	13.1	£59.95 D
20818	2m	2x9	3.57	13.1	£87.95 D
20822	2m	2x11	4.62	14	£119.95 D
20811	2m	11	4.56	14.2	£84.95 D
20817	2m	17	6.57	15.3	£99.95 D
20317	2m	17	10.45	17	£199.95 D
20899	2m/70cm	9/19	3.70	13/16	£89.95 D
20909	70cm	9	1.24	12.9	£45.95 D
20919	70cm	19	2.82	16.2	£59.95 D
20938	70cm	2x19	2.82	16.2	£65.95 D
20921	70cm	21	4.6	18.2	£74.95 D
20922	70cm	21	4.6	18.2	£117.95 D
20635	1296MHz	35	3.07	20.8	£64.95 D

CREATE RC5-1

*Rotation Torque: 6kg/m *Brake Torque: 80kg/m *Max. vert load: 400kg *Max. horz load: 800kg *Mast size: 48 63mm *Weight: 5kg

£339.95 D

CREATE RC5-1

*Rotation Torque: 6kg/m *Brake Torque: 90kg/m *Max. vert load: 400kg *Max. horz load: 800kg *Mast size: 48 63mm *Weight: 5kg

£419.95 D

NEW

FlexRadio Systems — Flex-5000 HF Transceiver 100W 160m - 6m

NEW - Performance Packed Radio

This new software transceiver brings you performace and features no other radio in the world can offer!

£1442.55 ex VAT
£1695 inc VAT

Order now for July Delivery

SSB CW AM FM from milliwatts to 100W. 105dB dynamic range at 2kHz! 33dB intercept point. Single Firewire cable to PC. No sound card needed. 24 but sampling at 192kHz, TCXO 0.5ppm ref. xtal, True plug and play with PC or laptop, Self test and calibrate, Many contest & DXing features www.flex radio.com

YAESU

FT-2000 Buy Now Pay Later! 0% Interest!*

1.8-30MHz +6m 100W

FT-2000D £2399 Phone!

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

£1845 D

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

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

£599 D

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

NEW LOW PRICE!

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

£499 D

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

LOW PRICE!

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

£349 D

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

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

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

KENWOOD TS-2000 Package Deal

Package:
TS 2000uk
25 Amp AC PSU
1.8 430MHz Pwr Meter
RG 213 patch lead

All Mode Multi Bander

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

Package Price £1379 D
Radio alone £1295 D

NEW PRODUCTS - NEW PRODUCTS

KENWOOD TM-V71E 0% Interest!*

NEW

EchoLink Memories & NODE Terminal
50W on 2m & 70cms!

£269 C

NEW

Bluetooth

YAESU FTM-10R/E

New 2m/70cm Mobile with Bluetooth option
50W 2m 40W 70cms
Removeable front
Built in PTT & Microphone!
11 x 3.7 x 17 cm!

This tiny mobile is the new Yaesu generation mobile. With the BU-1 adaptor you can enjoy BlueTooth operation. Other features include intercom ready, FM stereo radio, CD audio input, audio amp and PA function. A true car sport radio!

£Phone

YAESU FT-450

NEW

160m 6m 100W SSB CW AM FM
IF DSP
Voice Memories
23 x 8.4 x 22 cm

Budget Class with Performance! **£tba**

ICOM IC-7700

NEW

Billed as a Contest Radio, the design takes fearures from the IC-758 and IC-7800 to give you a hefty transceiver packed with features. Available towards end of the year.

160m 6m 200W SSB CW AM FM
+40dBm Intercept
7" Colour TFT Spectrum Scope

£tba

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Online Catalogue
www.wsplc.com

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

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

200W HF Built in AC PSU

£6,395 D

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

HF + 6m 100W All Mode

£1989 D

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

HF/VHF/UHF All Mode Transceiver

Rig Only £895

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

Deal1 IC 7000 with Watson Power Mite portable psu. £929.95 D

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

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

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

100W HF VHF Rig Only

£1,199 D

Deal1 IC 7400 with SM 20 Desk Mic & SP 21 Speaker £1,269 D

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

100W HF Transceiver

£399 D

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

HF/VHF/UHF All Mode Transceiver

SPECIAL OFFER! **£599 D**

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

The lovely 10W QRP HF 6m radio with built in Auto ATU **£449 D**

KENWOOD

Exclusive to Waters & Stanton!

NEW RADIOMATE

Keyboard For FT-817, FT-857 & FT-897

Rig not included

* Direct frequency entry
* Mode change
* Carrier tune mode
* VFO A/B
* 20 Memories
* Self Powered

RadCom Review (Feb 2007) "A pleasure to use - - has transformed my FT-817"

£99.95 C

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

100W HF+6m

£679 D

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

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

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DSP Noise Cancelling

bhi NES10-2 MkII SPECIAL OFFER!

Speaker and programmable DSP unit. Offers dramatic noise reduction.

Was £99.95 Now **£89.95 C**

bhi ANEM

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

£119.95 C

bhi NEIM-1031

Noise Eliminating In Line Module.

£129.95 C

bhi NEDSP-1061-KBD

Noise Eliminating DSP module designed for retro fit in a number of transceivers, FT 817, TS 50, IC 706MkIIG, FRG 100, DX 77. With Keyboard.

£89.95 C

bhi NEDSP-1062-KBD

Noise Eliminating DSP module simply fits into Loudspeaker path, features a small keyboard to control functions.

£99.95 C

Icom
VHF/UHF Mobile/Base

ICOM IC-E208

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

£215 D

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

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

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

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

Kenwood
VHF/UHF Mobile/Base

KENWOOD TM-271E

2m FM 60W Mobile Transceiver. MIL SPEC DTMF Mic.

Built in CTCSS & DCS encoder / decoder.

New Low Price! **£149 D**

TM-G707E £199 D
Dual Band 2m & 70cm with detachable front

Yaesu
VHF/UHF Mobile/Base

YAESU FT-7800E

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

YSK-7800 Remote Cable Only £24.95

£169 D

FT-1802E Low Price! £99 D
*2m FM Mobile transceiver *5, 10, 25 50W
*DTMF Mic Supplied as standard

FT-8800E Low Price! £219 D
*2m/70cmDualband FM Mobile transceiver
*50W 2m, 35W 70cm *Wideband receiver

FT-8900R Low Price! £249 D
*2m, 70cm, 6m & 10m Quadband FM Mobile transceiver *Independent dial for each band

Yaesu
ADMS Software

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

ADMS-1F for VX-110/1 / **ADMS-1G** for VX-7 **ADMS-1H** for VX-2E / **ADMS-1J** for FT-60E **ADMS-2H** for FT-8900 / **ADMS-2I** for FT-8800 / **ADMS-2J** for FT-2800 / **ADMS-2K** for FT-7800 / **ADMS-3** Programming Kit for VR-500, all **£39.95** with FREE PC Radio Data Lead.

ADMS-4A for FT-817 and **ADMS-4B** for FT-857/8 both **£29.95**, both these items require a seperate CT-62 lead at **£29.95**

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Icom
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ICOM IC-E91

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

SPECIAL OFFER! **£199.95 C**

IC-V82 7W 2m Digital £159 C
IC-U82 70cms Digital £159 C
IC-E90 6/2/70cm £189 C
IC-T3H 2m 5W £129 C
IC-E7 2m/70cm Wide Rx £139 C

Kenwood
VHF/UHF Handhelds

KENWOOD TH-F7E

• 144 146MHz Tx/Rx: FM
• 430 440MHz Tx/Rx: FM
Up to 6W out with Li ion battery and **"scanner" style coverage from 100kHz to 1300MHz** including SSB on receive!

£199.95 C

TH-K2E 2m 5W £99 C
TH-K2ET 2m 5W FM £145 C
TH-K4E 79cm 5W FM £139 C

Yaesu
VHF/UHF Handhelds

YAESU VX-7R

LIMITED SPECIAL OFFER

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

£209 C

VX-6E 2m/70cm wide rx 5W £169 C
FT-60E 2m/70cm wide rx 5W £129 C
VX-2E 2m/70cms miniature £99 C
VX-120 2m 5W w/ 8 key pad £99 C
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General Enquiries
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01702 204965

Online Catalogue
www.wsplc.com

MFJ SGC HEIL SOUND

MFJ

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

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

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

MFJ-948 £109.95 C
1.8030MHz ATU 300W, large cross needle meter

MFJ-993B £189.95 C
Auto ATU 1.8-30MHz, 300W SSB, 150W CW, Matches 6-800 Ohms

MFJ-945E £89.95 C
Mobile ATU 1.8-54MHz, 300W max, VSWR & 30/300W pwr meter

MFJ-949E £124.95 C
ATU / Dummy Load 1.8-30MHz, 300W, large cross needle meter

MFJ-901B £74.95 C
VERSA TUNER 1.8-30MHz, 200W, 135x150x60mm, weight 760g

MFJ-902 £65.95 C
Travel Tuner 3.5-30MHz, 150W, Mobile & portable use, 90x60x80mm

MFJ-259B £199.95 C
HF Digital SWR Analyser Coverage: 1.8-170MHz, Freq Counter, SWR & Impedance meters, Connectors: SO-239 (Ant), BNC (Counter).

MFJ-269 £269.95 C
HF/VHF/UHF Analyser
Coverage: 1.8-4, 4-10, 10-27, 27-70, 70-114, 114-170, 415-450MHz. Freq Counter, SWR & Impedance meters, Connectors: N-socket (Ant), BNC (Counter).

SGC

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

SG-237 £269.95 D
Compact ATU 1.8 to 60MHz, 3 - 100W (PEP) 40W max CW, VSWR: <1.4:1

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

SG-230 £339.95 D
The Original Long Wire SmarTuner - 1.6 - 30MHz, Power Input 3 - 200W

HEIL

PR-780-PTT £159.95 C
Deluxe Base Microphone
Dynamic cardioid studio mic w/ CB-1PTT base (needs CC-1-XLR) lead.

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

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

HTSS £49.95 C
Traveler Single Side Headset & Boom Mic
Requires HSTA patch lead

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Traveler Double Sided Headset & Boom Mic
Requires HSTA patch lead

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Patch Leads for HTSS & HTDS.
HSTA YM for Yaesu modular
HSTA 706 for Icom modular
HSTA KM for Kenwood modular
HSTA K8 for Kenwood 8-pin
HSTA IC8 for Icom 8-pin
HSTA KHT for Kenwood
HSTA IHT for Icom handhelds
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HF Antenna's

GAP ANTENNA PRODUCTS

We Are Now The Sole UK Distributors For Gap Antennas!

CHALLENGER
8 BANDS HF VHF

- *Bands: 80, 40, 20, 15, 12, 10, 6, 2m.*
- *2kW PEP SSB • VSWR: Better than 2:1*
- *Full band 40m upwards 130kHz + on 80m*
- *3/8 wave basic concept*
- *Height 9.6m (31.5ft)*
- *Radials 3 x 7.6m (25ft).*
- *3ft ground socket supplied*
- *Can be mast mounted*
- *Weight 8kg*

£229.95 D

EAGLE
6 BANDER

- *Bands: 40, 20, 17, 15, 12, 10m*
- *2kW PEP SSB*
- *VSWR: Better than 2:1*
- *Full band 40 - 12m - 40, 20, 17, 15, 12m, 500kHz + on 10m*
- *Height 6.4m (21t)*
- *2m (80") 3 x counterpoises inc.*
- *Support pipe reqd. (1.25" max)*
- *Weight: 4.9kg.*

£249.95 D

VOYAGER DX IV
4 BAND LF

- *Bands: 160, 80, 40, 20m .*
- *2kW PEP SSB*
- *VSWR: Better than 2:1*
- *80m up full coverage, 90kHz + on 160m*
- *Height 13.72m (45ft)*
- *Radials 3 x 17.4m (57ft)*
- *Requires guys - brackets inc.*
- *2ft groun pivot included*
- *Weight 13.6kg*

£329.95 D

TITAN DX
8 BANDS

- *Bands: 80, 40, 30, 20, 17, 15, 12, 10m*
- *2kW PEP SSB*
- *VSWR: Better than 2:1*
- *Full band 40 - 10m (40, 30, 20, 17, 15, 12, 10m) , 100kHz + on 80m*
- *Height 7.6m (25t)*
- *2m (80") 4 x counterpoise inc.*
- *Support pipe reqd. (1.25" max)*
- *Weight: 11.3kg.*

£279.95 D

CUSHCRAFT COMMUNICATIONS ANTENNAS

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

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

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

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

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

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

MA5B £399.95 D
5-band 2 El mini beam. 20m - 10m 2kW. Elements 5.2m Turn radius 2.7m. (Dipole on 17/12m) 5dB gain

HUSTLER

6-BTV

6-BTV £229.95 D
*6-band vertical, 7.3m tall, 1kW.
*Coverage: 80, 40, 30, 20, 15, 10m
Can be used at ground level with earth stake. Ideal for small gardens

5-BTV £199.95 D
*5-band vertical, 7.64m tall, 1kW.
*Coverage: 80, 40, 20, 15, 10m
Can be used at ground level with earth stake. Ideal small gardens

4-BTV £169.95 D
*4-band vertical, 6.52m tall, 1kW.
*Coverage: 40, 20, 15, 10m
Can be used at ground level with earth stake. Ideal small gardens

Watson Power Supplies

The UK's Power Supply Specialist.

WATSON POWER-MITE

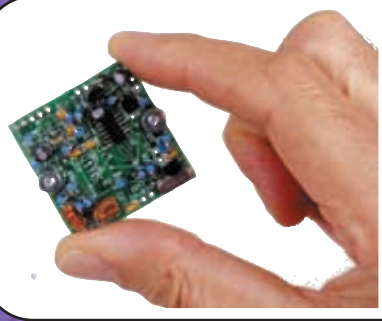
*11-15V Variable.
*20A continuous
*23A peak, 100 - 260V
*AC in. 2 x Meters
*150 x 55 x 165 mm

£49.95 C

WATSON W-25SM

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

£67.95 C



Software Defined Receiver £19.95!

NEW SoftRock-Lite v6.2

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

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

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

Prices

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

Practical Wirelesscontents

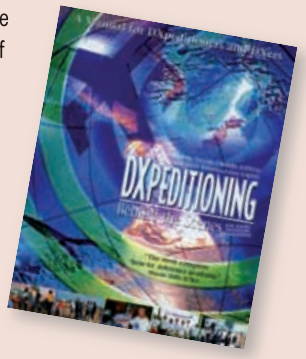
July 2007
On Sale 14 June
Vol. 83 No. 7 Issue 1203
(August 2007 Issue on sale 12 July)

60 Practically Yours
75 Years of Heritage & History
Looking back at some rather special news items, articles and other material covering the period from 1940 to 1949 in *Practical Wireless*.


19


26


40



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Cover Subject
Richard Newton G0RSN takes the Outreach Antenna out to the New Forest to put it to the test – he even found time to enjoy the cricket too! Read his evaluation and find out how it performed – once a stinger in the tail had been sorted out.

Design: Steve Hunt
Photograph: Terry Wood G7VJJ

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

Keylines

Rob G3XFD introduces another issue of great radio reading as he pays tribute to *PW's* founding editor, Fred Camm.

FJ Camm 1895-1959

This month's Keylines is dedicated to **Fred Camm**, the original and founding Editor of *Practical Wireless*. The reason why this month's editorial has become a personal tribute to my illustrious predecessor is directly due to the **Radio Society of Great Britain** (RSGB) who have paid a wonderful tribute to the magazine and the '*PW* man', without whom many of us would not have enjoyed the introduction to the radio hobby it has provided for generations of enthusiasts.

The story of this special Keylines began in early April when **Peter Kirby G0TWW**, the RSGB's General Manager wrote to me announcing that the RSGB's Governing Council had unanimously voted to mark *PW*'s 75 years of publication with a special award. The letter went on to invite someone from PW Publishing Ltd., to attend the Society's Annual General Meeting and the official dinner in Edinburgh on Saturday 18 April 2007.

The Invitation

Needless to say, we were all delighted to receive the invitation from the RSGB and before replying officially to the Society I discussed it with our Publishers, **Roger Hall G4TNT** and **Steve Hunt**. It was then decided that I would attend the AGM and dinner in Edinburgh, the capital city of Scotland, representing everyone who had ever worked on the magazine throughout its 75 years. I was immensely proud to have the opportunity to represent *PW* and the staff who had worked so hard to produce a magazine that, although it's changed over the years, has kept the same title and 'practical, hands on' ethos throughout.

It gave me much pleasure to write to Peter Kirby, accepting the invitation on behalf of everyone on *PW*. I was also very aware that I was following in the footsteps of 'FJ' himself!

Bearing in mind that Fred Camm died in 1959 at the age of 63 (I was 14 at the time), I never had the chance to meet him. However, over the years of working on *PW* I have had one or two little anecdotes featuring this prolific writer and journalist.

During my early years as Editor, I received Christmas cards for a number of years (they stopped over 15 years ago) from 'Daisy', Fred Camm's Secretary who was living in retirement in East Anglia. There was never any address so I could not reply to 'Daisy' but she mentioned in her cards – that I seemed friendlier than FJ!

The late **Basil O'Brien G2AMV** (former President of the RSGB) sat next to me at an official dinner some years ago. Basil (a remarkable raconteur) told me that FJ was a chain smoker and rather brusque. At a pre-Second World War official RSGB function in Wales, FJ chain-smoked his cigarettes while sitting on Basil's left, while **Austin Forsyth G6FO** (Editor of *The Short Wave Magazine*) sat on his right-hand side. Neither gentleman spoke to other guests and when the speeches started both FJ and G6FO got up and left!

Mr Camm was known to be brusque and not much of a conversationalist but certainly was absolutely dedicated to his work! However, it's important to remember that his wife died in 1939 and their only son (Freddie junior) died two years before his father. From this we can get the impression FJ was most likely a very lonely man and dedicated himself to *PW* and the many other 'Practical' titles that carried his name as Editor and often worked on Sundays. We must also bear in mind that pioneering Editors such as FJ were treated as almost God-like figures. And, although I'm proud to follow in Mr Camm's hallowed footsteps, the situation today is totally different. Nowadays, the dedicated staff who produce specialist magazines, appreciate their readers and work with them to provide the essential good reading that has ensured *PW*'s long life.

Presentation Plate

On behalf of everyone at PW Publishing Ltd. I was delighted to accept the engraved Silver Platter from **Angus Annan MM1CCR,** President of the RSGB at the AGM dinner in Edinburgh on 18 April. Angus, a keen *PW* reader and author himself, made a short speech and I expressed my own gratitude for the honour.

I end this special Keylines by saying, "Congratulations Mr Fred Camm for founding a magazine that's survived for 75 years and, with our combined continued efforts, will stride confidently into the future supporting the Amateur Radio hobby". Thanks also to the RSGB and to our wonderful authors and equally dedicated readers.

Rob Mannion G3XFD/EI5IW

services

Subscriptions
Subscriptions are available at £37 per annum to UK addresses, £45 Europe Airmail and £55 RoW Airmail. See the Subscriptions page for full details.

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

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

Placing An Order
Orders for back numbers, binders and items from our Book Store should be sent to: PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone 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.

Send in your thoughts and win a voucher!

letters

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

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

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**

More on Scratchers & Whistlers

● **Dear Rob**

Greetings, I'm writing after reading the Topical Talk section of the May issue of *PW* where you discuss the problems caused by the microphone Scratchers & Whistlers, mainly on 7MHz. I would like to know more on beating this disruptive menace and removing it from our hobby.

I have had experience in past QSOs of the Scratchers & Whistlers nuisance and it's most annoying to say the least, especially when the nuisance signal is stronger than the person you're talking to! (Which could means they are very close or using high power!)

I try diligently to ignore the problem but have found that sticking my head in the sand does not solve it. I want to take a more proactive role in chastising the unpleasant people who are making legal operators lives a misery. I've only had this problem a few times but I sympathise with operators for whom it's a big problem. Once is enough! Why should we suffer for other people's childish activities? Maybe a brief article in a later issue on how to tackle the problem will help? Many thanks and 73s

Denny Teasdale M3HSJ
Stockton on Tees
Cleveland

Thank you for your support Denny. Together we'll crack the problems I'm sure! ***Rob G3XFD***

The R1155 & Frank Rayer G3OGR

● **Dear Rob**

I'm writing this letter to you after just finishing reading the latest *PW* and, as usual, was fascinated by the historical *PW* articles, particularly the one on the R1155. I bought my R1155 in 1965 for the princely sum of £9 and still have it, now much modified. Now retired, one of my intentions is to strip out all the modifications and try to get the R1155, as it was when I bought it!

Regarding **Frank** (F.G.) **Rayer G3OGR** (who lived in Worcestershire, I believe - was it Kidderminster?). I was surprised to see his TRF5 portable in last month's historical section as I had only just got

Scratchers & Whistlers

Star Letter

● **Dear Rob**

I was very interested in reading the Scratchers & Whistlers item and your subsequent comments in the May issue of *PW*. During the 1960s and early 1970s, I worked as a GPO Radio Investigation Service (RIS) Officer in West Yorkshire. At that time, we were experiencing heavy pirate transmitter activity around the 6.5MHz portion of the spectrum, which was interfering with aeronautical and other government radio channels. This activity stemmed from a plentiful and cheap supply of ex-military radio equipment requiring little or no modification to start transmitting immediately. There was also concern with the lack of operational procedures and illicit operation on 144MHz.

At this time, the bread and butter work for RIS officers was radio and television interference. Due to a majority of the recipients of the interference working in the daytime, a lot of the tracing and remedial work was undertaken during the evenings, just at the time when the illicit transmitters were most active. The 144MHz problems were mostly sorted out because of the relatively short range of the transmissions, which meant that local knowledge within the Amateur Radio community usually provide the names and locations of the offending individuals.

The high frequency 6.5MHz transmissions posed a greater problem as they could be emanating from virtually anywhere within the UK. In West Yorkshire we relied on initial location information from three RIS direction finding (DF) stations in Lincolnshire, Hertfordshire and the West Country who maintained permanent watches.

Whilst using extremely good commercial DF equipment, their remoteness only gave us a triangulated location of the offender requiring more detailed local searches. Local officers then used their own DF equipment to find the offender as and when time allowed. Clearly the under funding of the service at that time (and probably now) meant no extra staff were available locally for these very time consuming duties.

The answer to the problem was that we approached about half a dozen local Amateurs; all were either ex-maritime, ex-services or ex-police personnel who readily offered their monitoring services on a voluntary and free basis. With their own existing or hurriedly made, relatively primitive DF equipment, they provided a superb monitoring operation for us. As Amateurs of integrity they relished the opportunity to have the illicit transmitters eradicated. The results were far better than expected. In fact, so much equipment was confiscated that storage of it became a problem as it overflowed the repository.

Things learnt were that illicit operators had patterns of operation governed by such things as work shift patterns, family and regular social commitments, which made the monitors tasks easier as they began to predict the times individual illicit operators came on air. With voice communications, over a long period it was amazing how the operators gave away little bits of seemingly unimportant information, which when meticulously logged by the monitors and studied, frequently gave their positions away. The DF information also provided by these monitors was very accurate and with the exception of the mobile illicit, which took more time to apprehend although most of the illicit transmitters were quickly silenced.

I am sure that this strategy would be successful again if a number of dedicated Amateurs work in unison to provide Ofcom with accurate logs and bearings of offending transmissions. The local RIS officers could then effectively act on the information received. Hopefully, the nets you are referring to, could then enjoy their QSOs without interruption.

Gordon
Ex-GPO RIS Officer
(Name and Address Supplied)

The feedback on the Scratching & Whistlers topic we've received has been most encouraging. If we all work together – as our correspondent suggests – the anti-social nuisance transmitters will be silenced. The Huff-Duff 7 Loop antenna projected has now been tested 'in the field' and we plan to publish it very soon. ***Rob G3XFD***

around to building it last December! It works well too!

Regarding **J. R. Davies**: As well as Smithy the Serviceman (*Radio Constructor*) and **W.G. Morley**, I'm pretty sure that **R. J. Caborn** and **G. A. French** were also pseudonyms of his. The G.A French author was, and still is, a particular hero of mine - how he managed to produce his Suggested Circuits article every month for year after year is beyond me! Especially, if (as I suspect) he was also simultaneously producing In Your Workshop as well! Incidentally, in a few of the In Your Workshop articles Smithy and Dick make jocular references to G.A French, which first led me to believe that Davies and French were the same person (Because it's okay to make a joke against yourself!).

Additionally, as you know, JRD wrote several articles for *PW* as well. The earliest article by him that I have is from around 1949/50. I passed a personal milestone the other day when I completed my collection of *Radio Constructor* containing In Your Workshop – I now have all the Dick & Smithy's articles!

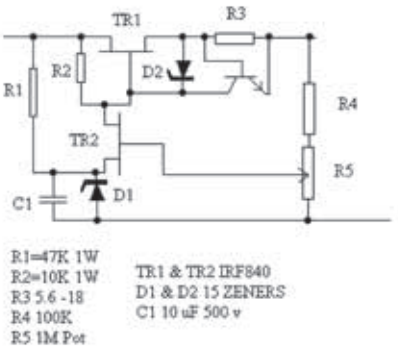
Hoping this is of some interest to you. Keep up the good work with *PW*! Best wishes.

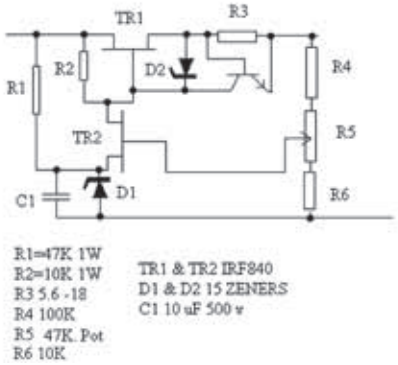
Jim Jobe
Ripon
North Yorkshire

Variable Voltage Power Supplies

● **Dear Editor**

I was reading the May 2007 issue of *Practical Wireless*, particularly the article on the Vari-HV a power supply. I use a circuit similar to the one I included in this E-mail. The advantage is that the transistor Tr1 is used as a variable resistance with the load but Tr2, which has a zener diode in its source, controls the control of its gate. This controls Tr1 when the base voltage of Tr2 is greater than the drain voltage. This makes Tr2 conduct more current bringing the voltage down on the source of Tr2 and the 'grid' of Tr1 depending on the voltage on the 'grid' of Tr2. This is determined by R4 and 5, which potentially divides the output voltage. There is a feedback loop between the output and the control. This acts like a variable regulated power supply.





I have kept the current protection circuit in and this protects Tr1, readers will find this circuit of some use. Further improvements could be to increase the loop gain around the controlling elements. We have to remember also that if you measure the open circuit voltage of the power supply from the last smoothing capacitor and then apply a load of, for e.g., 100mA the output voltage will fall this is of course due to internal resistance of the transformer and smoothing. This will give you an idea of the maximum voltage that the circuit will regulate to, since the input to the regulator has to be 4V more than the output for the circuit to work correctly. Drawing 100mA is drawing the maximum current and therefore loading the power supply to maximum. Output voltage from the regulator is determined by R3 and 4 and the zener diode. The output voltage is equal to 15*(1+(R4/R3)).

In practice, you may have to modify the voltage swing on grid of Tr2 by using the following (see circuit). You will have have change values of R5, 4 and 6 to give you the output swing you need. The value R, 5 and 6 are dependent on the characteristics of Tr1 and 2 and the zener voltage (in source of Tr2).

Peter Lewis MI0RTX
County Antrim
Northern Ireland

More *PW* Reprints Please!

● **Dear Rob**

I normally only get the chance to meet the *PW* team at the Leicester Show each year but this year I managed to get along to the Junction 28 Rally in North Derbyshire. I know that some readers complained that you were too busy operating **GB75PW** to talk to them but you managed to chat some of the time. I was very envious of you with the wonderful looking Icom IC-756PROIII you have on loan for the use with the Special Event station during 2007. When I've got my M3 callsign perhaps I'll save up and get one or use part of my tax free cash from my pension when I retire in three years' time!

During our chat at Junction 28, I told you how useful I found my old and tattered copy of *More Out of Thin Air* and the other *PW* reprints that have come my way. We then chatted about the possibilities of more reprints of articles published in *PW*, re-issued in booklet form. You mentioned there were some more 'at the planning stages'. Now that a few months have passed by can you possible let readers know what progress has been made on the new reprints?

Thanks for *PW*, I enjoy **Tony Nailer G4CFY's** Technical for the Terrified very much. It's an informative and enjoyable read. Tony is not afraid of being 'different' in helping us to understand the (sometimes awesome for the non technical amongst us) technical stuff! Best wishes.

Michael (Mike) Stowe
Mansfield
Nottinghamshire

Editor's reply**: It was good to meet you at Junction 28 Mike and I hope you can join us at the Leicester show again this year too where you'll be very welcome. Regarding the reprint situation I'm delighted to announce that shortly after this issue of PW is on sale our latest reprint booklet, entitled Even More Out Of Thin Air will be published. As he works very closely with the Antenna Workshop series of articles in PW, **Tex Swann G1TEX** has been very busy selecting articles for this new reprint of previously published articles. Tex has chosen well and I'm sure readers will be delighted to have such a good reference source available from PW. Please join me on the Topical Talk pages for further information on this topic. **Rob G3XFD

Contests & 7MHz

● **Dear Rob**

Many readers will agree with you (Keylines June 2007 *PW*) that the time has now come to do something about the appalling state of the 7MHz band during contests. When the maximum usable frequency (MUF) is below 10MHz it's no use being told to use

the 30m bands, so the choice for many operators is to participate or go QRT.

May I suggest the following 'argument'. I'll start with four assumptions, namely:
1: We want to encourage people to become Radio Amateurs
2: For many Amateurs 7MHz is an excellent band on which to start. For the urban dweller effective antennas can be erected and EMC problems are usually minimal.
3: The weekend is often the only time that many Amateurs can operate.
4: Contests are not the best environment in which to have your first QSOs.

From my listed assumptions the logical conclusion for the future good Amateur Radio is that the use of 7MHz for contests should be strictly limited, if not banned completely. My suggestion will not find favour with everyone and those who disagree should give reasons – assertions and abuse won't be acceptable! Sincerely yours,
Gerald Stancey G3MCK
Oakham
Rutland

Thank you for sharing your opinions Gerald. I invite other readers to hep us provide a balanced selection of opinions in these pages. Please join me on the Topical Talk pages for further discussion and suggestions. ***Rob G3XFD***

Latest News - GB7AIR On Air!

● **Dear Rob**

I hope you and everyone at *PW* are keeping well? As promised and following my telephone call from last year, GB7AIR is now on the air from my QTH here in Portballintrae, North Antrim in Northern Ireland.

It has been an interesting project from the Notice of Variation (NOV) to powering up the BBS, because there's no radio frequency (r.f.) connection available, is Telnet driven and access is available via **telnet:gb7air.no-ip.org** and locally via v.h.f. on 144.850MHz. Packet radio is now supported by and depends on the Internet but I still believe that with the *ISS* very active on packet, terrestrial packet can still co-exist with the Internet only because packet is still radio driven. I hope later on in the year to put a node (packet repeater) on a local hill top to extend the r.f. coverage.
Best wishes.
Ken GI8AIR (Sysop of GB7AIR).
Portballintrae
Northern Ireland

Congratulations Ken! Very often our hobby relies very much on the efforts of people such as you. Thank you. ***Rob G3XFD***

rallies

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

June 17
The Newbury & DARS
Rally & Car Boot Sale
E-mail: **carboot@nadars.org.uk**
The Newbury & DARS Rally & Car Boot Sale will be held at a new venue, the Newbury Showground A34/M4 Junction J13. Entry is £1 per person, £10 per pitch, £50 for your marquee. Set up from 0700, entry 0900hours.

June 17
The East Suffolk Wireless Revival
Contact: **John Quarmby G3XDY**
Tel: **(01473) 717830/(07710) 044858**
Website: **www.btinternet.com/~thomassg/eswr.htm**
The East Suffolk Wireless Revival will take place at the Suffolk Showground (Trinity Park), Felixstowe Road, Ipswich, which has ample car parking with the gates opening at 0930. The main attraction will be the radio car boot sale. In addition, there will be a Bring & Buy sale, bookstall, h.f. station and local club stalls. Food and refreshments will be available. Admission is £2, OAPs £1.50 and under 14s Free.

June 24
West of England Radio Rally
The West of England
Contact: **Shaun**
Tel: **(01225) 873098.**
E-mail: **rallymanager@westrally.org.uk**
Website: **www.westrally.org.uk**
The West of England Radio Rally will be held at the Cheese & Grain Venue, Bridge Street, Frome, Somerset BA11 1BE from 1000 to 1600hours. There will be inside and outside trade stands, including the PW Publishing Ltd., cafe, disabled access and facilities and free car parking. Adult admission will be £2, with accompanied children under 14 free.

July 1
Barford Radio Rally
Contact: **David**
Tel: **(01953) 457322/458844**
E-mail: **radio@dcpmicro.com**
Website: **www.norfolkamateurradio.org**
Norfolk Amateur Radio Club are holding their Barford Radio Rally at Barford, which is nine miles south-west of Norwich, close to the A11 and A47. Doors open at 0900 (traders from 0800). There will be car parking available as well as a Bring & Buy and catering facilities.

July 8
York Radio Rally
Contact: **Arthur G8IMZ**
Tel: **(07841) 120738**
E-mail: **apalg8@aol.com**
The York Radio Rally is being held at York Racecourse (Knavesmire). Doors open 1015for disabled visitors and 1030 for other visitors. There will be a Bring & Buy, traders and car parking is free.

July 15
The McMichael Rally & Boot Sale
Website: **www.radarc.org/MMRally.htm**
The McMichael Rally & Boot Sale will be held at the Reading RugbyFootball Club, Holme Park Farm Lane (for GPS users) SU 753 747, Sonning Lane (B4446), Sonning on Thames, Reading RG4 6ST. Just off the A4 East of Reading, Berkshire. Gates open at 0930 and admission is £2. Boot Sale pitches are £10 per pitch (no booking required) and set up is from 0830. Hall Traders have access from 0830 and tables are £10 booked (book early due to ensure a space) or £12 per table on day.

July 29
Colchester Radio and Computer Rally
Contact: **James McGinty**
Tel: **(01255) 242748**
E-mail: **James@M0ZZO.com**
The Annual Colchester Radio and Computer Rally will be held at St. Helena School, Sheepen Road, Colchester CO3 3LE. Doors open between 1000 and 1500hours. There will be all the usual traders, an RSGB Bookstall, car boot stands and a Bring & Buy. There is ample parking in the college opposite and limited disabled parking on the field.

August 10
The Cockenzie & Port Seton ARC Annual Junk Night
Contact: **Bob Glasgow GM4UYZ**
Tel: **(0187) 811723**
E-Mail: **bob.gm4uyz@btinternet.com**
Website: **http://www.cpsarc.com/**
The Cockenzie & PortSeton Amateur Radio Club is holding its 14th Annual 'Junk' Night in the Community Centre, Main Hall, South Seton Park, Port Seton, East Lothian EH32 0BQ from 1830 to 2130hours. Bring along your own 'junk' and sell it yourself. Tables are on First Come First Served basis. There is disabled access, catering and the raffle will be drawn at 2100hours. The entrance fee is £1 for everyone. All money raised will be donated to the British Heart Foundation.

August 26
The Milton Keynes ARS 21st Annual Rally
Website: **www.mkars.org.uk**
The Milton Keynes Amateur Radio Society's 21st Annual Rally will be held at Holne Chase School, Buckingham Road, Bletchley MK3 5HP. Doors open at 1000 hours. Visitors' entry fee will be £2, outdoor pitches £10 (or £7 in advance), indoor stands £12 (advance booking only).

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off. Look out for representatives from *Practical Wireless* and *RadioUser* at rallies printed in bold.

news & products

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

What is Ham Life?

Icom UK together with *Practical Wireless* are pleased to announce their new Ham Life website, **www.hamlife.co.uk** is up and running. This is a website dedicated to Amateur Radio. Containing lots of information including a brief overview of Amateur Radio, how to set up your own rig, the types of radio available and what's happening in the world of Amateur Radio. The website offers something to all, whether you're just starting out or have enjoyed the hobby for years. There is also the chance to win an IC-E91 dual-band transceiver.

Ian Lockyer, Marketing Manager at Icom UK Ltd., said,"We want Ham Life to develop into a community, which is why we are inviting Amateur Radio Enthusiasts to contribute their news stories and events to us. Stay tuned for other exciting developments to the site."

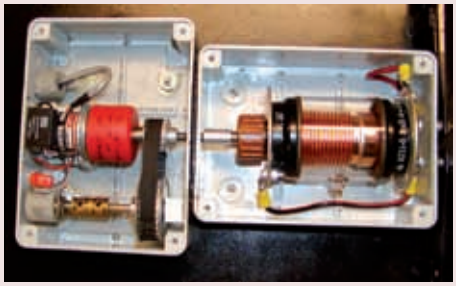
Check it out today at **www.hamlife.co.uk**

Can you Help?

Mike Green G4EZM is looking for information on the following MSF ex-military clock unit.
Radio Clock Unit RC1454. NSN 5840-99-760-5020. European Electronic Systems Ltd, Maldon, Essex.

Mike says it's a 19in unit and appears to combine MSF and GPS time in a processor, I have got the MSF bit going and although the display works it does not display time. Can anyone help? If so, please contact Mike at **6 Downham Place, Blackpool, Lancs, FY4 1QS. Tel: (01253) 347176**

Construction Contest



This year's **Braintree and District ARS Annual Construction Contest** event saw probably the best standard of construction seen in a long time.

In third place came **Keith G4MIU** with his version of the Simple Spectrum Analyser. Second place was given to **Edwin G0LPO** with his high current d.c. power supply. First place was awarded to **Geoff G0BYH** for his superbly constructed h.f. magnetic loop antenna. This was made from 20mm copper pipe and tuned with a very high quality vacuum capacitor that was driven by a belt drive from a small d.c. motor with a 300-1 reduction drive gearbox, all smartly fitted into watertight boxes. A remote control unit was built utilising a multivibrator circuit so that the loop could be tuned from the comfort of his shack.

As is the tradition of the contest, Geoff was presented with the Constructor of The Year Trophy by the club chairman **Dave G0DEC**. Well done to all the winners! If you fancy taking part in next year's contest or in the club in general take a look at: **www.badars.org.uk**

Pumping Stations on the Air

You or your club, along with your local pumping station are invited to take part in the 1st International Pumping Stations on the Air weekend, which is taking place on the Bank Holiday weekend Sunday 26 and Monday 27th August from 1000 to 1700 hours. The intention of the event is to set up Amateur Radio Special Event stations at as many pumping stations as possible throughout the world.

The scope of the station is entirely up to those taking part, with operation being allowed on the h.f. and v.h.f. bands. The choice of pumping station is also left very much up to the club or individual. For more information on how to register visit the Burton-upon-Trent Amateur Radio Club website at **http://www.burtonarc.co.uk/pump.htm** The Burton-upon-Trent Amateur Radio Club will be taking part in the event and will be operating from the Claymills Pumping Station as **GB0CPS**. For more information on the event please contact **Steve Warren** on **(07717) 857202.**

news snippets

Exam Success
The **Huddersfield Technical College Amateur Radio Society** (HTCARS) has completed its first foundation course. The pass rate was 90 percent and they are very pleased with the result.

Further courses will start in September and will include Foundation and Intermediate exams. Anyone wishing to enrol for the future courses should contact the club direct.

The club has also been running practical evenings, starting with simple projects such as Morse practice oscillators and these will continue with more advanced projects. Because many of the students and members have shown a healthy interest in Morse code, they are also running regular c.w. training sessions. The club station, **G3KJO** is also very active and gives newcomers a chance to sample the h.f. bands from the club shack. The club meets at the college on Mondays from 1800hours.

Contact: **Roger Higton G3XXR. Tel: (01484) 536975. E-mail rogerg3xxr@aol.com Website: www.huddcoll.ac.uk/g3kjo** for more details.

DXpedition to Anglesey
Members of the **Stafford & Districts Amateur Radio Society** will be taking their annual trip to the Isle of Anglesey from June 29 - July 2nd. They will be active on all bands using the callsign **GC3SBL/P**. They are looking forward to making as many contacts as possible. All modes will be in use and if it follows the pattern of last year, a highly interesting and fun-filled few days will be enjoyed by all. Check out the website **www.g3sbl.org.uk**/for more details and updates.

Leicestershire Beacon
The 10GHz beacon, **GB3LEX**, located at the Leicestershire repeater group site near J22 of the M1, is now operational on its assigned frequency of 10368.955MHz. It beams south and has a beamwidth of 90°. The e.r.p. is 500mW and reception reports would be welcome by **Geoff G4AFJ, Tel: (01455) 823344.**

Bolsover ARS
The **Bolsover Amateur Radio Society** will be operating as **GB2PF** on Saturday 11 and Sunday 12 August 2007 to commemorate the birthday of a local man, Peter Fidler, who was a famous surveyor in Canada in the 1790s. The club intends to operate as many bands as possible, h.f., v.h.f. and u.h.f, from the new club shack located at the Coalite Sports and Social Club, Moor Lane, Bolsover. Listen out for them!

Flying Boat Anniversary
On 5 July 1937, the first transatlantic passenger test flight took place from Botwood, Newfoundland and flew to Foynes, Ireland. To commemorate the 70th anniversary of this event, a special reenactment flight is planned. **Limerick Radio Club** has been invited by the Foynes Flying-Boat Museum to operate a special Amateur Radio Station in conjunction with the commemorative flight and the **Foynes International Flying Boat Festival.** The special callsign, **EI70FOY**, has been allocated to the station, which will be active from 6-8th July.

Marconi Award

The Marcon section of the Italian Amateur Radio Association (ARI) is commemorating the 70th anniversary of the death of Guglielmo Marconi with an Award running from 0000UTC on July 14 to 2400UTC on July 22nd. The Award is open to Amateurs and short wave listeners who contact or hear the radio stations of ARI Marcon Members (ARI Marcon Members are not eligible for the Award). Marcon Members of ARI will use their own callsigns, specifying 'Guglielmo Marconi Memorial'. They will be on the 3.5, 7, 14 and 28MHz bands using s.s.b., c.w., RTTY and PSK.

You just need to exchange or note the RS-RST as no progressive numbers will be necessary. Each QSO is worth one point; the Special Event Station **IQ3GA** is worth three points and the Special Event Station **IK3VII** (Daniele Raimondi) is also worth three points. Each station can be logged only once per day, even on different modes.

To obtain the Award, at least 20 points are needed. Stations that submit proof of at least 70 points will receive a celebrative medal in addition to the Award. Foreign Stations (outside of Italy) have to confirm at least 15 points. A copy of the log and 10Euros or 12 US$ must be included with the claim.

The Award can be claimed until 3 September 2007 direct from **Associazione Radioamatori Italiani Sezione di Marcon, PO Box 7, 30020 MARCON (VE), Italia**. A special QSL will be sent to all the stations contacted during the Memorial. Final results will be published in the ARI Magazine *Radio Rivista* and on their website at **www.arimarcon.com**

Summer Party

Instead of their usual open day at the Chertsey store, this year **Martin Lynch & Sons** are supporting their local Reading Club at the **McMichael Rally & Boot Sale**. They invite customers to come and see the massive array of new and used equipment they will have on display, browse the rest of the rally and enjoy the day out!

The McMichael Rally & Boot Sale will be held on Sunday 15 July at Reading Rugby Football Club, Sonning Lane (B4446), Sonning on Thames, Reading RG4 6ST. Doors open 0930 hours For more details take a look at **http://www.mcmichaelrally.org.uk/**

club news

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

EAST MIDLANDS
Welland Valley ARS
Contact: Pete Coles G1SFS
Tel: (01858) 469535
E-mail: g1sfs@bushinternet.com
Website: www.wvars.com
The Welland Valley Amateur Radio Society, G4WVR, meets at the Great Bowden Village Hall, Great Bowden, Market Harborough, Leicestershire LE16 7EU on the third Monday of each month at 1930. A full programme of events can be found on the club website, new visitors and guests are most welcome!

KENT
Hilderstone Radio & Electronics Club
Contact: Mike Howland G4MIX
Tel: 07732 133230
E-Mail: g4mix@waitrose.com
Website: www.g0hrs.org.uk
The Hilderstone Radio & Electronics Club meet on the second and fourth Friday of each Month at Hilderstone Adult Education Centre, St. Peters Road, Broadstairs from 1930hours. Forthcoming meetings include: **July 13**: Talk **by Don G4TKR** on D-Star and p.c.b. design with Eagle software; **27**: Natter Nite and final planning for WOK field day and **29th**: WOK event field day. New members and visitors are always welcome.

STAFFORDSHIRE
Stafford & Districts ARS
Contact: Allan Doe G4NJR
E-mail: AllanG4NJR@aol.com
Website: www.g3sbl.org.uk/
Stafford & Districts Amateur Radio Society meet on Thursday at 2000 hours. The shack is located in the AREVA T&D UK Ltd. Factory in St. Leonards Avenue, Stafford ST17 4LX. You may like to go along to one of the following meetings: **June 21**: Shack Night and **June 28th** to **July 2nd**: Club Isle of Anglesey Field Trip.

Radio Refit

Waters & Stanton have recently made some changes in their showroom in Hockley, Essex so that they have more Radio Amateurs ready to talk to visitors and better demonstration facilities. Also, if customers 'phone before they visit, staff will get their proposed purchase ready for demonstration when they arrive. You can also ask W & S staff questions and have a cup of coffee while you decide what to buy!

The W & S team say that you may also like to bring your 'better half', so that they can be amazed at the fantastic picture and sound quality of the latest range of Panasonic, Sony and Pioneer digital televisions and audio systems – all on demonstration too!

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

Doing it by Design

This month, Tony Nailer G4CFY discusses elliptic audio filters. We're literally looking over his shoulder as he works at his designer's desk, explaining the techniques as we go.

In my capacity as a designer, I recently had a need for a high quality stereo decoder for a studio-to-transmitter link system. The signal derived from the receive stereo decoder contained audio in the range 50Hz to 15kHz, plus a considerable amount of the 19kHz stereo pilot tone, a significant amount of 38kHz and other noise.

What was needed was an audio filter circuit to pass the 50Hz to 15kHz band and significantly reduce the 19kHz frequency, and above by a factor of 100 (-40dBs) or more. A few years ago I designed a circuit using a stereo decoder integrated circuit (i.c.), followed by a two-pole active low-pass filter. (Frankly speaking it did not come close to solving the problem!). This circuit I called the Stereo Decoder Mk1.

About five years ago, I again needed a high quality stereo link, so I designed a new audio filter circuit using an arrangement of four op amps, called a bi-quad filter to produce a notch at 19kHz. It was the best way I could think of, using op amp active filters, to allow the 15kHz to pass and yet still significantly attenuate the 19kHz. Unfortunately, however, it did not attenuate the 38kHz or other high audio frequency noise.

Regulations Directive

With the introduction of the Radio & Telecommunication Transmission Equipment Directive in 2003 and the necessary rework of all my Link and Transmission equipment, to meet the new Directive I have again had to look at all the modules making up a stereo link system.

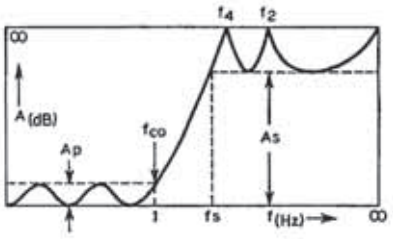
Being a radio design engineer means really having to come to terms with filters of all sorts. While I am, of course, familiar with using inductor and capacitor filters at radio frequencies, I generally favour active filters at audio frequencies to avoid being involved with iron cored, toroidal or pot cored inductors.

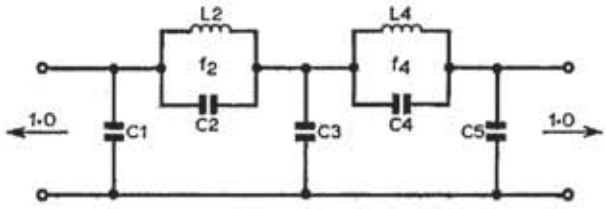
REFLECTION COEFFICIENT, VSWR & Ap	As dB	fs Hz	f_4 Hz	f_2 Hz	C1 Farad	C3 Farad	C5 Farad	C2 Farad	L2 Henry	C4 Farad	L4 Henry
Table 1–1 p = 4% VSWR = 1·08 Ap = 0·0069 dB	70	3·24	3·39	5·42	110·4	235	103·5	4·34	199·0	11·72	187·5
	65	2·92	3·07	4·88	109·6	233	101·0	5·39	197·9	14·67	183·7
	60	2·56	2·68	4·24	108·2	229	96·9	7·20	195·8	19·68	177·3
	55	2·37	2·48	3·90	107·2	227	93·8	8·57	194·3	23·9	172·7
	50	2·13	2·23	3·48	105·5	223	88·6	10·88	192·0	31·0	164·7
Table 1–2 p = 5% VSWR = 1·11 Ap = 0·011 dB	70	3·07	3·22	5·13	118·3	243	110·8	4·73	203	12·78	191·0
	65	2·79	2·92	4·64	117·4	241	108·3	5·82	202	15·82	187·2
	60	2·46	2·57	4·06	116·0	237	104·0	7·67	200	21·2	180·7
	55	2·28	2·39	3·75	115·0	234	100·8	9·07	198·5	25·3	175·9
	50	2·06	2·16	3·36	113·2	230	95·6	11·43	196·0	32·4	168·1
Table 1–3 p = 8% VSWR = 1·17 Ap = 0·028 dB	70	2·79	2·92	4·64	138·4	262	129·6	5·59	210	15·09	196·4
	65	2·56	2·68	4·24	137·4	259	126·9	6·75	208	18·32	192·4
	60	2·28	2·39	3·75	135·9	255	122·4	8·72	206	23·9	185·7
	55	2·05	2·16	3·36	134·2	251	117·4	10·98	204	30·6	178·4
	50	1·887	1·970	3·05	132·2	245	111·8	13·55	201	38·4	170·3
Table 1–4 p = 25% VSWR = 1·67 Ap = 0·28 dB	55	1·701	1·773	2·71	217	317	190·8	18·03	191·5	49·7	162·3
	50	1·556	1·617	2·44	213	306	181·3	22·8	187·3	63·8	151·9
	45	1·440	1·493	2·22	209	295	170·6	28·3	182·7	80·9	140·5
	40	1·325	1·369	1·988	203	279	155·8	36·4	176·0	108·0	125·1
	35	1·236	1·273	1·802	195·9	262	139·2	46·4	168·2	144·3	108·3
Table 1–5 p = 33% VSWR = 2·00 Ap = 0·50 dB	55	1·618	1·690	2·56	248	348	214	21·3	181·4	58·7	151·0
	50	1·481	1·540	2·30	249	336	210	27·4	174·9	76·7	139·3
	45	1·369	1·416	2·08	244	318	197·5	34·7	169·2	99·8	126·5
	40	1·270	1·308	1·878	238	299	177·3	44·4	161·7	133·7	110·6
	35	1·186	1·222	1·700	229	280	163·3	57·0	153·9	177·6	95·5
Table 1–6 p = 45% VSWR = 2·67 Ap = 1·00 dB	55	1·528	1·591	2·39	314	401	276	28·3	156·9	77·5	129·1
	50	1·407	1·459	2·16	308	381	260	35·5	153·3	99·6	119·4
	45	1·245	1·313	1·898	306	365	247	46·6	150·7	135·0	108·9
	40	1·217	1·250	1·755	296	341	227	59·2	138·9	176·2	92·0
	35	1·145	1·174	1·597	284	315	203	75·4	131·6	237	77·7
	As dB	fs Hz	f_4 Hz	f_2 Hz	L1 Henry	L3 Henry	L5 Henry	L2 Henry	C2 Farad	L4 Henry	C4 Farad

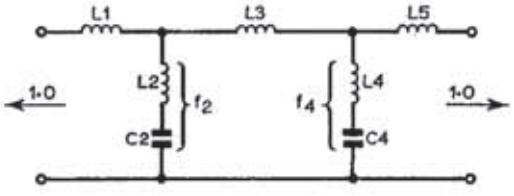
Table 1 Reproduced courtesy of the Radio Society of Great Britain.

In the above table, all values must be multiplied by a factor of 10^{-3}.

The top column headings apply to the upper circuit, while the lower column headings apply to the lower circuit.







Filters with maximally flat pass-bands and a gentle roll-off are provided by the Butterworth characteristic. A pass-band with preset acceptable levels of ripple but a sharper roll-off is achieved using the Chebychev characteristic. To achieve really sharp roll-off and really high stop-band attenuation requires the use of the elliptic low-pass filter.

Elliptic Low-Pass Filters

The secret of elliptic filters is parallel tuned circuits where the inductors are used in a conventional Pi filter. Each of the parallel tuned circuits provides a very high attenuation at a specific frequency. The characteristic is similar to the Chebychev but the negative excursions in the stop-band now drop to a point of high level or attenuation.

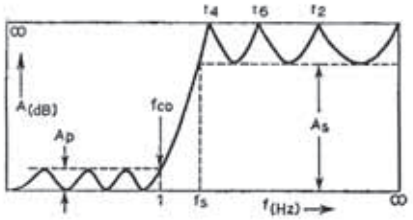
Although the elliptic filter can be simulated in an active circuit, using a gyrator in place of the inductor, the design becomes a law of diminishing returns, regarding number and cost of components, fitting and soldering. (Maybe it's perhaps just easier to use inductors?)

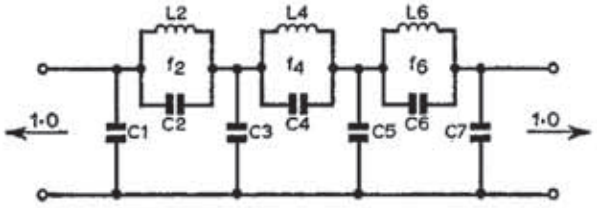
REFLECTION COEFFICIENT, VSWR & Ap	As dB	fs Hz	f4 Hz	f6 Hz	f2 Hz	C1 Farad	C3 Farad	C5 Farad	C7 Farad	C2 Farad	L2 Henry	C4 Farad	L4 Henry	C6 Farad	L6 Henry
Table 2–1 p = 1% VSWR = 1·02 Ap = 0·43 x 10^{-3}dB	70	2·00	2·04	2·49	4·35	79·6	209	201	63·1	7·42	180·2	30·9	196·4	26·3	155·2
	64	1·836	1·876	2·27	3·95	78·3	204	194·8	58·2	9·10	178·4	38·4	187·6	33·0	148·3
	60	1·743	1·780	2·15	3·72	77·3	200	190·3	54·5	10·35	177·1	44·1	181·4	38·2	143·5
	55	1·624	1·657	1·990	3·41	75·8	194·2	183·5	48·5	12·42	175·2	53·8	171·4	47·2	135·6
	50	1·524	1·554	1·854	3·15	74·1	187·8	176·3	41·8	14·75	172·8	65·3	160·7	58·0	127·1
Table 2–2 p = 2% VSWR = 1·04 Ap = 1·7 x 10^{-3}dB	70	1·836	1·876	2·27	3·95	93·8	222	212	75·7	8·34	194·8	35·8	201	29·4	167·0
	64	1·701	1·737	2·09	3·61	92·5	216	205	70·7	10·08	193·1	43·8	191·6	36·2	160·0
	60	1·624	1·657	1·990	3·41	91·5	212	200	67·1	11·35	191·6	49·8	185·1	41·3	154·8
	55	1·524	1·554	1·854	3·15	89·9	206	192·7	61·1	13·47	189·4	60·0	174·8	50·2	146·7
	50	1·414	1·440	1·702	2·86	87·5	196·9	182·1	52·2	16·70	186·1	76·4	160·0	64·8	135·0
Table 2–3 p = 3% VSWR = 1·06 Ap = 3·9 x 10^{-3}dB	70	1·743	1·780	2·15	3·72	104·2	230	219	84·7	9·06	203	39·7	201	31·8	172·5
	65	1·624	1·657	1·990	3·41	102·8	224	211	79·7	10·84	201	48·1	191·8	38·7	165·4
	60	1·524	1·554	1·854	3·15	101·2	217	203	74·1	12·86	198·3	57·8	181·6	46·8	157·5
	55	1·440	1·466	1·737	2·92	99·5	211	194·8	67·9	15·12	195·9	69·0	170·8	56·3	149·1
	50	1·367	1·391	1·636	2·73	97·6	203	186·2	61·2	17·65	193·1	82·2	159·2	67·5	140·1
Table 2–4 p = 4% VSWR = 1·08 Ap = 6·9 x 10^{-3}dB	70	1·701	1·737	2·09	3·61	113·0	236	224	93·0	9·37	208	41·6	202	32·7	177·0
	65	1·589	1·621	1·942	3·32	111·6	230	217	88·0	11·18	205	50·2	192·3	39·6	170·0
	60	1·494	1·523	1·813	3·07	110·0	224	208	82·4	13·20	203	60·0	181·9	47·6	161·9
	55	1·414	1·440	1·702	2·86	108·3	217	199·6	76·3	15·47	201	71·4	171·1	57·0	153·4
	50	1·325	1·347	1·576	2·61	105·6	206	187·5	67·3	18·94	196·9	89·7	155·6	72·2	141·3
Table 2–5 p = 5% VSWR = 1·11 Ap = 11 x 10^{-3}dB	70	1·662	1·696	2·04	3·51	120·6	242	229	99·9	9·77	211	43·9	201	33·9	179·4
	65	1·556	1·586	1·897	3·23	119·2	235	221	94·9	11·61	209	52·7	191·1	40·9	172·0
	60	1·466	1·494	1·774	3·00	117·6	228	212	89·3	13·67	206	62·8	180·8	49·0	164·1
	55	1·367	1·391	1·636	2·73	115·2	219	199·7	81·0	16·81	203	78·8	166·2	61·9	152·7
	51·5	1·325	1·347	1·576	2·61	113·8	213	193·4	76·5	18·57	201	88·2	158·3	69·5	146·6
	50	1·305	1·327	1·548	2·55	113·1	211	190·2	74·1	19·51	199·7	93·2	154·4	73·7	143·5
Table 2–6 p = 8% VSWR = 1·17 Ap = 28 x 10^{-3}dB	70	1·556	1·586	1·897	3·23	139·7	252	237	116·2	11·30	214	52·0	193·4	39·1	180·0
	65	1·466	1·494	1·774	3·00	138·1	245	228	110·9	13·30	212	61·9	183·5	46·6	172·5
	60	1·390	1·415	1·668	2·79	136·3	238	218	105·0	15·54	210	73·2	173·0	55·3	164·4
	55	1·325	1·347	1·576	2·61	134·4	230	208	98·6	18·05	207	86·3	161·9	65·4	155·8
	50	1·252	1·271	1·471	2·39	131·4	218	193·9	89·2	21·9	202	107·3	146·1	81·6	143·4
	As dB	fs Hz	f4 Hz	f6 Hz	f2 Hz	L1 Henry	L3 Henry	L5 Henry	L7 Henry	L2 Henry	C2 Farad	L4 Henry	C4 Farad	L6 Henry	C6 Farad

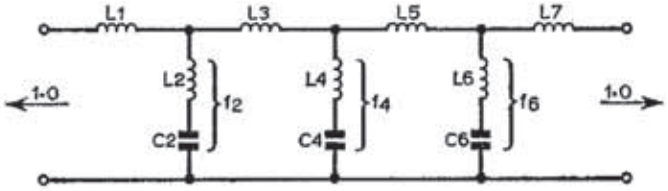
Table 2 Reproduced courtesy of the Radio Society of Great Britain.

In the above table, all values must be multiplied by a factor of 10^{-3}.

The top column headings apply to the upper circuit, while the lower column headings apply to the lower circuit.







Design Information

All through my years as a Radio Amateur and a professional designer, I have pulled out articles from magazines and filed them under a wide range of headings. Invariably years afterwards, I have found this library to be the solution to nearly all my design problems.

This is again proven here, when a look in the passive filter folder revealed an article entitled Modern Filter Design for the Radio Amateur by **W.H. Allen G2UJ**, from the **Radio Society of Great Britain**'s (RSGB) *Radio Communications* journal August 1971. It's written using information derived from an article of the same name by **Edward E. Wetherold W3NQN** in the **American Radio Relay League's** (ARRL) *QST* magazine in September 1969.

The article by W.H. Allen included tables of normalised values for two and three section filters. As reproduced here in **Tables 1** and **2**. I successfully used the three section design table, for a filter to pass my audio base-band signal, and to attenuate 19kHz and beyond, to greater than 50dB below the pass-band.

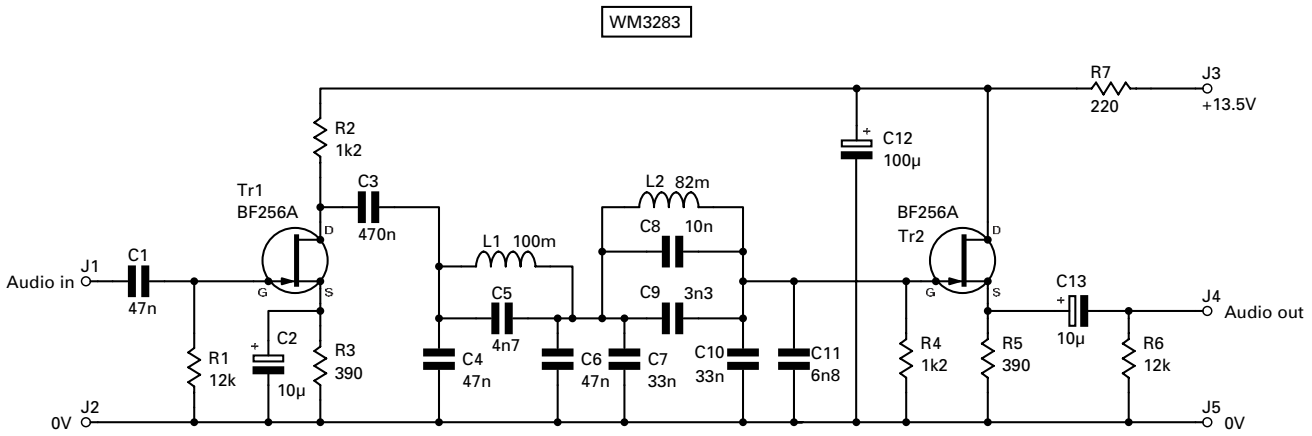
Active Filter

In the November 2005 *PW*, in my DiBD article for that issue, I dealt with an active low-pass filter for use in either a microphone path or to follow a detector stage. Subsequent to this I combined it with an audio amplifier in March 2006 *PW* DiBD to produce an audio loud speaker filter.

Passive Filter

I'll now proceed to design a passive elliptic low-pass filter, for a pass-band of 0 to 2.4kHz and a stop-band of a factor of 100, (-40dB) using Table 1. In this case fco is 2.4kHz and f4 is chosen to be twice

Fig. 1.



fco. Looking down the table reveals f4 at 1.97 giving a stop band of 50dB's. f2 corresponds to the third harmonic of fco.

The table refers to L2 in the second element position and L4 in the fourth element position. For our purposes they will be L1 and 2 respectively. **Note:** All the values in the table are, for some reason given, 1000 times higher than they should be.

Though Table section 1-3 is supposedly only for use at radio frequencies I decided to give it a try. The normalised factors for C and L given in the table I will prefix with an N, then

NC1 = 0.1322, NC2 = 0.01355, NC3 = 0.245, NC4 = 0.384, NC5 = 0.1118, NL1 = 0.201, NL2 = 0.1703. I arbitrarily chose a filter termination value R of 2.2kΩ.

Calculations: The values are then found by scaling, C = NC / R * fco, and L = NL * R / fco. In our case

R * fco = 2200 * 2400 = 5.28 * 10^6. So C is found in μF by dividing NC by 5.28. Then C1 = 25nF, C2 = 2.5nF, C3 = 46.4nF, C4 = 7.27nF, and C5 = 21.17nF.

Now R / fco = 2200 / 2400 = 0.916. So L is found by multiplying NL by 0.916.

L1 = 184mH, and L2 = 156mH.

Looking at the values of C and L, I decided it would be more practical to change the value of the termination impedance to reduce the inductance value. If C1 is increased from 25nF to 47nF it is a factor of 47 / 25 = 1.88. This will change the termination from 2200 to 1170 ohms. So let this be 1k2.

Re-run of the scaling then, R * fco = 1200 * 2400 = 2.88 * 10^6.

Then C1 = 45.8nF, C2 = 4.7nF, C3 = 85nF, C4 = 13nF, C5 = 38.8nF

R / fco = 1200 / 2400 = 0.5. Then L1 = 100mH, L2 = 85mH.

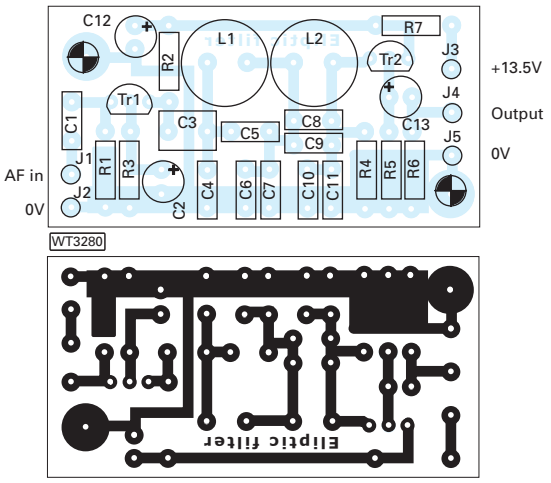


Fig. 2.

Practical values for the filter will then be C1 = 47nF, C2 = 4.7nF, C3 = 47 + 33nF =80nF, C4 = 10 +3.3nF, C5 = 33 + 6.8nF = 39.8nF. L1 = 100mH and L2 = 82mH. Unfortunately, 39nF is not a readily available value so C5 had to be made up from 2 capacitors in parallel.

Using a linear circuit analysis program with these values revealed the response is flat to 2.46kHz, is 3dB down at 2.7kHz, 80dB down at 4.77kHz, rises to –50dB at 6kHz and falls again to –85dB at 7.436kHz, then finally returns to an average stopband of –50dB to 20kHz. This compares with the active filter of 3dB down at 2.7kHz, 10dB down at 4.8kHz, -13dB at 6kHz, and –33dB at 20kHz.

Filter Termination

It's very important to terminate all filters with the characteristic impedance or the response will be degraded. This means that the source and load for this filter must be close to 1.2kΩ. This can be easily achieved with a pair of field effect transistors (f.e.t.s).

The diagram, **Fig. 1**, shows the complete circuit and I will now proceed to explain how the component values were determined. The transistor, Tr1, is a common source f.e.t. with a high impedance input (the source) decoupled with the drain circuit load being 1.2kΩ. The transistor Tr2 is a source follower with its input set at 1.2kΩ, the drain connected to a decoupled supply and the output taken from the source.

The DC Conditions

I have chosen BF256A because I have them in stock and like them! They have moderate gain and relatively low current consumption. The diagram, **Fig. 2**, shows the typical characteristic of drain current against negative gate voltage taken from the *Mullard Small Signal Transistor Data Book* (1978 edition).

The optimum signal operating point would be between 2 and 3mA drain current. At 3mA, -Vgs is 0.7V, and at 2mA –Vgs is 1V. The former gives R2 = 0.7/3*10^{-3} = 233Ω. The latter gives R2 = 0.5/10^{-3} = 500Ω. Midway between these

is 366Ω, so I chose the readily available 390Ω.

High-Pass Filter

In practice it's necessary also to reduce the level of low frequency signals passing through the filter. This can be achieved at one point by choosing C3 to work in conjunction with the filter characteristic impedance set by R3 and 4 to form a high-pass filter. The cut-off frequency should be set at about 300Hz.
Then f = 1 / (2*π*C3*R4).
So C3 = 1 / (2*π*f*R4),
C3 = 1 / (2*π*300*1200),
C3 = 0.000000442F or 442nF, (I chose 470nF).
A similar filter can be made using C1 and R1, by scaling. If R1 is 12kΩ, then C1 = 47nF.

Coupling & Decoupling

Capacitor C2 should chosen to be 10% the value of R2 at the lowest frequency. C = 1/(2*π*f*X), C = 1/(2*π*300*39) = 13.6μF, (use 10μF). The output capacitor C13 is also chosen to be the same value so that it does not affect the response of the high-pass or low-pass characteristics. Resistor R6 is added to ensure C13 had a direct current (d.c.) voltage across it and that the output signal swings equally about 0V.

Resistor R7 works in conjunction with C12 to form a low-pass filter to prevent power line noise from affecting the circuit. We expect the transistors each to run at around 2.5mA and it's good practice to design for 1V drop across the resistor R7. So R = 1/5mA = 200Ω. (Choose 220□).

Decoupling capacitor C12 should have a small reactance compared with R7 at the lowest frequency. We already know that 13μF is 39Ω at 300Hz (as we've already worked this out). This means that 130μF would be 3.9Ω at 300Hz. So, we can let C12 be 100μF.

Tony Nailer G4CFY

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Circuit Analysis

Analysis of the circuit with these values gave a gain of 9dB in the centre of the pass-band. Removal of C2 resulted in unity gain in the pass-band.

The high-pass response is relatively stable, then unity gain until the low-pass –3dB point around 2.7kHz, falling rapidly to give a –50dB stop-band from 4.5kHz to at least 100kHz. The negative poles occur at 4.8kHz and 7kHz (both at about -85dB). See **Fig. 3**.

The filter featured in DiBD for September 2005, is drawn on the same graph for comparison, achieving a reduction factor of 10 (20dBs) at 9KHz. Clearly, the use of inductors greatly increases the stop band capability of low-pass filters. (This one does it using one less component than the active circuit).

A printed circuit board (p.c.b.) was laid out, **Fig. 4**, together with the component placing positions. **Note:** The board will work with other filters of the same type using TOKO 10RB coils.

Other terminations from, let's say 560Ω to 2.7kΩ, can be set by changing R3 and R4 to the required value. For terminations above 2.7kΩ, it would be necessary to change the input device for a transistor (and run it at lower collector current) so the voltage across the collector load is less than 6V.

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Cheerio until next time! ●

Kits & Bits

Capacitor C9 can be ceramic or polyester. All other capacitors with the exception of the electrolytics should be polyester or Mylar. The inductors are TOKO type 10RB, 82mH and 100mH and available from Farnell codes 148-879 and 148-880 respectively.

The Elliptic filter p.c.b. is available for £3, other components £7, P&P £1.50. Please make cheques payable to **A.J. & J.R. Nailer** and send to **Spectrum Communications, 12 Weatherbury Way, Dorchester, Dorset DT1 2EF**.

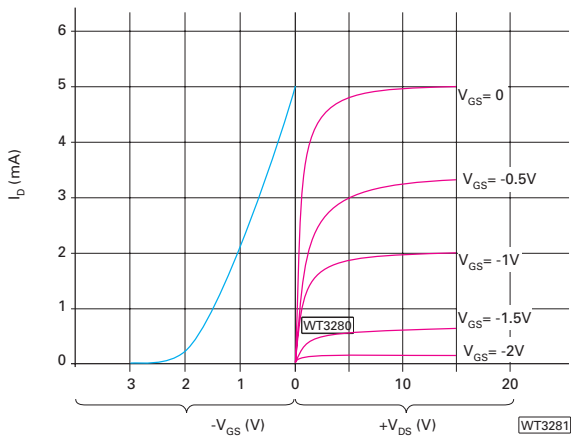

Fig. 3.

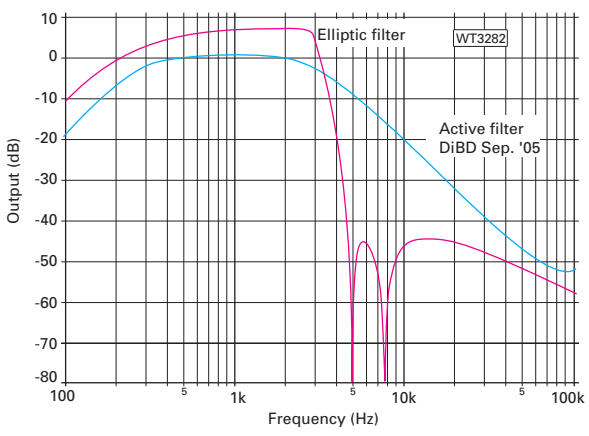

Fig. 4.

The Outreach Antenna from Outbacker

Richard G0RSN using the Outreach antenna (in background mounted on rear of car) with his IC-706 transceiver. Photograph Terry Wood G7VJJ.

Way back in 1999, I reviewed a wonderful Australian made high frequency (h.f.) multi-band antenna called the Outbacker. I had great fun with it and so I was delighted when *PW* asked me to take a look at the latest addition to the range the – Outbacker 'Outreach'.

As the name suggests the latest antenna also hails from Australia and is made by a firm called **Terlin Outbacker Communications**. Although essentially a mobile whip, the robust and sturdy design makes it a candidate for use as a portable vertical and even as a base station antenna.

First Impressions?

My first impressions of the Outreach antenna was that it's rather more substantial than many mobile whips I've used. The makers don't quote a weight but it's a 'beastie' and if I was going to use it mobile I want to have a very solid mount for it! In fact the instruction manual says, 'Trunk' (boot) lip and hatch mounting are not recommended.

The total length of the antenna when assembled is 2.72 metres (8ft 11in) and this is made up from two split 0.95 metres sections (3ft 1in), which assemble into a 1.9 metre length, to which the final 0.9m (3ft) section attaches. The entire unit packs into 0.95m for transport.

The antenna looks good and is beautifully finished. The Outreach consists of a two-part main shaft built around a fibreglass core. On this core is helically wound a copper wire, which is hand tuned to the various 'tap points' for each band.

A coating of clear epoxy resin is then applied and finally the outer layer of black polyurethane provides a final layer of protection against the elements. All fittings on the antenna are solid brass and nickel-plated. The antenna's mount, a 3/8 inch x 24 turns per inch (t.p.i.) stud is made of tough, high strength stainless steel.

Tap Points

At the relevant 'tap points' along the antenna shaft there are band sockets, these are non corrosive, silver-plated banana plug sockets. The band is clearly and rather smartly engraved in white on the black antenna shaft as either160, 80, 40, 30, 20, 17, 15, 12 or 10m (1.8, 3.5, 7, 10, 14, 18, 21, 24 and 28MHz).

The tap points are used to change the band of operation. This is done by the use of the 'wander lead' (WL). The user will plug one end of the WL into a labelled tap point near to the base of the antenna and then, winding the WL's wire around the shaft, eventually connecting the other end of the lead to

Richard Newton G0RSN is a keen mobile and portable operator so *PW* gave him the opportunity to try a well-known Australian antenna. It seems as though Richard enjoyed the evaluation process!

the desired band's tap point. The connections are very positive and have the perfect amount of grip without being too loose or too tight. As with the main antenna, the WL is engineered to be of the highest quality.

The antenna is then finely tuned for the best standing wave ratio (s.w.r.) by the use of a tuning spike (called a 'Stinger' by the manufacturers. The Stinger is 920mm (a fraction over 3ft) long fully extended and comes already installed. Again, this is beautifully engineered section and is held in place by a small knurled locking nut. Incidentally, it was this Stinger that was to prove the first hurdle with the review but it was more due to my hesitation than any fault of the antenna (more about that later!).

The assembled antenna has a feed impedance of between 48 and 52Ω and can handle up to 300W p.e.p.

Fig. 1: The Outreach antenna is large and substantially constructed.

Fig. 2: The wander lead curls around the antenna and connects to the appropriate band match point.

Simple Instructions

The Outreach is supplied with a simple but easy-to-follow instruction leaflet giving tips on installation, tuning and troubleshooting. I was delighted to see that the leaflet emphasised the single most important point in mobile and portable operating – having a good radio frequency ground and especially making sure your rig has a good ground connection to the chassis of the vehicle.

To try the antenna out, I armed myself with one of the most important bits of kit – my father-in-law **Terry Wood G7VJJ**! (and his superb motor caravan). We set off to the New Forest, not far from our homes here in the Bournemouth area.

Our first foray into the forest was to prove very frustrating! We couldn't tune the antenna using the supplied tow-hitch mount. Terry and I had checked every connection we could think of but couldn't find the problem. After a frustrating afternoon and much head scratching we gave up and decided to try and set it all up again in the driveway at my house. This was where we could tinker properly and without distraction.

Short Stinger!

In the comfort of my driveway we finally figured out what had happened. I had pulled the Stinger out as far as I thought it should go because it seemed to stop at a given point. I didn't want to force it but then having measured the length, it became apparent that we were only seeing a fraction of the Stinger's length!

The reluctance for the tuning spike (Stinger) to appear from the top of the antenna is due to the design of the antenna. It's so precisely made that the Stinger has to be pulled with some force to get it to come out, through the fitting, to the correct start length. (Not owning the antenna I had perhaps been over cautious!).

Anyway, having thrown caution to the wind we soon had the antenna tuned to 7.1MHz with an almost perfect s.w.r. There was no stopping us now!

I set up using the supplied tow ball mount but this wasn't suitable for my car's tow hitch. The second supplied mount was designed to attach to a photographic tripod, this was a great success – even when used with my mini tripod that's only 170mm long! However, I did need to use tent pegs to secure it, as the small legs could not cope with the length and weight of the Outreach. The system performed well, as long as radials were laid out for each band we wanted to operate on, the more radials the better!

The antenna mount we decided upon for the on-air trial was one that Terry had made up a few years ago out of an old 3/8in CB quick release type, together with a cycle rack that clamps onto a tow ball. This also raised the antenna a little higher and above the high metal back of my Nissan Tino. The quick release was a real bonus when retuning the antenna for different bands.

The mount was very successful as long as radials were laid out for each band we were operating on. The more radials the better and it proved to be a great way to go portable!

We then set off again to the New Forest and this time we went to a small village called Burley and set up on the edge of the village cricket green. It was idyllic!

We set up quickly, using an Icom IC-706 MkI and the Outreach antenna. With our newly found confidence we pulled and pushed the Stinger and tuned the antenna to 7MHz and were soon on the air. **Jimmy GI3GGY**, was in QSO with many stations having just finished reading the RSGB News for Northern Ireland and was a crashing signal many dB over 9. This was encouraging and after working contest stations **HB9HLM** and **HB9Y** (Switzerland) we decided to change bands and try for a contact on 3.5MHz.

It took less than three minutes to retune the Outreach and we

were soon in QSO with **Con G4EVP** near Wolverhampton. Con gave us a 5 and 8 report commenting, "Very good signal on a mobile whip Richard, doing very well!" **David GB4TCM** was next, was running a special even station on 3.723MHz from **Thorpe Camp Museum** in Lincolnshire but with a bit of fading (QSB) now and then. A very educational chat was had with David who told us that his station was an old 'Dambusters' RAF base.

The antenna also tuned wonderfully well to 18MHz but unfortunately the band was flat and despite calling and listening we had no luck. However, within minutes we were retuned to 14MHz and soon had our first DX QSO under our belt.

Andrey RW3MM (Russia) was on 14.180MHz when I heard him calling and returned his call, he answered me and said, "A lot of stations are calling me but you are 5 and 9, a very strong signal." So, without knowing it we had broken our first pile-up!

Another strong signal we heard was **HG200B**, a Special Event (SE) station from Hungary while they were in QSO with (another very strong signal) **Jim W3FQ** in Pennsylvania in then USA. Unfortunately, the SE station was calling for USA stations only but even though we didn't work them they were very strong signals .

The final QSO of the day was with **David SM7JKD**, a Yorkshireman living in Sweden. David was calling "CQ DX" but I took the chance and called in to see if he would be kind enough to give me a quick report. A wonderful chat with David followed, it's so rare to have a real old 'chin wag' on 14MHz and we had a very enjoyable contact. We received a 5 and 8 signal report from David and we were able to give him '5 and 9 plus'.

Just before we had started our QSO with David in Sweden the afternoon's cricket started and due to the fact that we were on the boundary we thought it best to 'strike camp' before we suffered a 'six' arriving and taking one of us out or – worse still – smashing the antenna!

Wonderful Kit!

So, in conclusion, the Outreach is a wonderful bit of kit. It's extremely well made, looks great and gives an excellent account of itself across a broad selection of frequencies.

Although we did not get a contact on every band, the antenna tuned to each band with ease and with two of us operating it was so easy. Once tuned to the centre of the band you could operate with little or no adjustment.

Product

Outbacker Outreach h.f. mobile antenna.

Company

Adur Communications (UK Agent).

Pros & Cons

Pros

A versatile and very effective antenna. Easy to tune and use. Great performance.

Cons

A physically large antenna. May be considered expensive.

Price

£199.95

Supplier

Phil Godbold, Adur Communications,
PO Box 2047 Steyning, West Sussex BN44 3XJ.
E-Mail: pgodbold@adurcomms.com
Tel: (01903) 879526, FAX: (01903) 879527.

If I am looking to buy equipment I ask myself two questions. One – does it work well? Two – is it value for money? The answer to question one is, yes, absolutely! In my opinion The Outreach is a first class antenna, Terry and I had a great day's radio, changing bands with ease and with no antenna tuning unit (a.t.u.) in sight. We were answered by every station we called. The Outreach oozes quality and if looked after I am certain it would last for a very long time and give a huge amount of enjoyment.

Question two is slightly more difficult to answer and I think what a prospective buyer has to bear in mind is just how good this antenna is. Obviously, I did not dissect it! But from what I can see the build quality is second to none and the antenna covers a whole multitude of bands and covers them well.

The Outreach can be used mobile, portable and I have seen reports on the Internet where people have used them as base antennas in blocks of flats. So, it's highly versatile. However, the price tag is still one that I would have to really mull over. But it's still a truly great antenna that I'm loath to part with. ●

Fig. 3: The peaceful setting in Burley before the cricket started! The location proved to be good for DX, with very strong signals being received from Pennsylvania in the USA using the Outreach antenna.

Fig. 4: When the cricket started Richard G0RSN and Terry G7VJJ thought it best to finish the testing before the match started and an English cricket ball sought out the Australian antenna!

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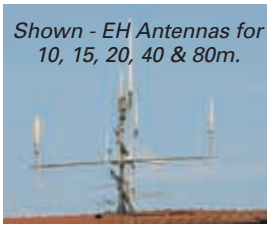

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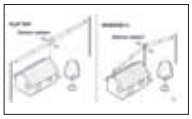

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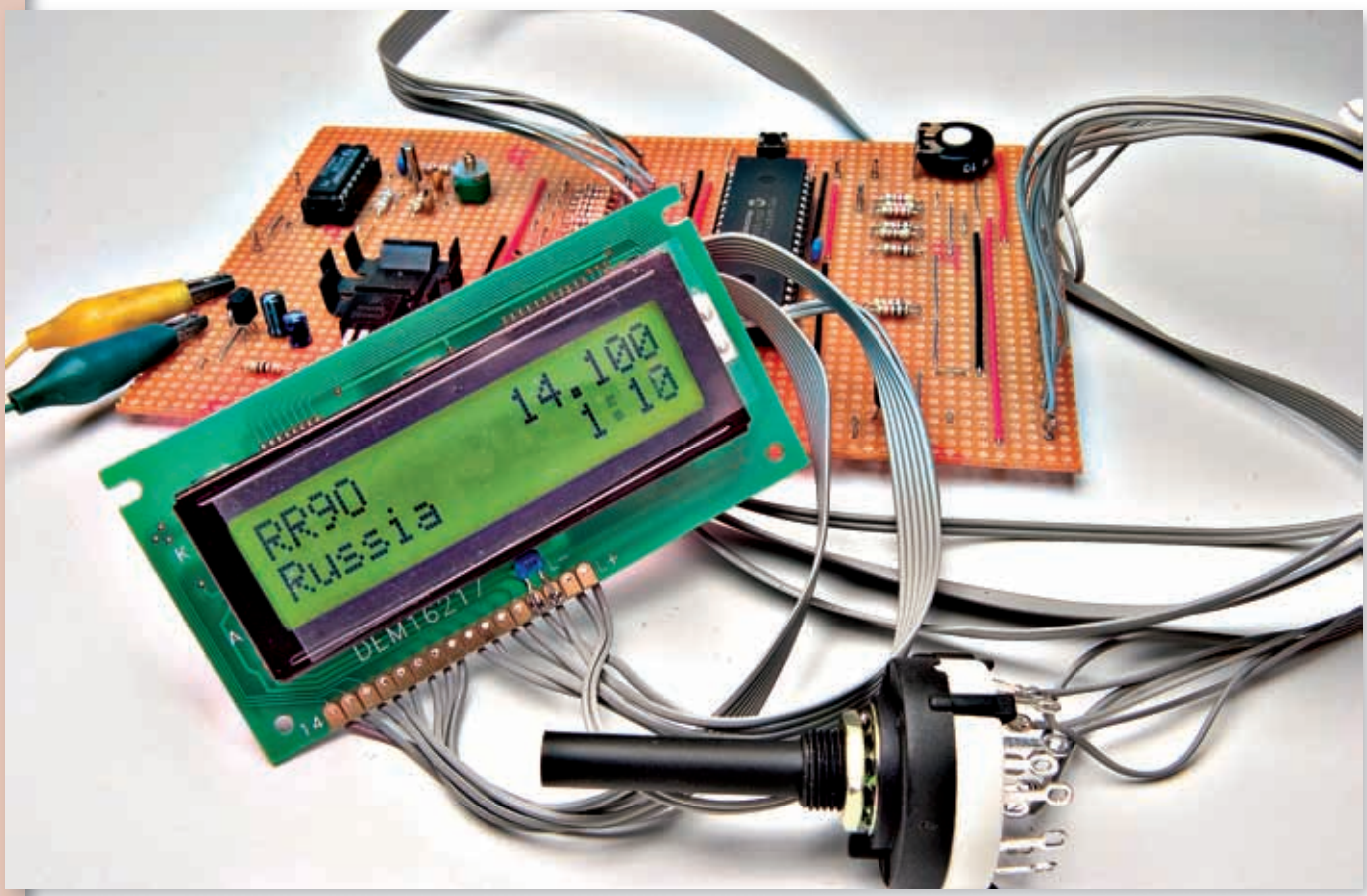
The Practical Wireless IBP Beacon Clock (PIC Version) part 2

Providing an LCD Readout



This month's project provides a visual display of the IBP beacon transmitter's callsign as they appear in the 18-beacon, three minutes cycle.

In the May 2007 issue of *PW*, I described a PIC-based International Beacon Project (IBP) clock, which used light emitting diodes (l.e.d.s) to indicate, in real time, which of the 18 IBP beacons should be transmitting in its allocated time slot on 14.100, 18.110, 21.150, 24.930 or 28.200MHz. The design was effectively a five band microcontroller version of the CD4000 series logic design featured in the December 2001 and January 2002 issues of *PW*.

Following on from Part 1 of the PIC-based International Beacon Project (IBP) 'clock', Phil Cadman G4JCP describes an extremely effective additional unit – a liquid crystal display unit that will provide visual identification of the 18 individual beacon time slots.

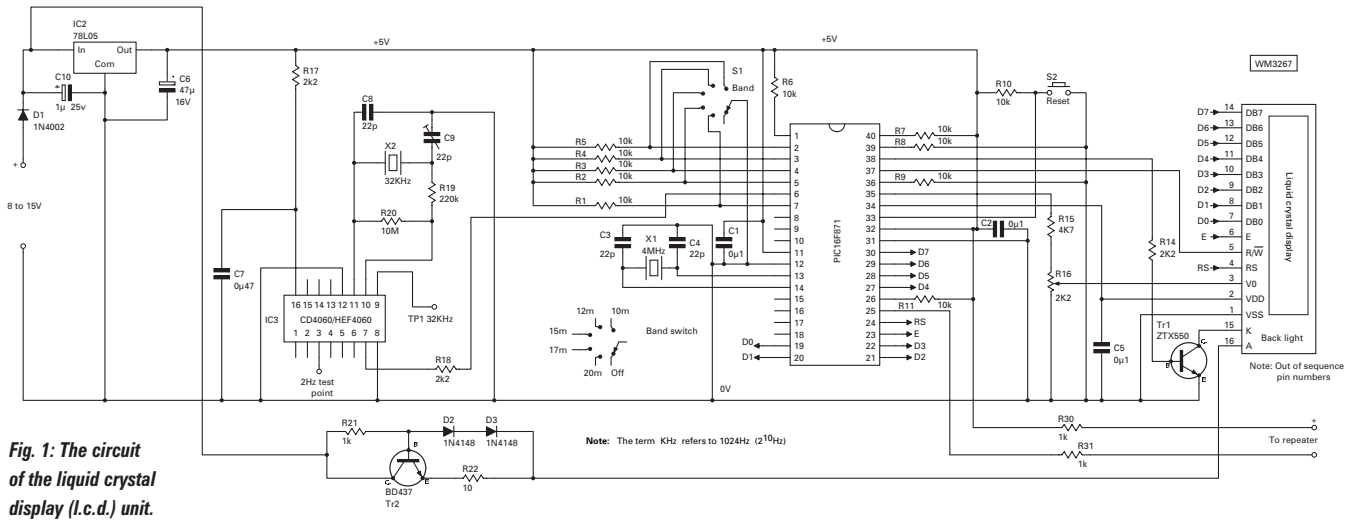


Fig. 1: The circuit of the liquid crystal display (l.c.d.) unit.

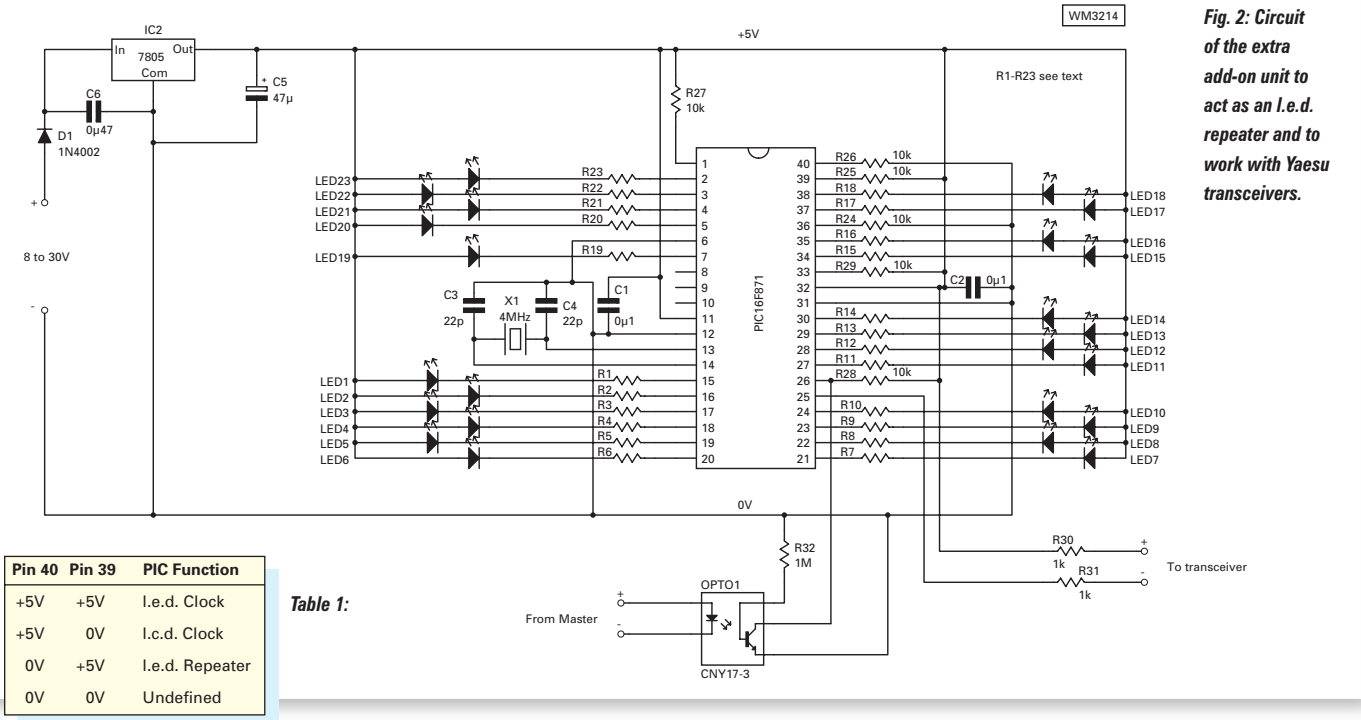


Fig. 2: Circuit of the extra add-on unit to act as an l.e.d. repeater and to work with Yaesu transceivers.

Pin 40	Pin 39	PIC Function
+5V	+5V	l.e.d. Clock
+5V	0V	l.c.d. Clock
0V	+5V	l.e.d. Repeater
0V	0V	Undefined

Table 1:

Using a microcontroller allowed me to trade hardware for software, making the circuit comparatively simple but adding the complication of having to write some software! This exchange is almost always worth making, even in the case of the l.e.d. clock.

Once we have a microcontroller in the design, other, more complex options become possible, including the use of a liquid crystal display (l.c.d.). Physically replacing the l.e.d.s used last time with an l.c.d. is quite straightforward and the circuit - shown in **Fig. 1** – is no more complex than the l.e.d. design.

The Display Circuit

Once again the timebase for the clock is provided by a 32,768Hz miniature watch crystal connected to a CD/HEF4060 oscillator/divider integrated circuit (i.c.). An output at 2,048Hz is taken from pin 7 of the CD/HEF4060 to drive the PIC's timer0 function. Trimmer capacitor C9 should be adjusted so that X2 resonates at exactly 32,768Hz.

The frequency can be checked either by measuring the buffered 32,768Hz output on pin 9 or by measuring the period of the 2Hz output on pin 3. The values of C8 and C9 are suitable for a crystal requiring a load capacitance of 12pF (a common value for these watch crystals). If C9 can't quite pull the crystal exactly on frequency, connect a 5 or 10pF ceramic capacitor in parallel with the trimmer.

The maximum current drawn at 5V is small (less than 10mA), so a 78L05 regulator is perfectly adequate. The band select switch, S1, selects the required band by connecting the appropriate band input (normally pulled high) to 0V. The sixth position is used for turning the l.c.d. off (more about this later). Switch S2 is the reset switch, which is used to set the clock to the beginning of the three minute beacon cycle. The three minute cycle starts on the hour and repeats at three minutes past, six minutes past, nine minutes and so on up until 57 minutes past the hour before starting again at the next hour. There are 20 complete three minute beacon cycles per hour.

The l.c.d. clock can drive an l.e.d. repeater - see **Fig. 2** - communicating at 4800 baud using the PIC's USART. I've chosen 4,800 baud because that's the default baud rate used by some Yaesu transceivers - specifically the FT-817/857/897 series - and because it's not too fast for the opto-couplers. (Again, more about this later).

I described the function of many of the individual pins on the

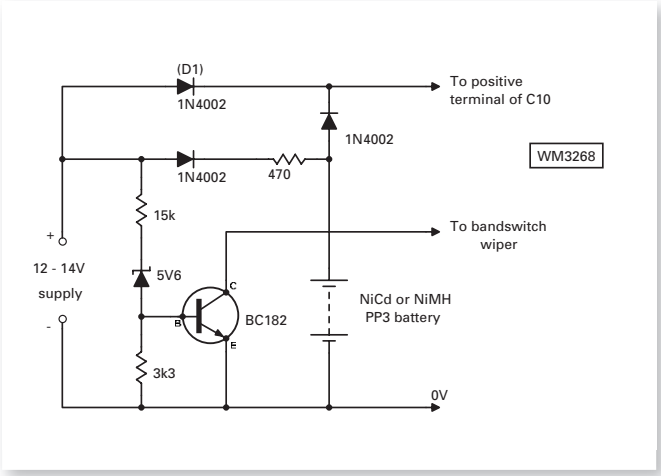


Fig. 3: Power supply and charging circuit.

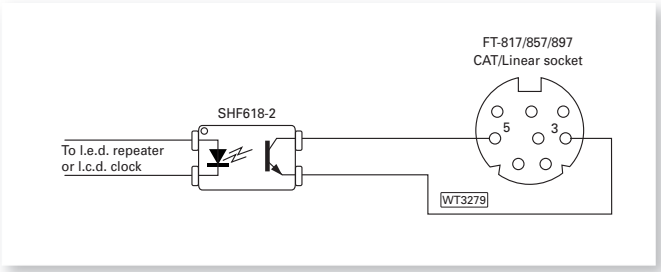


Fig. 4: Opto-coupler circuit for use with Yaesu equipment. The pinout is as viewed onto the socket or from behind the plug.

PIC last time, so I won't repeat the information here, save for the function inputs, pins 39 and 40. At switch on, the software checks the voltages on pins 39 and 40, and these voltages are then used to determine the function of the PIC. (See **Table 1**).

Unused pins on the PIC – the lower four pins of Port C and the three pins of Port E – are left unconnected. During initialisation, the software configures them as outputs and sets them low. They're free to be used as desired by anyone modifying the software.

Of course, the big difference between the l.c.d. clock and the l.e.d. clock is the liquid crystal display itself. Driving an l.c.d. is not the same as driving a light emitting diode! For anyone unfamiliar with these very useful devices, the following information may be of interest.

The LCD Module

The l.c.d. module I've chosen is a two line by 16-character display type **DEM 16217 SYH**. It's an inexpensive 'supertwist' display with an l.e.d. back light. Like the vast majority of character based l.c.d. modules, it uses an **Hitachi HD44780** (or equivalent) controller chip. Full data on the HD44780, which can handle up to 80 character displays – is available on the Internet. (As is a wealth of example software to drive it!)

The HD44780 has been the industry standard for many years, so readers should feel free to try any surplus two line by 16 character l.c.d. module they may have! One word of caution though: the required liquid crystal driving voltage - Vo - can vary somewhat between displays. This voltage is referenced to Vdd (the +5V supply) and is measured in the negative direction. It's made variable because it's effectively the contrast adjustment and it can (and usually does) change with temperature.

The DEM 16217 SYH will work with a Vo of around 4.5V. Remember that's negative with respect to the +5V rail, so relative to ground it's about 0.5V. Potentiometer R16 provides any necessary adjustment. Other l.c.d. modules may need a Vo greater than 5V, hence they will need a **negative** supply rail.

Character based displays usually have standard pin outs. Starting at pin 1, there is Vss (0V) and then Vdd (+5V). Pin 3 connects to Vo as mentioned above. Data is transferred to and from the l.c.d. module through eight data lines (DB0 to DB7), which are managed by three control signals – RS, R/W and E. The register select (RS) signal (pin 4) determines whether the byte sent to the display is interpreted as a command or as display data (low for a command, high for data).

When the read/write signal (R/W) on pin 5 is low, data is transferred from the host processor to the display. When high, data can be read out of the display's internal memory by the host.

In many designs, no reads from the display are needed so R/W is often tied directly to Vss (0V). The enable signal (E) on pin 6 strobes the command or data into (or out of) the display.

Finally, pins 7 to 14 carry (in sequence) the data bus DB0 to DB7. I'm sure that readers who remember the early days of computing and the Motorola MC6800 microprocessor (and the Mos Technology 6502), will recognise these signals. Here, software in the PIC is used to create what is in effect a microprocessor data bus and control signals.

Backlights & Variations

Not all displays have a backlight and the type of backlight can vary. The DEM 16217 SYH uses an array of light emitting diodes. Rather than power the backlight from the +5V rail, I've chosen to use a constant current source fed from the incoming supply. The backlight current is set by R22 (10Ω) giving about 75mA (0.75V divided by 10Ω). You can change R22 to adjust the brightness, **but please do not** let the backlight current exceed 120mA!

If you always plan to run the l.c.d. clock from a fixed supply,

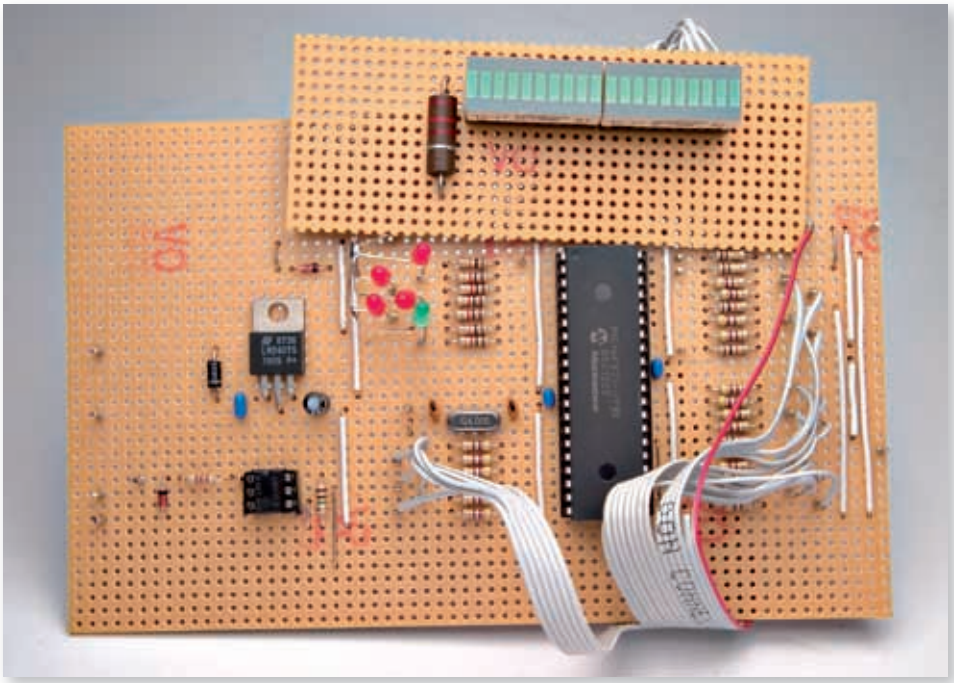


Fig. 5: The l.e.d clock repeater (front).

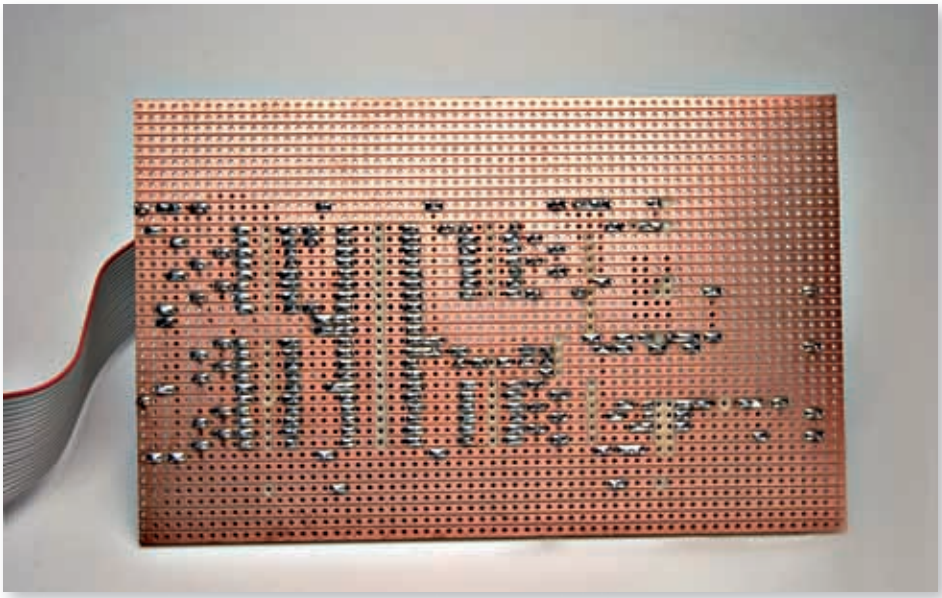


Fig. 6: Rear view (copper track side) of Veroboard layout of the l.e.d. clock repeater

Powering the display via the PIC introduces some undesirable impedance in the supply, so C5 provides local decoupling. It's best to mount this component on the l.c.d. module itself.

To save power when running the clock from batteries, simply turn off the backlight. Either wire an on/off switch in series with the backlight, or use a single pole change-over switch to switch the base of Tr1 from its connection with R14 to the 0V rail. The latter option saves 2mA of base current. Every little action helps reduce current consumption!

then Tr2 and its associated components can be replaced by a resistor. Try a 100Ω 2W component when using a 13.8V supply. By the way, backlight connections **do vary** and they can cause confusion, so always check the display's data sheet. You'll notice that this l.c.d. has its backlight pins - 15 and 16 - adjacent to pin 1, so be aware!

By the way, you can use other than the specified transistors for Tr1 and 2 as long as they are broadly equivalent. The critical parameter is the gain: Tr1 should have a minimum gain of 100 at a collector current of 100mA and Tr2 a minimum gain of 40 at 100mA.

Clock Software

Although the IBP clock software doesn't read from the display, the R/W line is nevertheless connected to a PIC port pin. After all, the R/W line has to be tied somewhere and using a port pin retains the option of reading the display data should the need ever arise.

A somewhat unusual feature is powering the display via two of the PIC's port pins. This allows the PIC to completely switch off the display when it's not needed. Similarly, transistor Tr1 allows the PIC to control the backlight too.

When the band switch is in the off position, only the PIC itself and the 32KHz time base remain powered. In this condition, the 78L05's quiescent current is often greater than the current taken by the PIC, so to reduce the 'display off' current to an absolute minimum, I suggest replacing the 78L05 with a TS2950CT-5.0 ultra low dropout regulator (Maplin code N69CA). When fitted with this alternate regulator, the prototype l.c.d. clock consumed just 1.2mA with its display off.

The diagram, **Fig. 3**, shows one method of providing a rechargeable battery back up for when the clock is normally powered from a 12 to 14V supply. Removal of the external supply automatically switches the band switch into the 'off' position by disconnecting the wiper from 0V. **Note:** D1 in Fig. 3 is the same component as D1 in Fig. 1.

Other Display Points

Next, I think it's a good idea to mention some other points concerning the display. To start, The HD44780 can communicate with the host processor using just four of its eight data lines (so called 4 bit mode).

Moving the l.c.d. data bus to the unused lower four pins of Port C will free up the whole of Port D and, as Port E is already unused, it's then feasible to replace the 40-pin 16F871 with the 28-pin 'skinny DIP' 16F870. (The necessary software changes would be minimal).

Map Mounted Attraction

While a liquid crystal display is very nice, l.e.d.s mounted on a map are both attractive and informative when illuminated, particularly if they're mounted on a great circle map. At a glance, you'll be able to see both the beacon heading and relative distance. So, rather than forgo such a display (or have to make both an l.c.d. clock and an l.e.d. clock and keep them synchronised!), I thought an l.e.d. repeater would be useful.

Repeater Function

The diagram, Fig. 2, shows the circuit of the l.e.d. repeater, which can be driven from both the l.c.d. clock and the l.e.d. clock. The circuit is very similar to that of the l.e.d. clock; the 32KHz timebase is not needed and the band switch is replaced by five l.e.d.s which indicate the band selected.

As in the l.e.d. clock, I suggest that constructors choose the values of those resistors (R1-23) in series with the l.e.d.s to give the desired brightness **but please don't** exceed an l.e.d. current of 15mA. Also, pin 36 on the PIC controls the l.e.d. drive, either active low - as in Fig. 2 - or active high. For active high outputs, simply tie pin 36 high by connecting the 10k resistor on pin 36 to +5V instead of 0V.

Communication between the l.c.d./l.e.d. clock and the repeater is via the PIC's USART, at 4800 baud. I've used an optocoupler to prevent ground loops and to give a measure of r.f. immunity. The serial transmission format is one start bit, eight data bits, no parity and one stop bit. Each time the l.c.d. or l.e.d. clock updates its display, a byte is sent to the repeater. It has the following format:

<D7 D6 D5> <D4 D3 D2 D1 D0>

<Band no.> < Beacon no.>

<D4 D3 D2 D1 D0> = Beacon number, one to eighteen. A beacon number of zero will switch all the beacon l.e.d.s off, and a beacon number of 31 will turn all the beacon l.e.d.s on (lamp test). Beacon numbers of 19 to 30 inclusive are ignored.

<D7 D6 D5> = Band number, one to five. Band 1 is 14.100MHz and band 5 is 28.200MHz. Again, a band number of zero will switch all the band l.e.d.s off and a band number of 7 will turn all the band l.e.d.s on. A band number of six is ignored.

It's possible to drive the repeater using an RS-232 serial interface. Just wire a 1N4148 diode in series with a 4.7kΩ resistor and connect them in series with the l.e.d. inside the optocoupler. Then connect all three components between signal ground (SG) and transmit data (TD) on the serial interface (cathode of the l.e.d. to SG). Naturally, you'll need to write a suitable program to drive the repeater.

Use With Yaesu Rigs

Not wishing to waste the USART's transmitter, I've given the repeater the ability to drive the CAT(tm) interface on Yaesu's FT-817/857/897 series of transceivers using the circuit shown in **Fig. 4**.

Whenever the repeater receives a different band number, it sends out a 'Set Frequency' command, thus automatically tuning the transceiver to the correct frequency. However, the transceiver must be set to c.w. on the five IBP bands of 14.1, 18.110, 21.150, 24.930 and 28.2MHz (on the chosen v.f.o.) for this to work properly. Once again, the optocoupler prevents ground loops. Oh, you can use a CNY17-3 optocoupler instead of the SFH618-2. However, the advantage of the SFH618-2 is its small size, which allows it to fit inside a mini din plug.

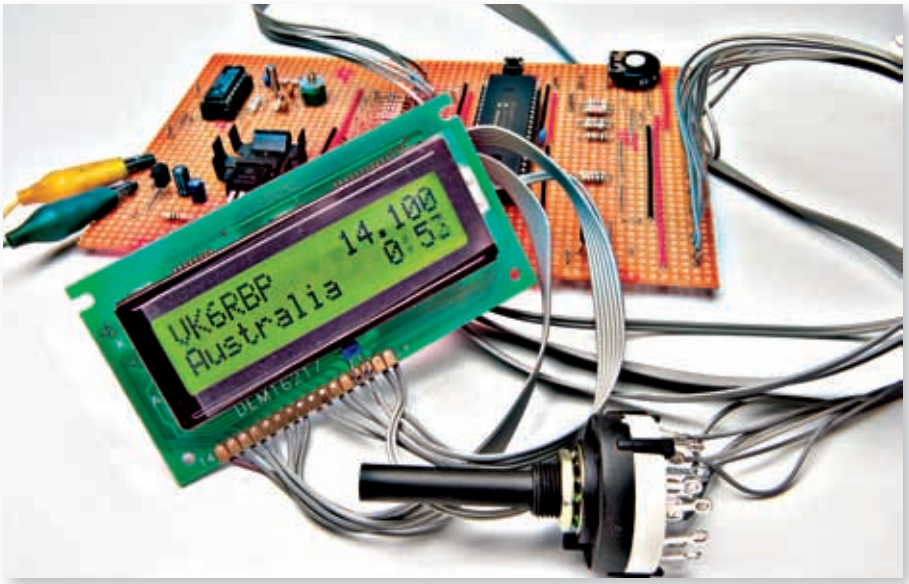


Fig. 7: The completed and working l.c.d. display unit. The beacon shown is the VK6RBP Australian beacon, (Number 6 in the three minute cycle).

More Clock Information

Returning to the l.c.d. clock, the l.e.d. clock's active high/active low control pin (pin 36) clearly has no function when an l.c.d. is involved. Consequently, I decided to make pin 36 control the type of data emanating from the l.c.d. clock's USART.

When tied low – as in Fig. 1 – the l.c.d. clock outputs single bytes for use by the l.e.d. repeater. However, if pin 36 is tied high (+5V), then the USART outputs 'Set Frequency' commands, just like the l.e.d. repeater. (Yes, I know this is confusing!) Use the circuit of Fig. 4 exactly as if you were connecting it to the l.e.d. repeater.

A word of warning! Although the optocoupler makes it extremely unlikely that any physical harm will come to any of the FT-817/857/897 series of transceivers, it's theoretically possible to interfere with their correct operation if things go wrong. Please, always make sure that the CAT baud rate is set to 4800 (the default) before connecting any transceiver to either the l.e.d. repeater or the l.c.d. clock. And also check that pin 36 is tied high when using the l.c.d. clock.

Conditions Improving!

Although we're pretty much at the bottom of the current sunspot cycle at the moment, conditions are going to improve very soon. Even now, day-to-day band conditions can vary greatly and it's really worth checking!

Monitoring the IBP beacons is an excellent way of keeping track of propagation, and maybe working that elusive DX. This is particularly true of QRP operation, where realising a band is opening before the 'big guns' find out, gives low power stations a brief window of opportunity.

Within their individual 10 second time slots the beacons send their callsigns and the first dash at the 100W level, then switch down to 10W, then 1W and finally transmit at the 100mW level. When you can hear the last dash at the 100mW level you will know the propagation conditions between you and that particular beacon are very favourable. I hope these late PIC IBP clocks prove useful. Good DX! ●

Fig. 8: A suitable CAT programming interface. The resistors do not interfere with the process but have leads suitable to fit into the rig's socket.

Note on In-circuit programming

Phil G4JCP writes: While developing the software for this project, I found a problem relating to the in-circuit programming of PIC microcontrollers. The problem occurs when using the Velleman PIC Programmer and Experimentation Board K8048, and I'm sure it must occur with other in-circuit programmers too.

It seems that PICs are very susceptible to glitches on their serial programming clock line - PGC - pin 39. Capacitive coupling between the data and clock lines can cause glitches on the clock line when the voltage on the data line changes very fast. Long leads – especially if twisted together – (okay, I should have known better!) can make the problem worse.

There are two simple remedies that ensure trouble free programming. First, keep the in-circuit programming leads as short as possible (and don't twist them together like I did!). Second, connect a 47pF (or 100pF) disc ceramic capacitor from PGC (pin 39) to the nearest 0V point. I suppose a similar capacitor connected between PGD (pin 40) and 0V wouldn't hurt either. Since connecting such a capacitor, I have had no problems at all, even with relatively long (200mm) twisted wires.

Programs and PICs

Should you feel confident to program your own PIC for this project, then the source code for this project, and the HEX file which is used by the programming software, is available from http://www.g4jcp.freeserve.co.uk/

Alternatively, if you'd prefer to have ready-programmed 16F871 PICs, they're available from the **Kit Radio Company** - see the Advertiser list for details.

Feature

Netting On Frequency

or perhaps not?

John Worthington G3COI has now recovered from his 85th birthday celebrations but still has problems with modern transceivers when using his favourite c.w. mode!

There can be little doubt that from the point of operating convenience, modern transceivers score heavily. Despite this, I for one have never been happy with their compact and closely packed construction, which requires nimbler fingers and better eyesight than mine to play around with. Additionally, I only have the required trouble-shooting expertise in tiny measure!

The one big snag with the modern transceiver is the fact that the operator often cannot 'hear' (monitor) what signal is being transmitted (without a separate receiver) and while other Amateurs will soon enough tell you if it's bad when using single sideband (s.s.b.) they cannot tell you precisely where you are in frequency if you are on the key using c.w. (Morse). This means, of course, that you can unwittingly place yourself in the zero beat position with QRM when answering a "CQ" call or during a QSO, the QRM can zero beat itself with you!

Gone Over?

If the QRM has become 'zero beat' with you, the station you're working may or may not have the patience to wait and tell you when they think you have "gone over" (switched to receive). In the former case, the operator you're calling will not hear you or if they do hear you, they'll probably not answer you if there's a more readable signal about.

The really keen c.w. operator often either operates with a separate receiver and transmitter or uses a second receiver with their transceiver and this can be the best way out of the problem. But, of course, many Amateurs don't wish to have the expense of a separate receiver, they may have no space to put it (if for instance they operate in their living room) or prefer to just put up with the snag.

Here, I must admit that I have been among the latter category for years! That is, it was until it occurred to me one evening when I was having a rough time making QSOs on the 14MHz band. The solution had been in my ear for a long time!

I have been using an old FT-101 (I prefer older rigs like this) for some years and the design uses the fairly common system – in s.s.b. transmitters – of producing c.w. by keying an audio oscillator. (My audio oscillator has a nominal frequency of 1kHz).

When the key is pressed, the tone that is heard in the speaker is therefore the tone I would hear if one had a separate receiver on exactly the same frequency as the transceiver. So, if I wanted to net exactly on the station I'm calling, I move the main tuning until the other station's note matches my keyed tone. Simple perhaps?

Furthermore, when in QSO and I'm transmitting, if I listen between the Morse signals and hear QRM come up that's matching my tone, I'll know it's zero beat with me and that I'll have to take the necessary action by perhaps moving a little in frequency terms.

Sounds Very Simple?

What I have said sounds very simple but, of course, the snag is matching tones is much more difficult to do than adjusting a variable frequency oscillator (v.f.o.) to zero beat. However, with practice **it can be done** and I have used the method with a fair amount of success for some time.

I can imagine the (suspicious) readers saying, "Ah, that's all very well with an FT-101 but will it work with my 'Super Yashimatsui Mark 1?" Well, in replying to the hypothetical question I would reply, " If your Yashimatsui produces c.w. using the tone oscillator into its s.s.b. circuitry then it will!" And in fact I believe that most modern (and ancient types, come to that) transceivers use the same method of generating a c.w. carrier for telegraphy purposes.

Trick Mastered

When you have mastered the trick, you'll be able to 'place' yourself neatly as zero beat with the last station that rare DX station has just worked and thus they should hear you right away without having to re-tune to your frequency.

You may even hear 'Fred' across town plonking his mighty carrier on you as you chat to a friend and still maintain the QSO by shifting up or down a bit. You'll also be able to zero a "CQ" call ready to contact a station knowing that you'll be in his pass band – even if the remote receiver's selectivity is screwed right up at its narrowest – quite a common occurrence nowadays).

After all this, there's will still be the odd time when a strongly received station – rather mysteriously – doesn't come back to you even when and they've known you for 40 years or so. If this does happen – don't be offended – the reason is usually quite simply that the incremental receiver tuning (IRT) has been left switched in. It's then a waste of time calling as the poor soul will never make another QSO until they wake up and switch the IRT out of circuit! ●

John Worthing G3COI celebrated his 85th birthday in April 2007. Here he tell us, that despite his seniority or perhaps because of his years of experience, he seems to prefer the old methods of 'netting in' prior to a c.w. QSO using traditional 'separates'.

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St. Brandon

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Don Field G3XTT and everyone involved in the Five Star DXer's Association are determined to work 'the Amateur with the G5RV antenna' from St. Brandon Island in September 2007.

The UK-based Five Star DXers Association (FSDXA) will be mounting a large multi-operator, multi-station, DXpedition to St. Brandon, 3B7, in September 2007. This is the same group, which was responsible for the 9M0C (Spratly Islands) expedition in 1998, D68C (Comoros) in 2001 and 3B9C (Rodrigues) in 2004, breaking many records in the process. The callsign on this occasion will be 3B7C.

As with previous FSDXA expeditions, this will be a major effort, with a target of more than 100,000 QSOs. There will be up to 12 stations using amplifiers and mono-band beams, on the air, 24-hours a day, for around 18 days, including three weekends. Operation will be around the autumnal equinox, when DX propagation on all bands is typically at its best. We expect to be active from 8th to 23rd September inclusive.

Saint Brandon

Agalega 3B6 and Saint Brandon 3B7 count as a single entity for DXCC. The 3B6/7 callsigns ranks high in most wanted listings, especially on lower frequencies (l.f.) and in the USA. The 3B6/7 call is much rarer than both the Comoros (D6) and Rodrigues (3B9) so demand should be huge.

The last two expeditions to 3B6/7 were 3B7RF (53,533 QSOs) in 1998 and 3B6RF (64,239 QSOs) in 2001. Despite these DXpeditions, 3B6/7 is already well up on the most wanted lists. In the *2006 DX Magazine* survey, 3B7 ranked 45th worldwide and 18th on the US West Coast. Its 'Rest of World'' (South America, Africa, Australia/New Zealand and so on) ranking is 26th. It ranked 45th worldwide on RTTY and a high 35th worldwide on single sideband (s.s.b.).

Ile du Sud, our operating location, at the southerly tip of the Saint Brandon archipelago, is a long narrow island, 1050m by 220m wide on average. There are two bungalows, recently built, of a good size but with limited accommodation. Some of the team will sleep in tents.

We will be taking marquees for some of the stations' equipment storage and the like. This will be a very different FSDXA DXpedition. There's no hotel and we'll be in accommodation of somewhat less than five stars, in fact, probably zero stars! The island is remote and is uninhabited apart from a few fishermen. But the radio take-off is outstanding.

Fig. 1: The Five Star Dxer's previous DXpeditions to Rodriques Island employed an extensive range of antennas. However, the St. Brandon DXpedition will feature a large array of h.f. and 50MHz antennas, together with an operating schedule that's planned to cover at least two weekends – providing more opportunity to get 3B7C in the log book!

As the Five Star DXers Association and *Practical Wireless* take pleasure in announcing the September 2007 3B7C St. Brandon DXpedition, Don Field G3XTT provides the background in the first of two articles. Don wants to make it very clear that this DXpedition is aimed at working the Radio Amateur who only has access to the simplest of antennas!

Map 2: There are some modern bungalows on St. Brandon but Don G3XTT says, "We're staying under canvas and I expect it to be far from Five Star accommodation, in fact, more like 'Zero Stars'!

Map 1:

Our Strategy

Our strategy is to run maximum power on as many bands as possible. We'll have big mono-band antennas on all bands 10 to 50MHz (30m to 6m) and verticals on the remaining bands. By adopting this approach we plan to be heard everywhere in the world at some time of the day or night.

We will also be active for around 18 days and in doing so will be covering three weekends. There'll be 20 operators, many of whom have been with us before and there will be enough to ensure that we can man all stations whenever there are band openings. By adopting this strategy we should be able to give at least one contact to anyone anywhere in the world.

Our last two DXpeditions have proved to us that there are huge numbers of DXers who would like to contact rare DXCC entities. There are probably in excess of 75,000 Amateurs who are unable to do so because they lack the necessary equipment – particularly large antennas.

Many would-be-participants are unable to hear the rare DXCC stations because of the DX station's weak signals and interference. To make it even more difficult many DXpeditions are active for a short period and do not even cover two weekends. We intend to avoid these problems with the St. Brandon DXpedition!

Stations & Equipment

We're planning to have 12 stations. There will be a station on every band from 1.8 to 50MHz (160m to 6m) with second stations on 80m and 20m so that we can operate on c.w. and s.s.b. at the same time.

Our propagation predictions show that we should have good propagation on all bands 21MHz (15m) and below but that there will be significant openings to Japan and perhaps elsewhere on 24 and 28MHz (12m and 10m). The 50MHz band is unpredictable but could produce surprises!

The antennas planned are as follows:

1.8MHz: 26 metre (85ft) Titanex
3.5MHz: Two pairs of phased verticals
7MHz: Four-square
10MHz: 2-element Yagi
14MHz: Two 3-element Yagis
18MHz: 4-element Yagi
21MHz: 4-element Yagi
24MHz: 4-element Yagi
28MHz: 6-element Yagi
50MHz: 7 -element Yagi.

We will be using the StarLog computer system. Logs will be uploaded by satellite telephone or Pactor. We'll need to take generators and fuel as there is only limited generating capacity on the island.

Sponsor Support

We are delighted that **Yaesu** have already agreed to be Principal Sponsors of 3B7C, permitting the use of the new FT-2000 transceivers along with the well-proven Quadra linear amplifiers. Leading UK Amateur Radio retailers **Martin Lynch & Sons** and **Nevada Communications** have also committed to supporting the expedition, for which we are extremely grateful.

In addition, the team has already been granted an ARRL Colvin Award, while recent sponsors include the Northern California DX Foundation and CDXC (Chiltern DX Club, the UK DX Foundation).

Expensive Air Fares

Because St. Brandon is so remote, the cost of airfares from Europe, North America or Japan is considerable. All members of the DXpedition are paying their own travel expenses from their homes to Mauritius on route to St. Brandon.

They are also paying for their accommodation and food on the Island as well as a contribution to the substantial logistics costs. Contributions from clubs and individuals are very welcome and, where appropriate, will be recognised on the website and QSL cards.

In the second section of the article, Don Field G3XTT discusses how you can prepare to work the station that's due to be on the air in September 2007.

Working The St. Brandon 3B7C DXpedition

In the first section of this article, you'll have read about the forthcoming Five Star Dxer's Association DXpedition to St. Brandon (3B7C). St. Brandon is a group of islands belonging to Mauritius but some 402km 250 miles) to the north-east, far enough away to count as a separate DXCC entity (and also to count separately for the popular RSGB Islands on the Air awards).

This section of the article aims to give you some hints and tips on how to make contact with 3B7C, though much of the advice would be equally applicable to contacting other expedition operations. Too many Radio Amateurs tend to avoid DXpedition operations, perhaps because they feel that with their modest stations or perhaps lack of time to be on the bands they don't stand a chance of making a contact.

With really rare expeditions to the opposite ends of the earth there is some truth in the 'I'll never contact them' belief. The N8S Swains Island and BS7H Scarborough Reef operations earlier this

year were a case in point. They were at the limit of propagation from the UK, especially as we are close to the bottom of the sunspot cycle, and also very rare, meaning that huge numbers of stations were calling at any one time.

Much More 'Available'

However, the Five Star DXers, a UK-led group, have made a point of undertaking operations that are much more available to the more typical Radio Amateur, who perhaps operates with a 'barefoot' transceiver (no linear) and simple wire antennas.

To make ourselves 'much more available' we pick locations that are reasonably rare but where we can ship large amounts of equipment and more importantly – antennas! We tend to go for locations in the southern hemisphere because trans-equatorial (north-south) propagation tends to be more reliable because it avoids transiting the auroral oval. And we tend to go for a longish period of time (this time it will be just over two weeks of operation including three full weekends) in order to work through the pile-ups and give as many people as possible a chance.

The result of our endeavours is that we made over 168,000 contacts from the Comoros (D68C) in 2001 and over 153,000 from Rodrigues (3B9C) in 2004. More to the point, we were able to attract many UK amateurs into rare excursions onto the high frequency (h.f.) bands, some even dusting off old valve transceivers that hadn't seen the light of day for many years! This can only be good for the hobby and for activity generally and, what's more, those folk had a lot of fun in the process of chasing us, as we discovered afterwards when giving talks to clubs around the country.

Aimed At You!

So, I hope you'll now realise that our operation is very much aimed at you, the typical *PW* reader! The organisers are keen to ensure that you are able to participate through making contact with 3B7C on a range of bands and modes. For seasoned DXers, that means being able to fill in those 3B7 band slots that you might still be missing, but hopefully it will also mean that you try out a new band or mode, perhaps satellite or PSK.

For those new to h.f. or to DXing, while the team certainly can't guarantee you a contact on all nine bands, almost everyone should be able to manage at least a handful of QSOs. The main purpose of this short section is to give you some advice on how best to go about doing so.

When To Operate?

One of the tough decisions DXpedition organisers have to make is, when to operate on each band. Anyone who has operated from near the equator will know that only the highest bands are open during local daylight but from dusk to dawn all nine h.f. bands can be open simultaneously.

With anything less than nine stations available, some will have to be missed. The good news is that 3B7C **will be able to operate all nine bands at once** (Yaesu, our Principal Sponsors, are loaning us **twelve FT-2000** transceivers **and six VL-1000 Quadra amplifiers**). And, all being well, we may even be able to activate more than one station on some bands (3.5 and 14MHz) to be active on both c.w. and s.s.b. together. This means that if there's an opening from the UK to 3B7 on a particular band, rest assured that we'll be there for you!

Propagation & Bands

Next, it's time to consider propagation and bands. Many DXpeditions nowadays run propagation forecasts for the major geographic areas, and post them on the DXpedition Website. Of course, 3B7C will be doing the same.

We will have propagation predictions from major areas of the world including the UK. Alternatively, if you want to run your own predictions using the latest solar data there are plenty of propagation prediction software packages available which allow you to do it yourself. Follow some of the links at the end of this article for some good examples.

Rest assured that the 3B7C team themselves have done similar analyses and will be aware of where their beams should be pointing on any given band and at any given time. Almost certainly, the easiest bands on which to look for your first QSOs with the expedition are going to be 14, 18 and 21MHz. As we are close to the bottom of the sunspot cycle, openings on the highest bands are less frequent, while the low bands are always a tougher challenge, with greater absorption and higher noise levels.

High Gain Antennas

Of course, most keen DXers have gain antennas for 14, 21 and 28MHz, often a tri-band Yagi beam antenna, or even stacked mono-banders. This means that despite our efforts, on those bands you may well have to wait your turn for a QSO (the good news is that 3B7C will be active for two full weeks and three weekends).

However, far fewer DXers have gain antennas for 10, 18 and 24MHz (30, 17, and 12m) so 18MHz may well be an excellent band on which to focus to make that first 3B7C QSO (or, indeed, to chase other DXpeditions).

One of the dilemmas facing the would-be h.f. operator with nine h.f. bands available (not to mention the v.h.f. bands), is how on earth can you put up an effective antenna system to cover them all? The answer is, unless you live on a farm, there's probably 'no way'! This is why low-profile multiband antennas such as trapped verticals or the G5RV are so popular but, inevitably, they are a compromise!

It's often forgotten, for example, that when the late **Louis Varney G5RV**, came up with his ground-breaking antenna design, not only did the WARC bands not exist, but neither did 21MHz (15m).

Neither was the antenna expected to present a resistive 50Ω load to the transmitter but, in those days of the valved power amplifier (p.a.), it didn't really matter! But modern solid-state rigs may behave differently, and reduce power in the face of what they 'see' as a mismatch. Despite this, of course, the G5RV antenna is a popular one and we hope to work you easily, helped by the advice provided in this article.

To help get over the problems associated with finding a suitable antenna, and finding one providing some gain on the h.f. bands (and works on the WARC bands) in the second article I'll be providing some really practical advice and simple ideas. Included will be a very effective and simple antenna suggestion. So, until next time I'll say cheerio and get on with my own preparations for St. Brandon! ●

Special Book Offer

DXpeditioning

Behind the Scenes for Radio Amateurs Worldwide

If you've been inspired by the St. Brandon DXpedition article, on the preceding pages, into organising your own Amateur Radio DXpedition with like-minded fellows or have been thinking about doing so for a while, then this book is just what you need! Described as a manual for DXpeditioners and DXers, *DXpeditioning,* edited by **Neville Cheadle G3NUG** and **Steve Telenius-Lowe G4JVG**, in where the authors, share the experiences gained during the Spratly Island 9MOC and other DXpeditions in a bid to offer help, hints and inspiration to others.

Contained within its 180 plus pages are chapters entitled: Project Plan, Licensing & Permits, Sponsorship, Equipment, Technology, Propagation, Life Support & Environmental Conditions, Finance and QSLing to name but a few. Members of various DXpedition teams have helped compile many of the chapters by drawing on their own experiences and knowledge from within their particular areas of expertise.

Wide ranging in its appeal, *DXpeditioning*, has a great deal to offer DXers and DXpeditioners alike and there are plenty of ideas to be gleaned on how to provide several band-country slots on several modes from a rare country. It also helps to prove that anyone can get involved.

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MFJ-269PRO 1.8-170&430-520 £319.95.

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MFJ-250 1kw Oil filled .....£69.95.
MFJ-250X 1KW without oil .....£49.95.
MFJ-260C 300w PL259 .....£32.95.
MFJ-260CN 300w N-Type .....£49.95.
MFJ-264 1.5kw PL259 .....£69.95.
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HM-IC Handy mic + Icom insert £59.95.
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HM-10-5 Hand mic + HC-5 £56.95.
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(traveller headsets require leads)

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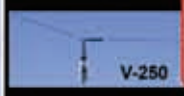

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£84.95 A 100m Drum

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MQ-36SR 6-20m + Dir	£579.95

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MA5B - Mini Beam	£399.95
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Bearcat UBC-120XLT Scanner £69.00
Bearcat UBC-278 XLT Scanner £99.00
Bearcat UBC-3300XLT Scanner £129.00
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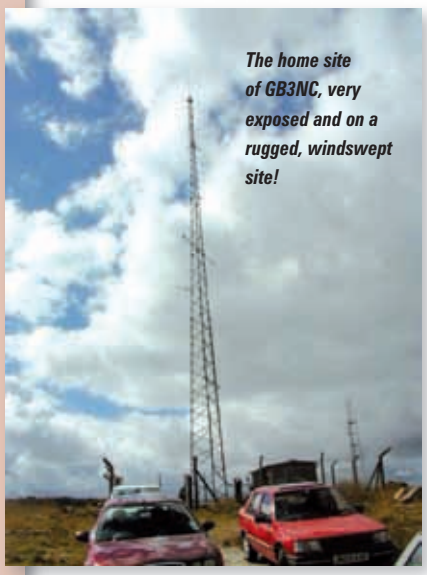
Taking a Look at the cornish repeater scene



The home site of GB3NC, very exposed and on a rugged, windswept site!

Way back in 1971, when I was a young man, the Home Office, then the regulatory authority, licensed the very first UK Amateur Radio repeater **GB3PI**. Log onto the page at **www.gb3pi.org.uk** for more exciting firsts. This milestone in UK Amateur Radio affairs has led to over 100, 144MHz repeaters, 150+430MHz repeaters and numerous others on various bands from 28MHz to "Gosh, does Amateur Radio operating go that high in the frequency spectrum?"

Repeater keepers run all the repeaters and are responsible to Ofcom in the final analysis, for the proper use of the facility. All repeaters are available to licensed Amateurs or short-wave listening enthusiasts to use and, of course, all of them come at a price to the group organising the repeater and maintaining it efficiently.

Repeater Information

For information about the United Kingdom Amateur Radio repeater system, you can do no better than refer to the web page for the RSGB Repeater Management Committee (RMC) and here you will find all the information on the current state of repeaters. Take a look at RMCWEB on, **http://www.coldal.org.uk** for data and comprehensive coverage maps and a lot more besides.

Repeaters by their very nature enhance the ability to communicate over difficult terrain, especially when mobile. Keep the 'over' short and never compromise your driving safety or that of others through lack of attention whilst on the air.

I prefer a 'hands free' installation or prefer to operate when my wife is driving while I'm attending to the mobile radio. Remember 'stroke mobile' means just that, the other station is moving and may well be out of range or has descended into a black hole and lost contact before you have finished your long over!

There's much to be learned on repeater protocol and as always it's best to listen before pressing to talk. Most repeaters nowadays use tone access but increasingly; continuous tone control sub-audio squelch (CTCSS) is being used for each county in the UK. The CTCSS frequency can be found by reference to the web page already mentioned and means that if I wish to travel from Lands End to John O'Groats by car operating via repeaters, I should pre-program my mobile radio with all the necessary CTCSS data, if contacts are to be made.

A channel spacing of 12.5kHz has become common and the reduced bandwidth may mean you are 'chopped out' of repeater access if your rig exceeds this limit. It only takes a minor adjustment to most radios to soon remedy this situation. If in doubt, ask your local club for help!

So, let's now discuss a typical repeater. I'll start with one that has had its fair share of trials and tribulations – as have many throughout the UK if my research is correct!

Cornish Moon Mountains

Sometimes likened to the mountains on the Moon – and also the location for an episode of the BBC programme *Doctor Who* – Hensbarrow Downs is the QTH of the Mid Cornwall* 144MHz repeater **GB3NC**. This location is unlikely to figure in any great English landscape debate!

The repeater site is in the heart of the china clay district of St. Austell and is approximately 300 metres above sea level. From there, it's possible to see a very large area of Cornwall. The mast, a triangular affair of uncertain origin is a further 30 metres high making for an impressive array of Amateur Radio antennas serving several bands and modes.

The GB3NC facility is administered by a local group of Amateurs, more correctly known as the Mid Cornwall Beacon and Repeater Group (MCB&RG). Meeting usually four times a year the repeater group committee has co-opted members from several Cornish radio clubs to add to the democratic process. Together they run, what has become, quite an undertaking from the small beginnings of one repeater to the facilities available for all those who use the 'Box', as it is affectionately known, under the current Chairman **Dave Last G6LEU**.

The dedicated voluntary band of enthusiastic Amateurs has expanded the facilities at the Hensbarrow site to include **GB3HB**, a 430MHz repeater and several beacons. Our thanks go to these committee members, who often travel long distances to attend meetings. Their contributions to the matters under consideration by the group are very much valued.

***For readers outwith the UK:** Cornwall is the county that,

Amateur Radio v.h.f. and u.h.f. repeaters are used and (often) abused. In his article John Newman G0VDU provides an overview of the Cornish repeater network, how it works and the invaluable support provided by repeater user groups and committees. We owe them much as we often take repeaters for granted as we 'listen through'!

The focus of attention - the GB3NC repeater 'box' itself ready for your use.

Dave G6GXK busy working on some of the equipment.

with Devon next door, occupies most of the far south western peninsula of England that juts out into the Atlantic, English Channel on the southern side, and the Bristol Channel and/ southern Irish Sea to the West on the other side! It's a truly wild, isolated and most beautiful part of these Islands. Kernow is the ancient Celtic name for the county and the genuine people of Kernow tell us that you pass from Kernow into England when you cross the River Tamar. Incidentally, the Tamar rises near Bude in Kernow and does so only 6.4km (4miles) from the Bristol Channel and effectively almost completely divides the peninsula from 'The English' mainland' in its 80km (50 miles) journey to Plymouth and the English Channel. **Editor**

Newquay Club

The original Repeater, **GB3NC**, (Newquay Club) was built and commissioned in May 1976 by the late **Bill Colclough G3XC** and **John Birkbeck G3IGV** – who remains the repeater keeper to this day. Bill had been impressed on a visit to the USA where he observed the very efficient use of a repeater calling out the emergency services to a road traffic accident.

The design of the equipment is based on the classical equipment of the era and uses special cavity filters providing a deep notch between the input frequency of 145.125 and the output frequency of 145.725MHz. The repeater logic has been modified over the years but essentially access is permitted using a 1750Hz tone or 77Hz on CTCSS.

The transmitter for GB3NC produces 10W of power and feeds the original folded dipole antenna at the top of the 30 metre mast. However, the mast top has corroded to a point where it is unsafe under the strictures of health and safety legislation. This corrosion is due to the severe climatic conditions at this location and has introduced unacceptable noise on transmit and we are unable to repair the damage.

A decision was therefore made to receive on the top antenna and transmit on an antenna at around the 25 metre level. This has proved to be a good temporary solution before a new omni-directional transmit and receive antenna is fitted at the 25 metre height. This (it's hoped) will improve 144MHz repeater use and avoid – for the time being anyway – the considerable financial headache of a replacement mast. The new antenna should be in place and operational by the time this article is printed given good weather, no wind and a brave a rigger to fit it for us!

The repeater equipment is maintained by its keeper John Birkbeck G3IGV and has been very reliable over the years giving excellent service to local Amateurs across Cornwall and beyond. It also provides contacts for the many Amateurs visiting us during the tourist season.

It's also available for use by RAYNET should the need arise and – with special permission – has since 1996 been used to transmit the RSGB news on Sunday. Our thanks go to the regular newsreaders **Dave Blackford G3NPB** and **Trevor Goldsworthy G4BHD** for their regular attendance on air and to the stations that report in afterward giving valuable feedback on the efficiency of GB3NC. We would also like to say that in all the years the news has been broadcast, not once has there been any complaint or attempt to interfere with this RSGB service for all Radio Amateurs and short-wave listeners.

Unscheduled Problems

As readers might expect, 'Acts of God' and unscheduled power failures and other problems are part and parcel of the day-to-day operation of the repeater group's facilities! What was not anticipated, however, was the loss of the repeater for several months due to circumstances well beyond anyone's control and this happened when GB3NC, along with our 23cm beacon was stolen!

It's true that you cannot please all the people all the time. However, GB3NC had seldom suffered from repeater abuse and stealing the equipment was going a bit too far to keep the odd 'zero IQ' type from interfering with the system. It's a tribute to the generosity of local Amateurs and the expertise of the repeater keeper that we got it back on air again, albeit a little later than the pundits forecast. Repeater logic is a lot harder to replicate than the transmit-receive side!

Cornish Beacons

The Beacons are kept by **Peter Gibbons 2E0YUV,** who took over from **Ted Warne G3YJX** and provide value to Amateurs well outside the county of Cornwall, in terms of propagation conditions useful under lift conditions and contest activity. Operation is on 50, 70 and 144MHz, 430MHz and 23cm. See **Table 1**.

The 23cm beacon was reinstated due to a very generous act by the **UK Microwave Group**. The actual beacon transmitter was donated by the group. It was built and installed by **David Wrigley G6GXK**. We will have our 430MHz (70cm) beacon up and running again as soon as possible, after we have repaired the antenna.

Frequency (MHz)	CW callsign Ident	Locator	Height (a.s.l)	Antenna/Heading	Power (ERP)	Status
50.0424	GB3MCB	IO70OJ	320m	Dipole	40W	On
70.025	GB3MCB	IO70OJ	320m	2-Ele Yagi / 45°	40W	On
144.469	GB3MCB	IO70OJ	320m	3-Ele Yagi / 45°	40W	On
432.470	GB3MCB	IO70OJ	320m	4-Ele Yagi / 45°	12W	Temp QRT
1296.860	GB3MCB	IO70OJ	320m	15/15 / 45°	50W	On

Table 1.

The Future

The group now have an Amateur Television repeater **GB3NQ**. This has allowed local amateurs the ability to explore fast scan television across the county. As usual with such projects, it's often the technology that delays matters and the expense.

Someone has got to do the maintenance up aloft! Frank G6CEP sets off, and is last seen half-way up the mast!

To be useful the ATV system must be omni directional and have sufficient power at 23cm to interest ATV enthusiasts in many a 'black hole' throughout Cornwall. Time will tell if there is sufficient interest to develop the system and explore the delights of 3cm/10GHz and above, bearing in mind our problems with a corroded mast.

The GB3NC repeater is now linked to the world via Echolink (Node 282184) enabling quality contacts with Radio Amateurs everywhere. The system uses a PC and is hosted by **Roger Gregory G4OCO**, who tells me that although today Echolink is for voice, it will not be long before video and data form part of the network.

Activity on the bands, as any active Amateur will understand, is constantly changing as enthusiasts explore and push the boundaries of the technology available today. Digital radio is a case in point. It will not be long before digital Amateur rigs become available. The advantages are many but for the repeater group perhaps the most significant will be that if you can hear the digital data even at a very low level the intelligence can be recovered.

Furthermore, digital bandwidths allow for greater channel use on what is becoming a crowded 144MHz band. In the future the group may be concerned with internet connections, voice mail and other activity yet to be dreamed up, Ofcom permitting.

Donations & Funding

The Repeater group, like all groups, is funded entirely by donations from Radio Amateurs who see the value in the facilities offered to the Amateur fraternity at large. Whilst expenses are kept to a minimum, certain costs, for example licensing, insurance and electricity are impossible to avoid.

In addition, the replacement costs of Antennas and Equipment must be considered if operation is to continue 24 hours a day, seven days a week. Log on to **www.btinternet.com/~kevin.francks/** for the latest information. The treasurer – myself G0VDU who is QTHR – will gratefully receive all donations legacies and bequests to the Mid Cornwall Beacon and Repeater group.

Cornwall due to its hilly topography supports several other repeaters notably **GB3SI** on 144MHz in St Ives, **GB3PL** on 144MHz in Gunnislake. There's also **GB3CH** on 430MHz and the **GB3WV** 23cm ATV repeaters both near Liskeard. All of them are available, as are all repeaters and beacons throughout the country, to be used by licensed Amateur Radio stations and short wave listeners. Please do not abuse them **but do use them**. The alternative – as the old adage states – you will lose them! Such is the demand for the radio spectrum. So, 73 from G0VDU and I hope to work you later on your local Kernow repeater! ●

In the Shop with Harry Leeming G3LLL

Harry G3LLL's column has been so well received by readers it's now appearing every month! This time, he looks at replacing valves in older Yaesu equipment.

When the manufacture of Amateur transmitting equipment became a profitable and competitive worldwide business, it wasn't long before someone realised that many high power line output valves, which were being produced cheaply by the million, would also function as r.f power amplifiers. Some, if pushed to their limits, would handle a lot power.

A pair of 6KD6 valves for example, which Yaesu used in the FT-500, FT-560 and FT-401, would produce nearly 300W of r.f. output. Of course, they melted if you tried to run a full power carrier for more than a few seconds but they were alright on s.s.b. or at lower power on c.w.

There was and there remains a snag, however, line output valves were designed for handling pulses at around 15kHz. Things that are important at 30MHz, such as lead inductance and internal capacity, don't matter at 15kHz and whilst by good fortune Japanese line output valves work satisfactorily as radio frequency power amplifiers, many others will not.

Many manufacturers – including RCA – decided to improve the reliability of their line output valves by adding extra heat dissipating plates. This was great as far as the TV trade was concerned but it resulted in an increase of internal capacity and made them useless as plug-in replacements in a p.a. stage.

Buying Replacement Valves

If you simply order a pair of 6JS6C or 6KD6 valves, without stipulating the manufacturer and detailing what you want them for, you're on your own. If they do not work in your rig, or they cause damage, you have absolutely no comeback at all, as you are be using them for a purpose for which they were not designed and any guarantee is void the moment you switch your rig on.

If at all possible when obtaining line output valves for use in a p.a. stage, try and get hold of some Toshiba or NEC valves as these are known to work well. If you can't find any, the only answer is to order from someone who has a knowledge of the Amateur market and who knows to which valves are suitable for your particular rig.

One trader who springs to mind is **Wilson Valves, Tel: (01484) 654650 E-mail: wilsonv@zoo.co.uk**

Fitting Replacement Valves

'Joe' came into my shop with a long face and an FT-101 that smelt like burnt toast. His rig had packed up and he had plugged in his spare p.a. valves. Unfortunately, when I examined the rig I found that the capacitor from the anode of the driver valve, to the control grid of the p.a. valves was short circuited.

The control grids of the p.a. valves should normally be biased at around -50V to stop them carrying too much current, the faulty capacitor had applied 300V+ to the following valve grids. At this the old p.a. valves had died gracefully but the brand new ones had taken so much current that the rig was a complete write-off!

If p.a. valves burn out there usually is a reason, and just plugging in £70 worth of replacements can, as Joe found out, lead to disaster. Before fitting new p.a. valves on any rig, your first move must be to check the d.c. voltages on the valve holder. Even if these are alright, on the Yaesu FT-101 Mk1 to FT-101E series, the FT-401, FT-200, FT-500, FT-560 FT-401, and quite a few of the other old rigs, you should also swap the capacitor that runs from the anode of the driver valve, to the grid of the p.a.valve. It is designated C13 on the FT-101 and it really is unlucky!

When I had the shop I heard the following tale with slight variations dozens of times from different customers, it almost brought me to tears!

"I bought this FT-101 from a *S*ilent *K*ey sale and it has been brilliant for the last few weeks. Last night, I was only out of the shack for a few minutes but when I returned there was a cloud of smoke rising from the rig."

If the customer was 'lucky' and the rig was fitted with the correct 'quick blow' 2.5 or 3A fuse, the rig would 'only' need a new anode choke, a new pair of valves, a screen resistor, a replacement grid coupling capacitor and a touch up of alignment, a mere £100 to £150! If a larger fuse had been fitted, a new mains transformer would also be needed as well. All of this can be avoided for the sake of a 10p capacitor - you have been warned!

Neutralising

When a pair of genuine r.f. valves such as the 6146, are replaced with an identical pair, the neutralisation may not even need touching. When line output tubes are replaced, however, the neutralisation can be so far out, that the rig becomes a high power oscillator on the higher frequencies, even in the receive mode. This will generate large r.f. voltages, which can cause damage as switches, and other parts flash-over.

After checking the d.c. voltages and fitting new valves, the safest approach is to fire the rig up into a dummy load, on one of the lower frequency ranges, such as 3.5MHz, where neutralisation is not too critical. Adjust the neutralisation capacitor, so that the dip in p.a. current is symmetrical and that maximum power output coincides with minimum p.a. current at point 'X', see **Fig.1**.

Having got things right on 3.5MHz switch to 7MHz, check that maximum output still coincides with minimum dip and if necessary touch up the adjustment. Gradually, work higher in frequency; and you will find that the adjustment of the neutralising capacitor will become more critical.

The best setting may not be exactly the same for every band; settle for the best compromise setting between the 10 and 15

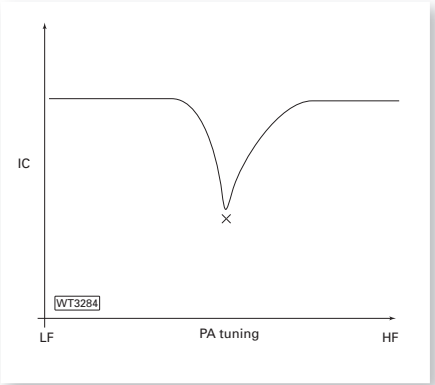


Fig. 1: When adjusting the neutralisation capacitor make sure the power output coincides with minimum p.a. current at point 'X'.

Fig. 2: David Kemplen sent in this photo of an early FT-101 with an alteration – can you spot it?

Harry Leeming G3LLL
The Cedars
3a Wilson Grove
Heysham
Morecambe LA3 2PQ
Tel: (07901) 932763
E-mail: G3LLL@talktalk.net

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 please remember to send me your E-mail address or enclose a stamped addressed envelope. Send your letters to the address above.

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.

metre bands. **Please be aware** that there are some lethal voltages in the vicinity of the neutralising capacitor, be sure to keep one hand in your pocket and use a well insulated screwdriver for the adjustment, I don't want to lose any readers.

So, what will happen to your FT-101 when suitable line output valves finally run out? See the photo of the underside of an early FT-101 in **Fig. 2**, kindly sent to me by **David Kemplen**. Can you spot the alteration? More details next month.

At Sea on *Island* Star

On a recent informal cruise (no penguin suits for me), round the Mediterranean and Adriatic on the *Island Star*, I mentioned my interest in radio and electronics and soon had an invite from the Captain, to visit the bridge. I was fascinated by the computer controlled GPS navigation equipment, which at first sight seemed like a large version of an 'in car' system. The ship's GPS equipment, however, was also coupled into the radar and as well as a chart of the sea, it was therefore able to display a real time plot of all the ships in the area. Other ships were not just anonymous dots; the radar interrogated their transponders and showed their essential details, such as name and tonnage, on screen.

Despite being fitted with side thrusters and other devices that enabled the ship to get into some extremely small 'parking spaces', trying to steer or stop a large cruise liner is somewhat a sluggish operation. To compensate for this, the navigation system's computer had a facility for predicting where the ship and other ships in the vicinity, would be in two minutes time, so that early avoiding action could be taken where necessary.

Nearly every item on the bridge seemed to be computer controlled and details, such as radio frequencies, were all 'on screen'. Like most modern ships the Island Star does not carry a dedicated wireless operator but at all times has an officer on the bridge qualified to operate the considerable amount of radio equipment that is installed.

I was interested to note that a listening watch was still being kept on the old 2.182MHz, and v.h.f. emergency and calling frequencies but that in addition the newer automatic Global Maritime Safety and Distress System (GMDSS) was installed. This, depending on propagation conditions, scanned h.f. distress frequencies in the 2, 4, 6, 8, 12 or 16MHz bands and automatically looked for calls from other ships or requests from search and rescue coordinating stations

Despite the extensive h.f. facilities, these were used in the main as a back up to the Inmarsat GMDSS safety and communications system. This satellite-based equipment automatically looked for any emergencies in the vicinity and provided more reliable communications than could ever be maintained on short wave frequencies.

Everything was, of course, duplicated, so that normal communications could take place without compromising safety watches. In addition, the NAVTEX marine information frequencies at around 500KHz were monitored; any warnings or safety notices received, being automatically printed.

I was told that a passenger had become ill on a previous trip and needed to be taken off by helicopter and that talking to the helicopter from the ship was no problem. In addition, to coverage of the usual h.f. band search and rescue frequencies, a v.h.f. Airband transceiver was installed.

On the basis that if you plan for the worst possible emergency, you can be sure it will never happen, 406 MHz beacons were also being carried. In the event of the ship sinking these would drop into the sea and would then automatically relay their position via the worldwide satellite safety system.

I found the visit to the bridge of the Island Star very interesting, and the emphasis on safety most impressive. I would like to thank **Captain John Brocklehurst** and Second Officer **Ivan Manasiev**, for their help and hospitality and also the ship's company for their smiling faces, friendliness and impeccable manners demonstrated to my wife **Brenda** and myself throughout our cruise. (Those of us who have been or who are in the retail trade could perhaps learn a few lessons).

A Final Note

Businesses and people like myself, are open targets for spam E-mails, as our E-mail addresses are published. We try our best but please help us to sort out the chaff from the wheat by heading your E-mail with a few suitable words.

If you head your E-mail 'Improving the FT-747' there is no doubt as to what it is about and it will be opened and read. If, however, you head it 'Improve Your Equipment'; at a busy time, especially after a gap for holidays when there are hundreds of E-mails waiting, it could be accidentally deleted as 'just another advert for Viagra'.

Many thanks! Harry

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Antenna Workshop

David Butler G4ASR takes his turn in the Antenna Workshop to bring you an omni-directional horizontally polarised antenna for the 144MHz Band.

A Big Wheel Antenna

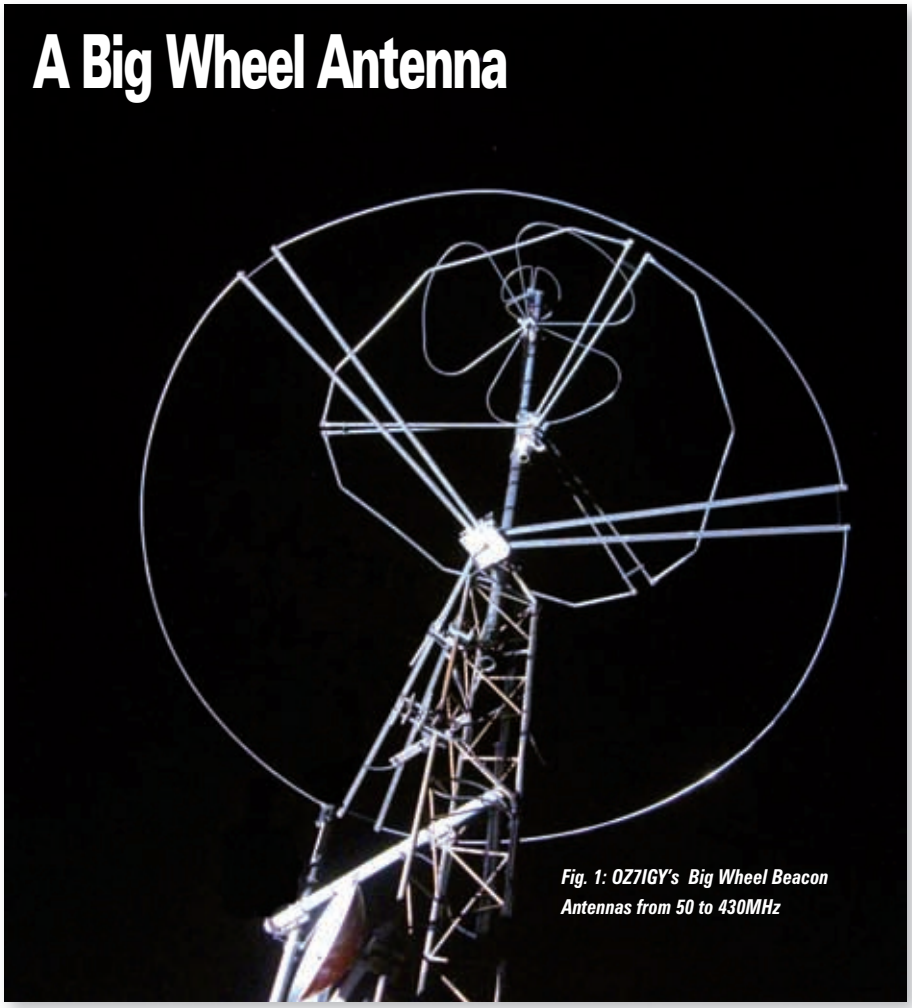


Fig. 1: OZ7IGY's Big Wheel Beacon Antennas from 50 to 430MHz

Hello and it's my turn again in the Antenna Workshop. Sometimes, I have difficulty deciding what antenna to describe and such was the case this time around. Then, I remembered that last month I had written about the Danish **OZ7IGY** beacon units in my VHF DXer column. The beacons use separate Big Wheel antennas for the 50, 70, 144 and 430MHz bands as shown in the photograph, **Fig. 1**. These have proved to be very reliable in service and that's the reason for describing one this time around.

Point-To-Point

It is common for high-gain directional antennas to be used for point-to-point v.h.f. or u.h.f. communication. The gain of a directive array magnifies the radiated energy towards the desired direction. Or it can reduce interference from signals in other than the desired direction. However, the directional characteristics of a beam antenna are not always an advantage or desirable. Normally, a beam stays directed into the general direction of most radio activity, so some possible contacts may not be heard.

It's to counteract the directional disadvantage of beam antennas, that the the Big Wheel comes into play. For general coverage purposes a horizontally polarised, omni-directional pattern is very useful and allows the operator to scan in all directions at once for signals of interest. And, of course, it's great for use as an antenna as the OZ7IGY beacon group can confirm.

The Big Wheel

The Big Wheel antenna design has been around since the early 1950s and it resembles a skeletal three-bladed clover-leaf. The three phased horizontally polarised loops with a common feed-point create an omni-directional pattern. The radiation pattern is not perfectly circular though, the gain being determined to be 3dBd when aligned with the flat sides of the driven element, reducing to 1.5dBd in the directions of the 'feeders' of the three elements.

The elements themselves are each one wavelength long for the band of interest as shown in the diagram, **Fig. 2**. The outermost side of the element is effectively half-wave long; therefore there are three half-wave dipoles each set at 120° to one-another around the perimeter of a circle. These dipoles are then 'stood off' from the centre hub by quarter wavelength sections at each end of the dipole. The dipoles are then fed at the ends of each element rather than at the centre as in a conventional dipole.

Each 'leaf' of the antenna will exhibit a terminal impedance of 36Ω and therefore, by paralleling the three sections results in a combined impedance of 12Ω. A stub (a strap of metal less than one quarter wavelength in size) is employed at the centre hub to increase the terminal impedance back up to 50Ω.

Antenna Construction

The antenna is constructed from three sections of aluminium tube or rod, each formed into a 120° clover-leaf shaped segment. In the centre of the antenna is an insulating block sandwiched between two aluminium fixing plates One side of the clover leaf element is screwed to the upper fixing plate and the other end of the element is screwed to the lower fixing plate. The lower fixing plate also facilitates attachment to the antenna mast via a 'U' bolt.

An adjustable tuning stub made from aluminium strip is attached centrally between the upper and lower fixing plates. An r.f. connector (of your choice) is fitted between the two plates into which the 50Ω feeder cable is connected. Although the following construction dimensions are specifically for the 144MHz band the Big Wheel antenna can be scaled for use on any v.h.f. or u.h.f. band.

Bending To Shape

Start the construction by bending to shape of the three elements, which are made from 10mm aluminium rod or tubing each 2032mm (80in) in length. Mark 508mm (20in) in from each end and bend them at these points with a 152mm (6in) radius to form one of the elements, which will look like the skeleton of a single clover leaf. The roundness of the 1016mm (40in) portion that is in between the two end sections may be formed by hand.

With tubing, the strength and stability of the antenna are both improved if lengths of hardwood dowel rod are driven into the element ends. Drill two M4 holes perpendicular to the plane of the element, 10mm in from each end and 20mm apart. Do this to both ends of all three elements.

Now, the central hub and plates need to be constructed. The bottom plate, made from 3mm (1/8in) thick aluminium is marked out and drilled as shown in the diagram, **Fig. 3**. The plate is bent at 90° to which is attached a suitable size 'U' bolt. Drill a hole centrally for a bulkhead socket of your choice and attach it to the plate. The upper plate is also made from 3mm thick aluminium sheet. It can be square, circular or even triangular as long as it corresponds to the holes drilled in the bottom fixing plate.

The two plates are spaced 38mm (1.5in) apart using a suitable insulating material such as nylon or ceramic pillars, solid nylon, Tufnell or Plexiglass. Solder a 50mm length of threaded brass rod to the r.f. socket centre conductor and attach it to the upper plate using a nut either side of the plate. Alternatively, you could use a short piece of stiff wire and a solder tag.

The matching stub shown in the diagram, **Fig. 4** is fashioned from a 127mm (5in) length of 25mm (1in) wide, 1.5mm (1/16in) thick aluminium strip. Drill an M4 hole at one end of it, on centre and 6mm (1/4in) in from the end. Only the stub length is critical and since it is merely a strip of aluminium all you need to do is create a slot with the mounting hole in one end of the stub so that its electrical length can be adjusted.

To create the slot at the other end, instead of making one hole, make a series of holes over a distance of about 30mm and with a needle file or saw, 'join' the holes up to make one long adjustment slot. Then bend this strap into a 'U' shape so that the open ends are approximately 38mm (1.5in) apart. Attach the stub to the upper and lower plates using M4 screws, **Fig. 5**.

Fig. 5: The centre clamping plate and 'hairpin' match.

The first element should be installed onto the central hub, placing one end of this element onto the bottom plate and secure it with M4 screws through the holes that you've made. The other end of the element should be secured to the top plate in the same manner.

The first end of the second element should be secured to the bottom plate right below the end of the first element's connection to the top plate. Then the free end of the second element will attach to the top plate at the holes provided. Follow suit with the third element.

Testing & Adjusting

Testing and adjusting the system is relatively simple, as the Big Wheel possesses a fairly broad bandwidth and will not require much tuning. Attach a convenient length of 50Ω cable to the coaxial connector and temporarily mount the Big Wheel antenna about two metres above ground.

Tuning (or matching really) is carried out by using your transmitter and v.s.w.r. bridge. Adjust the transmitter so that it runs just a few watts output on 145MHz. The transmitter should be keyed when the v.s.w.r. should be around 1.5:1. If the s.w.r. is still high, then stop transmitting and adjust the aluminium strap, in or out, to get an optimum match. Once the stub has been adjusted for a perfect match at 145MHz, the v.s.w.r. should be negligible over the entire 144MHz band.

That's all there is to it. Now get building! ●

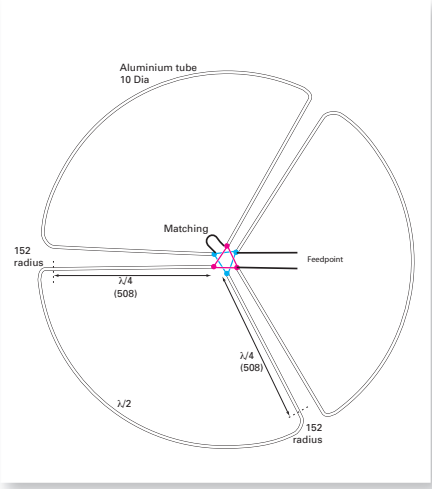


Fig. 2: Big Wheel layout, each 'leaf' has a feedpoint impedance of 36Ω, giving a combined impedance of 12Ω.

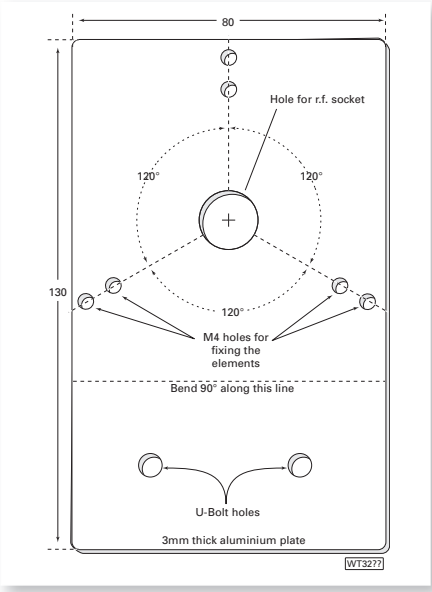
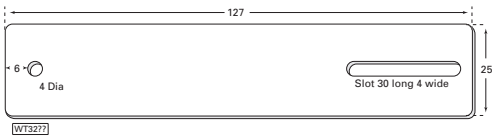


Fig. 3: Lower fixing clamp plate, it's bent along the dotted line to make an 'L' shape. The top plate is similar, but without the U-bolt area.

Fig. 4: Matching Stub The strap is formed into a 'U' shape to attach it to the top and bottom plates.



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A Chip Off the Old Block

Carrying on the Practical Way

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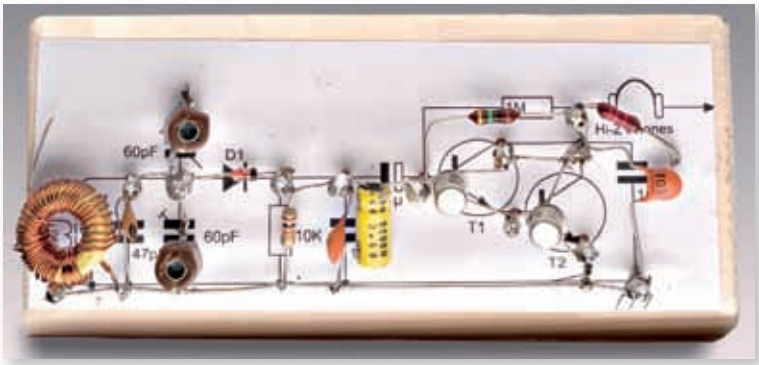
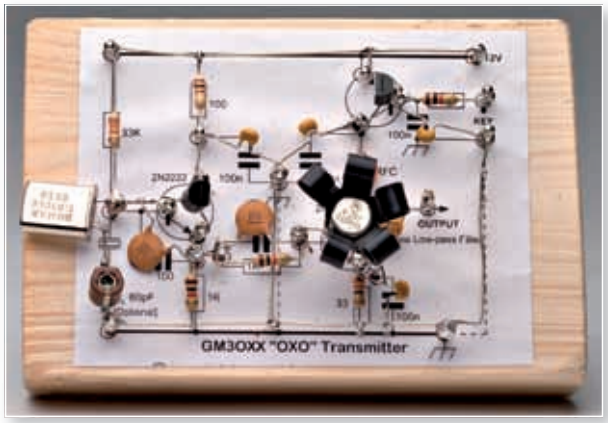
It could be said that the Rev. George Dobbs G3RJV is taking yet another 'chip off the old block' as he looks at more 'wooden radio' projects! It's a simple technique but can prove to be extremely useful for prototyping and educational purposes.





This month, by using a mix of radio and carpentry the Rev. George Dobbs G3RJV describes a method that clearly demonstrates just how simple radio construction can be!

"Wood isn't important in itself but rather in the fact that objects made in it are unique, simple, unpretentious."
Georg Baselitz (German Artist)

I can still recall the awe I felt, when I was a schoo boy in the local Amateur Radio club, for those who could read a radio circuit diagram. I vowed to learn what all those mysterious symbols meant and how the way they were drawn could be translated into a piece of working equipment.

That's why I was impressed by the technique used by **Johnny Apell SM7UCZ**, in teaching young people radio construction.

Johnny pastes a copy of the circuit diagram on to a wooden base and mounts the components over their appropriate symbols using copper-plated nails. In the May 2006 edition of this column, I described the technique and gave two simple examples using the wood-and-nails method of construction.

I then had some letters and E-mails from readers describing how they had used the technique with radio club and school projects. The projects I described were very simple, an MK484 based medium wave amplitude modulation (a.m.) radio and a single transistor c.w. transmitter called 'The Mini-Tuna'.

Because of the interest I thought it might be interesting to push the idea along a little further. However, it must be said that there are obvious limitations that prevent the technique being suitable for complex projects.

The Methodology

The best method is to gently hammer the nails into the appropriate places until about half their length is embedded in the wood. However, it's important to tin the nails with solder **before attempting to mount the components**. This requires quite a large soldering iron bit to ensure the nail is hot enough for the solder to flow freely.

The best test is to melt the solder on the nail and not on the soldering iron bit. When adding a component, it's also helpful to bend the component lead around the nail to make a physical connection before the solder is applied.

I prefer to prepare my circuit diagrams using computer software but a careful hand-drawn diagram will work just as well. For the projects described this month, the constructor could photocopy the circuit diagram, 'zooming' the size up or down for a reasonable component spacing.

The temptation is to place a nail at every interconnection in the circuit diagram! Unfortunately, this will almost certainly result in a nail-cluttered board.

I suggest that you look at the diagram and see where connection points can be shared by adjacent component leads. It helps to place transistor lead connection nails a little inside the symbol for the transistor. You may then have to add tinned copper wire links for some grounded points on the diagram and to complete some of the interconnection between the components.

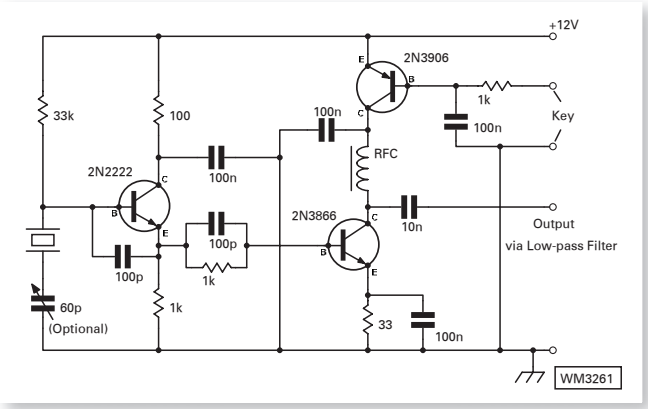


Fig. 1: The OXO circuit, ideal for use with the wood-and-nail construction technique.

A QRP Classic

I was then ready to go but what should I build? It obviously should be something reliable, useful and with not too many parts. So, I turned to a QRP classic, the GM3OXX 'OXO' transmitter. It first appeared in the G QRP Club journal over 25 years ago and has been the first attempt at a home-built transmitter for many QRP constructors since that time. It's a simple, reliable and reproducible design.

The OXO transmitter works on any band from 1.8 to 14MHz (160 to 20 metres) by using an appropriate fundamental frequency crystal and following the transmitter with a

low-pass filter. It also lends itself well for the nail-and-wood construction technique.

The circuit of the OXO is shown in **Fig. 1**. The OXO uses a variable crystal oscillator (VXO) with a fundamental frequency crystal being varied a little in frequency, by using a variable capacitor or variable trimmer capacitor. This capacitor could be omitted by connecting the bottom of the crystal directly to ground to produce a fixed frequency transmitter. Incidentally, I have suggested a 2N2222 transistor but any similar generic transistor, BC108, 2N3904 and so on would work.

Note that the oscillator is radio frequency (r.f.) and direct current (d.c.) coupled to the amplifier (2N3866), so oscillation will not occur without the amplifier and the 33Ω emitter resistor. This resistor could be used to adjust the power output but making the value too small could damage the amplifier transistor and the values shown here give about 1W of r.f. output on 7MHz. (The 2N3866 will require a small clip-on heat sink).

The amplifier collector load is a radio frequency choke (r.f.c.). This choke is hand wound by threading 10 turns of 0.32mm (30 s.w.g.) enamelled copper wire through a small ferrite bead. A commercial choke of about 100μH could be used but it would have to be capable of passing the full current of the amplifier. A *pnp* transistor, such as the 2N3906 or similar, acts as a d.c. switch to key the transmitter.

The OXO transmitter is simple to build on the nails above the circuit diagram by simply laying each part over the appropriate symbol. The transmitter requires a low-pass filter (l.p.f.). I used one of my available plug-in filters based on the W3NQN 7-element standardised low-pass filters. The diagram, **Fig. 2**, shows a simpler alternative filter for 7MHz. (This filter could be built on the board by adding a few extra nails).

Wooden Receiver!

Having successfully built a viable wooden transmitter, I thought it might be fun to try a wooden receiver. Again, the requirement was a simple design with only a few parts and I opted for a circuit, which followed the ideas of **RV3GM** and **PY2OHH**. The resultant circuit is shown in **Fig. 3** and it's very simple. I opted for the 7MHz version, as this was the frequency of the wooden OXO.

Let's now look at the circuit. A 7MHz tuned circuit based on L1 feeds a single diode passive mixer (1N914 or similar). The local oscillator is coupled to L1 via a link winding and the signal from the antenna (signal in) is coupled via a trimmer capacitor to the top of the tuned circuit. Both trimmers in the circuit are 5mm Murata (brown) types.

The resultant audio signal is amplified by a Darlington Pair of transistors to drive a pair of high impedance headphones. A Darlington Pair is two transistors connected together so that the second transistor further amplifies the current amplified by the first. The overall gain is equal to the two individual gains multiplied together.

I used 2N2222 transistors but again any similar types could be used. The circuit is so simple that it does not even have a gain control!

Using my bench signal generator as a local oscillator and my antenna coupled through an antenna tuner (a.t.u.) I managed to resolve plenty of c.w. signals on the 40 metre band. (It's a challenging receiver to use but great fun!).

For those readers who don't have a pair of high impedance headphones the receiver can feed an external amplifier perhaps using the amplified speakers that are so common nowadays. The diagram, **Fig. 4**, shows how this can be done and this how I used them for my prototype.

Feeling Brave?

The really brave might like to join the two designs and make a basic transceiver! The diagram, **Fig. 5**, shows how to facilitate a transmit-receive system to use both units. Note how the low-pass filter is used for both the receiver and the transmitter to provide a little more selectivity on receive. The local oscillator (l.o.) signal is taken from the emitter of the 2N2222 transistor, at the top of the 1kΩ resistor.

The diagram shows screened leads for the oscillator and input leads to the receiver. This is essential. In effect the receiver is mainly a high gain audio amplifier with a sensitivity that will pick up any signals, especially mains hum, within range.

Without some care in screening, all you might hear could be mains hum with perhaps some local broadcast stations breaking through. Also, please note that there's no receiver muting on transmit so you can expect some loud key thumps when you're transmitting!

The wood-and-nail system is very simple technology but it can work and it is certainly fun. Not least of all, a wooden transmitter or receiver (or even transceiver) is a great novelty and attention grabber!

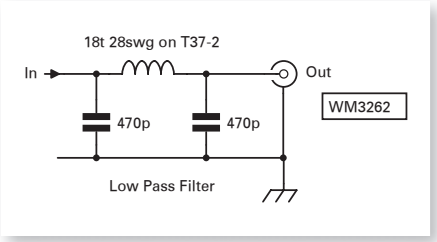


Fig. 2: A suitable alternative filter design for use on 7MHz.

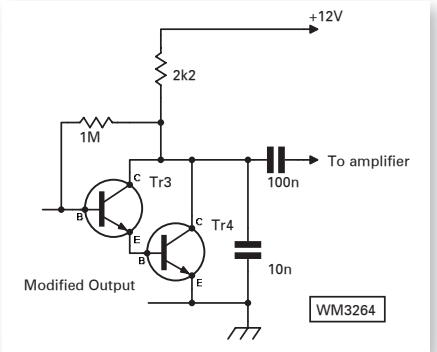
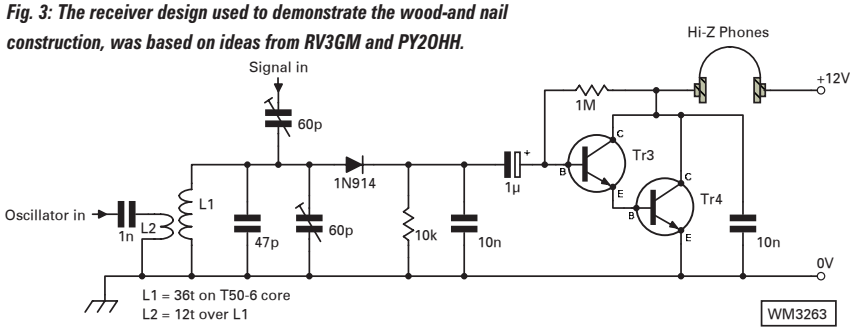


Fig. 4: Using an amplified speaker system with the simple receiver

Fig. 3: The receiver design used to demonstrate the wood-and nail construction, was based on ideas from RV3GM and PY2OHH.



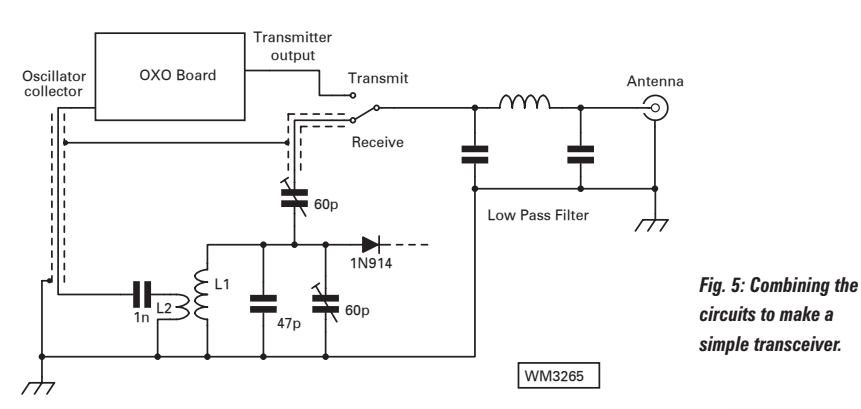


Fig. 5: Combining the circuits to make a simple transceiver.

VHF DXer

David G4ASR reports that conditions are improving on the v.h.f. bands and takes a look back at notable achievements during the 1940s.

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Propagation took a turn for the better during April with the first signs of summer Sporadic-E (Sp-E) and trans-equatorial propagation (t.e.p.) modes being reported on the 50MHz band. There were also some meteor scatter (m.s.) and a Sp-E event on the 70MHz band and some reasonable tropo openings on the 144MHz band.

Although there were a few brief instances of Sp-E propagation reported on the 50MHz band during April it wasn't until Sunday April 22 that the first lengthy event of the summer season was reported. It started at 0930UTC with the station of EA9IB (Ceuta, Spain) being worked from southern England. Although this initial opening faded out quite quickly, the Sp-E assisted signals returned at 1100UTC and remained in for the next four hours before disappearing shortly after 1500UTC.

The event was quite widespread throughout the UK with stations in England, Guernsey, Scotland and Wales participating in the opening. Amongst the c.w. and s.s.b. DX being worked were the stations of CN8IG (Morocco), DL5ROB (Germany), HA8EK (Hungary), IC8FAX (Italy), IT9KSS (Sicily), OK2ZC (Slovakia), SP9HWY (Poland), S56Y (Slovenia), 9A2PT (Croatia) and 9H4DX (Malta). Another Sp-E opening was reported on April 28 between 1115-1515UTC. Stations in England, Northern Ireland and Wales reported making contacts with CT1FJC and CT1HZE (Portugal), EA6SX (Balearic Islands) and EA8JF (Canary Islands).

Trans-Equatorial Propagation

Trans-Equatorial propagation (t.e.p.) is a relatively rare form of F-layer propagation that occurs during the spring and autumn months, often during sunspot maximum. This type of propagation allows two stations at nearly identical middle latitudes on opposite sides of the geomagnetic equator to communicate at frequencies up to 150MHz or sometimes much higher. For example, communications can occur between the Mediterranean area and Southern Africa over path lengths of around 6000km.

In the UK t.e.p. will be most prevalent on the 50MHz band but there is always a possibility that contacts on the 70MHz band may be made during the peak of the sunspot cycle. **Ken Osborne G4IGO** (Devon IO80) reports that he heard his first t.e.p. signals for a very long time during the evening of April 21. The 50MHz band was open to the Democratic Republic of Congo (9Q) for over an hour with the stations of 9Q1D and 9Q1EK being heard with signals peaking 549 at times. Both stations are located in locator JI75 some 6400km away from the UK.

The 70MHz band has been showing signs of increased DX activity. On April 8, a number of stations in southern England reported making s.s.b. contacts with LX1JX (Luxembourg) via tropospheric propagation.

The Lyrids meteor shower occurred during the month and on April 15 a number of UK stations make JT6M digital QSOs with DL3YEE (Germany), LA4ANA (Norway) and OE5MPL (Austria), all cross-band to 50MHz and direct on the band with OZ1DJJ (Denmark). The Sp-E opening on April 28 just managed to make its way up to the 70MHz band although signals from CT1HZE (Portugal) were quite weak in the UK. By the time you read this the Sp-E season will be well and truly underway and many contacts will be made on all the v.h.f. bands with consummate ease.

Hungarian Radio Amateurs

Janos HA3UU passes on the news that Hungarian (HA) Radio Amateurs can now apply for an experimental 4m permit that allows access to 70.000-70.300MHz in all narrowband modes and 150W effective radiated power (e.r.p.). Each permit will be authorised for a three month period and can be requested between March and December 2007.

Discussions with HA Amateurs suggest that many will wait until the Sp-E season is established before coming on the air. It's understood that meetings are underway to establish long-term access to the 70MHz band.

Greek Beacon

Since April 24 2007, the beacon **SV1FOUR** (Athens, Greece) has been authorised to operate on 70.040MHz. Currently it is running 1W output into a 5-element Yagi beaming towards the UK.

The mode is c.w. and it sends its callsign SV1FOUR followed by several dashes and the locator KM27AW. The beacon keeper SV1DH will appreciate a report if you hear it.

Other News

There was some reasonable tropo lifts on the 144MHz band during April, nothing spectacular but enough to keep the logbook filling up. Some of the more distant DX worked from the UK on c.w. and s.s.b. included the stations of; DL5XJ (JO54), EA2BFM/P (IN83 Spain) and F0FHU (JN06) on April 1, DL6WU (JN49) and F5DQK (JN18) on April 2, LX2LA (JN39 Luxembourg) on April 4, HB9QQ (JN36 Switzerland) on April 6, EA1BLA (IN53), EA1MX (IN73), EA1YY (IN73) on April 21 and DB6NT (JO50), EA1FBF (IN73 and F5NEV/P (JN04) on April 22.

Dave Ackrill G0DJA (Derbyshire IO93) mentions that he has recently obtained a Kenwood TS2000X transceiver and is now active on the 1.3GHz band running 10W into a 23-element Yagi. His initial results included the s.s.b. stations of G0EWN (Sheffield) at 28.5km, G3LRP (Wakefield) at 42km and GM4CXM (Glasgow) who he contacted on c.w. over a 361km path.

In the UK 23cm activity contest on April 20, Dave worked GM4CXM again and made new contacts with G3XDY (Ipswich), G8OHM (Birmingham) and GW8ASD (Wrexham). These are encouraging results and Dave is now planning to add three more 23-element Yagis to the array, fit a low-noise preamplifier to the receive side and upgrade the coaxial cable to something with less loss.

Deadlines

That's it for this month. It's now Sporadic-E season so keep a close watch out for DX signals on the 50, 70 and 144MHz bands. If you have any news, reports or anything of interest regarding the 75 years anniversary of *Practical Wireless* please send me the information to the address given at the head of the page before the last Saturday of each month.

73, David G4ASR

75 Years Celebration - The 1940s

Every month during 2007 I'm celebrating the 75 years of *Practical Wireless* by looking at recollections or notable achievements and this time around I'm looking at the period between 1940-1949.

Prior to the Second World War the only v.h.f. allocation for UK Radio Amateurs was at 56MHz and in those days that area of the spectrum was referred to as the 'ultra high frequencies'. On December 15 1945, following the cessation of hostilities it was announced that licences authorising operation in the bands 28-29MHz and 58.5-60MHz would be issued to holders of pre-Second World War radiating and non-radiating licence holders.

One of the early v.h.f. pioneers was **Hilton O'Heffernan G5BY** (Bolt Tail, Devon) who probably did more than anyone else this side of the Atlantic to open up the possibilities of communicating over long distances at frequencies above 50MHz. Every Sunday during June and July of 1946, he made automatic Morse (c.w.) transmissions on 58.632MHz using high gain antennas beamed at North America from a site situated on a 400 foot cliff overlooking the sea. For transmitting, Hilton used two 4-element arrays stacked vertically and fed in phase and for receiving he used a rhombic antenna, 240 feet on each leg.

For some months the station of G5BY had been following regular 50MHz listening schedules while across the Atlantic the station of **Edward Tilton W1HDQ** (Connecticut, USA) was running a series of tests involving transmissions on 6m (50MHz) and listening for replies on 10m (28MHz) and 5m (58MHz). During one of these tests on November 24 1946, the station of W1BEQ (Connecticut) telephoned Edward to say that he was in contact on 10m with G5BY who said he was hearing W1HDQ on 50MHz. A two-way was immediately attempted with G5BY transmitting on 58.632MHz but, unfortunately, the maximum usable frequency (m.u.f.) was too low for contact to be made. Since G5BY was copying the telephony from W1HDQ at over S9, it is not clear why he did not immediately go to 28MHz to make the first transatlantic cross-band contact from the UK.

At the same time, however, the station of **Denis Heightman G6DH** (Clacton, Essex) was also receiving 50MHz signals from W1HDQ and at 1119UTC on November 24 1946, G6DH made the first historic UK-USA cross-band (10m/6m) contact across the Atlantic Ocean. Then it was the turn of Hilton G5BY who made the second cross-band contact and continued to hear W1HDQ until 1225UTC, an opening of 68 minutes.

Following this success, Denis G6DH (shown in the photograph, **Fig. 1**) then requested that the RSGB obtain permission for v.h.f. experimenters to temporarily transmit on the 50MHz band. Permission was eventually granted by the General Post Office (GPO) on November 5 1947 and on that very day v.h.f. history was made again when G6DH and W1HDQ established the first two-way transatlantic contact between the UK and North America on the 50MHz band.

The telephony signal from W1HDQ was 59+ in Essex whereas that from G6DH was 57 in Connecticut. The temporary licences were subject to certain time and frequency limitations with a maximum power input of 25W. The experimental licences were due to expire on January 1 1948 but were later extended to April 30 1948 to encompass the peak of Solar Cycle 18 during the winter period of 1947-48.

In the summer of 1947, the International Telecommunications Union (ITU) held a World Radio Conference (WRC) in Atlantic City, USA. It was here that new worldwide Amateur allocations were formulated and in September 1948 the GPO released half of the 2m band (145-146MHz) as well as the new 70cm band (420-460MHz) and 13cm band (2300-2400MHz). On January 1 1949, the remainder of the 2m band (144-145MHz) became available in addition to the 23cm band (1215-1300MHz), 6cm band (5650-5850MHz) and the 3cm band (10000-10500MHz).

Fig.1: Denis Heightman G6DH

Early in 1949, a new British long-distance record was achieved on the 60MHz (5m) band when the station of G5MA (Surrey) contacted GM2DAU (Fife) over a 363 mile (585km) path. This was made possible by an intense auroral opening and at the time it was reported that "so far no observations of this effect have been made on 144MHz and it has been stated in American publications that it does not extend so high in frequency". (Years later this contention was proved to be completely incorrect!)

The Five Metre band (58.5-60MHz) was available for little more than three years as the newly emerging BBC Television service required these wavelengths. The first 405-line station was on 45MHz but the second one, at Sutton Coldfield, was scheduled to go right in the middle of the 5m band. There was a commemorative 'Last Night on Five' on March 31 1949, when a small number of pioneers who used the band gathered to see the curtain drop. (Incidentally, following the demise of the 5-Metre band a number of enthusiasts lobbied the RSGB to negotiate for access to a new frequency band somewhere in the lower v.h.f. spectrum. It was seven years later, in November 1956, that the GPO announced that UK Amateurs could operate between 70.2-70.4MHz.

The old 5m band had always attracted a very special kind of Radio Amateur, the pioneer, the experimenter, the real enthusiast. Fortunately, the recently allocated v.h.f. bands of 2m and 70cm started to attract the same sort of character who was prepared to extend the boundaries.

By the end of 1949, it was reported that the UK stations of G3BLP and GI3FHN had contacted one another over a distance of 327 miles (526km) on the 144MHz band and the stations of GM2JT/P and GW6DP/P had raised the 430MHz record to 130 miles (209km). Higher in frequency the stations of G6CW and G8DD had contacted one another over a distance of 4.5 miles (7km) on the 1215MHz band while G3CBN and G8IH/P had established a new record on the 2350MHz band by making a two-way contact over a distance of 35.5 miles (57km).

On the 10GHz band the stations of G3BAK and G3LZ had been experimenting with a mains powered klystron transmitter/receiver and this equipment was used to make a 1.75 mile (3km) contact across the Manchester ship canal in northwest England.

Share your news, views and reports with fellow readers. Reports to Carl by the 15th of each month please.

HF Highlights

Carl GW0VSW rounds up all the latest news from the h.f. bands with the help of your reports.

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Plans for the **Five Star DXers Association DXpedition** to St. Brandon 3B7C mentioned in the January column are now well under way and a suitable boat has been chartered and all licences/permits for the operation have been received. The team will be operating from Isle du Sud, the southern end of what is shown on the charts as Cocos Island, which should not be confused with Cocos Island in TI9 or the Cocos-keeling Island group VK9!

Those of you who are Lighthouse on the Air enthusiasts might be interested to know that Cocos has a beacon for WLOTA Ref. LH 1017 and this could be an all-time new one for lighthouse collectors providing the light is accessible from Isle du Sud. A four-page full-colour brochure setting out more information about the DXpedition can be downloaded now in both high and low definition PDF format from **www.3B7C.com** ***Note:*** *The first of our special features on this event appears in this issue on page 34,* ***Editor.***

Sigfrido Romeo's 7Q7RS QSL card who will be operating as 5H0RS.

'Chip' Diamond W2FJD was worked by John Crawford-Baker on 7MHz BPSK31

World Robinson Cup 2007

The **Russian Robinson Club** (RRC) sponsors the World Robinson Cup **(wrc_rrc@mail.ru)** for contacting stations operating from islands between 1 April and 30 September 2007. The national island programmes considered by WRC 2007 are BIA(Belarus), ClsA(Canada), DIA(Denmark), DIB (Brazil), DICE (Chile), DIE (Spain), DIFM and DIFO (France), DIP (Portugal), GIA (Germany), IIA(Italy), IOCA(Croatia), IOSA(Scotland), JIIA (Japan), RRA (Russia), SPIA(Poland), UIA(Ukraine) and USIA(United States).

Membership of the RRC is available to anyone operating from (or has operated in the past from) islands, drift-ice research and/or Arctic and marine stations, signing their personal callsigns or who operated as members of a DXpedition. More information, together with a list of current operations, photographs, articles, log searches and QSL cards, is available on the Russian Robinson Club's website at **www.hamradio.ru/rrc/wrc_e.htm**

The DX News

On to this month's DX news and to Greece where **Giannis Ioannidis SV2FPU** will be part of the **White Tower teams 2007** DXpedition to Skyros Island EU-060, the number four most wanted Island in Europe! The callsign with be **SY8WT** and activity is expected to be on all h.f. bands using all modes from 17 June at 0001 to 22 June at 2359UTC. More information can be found at **www.whitetowerdxt.com**

Spanish Amateur, **Dani Balanos EA4ATI** is returning to Dakar, Senegal and will remain there until April 2008. He expects to be active as **6W/EA4ATI** and **6W1EA** probably with a beam for 14, 21 and 28MHz and dipoles for all other bands. He can be QSLed direct via homecall to **Santa Cecilia, 15-2A Illescas 45200, Spain**.

Sigfrido Romeo 7Q7RS has been issued with the callsign **5H0RS** and will be working and operating in the Dodoma Region of Tanzania for one year. All QSLs should go via **IT9YVO Antonello Scauso, PO Box 34, 98057 Milazzo, Italy**.

Special Events

The Special event call **ON50EU** will be active on the h.f. bands until 31 December to celebrate the 50th anniversary of the Treaty of Rome, which was signed on the 25 March 1957 by France, West Germany, Italy, Belgium, the Netherlands and Luxembourg, which established the European Community. The QSL route is via the bureau or direct to ON7YX.

Another callsign, **YU07HST,** will be operating from Serbia until the end of the year for the Seventh IARU World Championship in High Speed Telegraphy (HST) that will be held in Belgrade on 19 to 23 September. You can QSL via YU1FJK and get further information at **www.hst2007.org**

On 5 June 1257, Krakow in Poland received city rights under the Magdeburg Law and to commemorate that event stations **SN750C** and **SN750BK** will be active until the 31 July on all h.f. bands. You can QSL via SP9PKZ and further information on the event and an award can be found **at www.sp9pkz.republika.pl/750e.html**

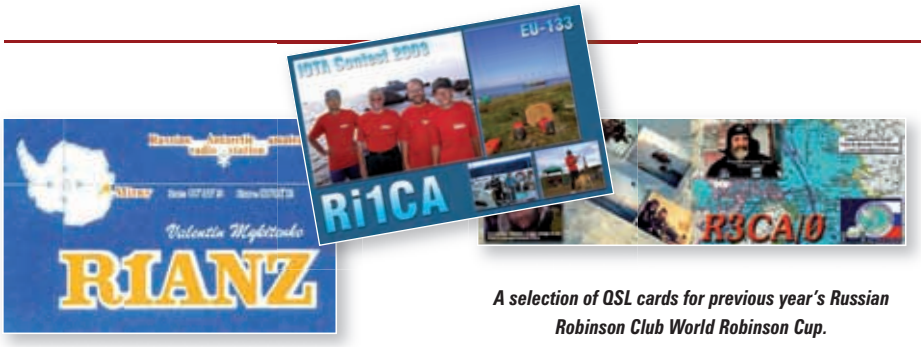
In Russia, **Nick Smerdov RA1QQ** is operating this year using the call **UE1SNA** (Smerdov, Nicolaj Anatolievich) to celebrate his 50th birthday. You can expect him to operate as UE1SNA/P from RRA islands and as UE1SNA/1 from IOTA islands during 2007 and you can QSL via home call or direct to **POB 24, Cherepovets, 162627, Russia**.

Your Reports

Starting your reports this month is the log of **Leighton Smart GW0LBI** in Trelewis, Mid- Glamorgan who used a Yaesu FT-100 and a 55m (170ft) long wire antenna to work c.w. stations K1GUN (USA) John in Woolwich Maine, RN1A (European Russia) and OH6M (Finland) with 100W before dropping his power to 5W QRP working HA1AG (Hungary), 9A5A (Croatia), OL7M (Slovakia), LA3AF (Norway), HB9BXE (Switzerland) and OZ1AA (Denmark). Changing to s.s.b. Leighton found CN2R (Morocco), 4O1A (Montenegro), LY2IJ (Lithuania) and CQ9K (Madeira Island) AF-014 between 0900 and 0000UTC.

The 7 & 14 MHz Bands

On the Isle of Sheppy in Kent is **Ted Trowell G2HKU** who found "band conditions improving slightly" worked 7MHz c.w. calls 3B8MM (Mauritius) AF-049, EA6/DL5NUA (Balearic Islands) EU-004 and V25OP (Antigua) NA-100 around 2100UTC using a



A selection of QSL cards for previous year's Russian Robinson Club World Robinson Cup.

Ten-Tec Omni V and 100W to a G5RV.

Also on the band. was **John Crawford-Baker GI0HWO** near Larne, County Antrim who lists BPSK31 QSOs with VK7GK (Australia) OC-001 at 0717, 4K6OF (Azerbaijan) at 2113, Peter K1PGV (USA), a software engineer in Mont Vernon, New Hampshire at 2121 and 'Chip' W3FJD in Delta, Pennsylvania at 2203UTC. Voice contacts here included ZL4AU OC-134 in Invercargill, New Zealand's southern most city at 0707 and later WB2YL (USA) Laura in Greenfield Park, New York at 0912UTC running 400W. The equipment used included an Icom IC-756 ProIII and a 61m (200ft) doublet at 20m (65ft) running East/West.

Moving to 14MHz John had one s.s.b. QSO with DU1EIB (Philippines) at 1341UTC using 100W, while **Martyn Medcalf M3VAM** in Chelmsford, Essex lists s.s.b. calls RN3ZC (European Russia) at 1253, SO8ZH (Poland) 1337, YO9WF (Romania) 1512, IZ7ATN/P (Italy) 1532, CT1DQV (Portugal) 1614, LZ2007EU (Bulgaria) 1619, 7X4AN (Algeria) 1708 and ZB2/4O3AL (Gibraltar) at 1751UTC amongst his contacts using an Icom IC-746 at 10W to a long wire antenna with SGC-237 auto tuner,

In Biggleswade, Bedfordshire, **Owen Williams G0PHY** also used voice to log D44AC (Cape Verde) AF-005 at 1044, HV0A (Vatican City) QSL via IK0FVC at 1222 followed later by RK2FWA (Kaliningrad) 1936, C52T (Gambia) 1946, P40W (Aruba) SA-036 at 1953 and 4U1WB (USA) The World Bank ARC in Washington DC QSL via KK4HD at 2110UTC using a Yaesu FT-747 and using an inverted L antenna using s.s.b. and 100W.

Welcome now to new reporter **Peter Leng G0SVO** in Gosberton, Lincolnshire who is a member of the **Spalding & District Amateur Radio Society** and the **GQRP club**. Peter logged EK0B (Armenia) 1653, 6V7E (Senegal) 1912, 8P1A (Barbados) NA-021 at 1938, 5T5JA ((Mauritania) 1953, T960ARA (Bosnia) 2014, A71EM (Qatar) 2029, TO5A (France) 2109 and ER/RW3AH (Moldovia) at 2113UTC using a Yaesu FT-1000MP Mark V at 100W to a G5RV antenna.

Eric Masters G0KRT in Worcester Park, Surry also said "the band conditions were improving" and using a Kenwood TS-570DG with SGC-230 tuner and 100W to a W3EDP antenna worked UA9UZZ (Asiatic Russia) 0608, VB3A (Canada) 1610, AP1A (Pakistan) 1838 and 5B/AJ2O (Cyprus) AS-004 at 1842UTC. He also had a two-way 5W c.w. QRP contact with OH5JJL (Finland) at 1035UTC.

The 18 & 21MHz Bands

On to 18MHz and Ted G2HKU listed c.w. QSOs with EA9EU (Ceuta & Melilla), CO8LY (Cuba) NA-015, PJ2/K2PLF (Netherland Antilles) SA-006, ST2R (Sudan) and Branon W5ZR (U.S.A.) in St. Martinville Louisiana between 1600 and 1645, while later at 2000UTC YV1NX (Venezuala) and EA8CN (Canary Islands) both made his log.

North of the border **Jim Pedley GM7TUD** in Dumfries used a Kenwood TS-450S, Cushcraft MA5B beam and 100Wworking s.s.b. calls JA2TQZ (Japan) AS-117 at 1115, 5H3VMB/3 (Tanzania) on AF-075 at 1430 and A45WD (Oman) at 1542UTC, while Peter G0SVO found JR1BLX (Japan) 1056,PY2OMS (Brazil) 1125 and ST2AC (Sudan) at 1720UTC.

Moving up to 21MHz Jim found the band "flat for most of the time" with just an "occasional opening" but still managed to work 9M4SDX (Spratly Island) AS-051 at 0950, 9N7JO (Nepal) 1027, VR2C (Hong Kong) AS-006 at 1039, 3DA0GV (Swaziland) 1050, A52AM (Bhutan) 1102, HZ1FS (Saudi Arabia) 1123 and VP8KF (Falkland Islands) SA-002 at 1441UTC. Owen G0PHY listed EK0B (Armenia) 1036, FY1FL (French Guiana) 1310, C52T (Gambia) 1345 and TU2CI (Ivory Coast) at 1622UTC.

Signing Off

Well that's about it for another month. As I was compiling the column I was able to monitor several stations on 7 and 14MHz operating **Radio Maritime Day** (RMD) in mid-April. Merchant Marine Radio Officers from several countries were active from shore stations or maritime mobile and it was nice to hear a high standard of operating in varied band conditions. I'm sure a good time was had by all. There is a monthly 'net' operating and an award is available for working in RMD. Full details of both these are available at **www.radiomaritimeday.org**

As usual my thanks go to all our reporters and to **Mauro Pregliasco I1JQJ** and **Valeria Pregliasco IK1ADH** editors of the *425 DX News Bulletin* for all the DX information. Until next time have a good DX-filled month.

73, Carl GW0VSW

75 Years Celebrations

History of h.f. operating during the 1940s

1940 to 1945 - Many Radio Amateurs had been taken up by the armed forces. Morse operators were used to listen to enemy transmissions and identify the operators by their c.w. swing or style of 'fist' helping to locate the source or stations location. Many were also employed as 'Code breakers' in the UK. The first programmable computer Colossus designed by engineer Tommy Flowers at the Post Office Research Station, Dollis Hill was running by the end of 1943. This contained 1500 vacuum tubes and was used to break the German codes. Today, Second World War movies are full of radio equipment that was in use at the time including models from National, Hallicrafters, RMEs and so on.

1942 - Arthur C. Clark, a British mathematician and science fiction writer suggested using a 'satellite' to relay radio signals around the earth. This was finally achieved in 1957 when *Sputnik I* was placed in orbit.

1945 - Coaxial cable was in wide use although it had been around since the 1930s. Surplus cable was ready available after the Second World War, whereas before ladder line was the preferred feeder. The BNC connector had been designed 'Bayonet Niell-Concelman' named after the inventors.

1946 - The Northern California DX Club (NCDXC), one of the oldest DX Clubs, was founded on October 10 1946 in San Diego, California.

1947 - W1FH is awarded the first 'modern' DXCC membership for mixed and phone operations. The DXCC country count at this time was 257.

1948 - William Shockley invents the transistor and the move from tubes to 'solid state' components began with new designs of both commercial and amateur equipment.

1948 - One of the first DXpeditions to the Bahamas takes place using the call VP7NG led by W4NNN and others during the 14th ARRL DX Competition. *CQ Magazine* also sponsored its first 'World Wide' contest.

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Fred Camm's Editorial April 1945

April 1945. Television – How Soon?

At the time of going to press Lord Hankey's Television Committee has not published its report to Mr. Attlee (Lord President of the Council) but it is likely to be published some time during March or April. Naturally there has been a lot of speculation as to its contents, especially among those who already possess television receivers, and are wondering whether those sets will be rendered obsolete by any new plans recommended in the report.

It must be remembered, however, that reports are often issued but not always acted upon in their entirety, and we have no doubt that the existence of a few hundred television receivers in the London area has not escaped the attention and consideration of the committee.

National Basis

At the same time, television now has to be considered on a national and not a local basis. The tail must not wag the dog. For television to attain a national basis the pre-war style of programme would not do.

In 1939, television was still in the experimental stage and the programmes were designed to suit the limitations of the system then in use. Neither the BBC nor the public were taking television very seriously in that year. The war clouds were looming, and it was a service designed to cover a very limited area – a part of the London area.

Such a limited market could not provide the demand, which is necessary to encourage manufacturers and financiers. As with so many other things, the war has developed television to an extent, which it would have taken 20 years of private endeavour to do and it has been brought to this state of perfection at public expense. The public is therefore entitled to expect television to be launched after the war in such a form that it is national in its appeal.

Entertainment Value

It must have real entertainment value and not be regarded purely as a scientific wonder by keen amateurs. The public would not tolerate the 1939 style of programme. The Alexandra Palace Station has been kept in working condition during the war but we do not think any television programme will be put out until the whole country can be covered. London should not be considered as a favoured county.

Some of the speculation suggests that we shall not return to the 405-line system, which was admittedly not good enough. Some of the prophets have suggested 1,2000-line transmissions. Others stress the need for a closer link between the television engineers of this country and those of America, where is seems likely that 660-line transmissions will be standardised.

The Report will undoubtedly deal with these matters as well as the range of the video signals. Even if fundamental changes are not made in the 1939 system, great improvements in the quality of the pictures are possible. It is well known that few existing television receivers are capable of translating intelligibly more than about 300 lines of the 525 transmitted.

The flickerless frequency varies from 60 to 48 per second, with an intensity of 70 to 12ft. lamberts, and thus by comparison with films television has a much greater advantage.

Large Screen Television

With a 35mm. film there are about half a million picture elements, while with the 525-line television there are only half that number, although it is realised that full advantage of improved definition can only be achieved with the large screen television suitable for cinemas.

Some of the improvements, which will give us better television, are the new flat-faced cathode-ray tubes and the tubes with black screens, which considerably reduce halo effect. The size of these tubes will be about 20in maximum.

Whether the constructor will be catered for by a supply of suitable components is still a matter of doubt and speculation. Television differs from radio in that much higher voltages are necessary and it is thought that this fact alone may prevent it from becoming popular with amateurs.

1940 – 1949

April 1945
Television – How Soon?
Fred Camm's thoughts on the development in modern televsion

July 1945
The Post-war Market
Editorial from July 1945 penned, of course, by Fred (F J) Camm.

May 1945
A Pocket One Valver
A design for a matchbox style receiver.

August 1941
Radiolocation
A brief account fof the wireless means of locating the prescence and position of an Approaching enemy Aircraft.

December 1940
Nazi Warplane Radio
The impressions from a member of *Practical Wireless* staff who examined the equipment of several German planes, which had been bought down in this country.

January 1943
Round the World of Wireless
Memories from January 1943.

June 1945
Round the World of Wireless
More memories from days gone by.

Looking Back
1940-1949
Snippets from the *Practical Wireless* archives.

Coming Next Month
Join the *PW* team as we take a trip back to the 1930s.

Fred Camm's Editorial

July 1945

July 1945. The Post-war Market

The Radio Society of Great Britain has prepared a list of the radio components, valves and associated equipment which in its view will find a ready sale among constructors and experimenters, and particularly amateur transmitters immediately experimental licences are reissued. No announcement has yet been made as to when amateur transmitting will recommence. It is possible that security regulations in that connection will continue until the war with Japan in over.

As it seems reasonably possible that this will take place some time this year the publication of this list will be of great use to manufacturers. It is noted that the list includes some items which were introduced prior to the war, but which were not available at prices, which compared favourable with those of foreign competitors.

The list includes A.V. transformers, such as Class B, microphone transformers, modulation and humbucking transformers, and sets of parts, together with interchangeable windings in a wide variety of gauges and turns. It is thought also that there will be a demand for the following items:

Disc batteries for wiring into apparatus; butterfly circuits for v.h.f. work; small cathode-ray tubes for use in oscillographs and having high deflection sensitivity; swinging chokes; smoothing chokes of higher inductance; and chokes for cathode modulation circuits; fixed vacuum capacitors for high voltage and suitable for connection in banks; mica-blocking condensers; a full range of variable condensers; connectors; components for rotary beams; Faraday screens; crackle-finish paint; silver-plated copper tube; plastic sheet, rod and tube; coaxial cable; quartz crystals in enclosed holders; moving-coil head sets; I.F. amplifiers; a range of plug-in coils in 25 and 200 watt sizes with variable links, unbreakable low-loss transposition blocks and spacers; prefabricated masts; sectional steel masts; a full range of meters, microphones and Morse keys; potentiometers, power supply systems and power transformers; all-British amateur bands communications type receivers and kits of parts; thyratrons; test apparatus; amateur television equipment; stabilisers and neon tubes; speakers, and a wide range of valves.

Constructors' Requirements

The list is comprehensive and really catalogues most of the lines, which were available before the war; thus it is a request for manufacturers not to desert the constructor, experimenter, and the transmitter, in order to cater for the completely assembled receiver and transmitter.

The constructor and transmitter market is a large one and it can only exist if supplies of components are made available. It may seem to some manufacturers more attractive now that the war in Europe is over to make complete receivers rather than the parts, because of the great demand now existing owing to the lack of production during the last six years. That will, however, be a temporary boom and if some of the component manufacturers desert the component market, other firms will step in and take their place.

The imminence of television needs the continued service of the great army of private experimenters who, for their own interest and enjoyment, yet conduct such valuable experiments and in the past have contributed so much to the perfection of radio. A new task awaits them with television and in the short-wave and ultra-short-wave sphere.

In the early days of television it will be necessary to build up a television audience and to interest the public in television programmes. It will be a limited service at first, but experimenters in exhibiting their receivers to their friends will be creating the demand for television apparatus by the non-technical.

The Radio Society of Great Britain is prepared to send its recommendations on the range of components for the post-war amateur radio market to any British radio manufacturer who has not yet received a copy.

Queries

Will readers please note that our query service is still suspended. We hope, as staff becomes available, to reintroduce it this year. Readers should await a further announcement.

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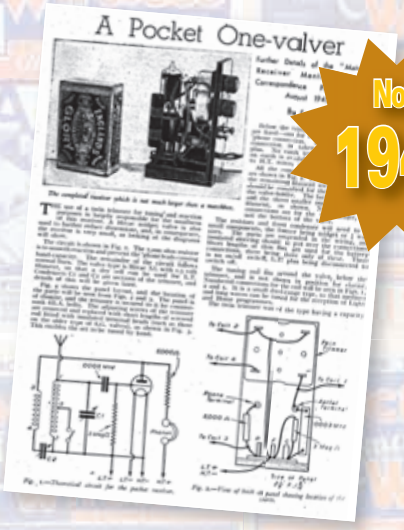
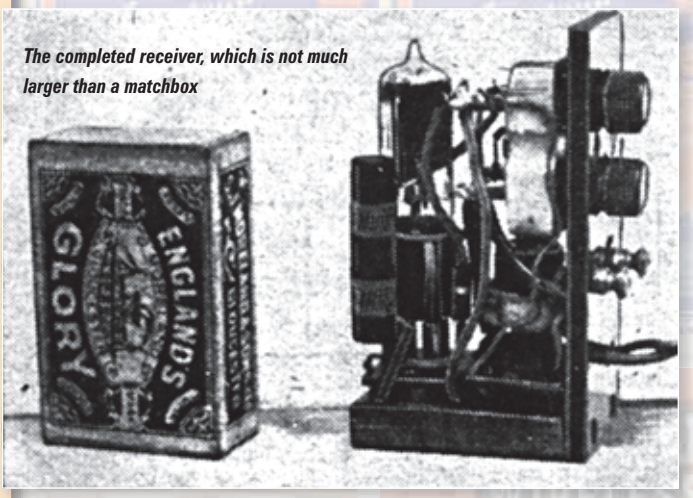




The completed receiver, which is not much larger than a matchbox

The use of a twin trimmer for tuning and reaction purposes is largely responsible for the smallness of this receiver. A Hivac midget valve is also used to further reduce dimensions and, in consequence, the receiver is very small, as looking at the diagrams will show.

The circuit is shown in **Fig. 1**. The 5,000Ω resistor is to smooth reaction and prevent the headphone leads causing hand-capacity. The remainder of the circuit follows normal lines. The valve type is Hivac XL with 1.5V filament, so that a dry cell can be used for low tension supply. Condensers C1 and C2 are section of the trimmer, and details of this will be given later.

The diagram, **Fig. 4**, shows the panel layout, and the location of the parts will be seen from **Figs. 2** and **3**. The panel is of

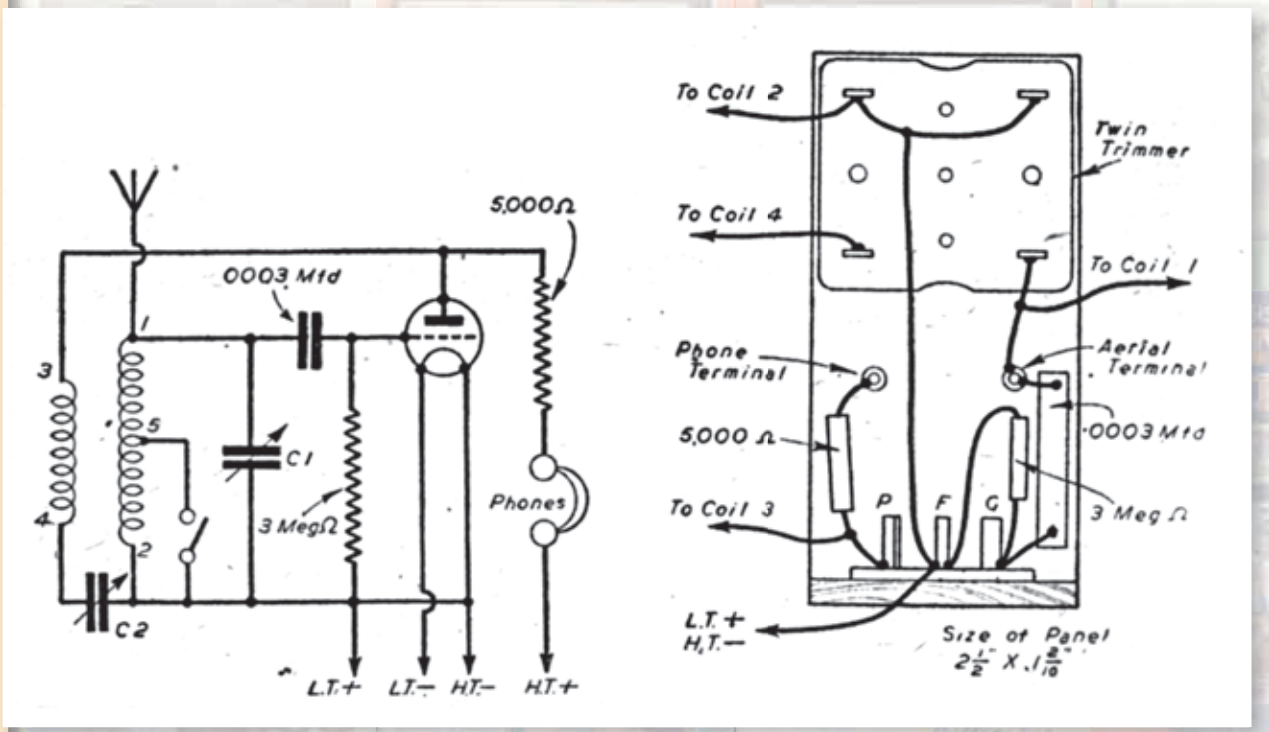


Fig. 1: Theoretical circuit for the pocket receiver.

Fig. 2: View of back of panel showing location of the parts.

Further Details of the 'Matchbox' Receiver Mentioned in the Correspondence Pages of our August 1945 Issue.

Ebonite, and the trimmer is secured to it by countersunk 6BA bolts. The adjusting screws of the trimmer are removed and replaced with short lengths of screwed rod fitted with insulated terminal heads (such as those on the older type of screen grid Valves), as shown in Fig. 3. This enables the set to be tuned by hand.

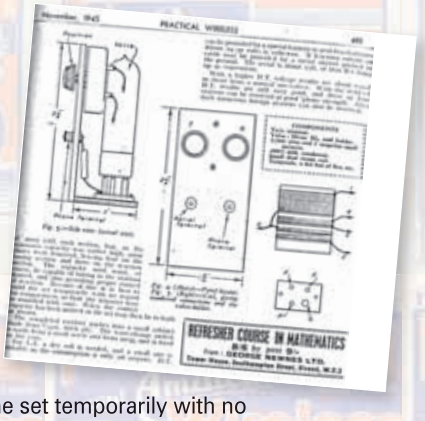
Below the trimmer two small terminals are fixed – one for the aerial and one for headphone connection. The positive headphone connection is taken directly to high tension positive (+) . No earth terminal is used, if an earth is available, it can be connected to h.t. negative (-) at the battery.

All the connections (except l.t. -) are shown in Fig. 2. The l.t. - is taken to the remaining filament socket and **Fig. 5** should be consulted for the connections to the valve-holder. The large socket is for the grid connection and the three smaller ones are anode and filament as shown. Note that these connections are for the valve-holder **and not the bottom of the valve**.

The resistors and fixed condenser will need to be small components, the former being midget or 0.25W sizes. The parts are suspended in the wiring, and insulated sleeving should be put over the connections. Short lengths of thin flex are used for the battery connections, as there are only three of these required. There is no **on**/**off** switch as the l.t. + is disconnected to switch the receiver off.

The tuning coil fits around the valve (below the trimmer) and is not shown in position for the sake of clarity. Numbered connections for the coil will be seen in Figs. 1, 2 and 5. It is a small dual-range type, so that medium and long waves can be tuned for the reception of the BBC Light and Home programmes.

The twin trimmer was of the type having a capacity of .0005μF each section. But as the minimum capacity was rather high some plates were removed, leaving four on the tuning section and three on the reaction section. The capacity used must, of course, be capable of tuning in the stations desired and also providing proper control of reaction. Because of this it's best to build the set temporarily with no regard for compactness so that the trimmer may be modified with ease. When the correct capacity has been arrived at the set may then be re-built as shown.



The completed receiver pushes into a small cabinet made from 1/16in thick plywood. The wave-change switch is made from a small screw and brass strip and this is fixed to the case.

For l.t. a dry cell is needed and a small one is suitable as the consumption is only .06 ampere. The h.t. supply can be provided by a special battery or grid-bias batteries approximately 24 -30V is sufficient.

If the receiver is to be used for listening outside an earth may be provided by a metal skewer pushed in the ground. The aerial used on the prototype is about 15ft. of thin flex hung out as convenient.

With a higher h.t. voltage results are about equal to those from a normal one-valver. With the reduced h.t. results are still very good, and three or four stations can be received at good headphone strength. After dark numerous foreign stations can also be received.

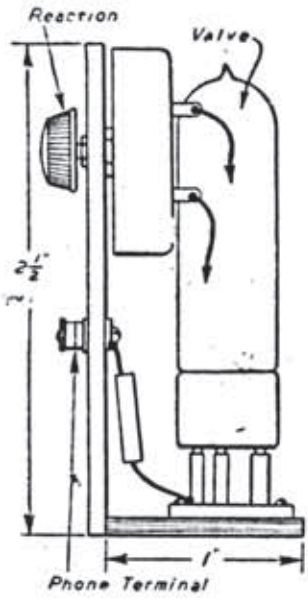


Fig. 3: Side view (actual size).

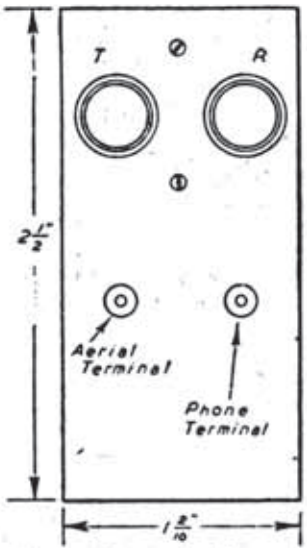
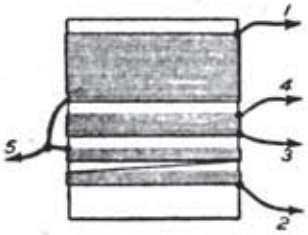


Fig. 4: (Above) – Panel layout.

COMPONENTS
Twin trimmer
Valve: Hivac XL, and holder
5,000Ω and 3MΩ small resistors
.0003μF condenser
Small dual range coil
Terminals, a few feet of flex, etc.



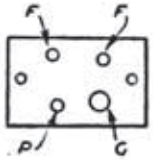


Fig. 5. Coil, giving numbered connections and the valve-holder.

Radiolocation

Aug 1941

A Brief Account of the Wireless Means of Locating the Presence and Position of an Approaching Enemy Aircraft

At a conference held recently at the Air Ministry, Air Chief Marshall Sir Philip Joubert revealed that one of the "mysterious" devices which is countering the night bomber is radiolocation. Although its development began years before the present war, it has remained a secret until now; in fact, it largely contributed towards the success of the RAF during the Battle of Britain last September.

Radiolocation is not a new departure in radio science but the application of existing knowledge. The urgent need of the RAF to have early knowledge if impending air attack resulted in the conversion of a laboratory experiment into a vital weapon of war. One man, **Mr Robert Watson-Watt**, visualised the great possibilities of the new device. He is now scientific adviser on tele-communications at the Ministry of Aircraft Production, and in 1935 he headed a team of brilliant scientists who worked with him on the problem from the start. They got together a team of clever young men and worked for months in absolute secrecy until they were able to show that radiolocation was a proved reality. Experiments went on continuously for four years.

As war became imminent their efforts were intensified, and so urgent did the need for radiolocation become that they made themselves the first series of radiolocators to give warning of the approach of German aircraft.

How It Works

Briefly, this is how the radiolocator works. Wireless waves, which are unaffected by darkness or fog, are constantly radiated to act as a scouting medium far beyond the limits of our shores.

If a solid object such as a ship or aircraft is encountered it sends back a reflection. Day and night distant outposts of the air are 'manned' by wireless electronic watchmen, ready to flash tidings of the enemy's approach with the speed of light.

This system makes it largely unnecessary to maintain standing patrols of fighters saving the country immense expenditure on petrol engines, wear and tear on aircraft and also has relieved the tremendous strain on personnel, which otherwise would have been unavoidable.

Trained Personnel Wanted

Under the impetus of war the system has developed rapidly, and the experiment that started six years ago is now a huge organisation constantly growing. The scientists are making improvements, and the manufacturers are keeping pace but there is a shortage of trained personnel to service the growing number of locators. The three Services have been combed for suitable men and women.

Dealing with the call for men to operate the device, Sir Philip said it was a marvellous opportunity for young men to "get in on the ground floor" of one of the most remarkable developments of modern times.

Mr. Robert Watson-Watt.

Technical Civilian Corps

It has been announced by **Sir Archibald Sinclair**, Air Minister, that a new technical civilian corps is being formed to operate and maintain the radiolocators. Skilled men from overseas will be enrolled for work here in the repair and maintenance departments of the Navy, Army and Air Force, in a non-combatant capacity. Schoolgirls and boys are to be trained for the radiolocator organisation. They must be good at physics and mathematics, and have reached the school certificate standard.

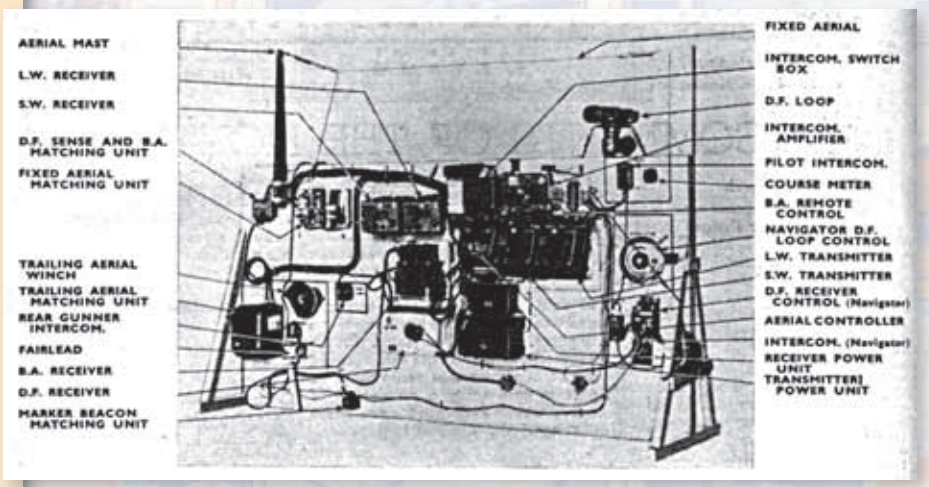
In an RAF operations room, where radiolocator messages are plotted on large table maps.

Girl telephone operators of the WAAF handling radiolocator messages.

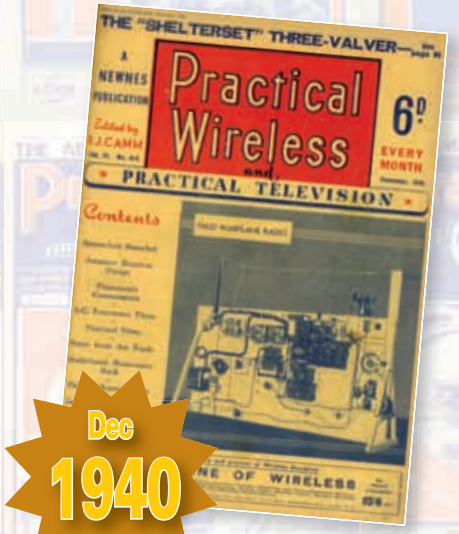
Feature

Nazi Warplane Radio

Original Text from 1940



This illustration shows the instruments used on the Heinkel bomber, mounted on a board for easy reference.

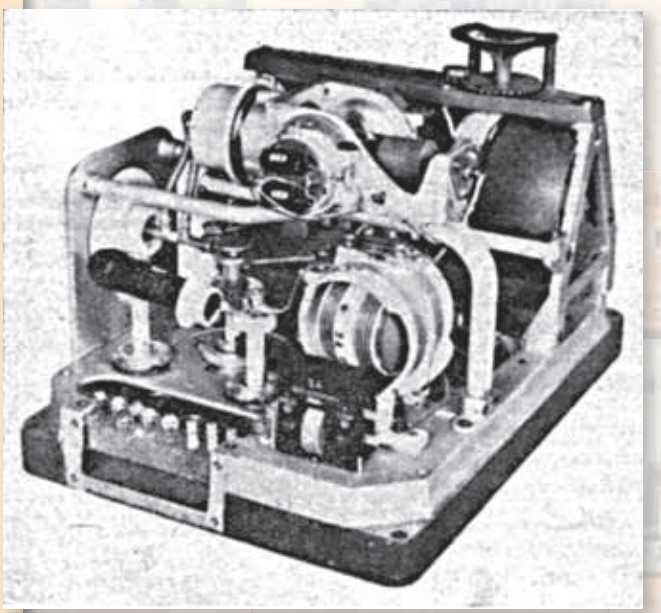


Technically sound, but not advanced; laboriously made; very easy to service and repair; the Germans can teach us very little about wartime aircraft radio. Those are the impressions that first occurred to me when I was recently privileged to see at close range the radio outfits of a number of Nazi aircraft of various types, which have been brought down over this country. The equipment – and the aircraft – was on private view to a few members of the Press at a well-known experimental station of the Royal Air Force.

Before describing the radio equipment in any detail it will be of interest to readers that there were no fewer than seven German aircraft in excellent condition at the station visited; many of them had been flown by members of the RAF for experimental purposes. My first inquiry concerned the method in which some of these aircraft could have been brought down for them to have sustained so little damage.

Well, one of them had actually been **landed by the pilot**, who was apparently under the impression that he was on French soil! Another, a yellow-nosed Messerschmitt 109, was in rather worse condition since the undercarriage had been broken away. Additionally there were bullet holes in the propeller, wings and engine cowling; nevertheless, its condition was quite good.

Later, I clambered into a Heinkel 111, a Messerschmitt 110, and several other German machines, which were almost "as new"; in most cases the makers' date stamp showed that the aeroplanes had been built during the past few months.



Top view of the aerial tuning unit.

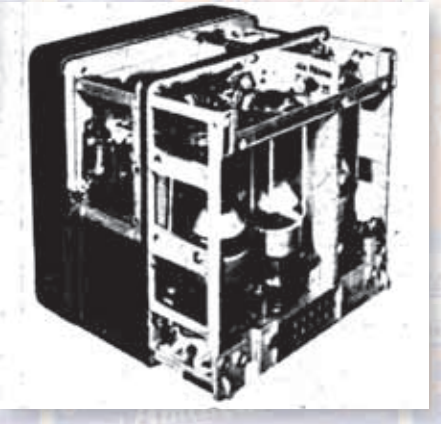
Twin Receivers & Transmitters

With so many items of interest, it was rather difficult to concentrate on the radio equipment alone, although that was in itself extremely interesting. It is not easy to decide at what point to start a description, for there are so many units involved, as may be gathered from an inspection of the accompanying illustration of a complete bomber outfit mounted on a board for demonstration purposes.

Primarily, there are two receivers and two transmitters – short-wave and long-wave – in each. The terms used in reference to the wavebands may be rather misleading until it is pointed out that the bands are from 3 to 6 megacycles and 300

Impressions of a member of the staff of *Practical Wireless* who recently examined the equipment of several German aircraft, which have been brought down in this country.

(Original introduction from 1940)



A view of the transmitter with the cover off.

A transmitting set found in a rubber dinghy from a German bomber, which crashed into the sea. It has a kite aerial, and one of the 'umbrella' type. It is used to send out SOS emergency transmissions.

to 600 kilocycles respectively. These are, of course, equivalent to wavelength ranges of 100 metres to 50 metres, and 1,000 metres to 500 metres.

Laryngaphones

In addition, there is an 'intercom' amplifier, which is used for communication between the pilot and crew of the machine. This inter-communication is, of course, by telephony but microphones, as they are usually understood, are not employed; instead, the crew use 'laryngaphones' or throat microphones. These are in pairs, fitted in the flying helmet and press lightly against the sides of the 'Adam's apple' (larynx).

In our own RAF aircraft high-grade microphones are employed universally, and these have proved to be superior to the larynx microphones, although the latter are not so bad for the guttural speech of the Germans.

Navigational Aids

In addition to the two transmitters and receivers, and the amplifier just mentioned, the Nazi bombers have navigational aids including a direction-finding receiver and a blind-approach (BA) receiver. The BA equipment operates on a waveband of 28.5 to 35 mc/s, and is on a modified Lorenz principle, where two beamed transmissions are used; one sends As (.-) and the other Ns (-.) and when the machine is on its correct course the two sets of code symbols 'link up' to produce a steady 'burr' sound

The direction-finding loop is unusual in that it more closely resembles a long oval tuning coil and is under 6in in diameter. This is mounted inside the fuselage and can be controlled by the navigator who has a large compass with which the loop control is combined. When direction-finding the navigator's job is to turn the loop until a fixed and moving scale on the compass correspond.

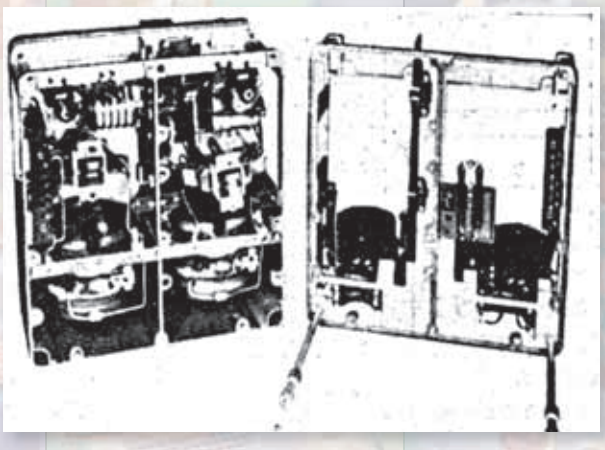
Power Supply

Power supply is taken from a 24V accumulator which, as my guide explained, is constantly overloaded in the same manner that most car batteries are overworked. Charging is by means of a generator and high tension (h.t.) is supplied by a rotary converter.

Besides the main items of equipment which have been referred to, there are all kinds of switching and aerial control arrangements; it is obvious that extreme care is taken to ensure correct matching between whichever aerial is in use and the receiver or transmitter, and for this reason there are several intricate matching or aerial control boxes.

There are two main aerials in addition to the direction finding (DF) loop, one of these being of the trailing kind and consisting of a coil of wire on a winch, and the other the small elevated aerial mounted on top of the fuselage. For use in conjunction with the aerials there is a multiple-way switch, which also serves to bring into use long or short wave receiver or transmitter.

After looking over the equipment in general, both on the demonstration board and in a number of aircraft, it was possible to examine some of the apparatus in greater detail by taking it apart. It was interesting to note that there was no shortage of



Showing the transmitter dissected.

Aerial controller and I/C controller.

The interchangeable high frequency pentode, showing the moulded base, contact pins and locking screw.

German receivers and transmitters, which indicated that they had been recovered more or less intact from a large number of machines.

On the bombers, the bulk of the equipment was seen to be mounted on a large and heavy bulkhead in front of which the wireless operator sits. Parts stowed away in the fuselage were the DF receiver, aerial-control units, generator and rotary converter.

Alloy Die-castings

Each unit could easily be removed from the rack after turning a couple of spring-loaded catches, whilst similar quick arrangements were provided for dismantling the units. When the case had been removed it was at once evident that the units were extremely well made – in fact, they were an instrument maker's job.

Pressings and stampings, which are familiar to us, were replaced by beautiful magnesium-alloy die-castings. It would appear that the equipment throughout is very costly to produce – far more so than ours. Despite this, however, it is slightly less efficient than that fitted to our own aircraft and which it would seem can be made in a fraction of the time. What is more, ours has proved to be every bit as reliable – perhaps more so, since there are fewer 'rubbing' contacts.

Interchangeable Valves

The main receivers are superhets types, the other two being simple 'straight' tuned radio frequency (t.r.f.) designs. One point, which is not without interest, is that every valve in the superhets is of precisely the same type, all are h.f. pentodes, and can be interchanged. These valves are very compact and not unlike 'acorns' valves and have a moulded base with side-pin contacts and a top cap.

The holders are 'inverted' so that the valves are pressed into place with the top cap downward; contact is made with it by means of a spring. Once a valve is in its holder it's completely enclosed and cannot be removed without a separate knob, which is screwed into a tapped hole in the centre of the base. The advantage of this is that there is never any pull on the glass envelope – the base takes the whole strain imposed by removal.

Convenient Servicing

Each unit is itself built up from separate units consisting of die-castings, so that a complete receiver or transmitter can be dismantled for service in a few seconds. The receiver tuning controls can be set to one of four 'spot' positions, into which the frequency at each can be checked and, if necessary, set by making use of the transmitter as a beat oscillator.

The arrangement is neat and, apparently, perfectly reliable. At the same time, if the many 'gadgets' fitted are not necessarily essentials, they are of the kind that have a strong appeal to the Nazi mind.

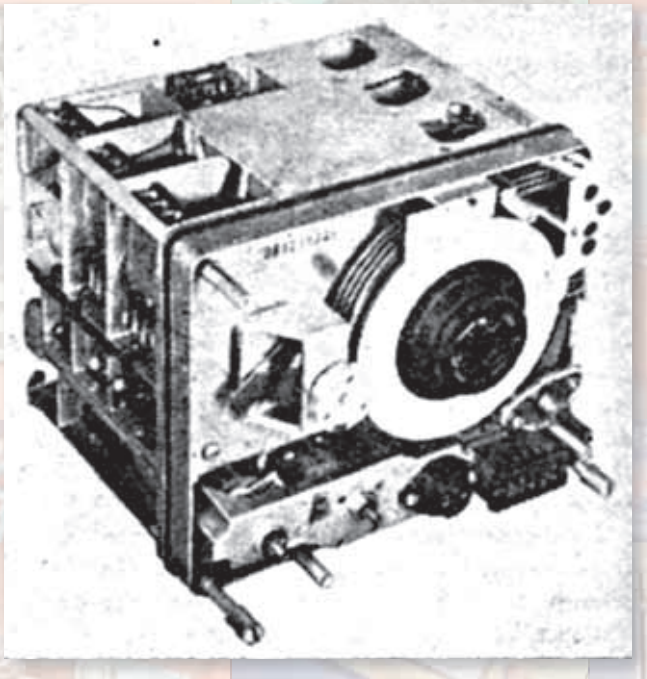
Total Weight 3581/2lb

In spite of the wide use of light alloys, the complete radio equipment of a German bomber weight 358$^{1}/_{2}$lb. The technicians attached to the RAF who were good enough to answer all my questions or as many as I could think of in the time at my disposal explained that, in their research into these German radio outfits, they have drawn the conclusion that, despite their excellence in many directions, they have apparently been designed by ground engineers rather than by technicians who have specialised in aeroplane radio. They have formed the genuine opinion, after months of careful research, that there is very little which they can learn from German radio designers.

Automatic Distress Signals

Quite apart from the standard radio equipment of the German bombers (and it might be mentioned that the fighters carry much simpler though otherwise similar radio equipment, without DF and BA systems), I was interested in another transmitter, which had been salvaged from a German machine. This was a bulky automatic SOS distress signal transmitter contained in a metal box, which also holds the necessary batteries. There is also provision for fitting a vertical 'umbrella' aerial or a kite aerial.

Apparently this outfit is for the use of aircrews who have to take to their well-known rubber dinghies. When they erect the aerial and switch on, a motor operates a keying system so that a string of Morse SOS signals is sent out. Only one of these rather awkward-looking pieces of gear has been found so far, and it is assumed that it is carried only when there is a 'big wig' on board. From appearances it seems likely that the aerial would tend to upset the boat rather than save it occupants.



A view of the receiver with the covers off.

Reprinted Advert from April 1940

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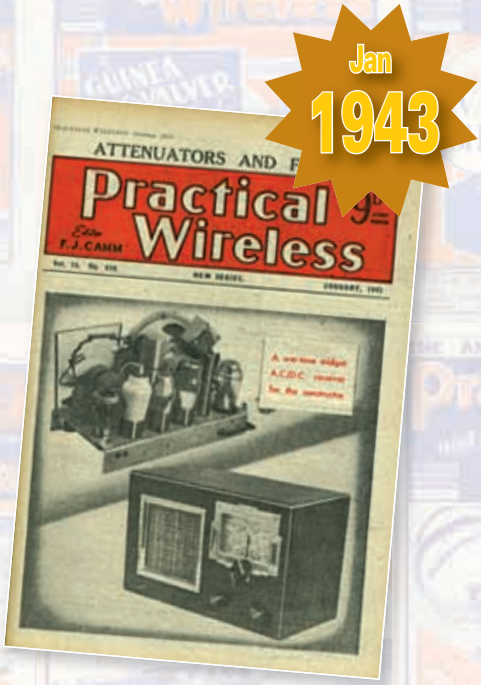
Round the World of Wireless



Fire-fighting by Radio

The use of radio for fire fighting purposes was recently demonstrated during a Gateshead fire. Telephone wires are often among the first casualties in a fire and learning from past experience, the Newcastle Fire Brigade have decided to adopt a system of radio communication, and this will soon be in operation throughout the country. Fixed transmitters at static points will be used to broadcast over a certain radius, in co-operation with mobile units.

The commander of an Armoured Brigade in Libya providing a report on a field telephone.

Broadcasting System on Battleship

It is now revealed that the 35,000-ton battleship HMS *Anson*, which was recently announced to be at sea, took five years to build. The electrical equipment in the ship would serve to light a large town. There is a cinema, a room for the ship's band and an internal broadcasting system. Telephone exchanges serve some 500 telephones throughout the ship, and there are postal services with pneumatic transmission. Two and a half million rivets were used in build the ship.

Voice Letters

Every purchaser of two dollars' worth of American war stamps in New York is given an opportunity to make a disc recorded voice-letter, which is mailed free to any man or woman in the United State Forces anywhere in the world.

New BBC Headquarters

In order to study West Indies's needs the BBC have established new headquarters in Kingston, Jamaica, to study the need of radio audiences in Jamaica and other Caribbean Islands.

Hitch Hike

Now that petrol restrictions are even more stringent, most of the traffic on the highways of Britain consists of heavy lorries. One of those lorries formed the background for a short musical show recently in the Forces programmed, when **Ernest Longstaffe** produced 'Hitch Hike', written by **Clifford Lewis**.

The programme told the story of a lorry, its genial, philosophical old driver and the assortment of passengers, ATS girls, munition workers, soldiers, etc., picked up on its journey. The lorry driver was played by our old friend **Syd Walker**, with Cheerful Charlie Chester, on special leave from the Army, as his mate. The passengers to whom he gave a welcome lift included **Miriam Ferris**, **Margaret Davison**, and the 'Four Clubmen', also a small orchestra conducted by Ernest Longstaffe.

Birmingham Police Radio

It is reported that police cars fitted with two-way radio-telephone equipment have been in use in Birmingham for about a month and already have been responsible for effecting several quick arrests. Credit for this successful innovation, it is said, is due to Inspector **G. Brown**, who was an experienced radio engineer before he joined the city War Police Reserve.

Earlier Closing for Canadian Radio

To reduce wear on equipment Canadian Broadcasting Corporation stations now go off the air earlier – at 11.30 pm.

Mrs Roosevelt's Blitz Record

The United States President and **Mrs. Roosevelt** will shortly be able to hear in the White House a recording of a heavy air raid on Bristol.

The record, which was made by BBC sound engineers, runs for about 20 minutes. It starts and ends with the sirens and includes the whistle and crash of high explosives and incendiaries and the deafening noise of the barrage.

It has been presented by the BBC to Mrs. Roosevelt, who took it back to America for use during her lectures.

Songs from the Cartoons

Quite a number of film cartoons have been adapted for radio, and recently, in the Forces programme, listeners had a chance to hear once more some of the best songs from these cartoons, ranging from 'The Big Bad Wolf' through 'Snow White', 'Pinocchio', 'Gulliver's Travels' and 'Dumbo', right up to the latest Disney film '*Bamby*'. The programme was planned by **Henry Reed** and was introduced and compered by **John Watt**.

B.I.R.E. Meeting

On Saturday, November 21st, at a members' meeting of the British Institution of Radio Engineers, an interesting paper on 'The Technical Basis of Sound Reproduction' was read by L. E. C. Hughes, AMIEE. The meeting took place at the Institution of Structural Engineers, at Upper Belgrave Street, London SW1.

Nine Hundred Years' Service

How old is the electrical industry? Not much more than half a century. Ediswan is in its 62nd year, and **Sir Felix Pole** is still making presentations to Ediswan employees who remember Edison's 'Jumbo' being installed at Holborn Viaduct – the first central station in this country. Sir Felix presented gold watches to Messrs. **J. Davidson** and **E. Paul** for 50 years' service. Actually, this industry, an integral of modern civilisation, was only seven years old when Mr. Davidson became cost clerk in Swan's lamp works at Ponders End in North East London. Eighteen such presentations have now been made – a total to 900 years of service given to the building of the electrical industry.

Desert Radio Talks

The British Army now has its own broadcasting unit in the front line in North Africa.

The first recording by an officer observer, who accompanied a fighting patrol into no-man's- land, was broadcast from the Egyptian State Broadcasting Station in Cairo recently.

With recording apparatus built into a lorry, the observer took the microphone to the limit of its half-mile of cable, and, standing near enough to touch the wire of a minefield, described the departure of the patrol.

Newly appointed officer observers will be the commentators in these front line broadcasts.

Comfort for France

"*If there is resistance in France it is thanks to the BBC".* These words of **M. André Philip** constitute the highest tribute that could have been paid to the BBC French service. Each week of growing tension in France, the importance of this link becomes more evident. Thus, by a happy coincidence, within the hour, the latest appeal by M. Laval for France to hug the chains which Germany has bound about her prostrate body found a prompt *riposte* in one of General de Gaulle's most compelling broadcasts on the theme of French unity – against the German Reich. This challenge described the "*multitude of Frenchmen, all together, on the way to general resistance*" and deriving from that unity a sense of comfort, a kind of deep-seated confidence and a sort of "*terrible joie*".

Remembrance Day

The Unknown Soldier, a play for Armistice Day by **Clemence Dane**, was produced on November 11th by **Val Gielgud** in the BBC Home Service with **Leon Quartermaine** as 'Merlin' and **Marius Goring** as 'The Soldier'. **Muir Mathieson** directed the orchestra.

This year the British Legion celebrates its coming-of-age. It looks back upon a remarkable record of service to the soldiers of the last war and looks forward to acting as a shield for the millions of ex-Service men and women after the present war, which has already taken a quarter of the population into the Services.

Much intricate planning, imagination and skill on the part of the producers will be required to put over these programmes to the best advantage in order to meet the day-to-day needs and ever-changing conditions of this vast and varied audience.

Included in this audience at any time are many who are in hospital or who are forced to spend long periods of monotonous waiting in lonely places. To such it is hoped that the light music in these programmes will come as an especial boon, soothing and restoring tired minds and weary spirits.

Twin sisters M. and V. Hills, who arte both in the Auxiliary Territorial Service (ATS) testing portable wireless sets used by the Army.

Calling Forces Overseas

Men and women of the Services in the Middle East and Africa, and those serving them, now have a seven-hour continuous broadcast entertainment programme daily, specially designed to meet their needs. This new transmission began on November 2nd. Not merely is its audience widely scattered but its listening conditions are totally different from those of civilians.

Crowded together in canteens on board ship, in aircraft and in many other places, often in circumstances of danger and nearly always in considerable discomfort, such listeners need good, light entertainment 'on tap'. The BBC aims to give it to them, interspersed with news flashes, sports items and very brief talks by popular speakers, talks suited to them personally, serving as a link with home and a reminder that their wants and anxieties are not being forgotten.

Based on programmes chosen to meet the expressed needs of men and women serving overseas, the new service will utilise a number of the most popular current features in the Home, Forces and Overseas programmes, including 'Beeb, Vic and Ben', 'Songtime in the Laager', 'Tommy Handley's Half-hour", 'Record Time', 'Itma', and Newsletters from Australia, New Zealand and South Africa.

The service will be continuous from 3.45 to 10.45 p.m., GMT, with special transmissions serving the Middle East from 3.45 to 9.0 p.m., GMT. and West Africa from 8.0 to 10.45 p.m., GMT. Gibraltar, Abyssinia and Aden will also be covered.

Wireless Sets in France

According to a recent report, wireless sets are still obtainable in France, and repairs are possible. Reliability, however, is not always obtainable, especially in home-constructed sets, in which a kind of celluloid has to be used, instead of a more durable plastic. This gets very hot in use and limits the life of the set to about six months.

Continued on page 72

Round the World of Wireless

June 1945

Broadcasting on Large Troopship

The 27,000-ton motor ship *Georgic* is now the finest and best-equipped troopship in the world. It has recreation rooms, cinema, up-to-date and well equipped sleeping quarters, spacious troop mess halls, and an elaborate system of broadcasting involving the laying of miles of new wiring, and the installation of hundreds of loudspeakers.

Sir Ambrose Fleming Dies

Sir Ambrose Fleming, one of the pioneers of wireless, and inventor of the thermionic valve, died at Sidmouth, Devon on April 19th, at the age of 95.

When working at Cambridge with Clerk Maxwell, Sir Ambrose investigated electro-magnetic waves, and in 1898 he was associated with Marconi's early demonstrations. A year later he designed the wireless station for Poldhu, Cornwall, and on December 12th, 1901, Marconi, in Newfoundland, heard the signals transmitted from Poldhu.

Mobile Wireless Unit

The Cable and Wireless, Ltd., mobile wireless unit, which moved from Naples to Rome on the liberation of the capital, has now moved to the forward operational area in Northern Italy, and is transmitting telegrams direct to Cable and Wireless, Ltd.'s central telegraph station in London.

"Attention! Aux Six Tops"

A booklet has just been sent to the BBC from Monsieur **J. Pailhiez**, of Rennes, France. The title is 'Ici Londres', which the author interprets as 'This is London Calling', preface to all BBC French transmission.

'Ici Londres' teaches French readers to understand English heard over the radio. M. Pailhiez writes that the booklet was devised and carried out under the German occupation. All he had to help him were the memory of three months spent in London twelve years ago, a pocket dictionary and regular listening to the BBC. He chooses two Home Service programmes as especially good for students of English; 'The Daily Dozen' because it teaches the names of the parts of the human body and verbs of movement, and the morning religious service, easily followed by any Christian.

Monsieur Pailhiez tells his listeners about BBC service in French and in English directed to France and also about the Home Service and GFP as well as the BBC's AEF programme broadcast for Allied Forces on the Continent. He translates all customary phrases used in programmes, such as 'Attention! Aux six tops'. the French for the preface to the Greenwich time signal, 'Stand by for the six pips'.

The author could not get English books during the occupation and begs to be sent some, which will enable "my further books to be better". He concludes with, "I offer you my most sincere congratulations on your excellent work during the war. More power to the BBC's elbow in helping us to make a solid Franco-British *entente*, the certain guarantee of a durable peace".

Broadcasts To Schools

Some school broadcasts were given during the Easter holidays. These broadcasts offered pupils an opportunity of keeping abreast of current affairs at a period in world history when events were moving more rapidly than ever before.

The new term for school broadcasts started on Monday, April 23rd, when the various series began last autumn were continued.

Interior of the wireless room on the cable ship Mirror, owned and operated by Cable and Wireless, Ltd., which has been on constant active duty in the C S Mediterranean since the Allied landings in North Africa. This room has direct radio press transmissions to London.

The talks for elementary schools include the final term of an interesting series on 'Music and the Dance' on Wednesdays, in which the influence of dance rhythms and forms on music will be discussed.

In the Senior History broadcasts on Tuesdays, stories will be told of three men of different generations who have served Africa. They are **Wilberforce**, **Livingstone** and **Albert Schweitzer**, whose 70th birthday was celebrated not long ago. Other stories of men remembered by their work for the British Empire include **Sir Stamford Raffles**, **Sir James Brooke** and **Sir Ronald Ross**. Biographies of Chaucer and Charles Dickens will be heard in the Senior English series on Tuesdays, as well as dramatic readings from 'The Lawyer of Springfield' by **Ronald Gow**. **Shakespeare**'s 'Henry V' and three programmes on **Dickens**' 'Barnaby Rudge'

For Secondary Schools

In the series for secondary schools there will be six talks on Fridays about mathematics by **W. W. Sawyer**, mathematical lecturer, Leicester Technical College, followed later in the term by talks on **Samuel Butler's** 'Erewhon' and "The Way of All Flesh, 'Shakespeare's 'Antony and Cleopatra, **Dryden**'s 'All for Love' and **Shaw**'s 'Caesar and Cleopatra'.

In the Fourth Form features on Tuesdays the making of a documentary film will be described, and there will be an imaginary interview with Emma Cons, founder of the Old Vic. Other broadcasts are to be given by **James Stephens**, the poet, and **Edith Evans**, the actress, on their work, and there will be productions of parts of 'Henry IV' and a medieval play.

Although it's not yet possible to return to the full pre-war issues of special pamphlets, leaflets with notes for the class teacher are available for many of them, and these can be obtained by interested schools, together with the schedule from the Secretary, Central Council for School Broadcasting, 55, Portland Place, London, W1.

Services Educational Broadcasts

The BBC has been invited by the three fighting Services to contribute to their educational schemes during the demobilisation period, and has undertaken to broadcast 18 programmes a week for this special audience.

These programmes, which will be in the daytime, will be about 20 minutes in length, and will start shortly after the end of hostilities in Europe. They will deal with a wide range of subjects – literature and music, current affairs and industry, history and geography, citizenship and science – and will employ a variety of production techniques, the discussion, the talk, dramatisations, concerts, interviews and readings.

The broadcasts will supplement the work of the Service instructors in the classroom, and an inter-Services committee will advise the BBC in the planning of them. They will be heard by men and women in the Forces awaiting demobilisation both in this country and in occupied territory.

The Harbour Called Mulberry

On March 5th 'The Harbour Called Mulberry' was broadcast as the 'starred' programme of the week, and on April 7th in the afternoon it was repeated in the Home Service.

Using a 'walkie-talkie', an American patrol sends back a report as it moves cautiously into Cologne.

After going off the air when the Germans advanced into Luxembourg, this station was dismantled, but started operating again at the end of last December. The illustration shows a radio engineer making a final connection to one of the high-power valves.

The story of the planning and construction of the prefabricated Mulberry harbour was released piecemeal by various authorities concerned with the operation, and it was left to the BBC's Features Department to tell the world the first comprehensive story of this magnificent achievement.

The programme, which bids fair to become a radio classic, received almost unanimous praise both from radio critics and listeners, and even though the broadcast began at the comparatively late hour of 9.30 p.m., and lasted for 90 minutes, B.B.C. listener research figures showed that a very high percentage of listeners heard it.

Both script and production were the work of **Cecil McGivern**, a Newcastle man who has been responsible for many outstanding broadcast features, amongst them 'Fighter Pilot', 'Bombers Over Berlin', 'Junction X' (the story of British railways at war), and the last three Christmas programmes – 'Absent Friends', 'The Fourth Christmas', and in conjunction with **Laurence Gilliam**, 'The Journey Home'.

Mine-sweeping by Radio

A radio-operated device, which detonates mines 20 miles distant by dialling a combination of numbers, as on a telephone, was one of a number of secret weapons, details of which have just been released. It can be used against either land or sea mines.

A selection of what was happening between 1940-1949 in the Amateur Radio hobby – how much do you remember?

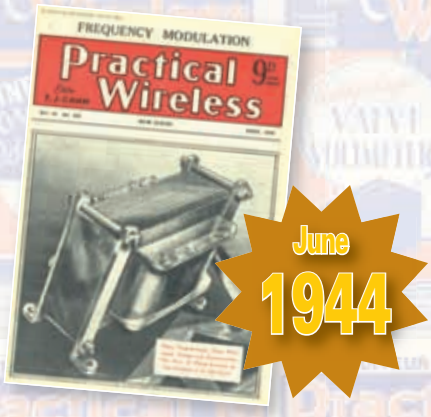
News, Views and Memories from 1940-1949

Radio Work at Borstal

Forty girls in a Borstal Institution have been assembling radio power units for tanks for a Ministry of Supply contractor. A shop in the institution has been fitted up and work is supplied by a local factory. The girls are between 16 and 23 years of age and the factory management says that their work is as good as that done in their own factory.

Borstal girls completing work on built-up chassis of radio power units.

The French Merchant Navy



Little has been said about the Free French Merchant Navy. General de Gaulle has placed at the disposal of the United Nations a considerable tonnage of the merchant fleet who were able to escape from Vichy France.

The French Merchant Navy has been doing great work in helping Britain in their Mediterranean and African campaign. Ships from the Middle East and from French Colonies have been transporting valuable cargoes and were even in active warfare against Italian warships in Africa. At present they are doing convoy work in the Atlantic. During all this work the wireless operators are doing twenty-four hours uninterrupted service.

Wireless operators in the French Merchant Navy listening to distress signals.

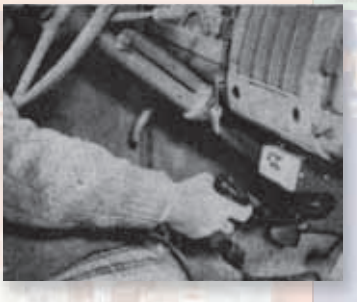
August 1946

Mobile Telephone Service

Any motor vehicle driver, whether parked, speeding over a highway or caught in a traffic jam, may now reach for his vehicular radiophone, ask for anyone of America's 27,000,000 odd phones by number and get it in a few seconds. St. Louis is the first American city to receive such a service. The accompanying illustrations show a view of the handy slide-out type telephone set used in connection with mobile radiotelephone equipment. The set fits under the dashboard of the motor vehicle, within easy reach of the front seat occupants.

To operate the mobile radiotelephone, the customer (1) dials 'Long Distance' and asks to be connected with the mobile service operator to whom he gives the telephone number of the vehicle he wants to call. The operator sends out a signal from the radio control terminal (2), which causes a lamp to light and a bell to ring in the mobile unit (3). Occupant answers his telephone, his voice travelling by radio the nearest receiver (4) and thence by telephone wire.

To place a call from a vehicle, the occupant merely lifts his telephone and presses a 'talk' button. This sends out a radio signal, which is picked up by the nearest receiver and transmitted by telephone wire to the operator.



Mobile Radio Telephone Service and diagram of the method of working.

October 1941

Mr Winston Churchill recently paid a visit to Scotland where he inspected troops and equipment. He is seen watching two soldiers using a portable transmitting and receiving set.

May 1943

Anti-jamming Device!

A radio dealer in Holland has been doing a roaring trade with a device to conteract jamming. Impudently, in view of Gestapo watchfulness he advertised that he could " make any receiver selective". And he made the meaning of his offer plain by the slogan *If the din should be too loud, our experts can cut it out.*

May 1940

DX Reception

Much has been written from time to time about DX or long distance work and many listeners think that this is the most interesting part of radio. Although extensive logs may be compiled by listeners who only just hear the callsign and then immediately try to get another station, this is not real DX work and the test of efficiency of a station and the way in which it is handled is better judged by the constancy of reception and the time for which it may be received. For example, if you are able to tune in quickly one of the weaker American stations and hold it for an hour. However, in this issue we give some details of the latest methods of getting long range results and also give constructional data of a Home Service receiver built on Diversity Receiver lines. The principles involved may be adapted to a standard receiver and may even be incorporated for all-wave receiver working.

October 1941

US Radio Lifeboats

The United States is equipping all its Coastguard lifeboats with two-way short-wave radio systems capable of accurate communication to distances up to 25 miles. Thus these crafts will be able to keep in constant touch with cutters, aeroplanes, and shore stations in co-operating in rescue work at sea.

The land station transmitters are rated at 50W output, while the lifeboat transmitters have an output of only 15W. A standard Coastguard loudspeaker is located on both shore station and lifeboats.

June 1944

Radio Pirates

According to a recent official report, Scotland appears to have more wireless 'pirates' than England and Wales. It is believed that about one in every six receivers north of the border is unlicensed. Free libraries and free wireless eh?

October 1940

Wavelength Changes

Short wave listeners should make a note of the following wavelength changes announced by All-India Radio.

Morning transmissions from the Bombay, Calcutta, Delhi and Madras stations have been transferred from the 31 to the 41 metre band. This has been carried out primarily for the benefit of listeners within a 300-mile radius.

March 1941

Women Radio Operators Wanted

The further expansion of the Air Force planned for this year brings the opportunity to thousands of girls of all ages to join the WAAF. One of the most interesting jobs is radio operator, open to the responsible type of young woman, aged 18 to 35.

Here are some of the other trades for which recruits are wanted. The age limits are all 18 to 43:

Morse Slip Readers (Touch typists only);
Teleprinter Operators;
Mess and Kitchen Staff;
Clerks, General Duties;
Equipment Assistant.

Application should be made to the nearest Area Headquarters of the WAAF - there is one in London, Bristol, Birmingham, Sheffield., Manchester, Newcastle –on-Tyne, Cardiff, Glasgow and Belfast.

June 1945

Colour Television Sets!

According to Mr J L Baird, a combined sound and television set for the home with colour television and stereoscopic effect, is likely to be produced after the war for about fifty pounds. Mr Baird was also of the opinion that with mass production the price of a black and white receiver set may well become much less – possibly in the neighbourhood of fifteen pounds.

January 1940

Radio Sales in USA

The year-end sum of radio sets sold during 1939 is expected to total 9,000,000, a high spot for the industry. Receiver sales are stated to be currently running about 26 percent of 1938, when the total was 7,100,000. the radio sales for 1939 bring the number of sets in use by American listeners to a total of 45,200, 000 as 1940 opens, taking into consideration that half of the sales made in 1939 were replacements.

It is also announced that in conjunction with the increased sales there is also increased quality. The dollar volume of all sets sold in 1939 is running at 30 to 35 per cent ahead of 1938.

Please Note: Reprinted Advertisements in this supplement each month.

As the person responsible for the advertising in *PW*, I've been surprised by the number of readers who have called me and others in the office asking about products and advertisers in this section of the magazine. We've heard from people wanting to know how they can reach companies they've seen here, where they can get the products being advertised and so on and they've been very disappointed by our response. It might seem obvious to most of you but the past few months have shown us that not everyone has realised that this is the historic section – the place where we look back at the history of *PW*.

Everything printed here is from the past, articles ***and*** advertisements. We've reprinted some of the more evocative advertisements simply to bring you a flavour of the various decades and they are not current – the products are no longer available and, in some cases, the companies have ceased trading. So please, just read and enjoy them but do not try to buy from them. **Roger Hall G4TNT**

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Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

Valves

VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ. Tel: 01484 654650/649380/650725. Mobile:- 07733 283084. E-mail: wilsonv@zoo.co.uk Visa etc. Fast & personal service.

VALVES AND ALLIED COMPONENTS IN STOCK Ring for free list. Valves/ books/ magazines wanted. Geoff Davies (Radio). Tel: 01788 574774.

TOP PRICES PAID

for all your valves, tubes, semi-conductors and ICs.

Langrex Supplies Ltd.
Unit 4, Daux Road, Billingshurst, W. Sussex RH14 9SJ
TEL: 01403 785600. FAX: 01403 785656.

Repairs

REPAIRS TO ALL AMATEUR AND VINTAGE Rx/Tx Cost effective service. Phone or call in for details. Medway Aerials, Rear of 14 Luton Road, Chatham, Kent ME4 5AA. Tel: 01634 845073.

Aerials

GAREX ELECTRONICS VHF/UHF accessories and aerials, PMR equipment and spares. www.garex.co.uk Tel: 0771 4198 374 PO Box 52, Exeter EX4 5FD.

QSL Cards

FULL COLOUR QSL CARDS for all your QSL needs. Shirts and caps with callsigns and also ham cartoons by GW3COI. For free samples contact Chris M0DOL. E-mail: qslers@aol.com P.O. Box 184 Northampton NN3 9JH.

Wanted

OLD HALF INCH FERRITE RODS Must be half inch in diameter and be six inches long or more. Tel: Peter Tankard 0114 2316321.

For sale

Qtz x-tals 455kHz to 150MHz Std 10.106, 10.245, 10.7, 11.155MHz £1.00/unit. Callg 3.56, 7.030, 21.06, 28.06 £1.00/unit. 1.4MHz fltrs £14.00. 10.7MHz 10kHz fltrs £3.25 P&P £1.00 + VAT. IQ Electo 0208 391 0545. vincent@jakomin.fsnet.co.uk

Classified Advertisment Dept.
PW Publishing Ltd., Arrowsmith Court,
Station Approach, Broadstone,
Dorset BH18 8PW

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The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7820, Fax: 0870 224 7850.

Please insert this advertisement in the ..... **issue of *Practical Wireless*** (if you do not specify an issue we will insert it in the next available issue of *PW*) for ..... insertion/s. I enclose Cheque/P.O. for £.....(42p per word, 12 minimum, please add 17.5% VAT to total).

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Bargain Basement

SEND YOUR ADVERT TO:-
***PRACTICAL WIRELESS*, BARGAIN BASEMENT, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW**

For your advert in Bargain Basement please remember to include your dated, coloured corner flash from this page along with your entry.

Bargain Basement rules - £4 per advert

Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of **30 words**, plus **12 words f**or your contact details on the form provided and send -it together with the dated corner flash and your **payment of £4 (subscribers** can place their advert **free of charge** as long as they provide their **subs number and corner flash),** cheques should be made payable to **PW Publishing Ltd.**, credit card payments also accepted.

Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert to **peter@pwpublishing.ltd.uk** (If you don't want to include your credit card details on your E-mail, just 'phone us on **0870 224 7820**.

Please help us to help you by preparing your advert carefully. Any advert which contains **??** marks indicates that the advertiseing dept. could not read/interpret the wording.

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You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

For sale

ALINCO DR-599E mobile transceiver with remote control kit. VHF/UHF 2m/45W 70cm/35W. Microphone, manual, boxed, good condition, £100. Tel: Adrian 01584 872618 (Ludlow).

COMPLETE YOUR COLLECTION of radio magazines. First volumes of *Practical Wireless* and *Modern Wireless*. Very early *Wireless World, Popular Wireless, Short Wave Magazine, Radcom, Ham Radio Today* and much, much more. E-mail or SAE for huge list. Tel: Simon M5POO QTHR 07860 892222. E-mail: simon@nomis.co.uk

ELECTRONIC MORSE KEYER PIC programmed for 5-35w.p.m. For practice or transmit. With automatic switch-off. Easy build, details provided, needing very few extra components, £10. E-mail: chick@chickene.freeserve.co.uk

FOR SALE DUE TO ILL HEALTH Icom 775DSP. Excellent condition, boxed, manual, £975. Kenwood TS-450 ATU. Boxed, manual, £365. All plus carriage. Tel G7IAY: (01223) 242646 (Cambridge)

ICOM IC-R2 hand-held scanner/receiver. Frequency 0.495-1310MHz. FM/AM and WFM with 450 memory. Mint condition, as new, boxed, manual, £60 + postage. Tel: 01584 872618 (Ludlow, Shropshire).

ICOM IC-7400 with SM-20 desktop microphone and SP-21 external speaker. All in mint condition. Buyer collects, £900. Cash only. Tel: Paul 01422 370665 (West Yorkshire).

ICOM R8500 RECEIVER. Timewave DSP-9+ Vectronics active antenna. All first class condition with manuals. Also PC disc for 8500. Bargain for £600 or may part exchange for radio gear. Tel: (01902) 672539 0r 07944 705667 (Bilston)

KENWOOD Transceiver model TS950S Digital. 100 watts, full filters. Dual Receiver. Mike, Morse key and Inst. Manual, £625. Buyer collects or pays post. Tel: 01745 560613 (Prestatyn).

MARCONI INSTRUMENTS signal generators VHF FM/AM, 1.5-220MHz, £38. FM deviation meter, £25. Audio 20Hz-200kHz, £40. True RMS meter 10mV-300V, £28. Audio distortion analyser, £50. 3.5in small oscilloscope, £35. RCL bridge, £25. Tel: 01234 354767 (Bedford).

MFJ-971 ATU tunes all HF. Fitted cross needle SWR meter and will tune any aerial. Ideal for portable or fixed station. Boxed with manual, as new, £60. Tel: G4AQZ QTHR 01255 429117 (Clacton-on-Sea).

MFJ-1020B active antenna, (whip needs soldering. Some wear on dials). Panasonic antenna coupler (RD-9820), Realistic SW amplified antenna, all 3 for £55 plus postage. Tel: Lionel 01795 538599 before 9pm. (Faversham).

MYDEL MP-925 PSU 25/30 Amp. As new, boxed, £70 plus carriage. Tel: 01745 570538 (North Wales).

PALSTAR R-30CC £300. Lowe HF-150, £125. Both VGC. Sony ST-2950F tuner and Leak Delta 30 Amp. Two sound worthy veterans, £50 the pair. Buyer collects or pays carriage. Tel: Norman 01202 747223.

R1155 RECEIVER. No PSU. Condition - it is 60 years old, £20. Buyer collects or pays post. Tel: 01745 560613 (Presatyn).

SGC SG-230 SMARTUNER Excellent condition. Including installation and operations manual, £150. Tel: Paul M1DBX 01283 226700 (Ashby, Leicestershire).

SHACK CLEAR OUT Yaesu FT-790R, £100. FT-290, £100. Plus amps test gear, etc. Buyer collects/pays carriage. Send SAE for list to 68 Cobden Terrace, Gateshead NE8 3TB. Tel: G7PJT 07913 334564.

TRIO KENWOOD 70cm multimode 25W with voice mobile bracket. Original box, manual, suitable for blind person, £335 + P&P. Tel: GW0PQI 01492 623672 (Conwy).

TS-480SAT £600. Hustler 6-BTV with tilt base, £250. Signalink USB interface, £60. Daiwa CN-101L SWR/power meter, £30. AKD HF wavemeter, £20. All in excellent condition. Tcvr, Hustler and Signalink only 2-3 months old. Carriage on all items to be mutually agreed. Tel: 01935 422973. E-mail: merv.al@virgin.net M.A. Tindal, 14 Higher Bullen, Barwick, Yeovil BA22 9TZ.

WATTMETER Bird Thruline model 43P + 2 elements. Perfect unmarked condition, £100 o.n.o. Two HF-2V Butternut 80/40m verticals. Little use from new, £50 each or £80 for both, plus unique phasing unit for free if you have both. Tel: Bernie 01932 847019 (Weybridge).

YAESU FT-736R 6m/2m/70cm base station. Mint condition, boxed. Manual, buyer collects, £725 o.n.o. ADG AT-100PRO ATU 160-6m brand new still boxed, £140 o.n.o. Tel: 01384 256826 or 07976 370840 (Dudley, West Midlands).

6JB6 PA VALVES No.5. I have 18 of these at £20 each. They are £40 new. Used in Drake T4X and TR3, TR4 rigs. Prefer collect or deliver. Tel: Colin (01634) 250427 (north Kent, Medway).

Wanted

FT-101ZD MAINS LEAD or the small six pin Jones type plug that goes into mains socket. Tel: Ross 01726 891320 (Cornwall).

KW 103 SWR METER and **KW TRAP DIPOLE TRAPS** in good working order. Tel: (01343) 835635 (Burghead).

MFJ-219B UHF antenna analyser. Tune 420 to 450MHz. Tel: Baz G4KCD 0794 636 9256 (Marlow, Bucks).

OLD HALF INCH FERRITE RODS must be half inch in diameter and be six inches long or more. Will pay very good money for the rods. Tel: Peter Tankard 0114 2316321 between 9am and 10pm (Sheffield).

Please mention Practical Wireless *when replying to advertisments*

bargain basement order form

Please insert this advertisement in the next available issue of *Practical Wireless*.

❑ **For Sale** ❑ **Wanted** ❑ **Exchange**

PLEASE NOTE: as a security measure, you must include your house number and postcode.

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Address .....

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..... Post code .....

Telephone Number .....

CARD NUMBER

Signature..... Security number
last three digits on the back of the card

Switch issue number (if on card) .....

Start date of card ..... Expiry date of card.....

My Subs Number is.....(or mailer label) .....

please write in block capitals

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Please only write in the contact details you wish to be published with your advert, ie. do you want your name & address, or just your telephone number?

Your advert, you decide! PLEASE - No FAXed Ads!

			(12)

B.B. July '07

TRADER'S TABLE

The equipment for sale on this page is secondhand or ex-demonstration

Disclaimer

Advertisements from traders for *equipment that is illegal to possess, use or which cannot be licensed in the U.K, will not be accepted. While the publishers will give whatever assistance they can to readers or buyers having complaints, under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.*

SHORTWAVE SHOP LTD

01202 490099

TRANCEIVERS

ICOM IC736 HF/6..... £550
ICOM IC703..... £350
ICOM IC706 MkII..... £525
YAESU FT990..... £845
ICOM IC F22 x2 (PMR)..... £225
NAVICO AMR1000 145MHZ..... £50
AKD 2001..... £60
KENWOOD TS870 + ATU..... £949
YAESU FT690R..... £125

RECEIVERS

BEARCAT 278 BASE..... £95
BPL CELESTE WORLD SPACE..... POA
KENWOOD R5000..... £395
SONY SW11..... £20
BEARCAT 278 BASE EX DEM..... £139
AMI DIGI SAT RX ASR WS201..... £129
SANGEAN AT818..... £85
HITACHI WORLD SPACE..... £55
YAESU VR120D..... £120
LOWES HF 125..... £125
GRE PSR 225..... 249
RADIO SHACK PRO28..... £55
ICOM 8500..... £695
AOR EM8200 MEMORY..... £35
RADIO SHACK PRO 63..... £75
TEN TEC RX350..... £495
REALISTIC DX395..... £125
ALINCO DJX3..... £70

ACCESSORIES

NISSIE BASE MIC YAESU/KENWOOD..... £55
ICOM SM6 BASE MIC..... £49
TOKYO HL50B AMP..... £180
ERA MULTIREADER..... £45
TOKYO HL66V AMP..... £45
PALSTAR AA30 ACTIVE ANT..... £45
DATONG SPEECH PROC..... POA
GLOBAL AT200 ATU..... £49
GLOBAL AT1000 ATU..... £60
KENWOOD FAST CHARGER BC15A(78)..... £40
STARMASTER KEYER..... £85
TONO MR1300E..... £60
HARRIER CB..... £35
KPC-2 TNC..... £85
PACCOMM TINY-2..... £85
HARRIER CB..... £35
GARMIN GPS 48..... POA
TNC 320..... POA
MFJ 432 VOICE KEYER..... £175
MFJ 1020C ACTIVE ANT..... £69
KENWOOD MB11 MOUNT..... POA
FRV 7700..... £20

For latest list please see www.shortwave.co.uk

NEVADA

023-9231 3090

Icom E7 2/70 Twin Band Handy Transceiver..... £125.00
Yaesu FT736R 2/6/70cms Base Transceiver..... £599.00
Alinco DJX3 All Mode Scanning Receiver..... £75.00
AOR AR8200 Mk 3 Wide Band All Mode Handheld Scanning Receiver..... £279.00
Bearcat UBC120XLT 100m Handheld Scanning Receiver..... £79.00
Bearcat UBC180XLT Handheld Scanning Receiver..... £109.00
Bearcat UBC3300XLT Handheld Scanning Receiver with PC Lead..... £159.00
Bearcat UBC860XLT Scanner..... £99.00
Bearcat UBC30XLT Scanner..... £39.95
Icom R10 All Mode Scanning Receiver..... £179.00
Icom R2 Compact Handheld Scanner c/w case (0.5-1300Mhz)..... £89.95
Icom R5 Compact AM/FM/WFM Handheld Scanning Receiver..... £99.00
AOR 7030+ Receiver c/w NB, Filter Board & Remote Control..... £699.00
Eton E1 Shortwave Receiver..... £325.00
Icom 7400 100w HF/2/6m Base Transceiver with DSP/ATU..... £899.00
Yaesu FT1000MP Field 100W HF Base with ATU/Psu & DSP..... £949.00
Midland 98+ Mobile CB Transceiver..... £69.00
Zetagi M27 Antenna Matcher..... £20.00
Bencher Keyer Bencher Paddle Keyer..... £59.95
Adonis AM-601 Desk Microphone (Wired 8-pin Yaesu)..... £47.00
Icom AT160 Coaxial Auto ATU..... £179.00
Kenwood PS30m 20amp Power Supply..... £110.00
MFJ 784 DSP Filter..... £129.00
MFJ 9406 6m SSB Transceiver c/w microphone & manual..... £139.00
MMT144/28 10watt Transverter..... £89.00
Palstar PS04 2-4 Amp Power Supply..... £14.00
Timewave 59+ Digital Noise Filter..... £159.95

Check our web site for latest items available.

E&OE. Prices quoted are in pounds sterling and exclude carriage

WATERS & STANTON

01702 206835

Icom IC-821H2m, 70cm All Mode Base Transceiver 45/40W 12V..... £499.00
Alinco DJ-190T 2m FM H/held Transceiver + CTCSS..... £99.00
Kantronics KAM plus Multimode Dual Port Data Controller + Pactor..... £149.00
GRE PSR-282 66-512MHz (with gaps) AM,FM Hand Held Receiver 200ch..... £69.00
Kantronics KAM Multimode Data TNC..... £99.00
Icom IC-821H2m, 70cm All Mode Base Transceiver 45/40W 12V..... £499.00
Alinco DJ-190T 2m FM H/held Transceiver + CTCSS..... £99.00
Kantronics KAM plus Multimode Dual Port Data Controller + Pactor..... £149.00
GRE PSR-282 66-512MHz (with gaps) AM,FM Hand Held Receiver 200ch..... £69.00
Kantronics KAM Multimode Data TNC..... £99.00
AKD 2001 2m FM Mobile Transceiver Channelised 25W..... £89.00
Optoelectronics Model 40 "Scout" 10MHz-1.4GHz Frequency Counter + Reactive Tune & 400ch..... £199.00
Palstar KH-6 6m FM H/Held with CTCSS, NiCd, Charger, DC lead..... £75.00
Sony ICF-SW07 Mini Receiver + FM stereo, SSB & "One Touch" tuning..... £169.00
Icom PS-85 13.8V 20A (max) Matching PSU..... £179.00
SEC 1212 13 8V Switch Mode Regulated 12A (max) PSU..... £45.00
Alinco DJ-496E 70cm FM H/Held Transceiver w th CTCSS, DTMF keypad, NiMH & charger..... £99.00
Alinco DJ-496E 70cm FM H/Held Transceiver w th CTCSS, DTMF keypad, NiMH & charger..... £99.00
Mirage RC-1 Linear Remote Control Unit for Power, Mode & Preamp with 25' of cable..... £29.00
Kantronics KAM-98 Multimode Digital Data Controller with Pactor, GTOR, AMTEXT & NMEA-0183 GPS..... £279.00
Icom SM-20 Deluxe Desk Mic 600ohm + Amplifier..... £99.00
Tokyo HX-240 HF Transverter 3.5-28MHz w th 2m IF 40W..... £139.00
Icom IC-2100H 2m FM Mob le Transceiver 55W 113ch. + CTCSS..... £149.00
SGC PortaPak Portable QRP Transceiver SSB,CW 25W 10 x D cells or 12V..... £599.00
Alinco DJ-X7 00kHz-1300MHz AM, FM, WFM Hand Held Receiver 1000Ch + 8.33kHz step..... £79.00
Alinco DJ-491T 70cm FM H/Held Transceiver 40ch. + DTMF keypad & CTCSS..... £115.00
Uniden UBC-68XLT 66-512MHz (with gaps) FM Receiver 80Ch. 4 x AA or 12V DC..... £59.00
Uniden UBC-105XLT 25-960MHz (with gaps) AM,FM Receiver + 8.33Mhz step 100Ch. 4 x AA or 9V DC..... £49.00
MFJ MFJ-484C Grandmaster CW Memory Keyer + 4 Random Access Memories..... £89.00
Kantronics KPC-3 Plus Single Port VHF/UHF Packet TNC + WEFAX..... £99.00
SSE PSU-101 Desk Stand with 2 x 12V DC outputs 240V AC..... £29.00
Matsui MR-4099 Portable World Band Receiver with FM stereo and SSB..... £59.00
Uniden UBC-3300XLT 25-1300MHz (with gaps) AM, FM, WFM 1000Ch. Alpha-tag + TrunkTrackerIII, CTCSS..... £99.00
Radio Shack Pro-97 25-1300MHz (w th gaps) AM,FM Hand Held Receiver + "SignalSta ker" 1000Ch.Alpha & PC input..... £75.00
Yaesu FT-290R II 2m All Mode Portable Transceiver 2 5W 12V or 9 x C cells..... £199.00
Realistic Pro-43 68-999MHz (with gaps) AM,FM Hand Held Receiver 200Ch..... £69.00
Optoelectronics Digital Scout 60MHz-2.6GHz Digital Frequency Counter + Field Strength, Reactive Tuning & 1000 Memories..... £259.00
AOR AS-5000 3 Way Antenna selector for AR-5000 Receivers..... £65.00
Steepletone MBR-2000 Portable FM Stereo,MW & SW Radio 20ch..... £14.00
Realistic Pro-43 68-999MHz (with gaps) AM,FM Hand Held Receiver 200Ch..... £69.00
Icom PS-85 13.8V 20A (max) Matching PSU..... £129.00
Oregon Scientific BA-312E Radio Controlled Clock with Temperature and Weather Forecast..... £19.00
Yaesu VR-120D 100kHz-1300MHz AM,FM,WFM Hand Held Receiver 640Ch..... £99.00
Icom SM-20 Deluxe Desk Mic 600ohm + Amplifier..... £99.00
Alinco DJ-X3 00kHz-1300MHz AM, FM, WFM H/Held Receiver 700Ch + 8.33kHz step..... £69.00
Yaesu VX-5R 6m,2m,70cm FM Hand Held Transceiver 5W, Full CTCSS & Wide RX (Used Condition)..... £99.00
Yaesu FT-290R II 2m All Mode Portable Transceiver 2 5W 12V or 9 x C cells..... £199.00
Yaesu FL-2025 2m clip-on 25W Linear (for FT-290R II)..... £99.00
Garmin eTrex-Summit Hand held 12Ch 500 Waypoints w th Barometric Sensor & Electronic Compass..... £109.00
Sony ICF-SW100E Pocket Shortwave Receiver w th FM stereo and SSB..... £99.00
Sony ICF-SW7600 Portable Shortwave Receiver with FM stereo and SSB..... £89.00
Fujikon NC-4 Foldable Noise Canceling Headphones with 3.5mm jack plug..... £17.00
Garmin GPS-II plus 12Ch. 500 Waypoints,BackTrack..... £79.00
Hora C-408 70cm FM Micro Transceiver via 2 x AA batteries (not supplied)..... £39.00
Icom IC-R10 500kHz-1300MHz All Mode Hand Held Receiver 000Ch. + RS-232..... £149.00
Hora C-150 2m FM H/Held with DTMF keypad & Battery box..... £55.00
Yaesu FT-2800M 2m FM Mobile Transceiver 65W + CTCSS & DTMF mic..... £99.00
Icom IC-2000H 2m FM Mob le Transceiver 50W, 10W + Alphanumeric Memories..... £119.00
Garmin eTrex Hand held 12Ch.GPS with 500 Waypoints 2 x AA cell (not supp ied)..... £59.00
Kenwood AT-50 1.8-30MHz 100W Matching Automatic ATU..... £219.00
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Rob's chance to air his views!

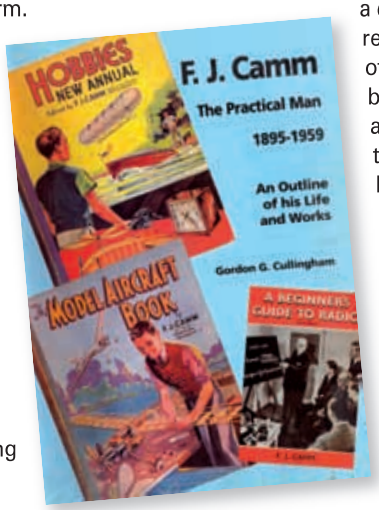
Topical Talk

This month, Rob Mannion G3XFD discusses *PW* reprints and ideas for a possible new title and contests on the h.f. bands.

FJ Camm 1895-1959

The letter from **Mike Stowe** (Letters pages this month) asking about the progress of some planned reprint projects from *PW*, provided the opportunity to update my friend on the progress of a booklet he was particularly interested in obtaining. It also set me thinking about a project we've had in mind for several years and our plans (and indeed the decisions required) now really needs help from our readers.

In the past, we have often re-published articles from *PW* into booklet form. Traditionally, the reprints have always been exceptionally popular and indeed, the 'classic' reprint *Passport To Amateur Radio series* by **John Thornton-Lawrence** was so useful I used it as a textbook at a school radio club I helped to organise.



However, the project in mind this time is not based on our own articles. Instead, it's the privately published booklet *F.J Camm The Practical Man*, featuring our pioneering founding Editor, which was produced by the late **Gordon Cullingham**. Up until the time of his death, Gordon would regularly keep me updated on the number of the booklets he was producing for our readers.

Gordon was a keen local archivist and historian based in Richmond on Thames near London. When he originally set about recording the life of 'local hero' Fred Camm, he had no idea *PW* was still being published. Eventually, we made contact and he supplied me with a copy, which then duly made the rounds of radio clubs I visited on behalf of *PW*. My copy of the book was provided with a library style pocket carrying slips Gordon Cullingham's address, purchase price and the like.

There was much interest in the book and occasionally it would go missing after a club visit. It would be returned weeks later, often accompanied by an anonymous apology announcing that the 'borrower' had purchased a copy! There's still much interest in the book nowadays and second-hand copies can often obtained on the various Internet auction sites at (sometimes) inflated prices.

My last copy disappeared completely, several years ago, after a club visit. It was only due to the kind donation of a replacement copy from **Gordon Hunter GM3ULP**, from the **Strathclyde Fire & Rescue Amateur Radio Club** in Scotland, that I will be again (carefully) sharing it at club meetings. He heard – during the talk to his club – of my loss and decided to help (thank you Gordon!).

If there's enough interest we could arrange to re-publish the book with the agreement of the local historical society who originated the project. However, such an initiative needs to be on a firm financial footing so I'm inviting readers to write or to E-mail me their comments and names and addresses if they are interested. Please mark your postcards (postcards only please) as **Fred Camm Book** or use the term **Fred Camm book** on the subject line of any E-mail. Thank you, your feedback will be most helpful.

Contests on 7MHz

Gerald Stancey G3MCK has been brave enough to offer his opinions regarding contest operating on the 7MHz band in the letters pages this month. With his understanding of the situation – judging by his concluding words – Gerald is expecting some strongly worded comments from contest supporters! Indeed, to ensure that *PW* maintain its ethical stance the editorial team sincerely hopes that opinions reflecting all sides of the argument will appear in the letters pages. Let's hear your opinion please!

Rob Mannion G3XFD/EI5IW

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