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New Hockley D-Star Repeater GB7SS! **Rx 439.8625 Tx 433.2625**

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SUNDAY 25th MAY 2008
From 10am

FT-450 NEW YAESU

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

Also get voice recorder and announcer!

W&S £529 D

Deal: *Get FREE Extra DC Lead!* Exclusive to PW Readers - Request when ordering

FT-450AT with Built-In ATU **£609 C**

FT-950 NEW YAESU

100W
160 - 6m

W&S £999 D

DSP filtering, incorporating features such as Variable Bandwidth, IF Shift, and Passband Contour tuning. Digital Noise Reduction and Digital Auto-Notch Filtering. On transmit you get a three-band graphic equaliser and the ability to change the transmit SSB pass-band. There are plenty of other features which you will get from the Internet. What you won't get elsewhere is our offer to PW readers!

Deal: *Get FREE W-25XM power supply worth £99 when you buy FT-950 from W&S. Offer to PW readers only at time of order.*

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NEW Icom IC-7700 HF Transceiver

• 1.8 - 54MHz up to 200W PEP • SSB CW FM AM

Exclusive - get FREE IC-7000kbd with matching lead for instant RTTY/PSK31

In Stock!

Icom have produced a realistically priced transceiver based on the IC-7800 technology. Dual DSP units form the heart of the design, and the front end receiver section boasts 40dBm intercept point - matching the IC-7800 at twice" the price! With the built-in tuneable preselector, you have an amazing front end. The 7" colour LCD panel is truly amazing in clarity. A multi-function spectrum scope allows close in rx signal monitoring or band monitoring. Another first: built-in PSK31 and RTTY. Just add a USB keyboard - no PC needed. Other features include IF notch, professional grade 6m rx, digital voice recorder, dual USB ports, auto atu etc.

£3995 C

Avair Power Meters

AV-201

Ideal for HF and VHF operation. It features high power handling up to 1kW.
** 1.8-160MHz * 5W, 20W, 200W, 1kW * Av or PEP*

£49.95 C

AV-400 **£49.95 C**
140 - 525MHz, 5W, 20W, 200W, 400W

AV-601 **£69.95 C**
1.8 - 160MHz(S1), 140-525MHz(S2)

Get Ready For D-Star (first repeater at Herne Bay)

Log on to GB7WW repeater at Hockley

ICOM IC-E2820

This dual band mobile offers D-Star facilities with digital speech as well as normal FM at 50W

IC-E2820 Mobile FM **£379 C**
IC-E2820 with D-Star **£519 C**

PW customers can claim an extra DC lead when ordering!

IC-E91
Fitted with D-Star
£349.95 C

D-Star Repeater - Low cost subsidised Icom repeater available to clubs when purchasing D-Star Radios from us. Phone for details.

FT-2000 YAESU

1.8-30MHz +6m 100W

£1695 D

FT-2000D 200W
£2399 D

FT-897D YAESU

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

W&S £579 D

Deal: FREE DELIVERY

FT-857D YAESU

New Low Price!

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

W&S £449 D

FT-DX9000D YAESU

FT-DX9000D	**£7,299 D**
FT-DX9000CONTEST	**£3,799 D**
FT-DX9000MP	**£8,299 D**

FT-817ND YAESU

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

Deal: bhi DSP fitted **£449**

W&S £349 D

TM-V71E NEW KENWOOD

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

W&S £269 D

FTM-10R/E NEW YAESU

Bluetooth

W&S £249 D

New 2m/70cm Mobile with Bluetooth option
*50W 2m 40W 70cms
*Removeable front
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*Size: 11 x 3.7 x 17 cm

Deal: FTM-10E with Bluetooth Adaptor (BU-1), Headset (BH-1) & Charger (CAB-1) **Total List Price £382**
Offer Price £279.95 D

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

Billed as a Contest Radio, the design takes features from the IC-758 & IC-7800 to give you a transceiver packed with features. Available February.

W&S £3999

Deal: NC-4 Headphones **FREE**

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Deal: SP-120 Filter Spkr **FREE**

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DEAL! IC-E2820 + UT123 D-STAR MODULE FITTED ONLY £499.95!

ICOM

NC-2 & NC-4 NOISE CANCELLING HEADPHONES!

*32 Ohm Imped *Supply: 1x AAA *3.5mm Jack Plug *Lightweight

£24.95 C

*32 Ohm Imped *Supply: 1x AAA *3.5mm Jack Plug *Folding Design

£24.95 C

TS-2000

KENWOOD

*100W All-mode
*160m - 70cms
*Duplex operation
*Satellite ready
*DX cluster QSY

The TS-2000 offers all-band coverage in one very neat & effective high performance system. This is one of the best buys in ham radio. Add our W-25AM 13.8v supply (£89.95) and you are ready to go.

Deal: FREE Extra DC Lead (Quote advert when ordering)

W&S £1295 D

TS-2000X with 23cms £1599 C

TS-480SAT 100W HF+6m £679 D

IC-756PROIII

ICOM

HF + 6m 100W All-Mode

W&S £1749 D

IC-756PROIII Special Deal

IC-756 Pro III
+ SM-20 Desk Mic
+ NC-2 Noise cancelling 'phones
+ W-25AM power supply
+ Spare DC lead

Only £1829 D

IC-7000

ICOM

HF/VHF/UHF All-Mode Transceiver

W&S £899 D

Deal2: With TFT PAL TV Screen £989
Deal3: With TFT + Power-Mite PSU £1009

IC-7400

ICOM

HF - 70cms 100W transceiver plus SP-21 spkr and SM-20 mic £1295

IC-718 HF 100W transceiver £439

IC-706IIGDSP

ICOM

HF/VHF/UHF 100W Transceiver

Deal: IC-706 + New Power-Mite-NF FREE

W&S £649

IC-703DSP

ICOM

10W QRP HF-6m built-in Auto ATU + DSP

W&S £449.95 D

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Radiomate NEW

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

Rig not included!

* *Direct frequency entry*
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* *Carrier tune mode*
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* *Self-Powered*

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NES10-2 MkII

Speaker and programmable DSP unit. Offers dramatic noise reduction.

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

£124.95 C

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Noise Eliminating In-Line Module.

£139.95 C

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. WithKeyboard.

£99.95 C

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

£104.95 C

Icom VHF/UHF Mobile/Base

IC-E208

Dual Band FM Mobile *144-146MHz, 430-440MHz Tx *55/50W (3 pwr steps each band) *Wideband Rx 118-173, 230-549 & 810-999MHz £219.95 D

IC-910H £1089 D
2m/70cm 100W Base station all-modes Option for 23cm module (UX-910 £359)

IC-910HX £1239 D
As Above but with 23cm Module ready fitted and a big saving as well.

IC-2200H £179.95 D
2m 55W FM mobile with rugged construction and with digital option.

IC-2725E £279.95 D
2m/70cm radio. Easy to operate and install and a lovely detachable head.

Kenwood VHF/UHF Mobiles/Base

TM-271E

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

£149 D

TM-D710E *Low Price* £399 C
Dual band APRS 50W FM

Yaesu VHF/UHF Mobiles/Base

FT-7800E

*2m/70cm Dual Band Mobile *High power 50W 2m /40W 70cms *Wide receive inc. civil & military airband *CTCSS & DCS with direct keypad mic. *1000 memories £169 D

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

FT-8800E *Low Price!* £219 D
*2m/70cm Dualband FM Mobile transceiver

FT-8900R *Low Price!* £249 D
*2m/70cm/6m/10m Quadband FM Mobile

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-1 F for VX-110/150 / 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 & **ADMS-4B** for FT-857/8 ***BOTH*** **£29.95** both these items require a separate CT-62 lead at **£29.95**

IC-E92 NEW

ICOM

2m/70cm Handheld with Built-in DSTAR

* *144-146MHz / 430-440MHz*
* *FM FMN WFM AM (Rx) DV*
* *5W/2.5W/0.5W/0.1W*
* *1304 memories*
* *100 scan ranges*
* *Rx range 0.495kHz-999.9MHz*
* *CTCSS, DTCS, DTMF*

Includes antenna, and charger.

A fully fledged digital radio using D- Star aswell as traditional dualband.

W&S £319.95 C

Icom VHF/UHF Handhelds

IC-E91 D-Star Ready

Latest dual-band handheld transceiver. receiver that covers 0.495 to 999MHz. £239.95 C

IC-E91 with D-Star	£349.95 C
IC-V82 7W 2m Digital	£159.95 C
IC-U82 70cms Digital	£159.95 C
IC-E90 6m/2m/70cm	£199.95 C
IC-T3H 2m 5W	£129.95 C
IC-E7 2m/70cm Wide Rx	£169.95 C

Kenwood VHF/UHF Handhelds

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

VX-7R (Black)

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-120 2m 5W w/8-key pad	£99 C
VX-170 2m 5W w/16-key pad	£109 C

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

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< RADAR-RAMA
EXTERNAL 1090MHZ ANTENNA

These two antennas give you a choice of performance and out-perform anything similar. Both are fitted with "N" type connectors.

Radar-Rama £49.95 C
Radar Extender £79.95 C

RADAR-EXTENDER >
1090MHZ GAIN ANTENNA

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Includes Software, Receiver, Antenna & Leads.

Also available from AOR UK, Lam Communications, Transair (UK)Ltd, Radio World, The Aviation Shop, Pooleys Flight Equipment, ML& S

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Official Distributer UK's Lowest Prices

Power-Mite-NF

NOISE OFFSET POWER SUPPLY

NEW

22 Amps of continuous power output with variable voltage plus the new Noise Offset Function (NF). This allows you to move any noise spikes out of the ham band with the front panel tuning control.

W&S £59.95 C

W-25AM WATSON POWER SUPPLIES

25A Variable Power Supply. *Output Voltage 0-15V DC *Output Current 25A (30A Peak) *Over Current Protected *Dual Meters *3 sets of Terminals *Cigar socket *Front Panel Fuse *Supply 230V AC 50Hz

W&S £89.95 D

W-3A	Output 3A, 13.8V DC, supply 230V AC	£22.95 C
W-5A	Output 5A, 13.8V DC, supply 230V AC	£29.95 C
W-10AM	Output 10A, 0-15V DC, supply 230V AC	£59.95 D
W-25XM	Output 25A, 9.7-17V DC, Dual meters	£99.95 C
W-30AM	Output 30A, 0-15V DC, Dual meters	£119.95 D
W-25SM	Output 22A, 13.8V DC, supply 230V/115V AC	£79.95 C

DM-15W 15W DUMMY LOAD

Ideal for testing handhelds and lower powered transceivers. *Range DC-600Mhz *Power 15W (20W CW) *VSWR 1:1:1 *Connector PL-259 *50 Ohms Impedance *Size 34x72mm *Weight 76g

W&S £15.95 A

Power-Max-25-NF

NOISE OFFSET POWER SUPPLY

NEW

This very compact base station supply delivers 22 Amps of continuous power with the new Noise Offset Function (NF) that moves noise out of the band. Includes cigar socket.

W&S £89.95 C

Bargain Price Antennas

Pre-tuned & Weather Sealed Fibre-glass encapsulation

W-30	2m/70cms 3/6dB length 1.15m 150W SO-239	£29.95 C
W-50	2m/70cms 4.5/7.2dB length 1.8m 150W SO-239	£39.95 C
W-300	2m/70cms 6.5/9dB length 3/1m 150W SO-239	£49.95 D
W-2000	6m/2m/70cms 2.15/6.2/ 8.4dB length 2.5m 150W	£59.95 C

Mobile Whips Bargain Prices

Watson mobile antennas are made to a high specification and employ stainless steel whip sections with SO-239 receptors. All models are pre-tuned and will withstand at least 100 Watts RF.

Watson - the name you know!

W-2LE	2m 0dBv length 0.48m	£9.95 C
W-285	2m 3.4dBv length 1.33m	£12.95 C
W-77LS	2m/70cm 0/2.4dBv length 0.43m	£10.95 C
W-770HB	2m/70cm 3/5.5dBv length 1.1m	£16.95 C
W-7900	2m/70cm 5/7.5dBv length 1.58m	£24.95 C
W-627	6/2/70cm 2/4.5/7.2dBv length 1.6m	£27.95 C

QS-112 HANDHELD SPEAKER MIC

Handheld Spaeker Mic available in 4 different models. *PTT Side Button *Curly Cord *Electret Insert *High Quality Speaker *Compact & Lightweight.

W&S £16.95 A

WEP-601 HEADSET WITH BOOM MIC

Adjustable Headset with Boom Mic. *Heavy Duty *Swivel Boom *Earbud type Earpiece *PTT In-Line Switch *Choice of Connectors *32 Ohm Earpiece

W&S £19.95 A

SP-160 COMPACT MOBILE SPEAKER

*8 Ohms *Power rating 1.5W *3m of lead *Fitted 3.5mm mono jack plug *Adjustable mobile mount *Size 97x67x27mm * Weight 165g

W&S £9.95 A

SP-170 COMPACT MOBILE SPEAKER

*8 Ohms *Power rating 1.5W *Volume Control *Switchable Filter *3m of Lead *Fitted 3.5mm mono jack plug *Adjustable mobile mount

W&S £12.95 A

WD-24 / WD-25 DUPLEXERS

WD-24

WD-24 SO-239 Socket & 2x PL-259 Plugs. Port1: HF + 6m + 2m Port2: 70cm
WD-25 SO-239 Sockets Port1: HF + 6m + 2m Port2: 70cm

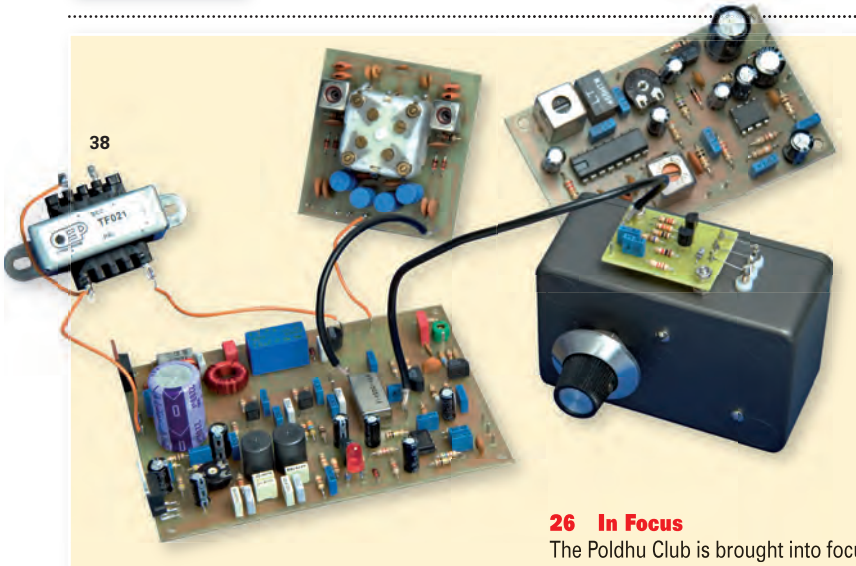
WD-24 £22.95 A
WD-25 £24.95 A

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

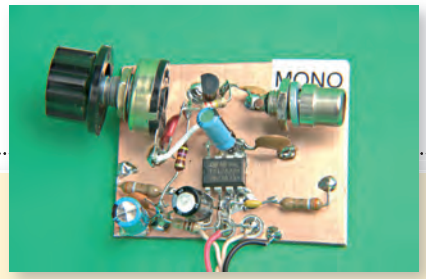
Practical Wireless May 2008

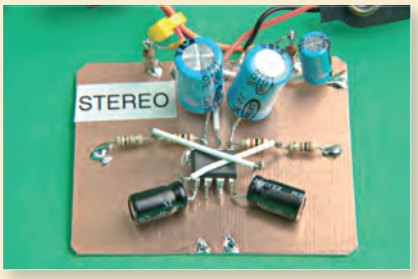
contents

Volume 84. Number 5. Issue 1213. On sale 10 April 2008



38





52

62

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Rob Mannion's

keylines

Rob discusses the advantages and disadvantages of computers.

Listening in on the Amateur bands leaves me in no doubt that the modern computer and the Internet are both a boon and a nuisance at the same time for Radio Amateurs. However, I don't need to listen to other Radio Amateurs to be aware that there are good and bad sides to the Internet and computers!

At this point I must acknowledge that *PW* could not be produced without our Apple Macintosh computers and the Internet. The 'Macs' are superb computers – absolutely ideal for journalists and writers like myself who treat them as though they were very special electronic typewriters (they're a writer's dream). Unlike my good friend and valued *PW* colleague **Tex Swann G1TEX** who enjoys working on computers and related systems, I just see the computer as a tool to help me do my work.

Without Tex's knowledge and expertise we would soon run into trouble producing the magazine. Friends and family have often referred to me as a 'Railway Anorak' and I'm sure Tex is the computer version of a 'dyed in the wool' railway enthusiast as he's so keen!

I'm mentioning computers this month because they effect every aspect of our job at *PW* and enable me – with my worsening typing skills – to carry on regardless of my physical problems, as corrections can be easily made on screen as I work. However, another aspect of computers in communications – the Internet – is rapidly beginning to cause problems for anyone working in publishing, even though at the same time it's providing essential links to our authors around the world!

Internet Publishing

Increasingly nowadays both Tex and I receive suggestions from readers that we should consider publishing something the readers have either seen on websites, or have published on the web themselves. We've even had keen Radio Amateurs – with their own websites – suggest that we go to their websites, help ourselves and publish the material in *PW!*

However, the problems also appear in the 'other direction' as some website publishers help themselves to material published elsewhere – including material from *PW* – without asking for permission to do so, although we are very approachable! Obviously, the unauthorised re-use of copyrighted material is an international offence and nowadays even the People's Republic of China (Communist China), a regime previously notorious for not recognising trademarks and other intellectual rights, now accepts the existence of intellectual copyright.

Although the Chinese Government has allowed copyright to be ignored in the past to allow vast commercial gain, I've come to the conclusion that most of the Amateur Radio websites who have 'helped themselves' to copyrighted material have done so quite innocently and in ignorance of the the incredibly complex copyright laws. In fact, the 'lifting' of other people's published work is often done in a misguided attempt to help other Amateurs.

Tex and I have discussed the various offers from website publishers (they are, of course, publishing!) and we've both come to the conclusion that the majority of people using the Internet to publish material don't actually realise **they are** publishing! In fact, I can back up my opinions from the many surprised reactions from website operators when they've realised that their offers of 'free use' of their own material in *PW* could compromise their 'intellectual rights' and cause further problems if another author's work is involved without that author's specific knowledge and agreement.

Writing For *PW*

When potential authors contact the *PW* offices I always send the latest Author's Guide (AG), which contains advice on copyright and how we can work together. The AG is regularly up-dated with advice and helpful hints for our authors, some of which has come as feedback from our authors.

One particular up-date I have just included in the AG is to remind authors that they must ensure that any information (text, circuits, charts, tables, photographs, maps, etc.) that could be the subject of a copyright claim is only used with the necessary permission to do so from the copyright holders.

It can be an extremely difficult process but as I strive to Edit *PW* in an ethical fashion, I'll always be very happy to discuss possible copyright problems with our authors. Don't forget – producing *PW* is a team effort and our authors are part of the team!

Rob Mannion G3XFD/EI5IW

Practical Wireless

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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.

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

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

Practical Wireless readers' letters

The Star Letter will receive a voucher worth £20 to spend on items from our Book Store.

Send your letters to:
Rob Mannion
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: pwletters@pwpublishing.ltd.uk

Voltmeter Advert In *PW*

Dear Rob
I was ferreting through some back copies of *PW* for some circuit information, when a page happened to fall open at November 2007, page 72, where I was amazed to see the voltmeter, (extreme left of page) for the princely sum of 8/6d, PLUS 2/6d for the case! I was given one of these by an aged uncle when I started work as an apprentice with Radio Rentals (too many years ago), but as the Avo 8 was the order of the day, I never used it.
Amazingly, the 1930s meter still works! So, if there are any bona fide Amateur Radio Museums out there who would like the meter for permanent display, can they get in touch? I haven't used it in the last 40 years, and I can't see me using it in the future either!
Keep up the good work at *PW*. Cheers and very best 73s .
Dave Shuttleworth M0PSY
Egerton
Bolton
Lancashire
theshutts@dc27.fsnet.co.uk

I'm sure there'll be a home for it somewhere Dave! Many such instruments survive – I've got one but I think the indicator needle has tried to wrap itself around the end stop when someone made a mistake using it! ***Rob G3XFD***.

Home-Brewing Transistors

Dear Rob
I hope this e-mail finds you in good health! Although there was a problem at this end with my January issue of *PW* – thanks to your colleagues all was sorted out very quickly. Please pass on my thanks. Missing an issue of *PW* here in South Africa is 'like having a tooth extracted!'

I have a few very old *PW*s as well as some *Short Wave Magazines,* which I enjoy re-reading from time to time. **Bob Harry G3NRT's** letter in the Letters column, *PW* January 2008, page 7, brought back a few old memories. So I dug out the old *SWM* copies. Lo and behold I managed to unearth the very articles to which he refers and I hope you can locate the original copies in your sister magazine's archives.
(All references are from *The Short Wave Magazine*).

Volume XII March 1954 page 10
Transmission with Transistors By J.M.Osbourne (includes a description of a QRP transmitter using homemade transistors.

Star Letter

Secret Band Police

Dear Rob
I have recently had a discussion with an agent of the secret band police! There was a c.w. contest on the other bands, so I found myself 'sitting' on 10.106MHz or thereabouts for about an hour, having the occasional pleasant conversation with old friends and new acquaintances in Europe and putting out an occasional "CQ call DE 2E1RAF", (as I often do). It's a Very pleasant afternoon occupation when it's too cold to go into the garden for any length of time!

I was then disturbed by a 599RST signal telling me to "QSY", although I paid no attention as it was not addressed to me. After another QSO into DL came the "QSY QRM", obviously from the same station but not addressed to anyone in particular. I then called "CQ DE 2E1RAF" and received "LISN QRM" – I then twigged that the 'band police' were on my case!

As instructed by the police officer I listened but heard nothing. I was operating on my dipole and I have an Elecraft K2 for c.w. (which is reckoned to be reasonably sensitive), so I opened up the filter to the widest position and listened again and heard nothing. I then sent 'QRZ DE 2E1RAF?

Back came "QSY QRM DX". I then identified myself again and politely sent QRZ? then came "QSY LID". I then asked "Your call? DE 2E1RAF." Back came, "NO", and "2E1RAF has no RX and is a LID". I then realised it was an officer from the The Secret Band Police! Finally I went away in disgust, but I listened and the secret policeman had gone away as well! So if the 'Gentleman' gets to read this – in whatever country he is in – I would appreciate the courtesy of a callsign and a discussion with him.

I ask you Rob G3XFD, who appoints these people and why do they operate to the detriment of others in this way? By calling out with an unidentified 'QSY' and 'QRM' and by engaging in gratuitous bad mannered comment, patently using high power, surely they create much more disturbance on a frequency than does my lowly 50W maximum signal and a low height dipole?

I know there is no cure for such behaviour but I tried to ignore it – I really tried (honest Guv!).
Roy Walker G0TAK/2E1RAF
Kendal
Cumbria

I have also heard the same bad mannered operating on 10MHz and I'm not sure what the motives are Roy! Please join me on the Topical Talk page on page 81, for further discussion. ***Rob G3XFD***.

Volume XII May 1954 page 163
Transistor Topics conducted by G3HMO

Volume XII August 1954 page 327
Transistor Topics conducted by G3HMO

Volume XII November 1954 page 499
Transistor Topics

Another interesting reference I came across is a book which describes the detail and making transistors from point contact diodes. It's entitled *Practical Transistors & Transistor Circuits* by J. S. Kendall published by Bernards Radio Manuals (No.128) UK price = 3/6d (SA price 4/9d – that takes me back a bit!!) I might even have a copy of the booklet Bob mentions. I'll keep an eye open for it next time I have a 'tidy-up'. But now for the Big Question! If you haven't got a supply of the good old OA79 or OA81s, etc., what are their modern equivalents? That is, are point contact diodes still being manufactured? At least, you could see the 'cat's whisker' and crystal on those old types! 73 from,
Dave Gemmell ZS6AAW
PO Box 77
Irene 0062
South Africa

Thanks Dave and we're all well here except that we had an incredibly cold early Easter! We are planning an article on making transistors and have the full SWM *archives to hand. However, I will ask our knowledgable readers to answer the question on point contact diodes, although* PW *reader* ***Jim Roberts*** *in North Yorkshire has a plentiful supply of galena (contact me for details on how to write to Jim) so that we can make our own contact diodes to try and replicate the experiments our grandfathers made with 'amplifying crystals'!* ***Rob G3XFD.***

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**

Alan Ford's Article

Dear Rob

A well reasoned article by **Alan Ford VK2 DRR** in *PW* April 2008. Unfortunately by the effect of QSB nature would foil any meaningful measurement even with a wonder device that could register micro, micro, micro amps. Indeed it was macro, macro, macro foolish – April Foolish!

Imagine all the phone wires, cables, fences and metal structures in (let's say Europe) happily absorbing power. Then the 'skip' shifts to the Mid-Atlantic with nothing metallic except the odd ship. How would the wonder device interpret this? Mass extinction of listeners?

Alan Ford is very plausible though! Perhaps he should consider exporting deep freezers to Antarctica or electric blankets to the Gobi Desert – possibly powered by solar panels! A very entertaining 'Tall Tale' – well told Alan! Thanks to everyone.
Bill Graham GM3GDS
Douglas
Lanarkshire, Scotland

Ridiculous Research!

Dear Rob

I think the Australia Research Report by **Alan Ford VK2DRR** on page 54 of the April *PW* is ridiculous!

How will the transmitting station be able to tell if a certain receiver is 'listening', or tuned to the station but switched off? Many radio receivers use a tuned circuit to ground in the antenna input stage. The actual current taken from the antennal will be negligibly small – whether the receiver is switched on or off, especially if the front end is made using f.e.t.s or valves. How will they tell the difference?

For instance, my bedside radio is permamently tuned to BBC Radio 4, as is my car radio. My FT-101B was last used on 7.050MHz and my IC-R70 on 7.100MHz precisely. Furthermore my TV was last tuned to BBC 1 and my cable TV digibox to the Discovery channel but I'm not using any of these at the moment.

PS, Yes, I know it's your April spoof, but I was tempted to reply in like vein!
Geoff Theasby G8BMI
Sheffield
South Yorkshire

Heaters 100% Efficient?

Dear Rob

It might be me but having read this article in the new issue of *Practical Wireless* and having 'thought about it, I'm at a loss to understand how a heater can be 100% efficient! From memory the most efficient heater ever marketed was the Main 121 Century gas heater which achieved an efficiency of about 27% due to its use of galvanised steel fins set into a sand cast heat exchanger. Nothing made before or since has got within about 5% of that figure simply because of the cost of making this type of heat exchanger. Even our ever-so-cuddly nuclear power stations fail to get any where near 100% efficient and that's before power line losses!

Then there's the way that **Alan Ford VK2DRR** tells us how they are testing the radiated energy from an antenna. Whilst it might be possible to get another number of people to switch their radios on at a set time and then switch them off at a set time, how do you get those people to switch them back on again at a random time when their radios are switched off (I'm still thinking about that one and it hurts!). I do remember an ecologically unsound voting method in, I think, the USA where members of the public were asked to flush their toilets as a way of casting their votes but am not sure if that idea is relevant to this idea or not? Aaar, hang on, this might be March 10th but isn't this the April issue?
Geoff Turner (an ever so 'umble M3FFT)
Mannigtree
Essex

Alan VK2DRR and the PW *team are delighted that so many readers enjoyed the Antipodean Spoof!* ***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.

Send all your rally info to

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

April 27th
Yeovil Amateur Radio Club 24th QRP Convention
George Davis. Tel: (01935) 425669
www.yeovil-arc.com
The Yeovil QRP Convention will be held in Sherbourne Arts Centre Association, Digby Hall, Hound Street, Sherborne DT9 3AA. Follow the white road signs to the town centre as Digby Hall adjoins the central shopping car park. Doors open at 10am. There will be trade stands, a Bring & Buy, catering and talk-in on S22.

May 4th
3rd Dambusters Hamfest
Tony Nightingale. Tel: (01507) 527835
E-mail: G3ZPU@hotmail.com
The third Dambusters Hamfest will be held at Thorpe Camp Museum, Nr Coningsby, Lincolnshire LN4 4PE (the 617 Dambusters Squadron base). Free pitches are available for traders and entry is £2 per person, which includes entry into the museum. There are no inside pitches but traders can bring their own tents, gazebos or marquees at no extra cost. Please book these in advance. The Naffi will be open for hot drinks and home made cakes. Doors open for visitors at 10.30am.

May 5th
Dartmoor Radio Rally
Peter. Tel: (01822) 860277
The 24th Dartmoor Radio Rally will be held at Tavistock College, Crowndale Road, Tavistock, Devon PL19 8DD. There will be trade stands, special interest groups, Bring & Buy, catering and free parking. Doors open at 10.30am (10.15am for disabled). Talk in on 145.550MHz.

May 16th – 18th
Dayton Hamvention
www.hamvention.org
The Dayton Hamvention will be held in the Hara Arena, Dayton, Ohio, USA. A three-day pass will cost $20 in advance or $25 on the door. Outside exhibits open at 8am each day and inside exhibits open at 9am. There will be a large RSGB bookstall.

May 18th
Magnum Radio Rally
Helen. Tel: 0777 638 5247
E-mail: Helen@magnumrally.org
www.magnumrally.org
The Magnum Radio Rally will be held in the Magnum Leisure Centre, Harbourside, Irvine,

Ayrshire KA12 8PP. There is plenty of free car parking and doors open at 10.30am. Entry fee is £3.50 and there will be trade stands, a Bring & Buy and special interest groups.

June 1st
Spalding Rally
Alan. Tel: 0776 777296
E-mail: rally-secretary@sdars.org.uk
www.sdars.org.uk
The Spalding Rally 2008 will be held at The Sir John Gleed Technology School, Halmer Gardens, Spalding, Lincs PE11 2EF. Doors open 10am. There will be a Fleamarket, free parking and plenty of catering.

June 8th
Elvaston Castle National Radio Rally
Ken Frankcom. Tel: (01332) 720976
www.elvastonrally.co.uk
The Elvaston Castle National Radio Rally will be held at Elvaston Castle, Derbyshire DE72 3EP. There is plenty of car parking and the gates open at 9am. Entry fee is £4 with accompanied U16 free. There will be catering, a Bring & Buy, trade stands, the RSGB and special interest groups.

June 15th
Newbury & Districts ARS Rally and Boot Sale
Richard Jolliffe. Tel: (01635) 46241
E-mail: carboot@nadars.org.uk
The Newbury & Districts ARS Rally and Boot Sale will be held at the Newbury Showground - nearest postcode RG18 9JU. Pitches are £10 each or you can erect your own marquee for £50. The entry fee for visitors is £2.

June 27th - 29th
Hamtronic Show
www.hamradio-friedrichshafen.de/html/en
The Hamtronic Show will be held at Messe Friedrichshafen, Neue Messe 1, 88046 Friedrichshafen, Germany. There will be trade stands, special interest groups and a large RSGB Bookstall.

June 29th
West of England Radio Rally
Shaun. Tel: (01225) 873 098
Email: rallymanager@westrally.org.uk
www.westrally.org.uk
The West of England Radio Rally will be held at the "Cheese & Grain" venue, Frome, Somerset.

July 5th
Reddish Rally
Nigel. Tel: 0161 428 8413 evenings and weekends
www.reddishrally.co.uk
The Reddish Radio Rally will be held in St.Mary's Parish Church Hall, St Mary's Drive, Off Reddish Road, Stockport, Cheshire SK5 7AX. Doors open at 10.30am and entry is £1. There will be car parking available. Tables are available at £10 each. Please note this is a Saturday rally as the venue is in use on Sundays!

July 6th
Barford Radio Rally
David. Tel: (01953) 458844
www.norfolkamateurradio.org
The Norfolk ARC Barford Radio Rally will be held in Barford Village Hall, Barford, Norfolk NR9 4AB. There will be car parking available and the doors open at 9am. There will be trade stands, a Bring & Buy, special interest groups and the RSGB bookstall.

July 6th
Cornish Mobile Rally
Ken. Tel: (01209) 821073
E-mail: keng0fic@fsmail.net
The Cornish RAC 45th Mobile Rally with Kernow Microscopical Society will be held at Penair School, Truro, Cornwall TR1 1TN. Doors open 10.30am (10.15am for disabled visitors). There will be trade stands, a Bring & Buy, refreshments, disabled facilities and car parking.

July 13th
McMichael Rally and Boot Sale
M. Standen. Tel: 01189 723 504
E-mail: g0jms@radarc.org
http://www.radarc.org/MMRally.htm
The McMichael Rally and Boot Sale will be held at Reading Rugby Football Club, Holme Park Farm Lane, Sonning Lane (B4446), Sonning on Thames, Reading RG4 6ST, just off the A4 East of Reading, Berkshire. It is a large site and the boot sale area is on level ground. There will be Special Interest Groups, computer equipment, demonstrations and lectures, catering services, a fully licensed bar and plenty of parking areas with disabled special parking on level ground. Gates open at 9.30am and admission is £2. Gates open for sellers from 8.30am. Boot Sale Pitches costs £10, no booking required. Hall traders, tables £10 pre-booked or £12 on the day.

Elaine Richard's

news & products

A comprehensive round-up of what's happening in our hobby from G4LFM.

Worcester Lottery Award

The National Lottery Awards For All Scheme have awarded the **Worcester Radio Amateurs Association** (WRAA) over £5000 to enable the club to provide even more for their members and others in the area.

On Saturday March 8th, **Rob Mannion G3XFD** travelled to Worcester to present the club with the all important cheque. Everyone had a great time and many of the members were able to exchange stories with Rob. The club would like to say "thank you" to Rob for coming all that way to spend some time with his fellow members – that's right Rob is also an honorary member of the WRAA too!

Rob Mannion G3XFD/EI5IW presenting the cheque to WRAA Chairman, Pete Badham G0WXJ, with members looking on.

Competition Winner

To celebrate the magazine's 75th anniversary last year, *PW* ran a competition to win an FT-450, kindly donated by **Yaesu UK Ltd**. The lucky winner was **John Bell M0GFN**. John took the RAE about 17 years ago but remained a short wave listener until just before Christmas when he decided to apply for his licence! He received his licence at about the time he was informed of his win in the Yaesu competition. He said, ''Imagine my surprise when you called me to inform me of my win."

John said, "My regards to you, Rob, and all the team at *PW*, a great magazine and a great competition. I look forward to using the transceiver."

Prize Chances For SBS-1 Buyers

Following on from the success of the SBS 1 Open Day held at the distributor **Martin Lynch & Sons Ltd** in February, any individual buyer of the SBS 1 Virtual Radar will be entered into a free prize draw as long as they've purchased their SBS 1 from any of the authorised distributors. This time, customers have the chance to win a brand new *Vista* Note Book PC and five Bearcat UBC 3500XLT scanners each month until May.

Over 8000 units have been sold throughout the world and they're in use by hobbyists and professionals alike. For more details see **www.sbs-1.co.uk**

Martin Lynch & Sons, Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS. Tel: 0845 2300 599. www.hamradio.co.uk

Linear Amp UK

Following the semi retirement of **Peter** and **Gwen Rodmell,** Linear Amp UK business has been transferred to **Elite Interfaces** in Reading, who are taking over production of all of the current range of products. Elite aim to give the same level of personal service that was given by Peter and Gwen.

Production in Reading will be under the control of **Paul Cullen G4KTZ** and it's Paul you should contact in the event of any technical queries.

Elite Interfaces Ltd., 5 Trafford Road, Reading, Berks RG1 8JP. Tel: 0118 958 4600.

QSL Communications Open Day

Somerset-based **QSL Communications** will be holding their Annual Open Day on Sunday May 11th, starting at 10am. The major manufacturers, Icom, Kenwood and Yaesu, will be there with their demonstration stands and *PW* will be there with a selection of books and magazines. There will be free tea and coffee and a warm welcome for all visitors. For a map and full directions, check out the website: **www.qsl-comms.co.uk**

QSL Communications, Unit 6 Worle Industrial Centre, Coker Road, Worle, Weston-Super-Mare BS22 6BX. Tel: 01934 512757.

The IRTS 2008 AGM

The **Galway Radio Experimenters Club** (GREC) will be hosting the 2008 AGM of the **Irish Radio Transmitters Society** in the Salthill Hotel, Salthill, County Galway on Sunday April 27th. The usual rally will accompany the meeting. Doors open at 10.30am and the AGM will start approximately 2pm. There will be a dinner on the Saturday night (26th) at 8pm for any who would like to attend – tickets can be booked from **Tom Frawley** (**E-mail: ei3er@galwayradio.com**)

Foundation Tuition

The **Radio Society of Harrow** has resumed tuition for Foundation licences. For the full details please contact **Jim M0UJC** (**jdclarke@freenet.co.uk** or **Tel: 020 8907 9441**).

Great Fire of Holt

On May 1st, 1708, the town of Holt in Norfolk was devastated by a fire that destroyed most of the medieval town in a matter of just three hours. Local reports of the time state that the fire spread so swiftly that the butchers did not even have time to rescue their meat from their stalls on the market.

The fire started at Shirehall Plain and quickly spread through the mainly timber-framed houses of the town. A Royal Brief asked Churches throughout Britain to collect money for the homeless town folk of Holt and many small donations arrived from hundreds of tiny congregations. Holt gradually rose from the ashes to become the delightful Georgian town of today.

To mark the 300th Anniversary of the Great Fire of Holt, members of the **Bittern DX Group** will be operating the Special Event Station **GB0GFH** to coincide with the organised events in the town on the Bank Holiday weekend May 3rd - 5th.

Further information available on the group website: **www.bittern-dxers.org.uk**

Electronic Log Book

The **G8PUT Logbook Contest and Award System** is a computerised logbook designed to look and feel like a 'real' logbook so you are working with something familiar. All the data is typed into a yellow line at the bottom of the screen and, wherever possible, selections can be made either using the mouse or by pressing a function key. When you start entering the details for a new QSO, the program will wait for you to finish your conversation at any stage.

For contest working, there's a large clear screen for easy data entry and at the end of each QSO you can save the details to the contest log for easy checking.

You can check your progress towards any award as the program keeps an eye on how you are doing.

For more information visit **www.g8put.com**

Send all your news to:
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: pwnews@pwpublishing.ltd.uk

Poldhu Beacon

The Poldhu beacon (as mentioned in *PW* News in the March issue) on 3.597MHz has ceased operation. The beacon keepers would like to say thank you to all those who sent reports. The beacon was heard regularly after sunset in VO-land and also reported from ZL.

First Advanced Licence Course

In response to requests from a group of Intermediate licence holders who are members of **Cray Valley Radio Society**, **Chris Whitmarsh G0FDZ** organised the club's first Advanced Licence Course. What with alterations to the syllabus and the depth of knowledge required for such an undertaking; both from the students and the trainers, the challenge was felt to be quite daunting. However a small number of candidates came forwards and Chris selected his group of 'volunteer trainers'. The course was run as a home study course with 'on-line' mentors and study evenings for the more complex subjects; such as the mathematics requirement. Finally, three Saturdays at the start of 2008 were chosen for an in-depth set of lectures just prior to the actual examination itself.

Cray Valley RS now has three new full licence holders; **Sam M0SJW**, **Karen M0KAZ** and **Kevin M0KSJ**. The three successful candidates are to be congratulated not only on passing the Advanced licence examination but on the fact that they all took the three steps required in the shortest possible time available to them. The Cray Valley Radio Society meets at **The Progress Halls, Admiral Seymour Road, Eltham, London, SE9 1S** , at 7.30pm for an 8pm start on the 1st and 3rd Thursday of every month. Refreshments are provided. For more details, E-mail the Secretary; **Richard Perzyna G8ITB** at **secretary@cvrs.org**

Macclesfield DXpedition

Members of the **Macclesfield and District Radio Society** are set to operate from the Isle of Jura (IOTA: EU-008). The remote island, which lies in the Inner Hebrides off the west coast of Scotland, will be activated during the week commencing April 26th using the callsign **GS4MWS/P**. Operators are expected to mainly be active using s.s.b., c.w. and data modes on all IOTA frequencies, a list of which can be found at **www.rsgbiota.org Please** QSL via bureau to **2E0DOD**. Weather permitting it's also possible that the Summits on The Air (SOTA) summits on the island may also be activated. The five operators are: **Keith Kelly G3VKF** (Macclesfield), **Ray M1REK** (Congleton), **Adrian 2E0DOD** (High Lane), **Andy G1DDU** (Congleton) and **Allan G0JNJ** (Macclesfield). They're all hoping for maximum good weather and minimum 'midgies'!

Dover Foundation Courses

It's quite amazing for the instructors at **Dover Radio Club** to look back and realise that they have now run 23 Foundation courses! In the relatively short space of time since the Foundation Licence was introduced, Dover Radio Club have managed to initiate 146 newcomers to the hobby and their success rate is a remarkable 92%. Many of the newly qualified 'Foundationers' are inspired to go on to the Intermediate course and, ultimately, the Advanced.

Much of the success is due to the devotion and enthusiasm shown by the instructors. Leading the team is **David Harding G0DQI**, who shares the bulk of the work with **Brian Joyner G8ZYZ**. Backing them up with their own expertise are **Tony Phillpott G4IMP**, **Brian Cuff G4SAU**, **Anne Phillpott G4RJZ**, **Matt Curtis M1CMN** and **Fred Knight G4GAN**, whilst the examinations are administered by **Graham Cahill 2E1ITE** and **Ben Sutton M0TUX**.

The candidates vary enormously, from schoolchildren to professionals. They come in all ages, the oldest so far being 76 and the youngest just eight. A goodly number are ladies too! Contact **Dover Radio Club, PO box 73, Dover, Kent CT16 2FD** or **David g0dqi@darc.org.uk**

Douglas Bryce Pitt (1919-2007)

Doug was born in Portobello, Midlothian, Scotland, the youngest of four. He lived in Midlothian and then in Fife, before his father's work took the family to Derby where Doug attended Bemrose School. His lifelong interest in science and technology was kindled by experiments in chemistry, photography and radio. He witnessed the first public demonstrations of television in the UK and sat before a bright Baird Company's closed circuit flying-spot camera, always recalling a snatched glance into the adjoining hall barred to visitors where the floor accommodated a mass of car batteries in series!

A keen exponent of educational technology, Doug pioneered various audio-visual aids to learning. More than one film, made by pupils under his guidance, gained national awards. He devoted many off-duty hours to theatre, in and out of school, also publishing several short comic plays. It was through amateur drama that he met **Esmé Barbara Crow**, whom he married in 1956. They had a daughter, **Zoë**. In the 1960s Doug was known for his articles in *The Radio Constructor* and *Practical Wireless* and also contributed to *Wireless World*.

All his friends express our appreciation also of the hard work and support of his daughter Zoë and give her our best wishes. **Jeremy Jago**

Quiz Night

Let the quiz begin.

The **Yorkshire Regional Quiz 2008** took place at **The Grange, Carleton, Pontefract**, the home of **Pontefract and District Amateur Radio Society** (PDARS). It attracted teams from right across Yorkshire with representatives from radio clubs in North, West and South Yorkshire.

There was an interesting trade stand put on by **Lee** of **LAM Communications**, showing a comprehensive range of contemporary Amateur Radio equipment and they also donated raffle's first prize of a v.h.f./u.h.f. co-llinear antenna. Lee demonstrated a selection of D-STAR radios. A team from the **Northern D-STAR Users Group** came for the quiz but ended up spending a lot of time answering questions about D-Star and repeaters!

The quiz questions covered a range of subject including technical topics, history, general knowledge and trivia. The questions were set by Quizmaster **Chris M0JRQ**.

The quiz winners were four members of the **Ripon & District Amateur Radio Society** and they take back to Ripon an engraved shield marking their achievement.

Finally, the questions that no-one got right: In 1802 an Italian suggested the relationship between electric current and magnetism. His name is an anagram of Radio Enigma Coming Soon. Who was he?

Answer: **Gian Domenico Romagnosi** (1761-1835) Romagnosi's account of an electrostatic charge from a voltaic pile deflecting a magnetic needle appeared in 1802.

AirNav System's Radar Box

Essex-based **Waters & Stanton plc** have taken over the distribution or AirNav System's Radar Box. AirNav Systems are well-know in the aviation market for their professional software used at airports around the world. The Radar Box, reviewed in the September and November 2007 issues of *RadioUser*, will have great appeal to enthusiasts and those who commercially have a need to know where particular aircraft are. To this end, comprehensive user filters can be invoked to limit the display to just the aircraft that interest the user.

With the release of the new 2008 software, Waters & Stanton have negotiated a major price reduction from £469 to £399.95 retail including VAT.

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

Euro-African Guide Anniversary Quiz

The *Euro-African Medium Wave Guide* (EMWG) is celebrating its 10th Anniversary in 2008. To celebrate the occasion the guide is running an international quiz open to entrants around the world. The quiz has been devised to run throughout March and April 2008 and will be free to enter. The quiz does not solely deal with medium wave but covers very different radio aspects and there are only 21 questions. Entrants can enter online or download the questions. There will be a selection of prizes for the winners. For further information on the EMWG contact **Herman Boel** at **contact@emwg.info,** or write to **Herman Boel at Papeveld 3, B-9320 Aalst, Vlaanderen (Belgium).** Website **www.emwg-contest.org**

British Young Ladies Amateur Radio Association

The British Young Ladies Amateur Radio Association (BYLARA) was formed in April 1979 to further YL operating in Britain and to promote friendship, stimulate interest and, in particular, encourage good operating techniques and courtesy to all operators at all times. The BYLARA 3.5MHz events take place on Mondays at 7.30pm on 3.708MHz (±QRM). The BYLARA 7MHz net takes places on Wednesday and Friday mornings at 11.30am on 7.103MHz (±QRM).

Membership (from July 1st) costs £4 for the UK or £5 for overseas (airmailing the newsletter costs an extra £4).

Jackie Head M0CUR, 36a Ashacre Lane, Worthing, West Sussex BN13 2DH, E mail to **jack.head1@ntlworld.com, website www.bylara.net**

Thinking Day On The Air

The **Scarborough Special Events Group** operated **GB1GG** for **Girl Guides Thinking Day on the Air 2008**. A total of 160 contacts were made around the UK. The Girl Guides were able to spell out their names using the phonetic alphabet. Greetings were received from stations in Belgium, France, Sweden, USA, Canada, Bulgaria and Russia.

Just over 100 Guides, Brownies and Rainbows took part in the weekend and each girl received a certificate for speaking over the air. The girls were also shown how to send their names using a Morse key. A competition was then held to see who could send a message the quickest between two radio amateurs using Second World War Morse keys and a team of Guides using the latest technology to pass a text message using mobile phones. To the surprise of everybody the Morse message was sent faster. Contact details: Telephone Helpline 07789-800-726 (Only during active weekends). Direct QSL Route for all events **Roy Clayton G4SSH, 9 Green Island, Irton, Scarborough North Yorkshire YO12 4RN.** E-mail: **sseg@sseg.co.uk**

The PERSEUS Receiver

The PERSEUS (Pretty Excellent Receiver for Software-Eager Unperceivable Signals) is a v.l.f./l.f./h.f. receiver based on a direct sampling digital structure. It features a 14-bit 80Ms/s analogue-to-digital converter with a 76dB signal-to-noise ratio (bandwidth = 40MHz), a high-performance configurable FPGA digital down-converter with an up to 1Ms/s output sampling rate and a 480MBit/s, high- speed USB 2.0 PC interface.

The PERSEUS r.f. analogue front-end has been designed for the most demanding users and includes a 0-30dB, 10dB steps attenuator (with an up to 500mW input lower rating), a low-loss 10 bands pass-band r.f. pre-selector filters bank and a high dynamic pre-amplifier with a top-class input third-order Intercept Point of more than 30dBm. The resulting third-order dynamic range is 103dB for s.s.b. signals (2.4kHz bandwidth) and 107dB for c.w. signals (500Hz bandwidth).

The PERSEUS can also be operated in a wide band mode as a 10kHz - 40MHz spectrum analyser with more than 100dB dynamic range in a 10kHz resolution bandwidth. PERSEUS is a Software Defined Radio and relies on PC software applications to carry out the demodulation process. Compatibility and support of most used software will be provided by an interface DLL for *Microsoft Windows* operating systems and drivers for *Linux*.

Price: £599.96 including VAT at 17.5% from Martin Lynch & Sons Ltd., Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS. Tel: 0845 2300 599. www.hamradio.co.uk

Newbury Lottery Award

Newbury and District Amateur Radio Society (NADARS) have just been awarded a grant of nearly £10,000 by the National Lottery under the Awards For All Scheme. These grants are provided by the Lottery to help local clubs. The society will use the Lottery money, to run training courses for Amateur Radio licence examinations, to administer examinations for the Amateur Radio licence, to provide Amateur Radio awareness exhibitions and demonstrations at local events, and to operate portable Amateur Radio stations – for emergency planning, demonstrations and, of course, the enjoyment of all their club members.

The photograph shows the launch ceremony at the NADARS club meeting on February 27th, 2008 showing **Don Field G3XTT**, RSGB Board Member (right) handing a cheque to **Andy Hewitt G3SVD**, Chairman of NADARS, who is standing to the left of the boxes that contain some of the lottery funded equipment (supplied by ML&S) and surrounded by NADARS members.

Radio Stations in the UK

The new 2008 edition of *Radio Stations in the UK* has just been published by the **British DX Club**. Now in its 21st edition, this 68-page booklet is a must for anyone interested in UK or Irish domestic radio.

The booklet covers BBC, commercial stations, community radio and low power services on a.m./f.m. Stations are listed in both frequency order and by station name and the information given includes transmitter sites, power and polarisation. The frequencies are cross-referenced to help you find parallels. Readers will also find station websites, contact address and 'phone/fax numbers so you can contact the stations if necessary. A separate section covers **Radio Telefís Éireann** (RTE) and independent stations in the Republic of Ireland.

It's been two years since the last edition was published so there are numerous changes, including almost 100 new community radio stations now on the air.

A single copy costs £3.50 to UK addresses, £4.50 to Europe (7 Euro or cash/PayPal) or eight IRCs) and for the Rest of World it's £5, $10 US (Cash/PayPal) or nine IRCs. There's a special price for two copies, £6 to UK addresses and 12 Euro to Europe. Further enquiries to **The British DX Club, 10 Hemdean Hill, Caversham, Reading RG4 7SB. www.bdxc.org.uk**

Macclesfield & District Radio Society

The Macclesfield & District Radio Society continues to hold successful licensing courses. In the recent Foundation examinations, there were three successful candidates – **Bob Murphy M3UVM**, **Damon Lake M3VEP** and **Peter Taylor** being able to get on the bands for the first time. Successful in the Intermediate course were **Greg Acton 2E0RXX**, **Chris Eyre 2E0CJD** and **Adrian Dodd 2E0DOD**.

A new Foundation Licence course is underway, with keen youngsters taking part and enjoying the practical assessments. Additionally, a group of the club's current Intermediate Licence holders are holding regular study clubs, in addition to their tuition, in preparation for their forthcoming full licence examinations.

The society is set to become 'competitive' in 2008, with a developing interest in Amateur Radio Direction Finding (ARDF) and plans for participation in the RSGB Tuesday night activity contests and club championships. **Ray King M1REK** has taken over as secretary for the club, with **Tom Read M1EYP** standing down. He joins **Keith Kelly G3VKF** who was re-elected as vice-chairman, and **Dave Lucas G0BIE** (chairman) and **Ron Rous G0WUZ** (treasurer) who are halfway through their terms of office. **Macclesfield & District Radio Society** meets every Monday at **The Pack Horse Bowling Club, Westminster Road, Macclesfield SK10 3AU at 8.00 pm. E-mail gx4mws@gx4mws.com**

Summer Microwave Round Table

The **Sheffield Amateur Radio Club** is hosting the **UK Microwave Group's** Summer Microwave Round Table and Workshop this year. The club premises are ideally located for such an event, with ample parking on site, proximity to overnight accommodation and on-site catering during the day.

The weekend will consist of two separate but linked activities. There will be a workshop on the Saturday and a conference style meeting on Sunday. The Intermediate Workshop is aimed at those amateurs who have recently entered into the microwave region and wish to learn more about home construction, operating, setting up a station and propagation.

The conference or 'Round Table' will be on the lines of other annual events held at Martlesham, Crawley and the Rutherford Appleton Laboratories. It will include up to four lectures, an antenna test range, an all day Bring & Buy and plenty of time for meeting friends and socialising. An informal Saturday evening dinner may also be arranged in a local hotel, again if there is sufficient interest.

It's essential to register for both events so that catering and overnight accommodation can be organised accordingly. Sheffield Amateur Radio Club is also planning to hold an Amateur Radio Boot Sale on either Saturday or Sunday morning. This may appeal to microwavers, some of whom may like to bring surplus equipment for sale at that event. A section of the sports ground has already been allocated for the boot sale.

At this stage please register your interest with the organiser as soon as possible, **Peter Day G3PHO** (**146 Springvale Road, Sheffield, South Yorkshire S6 3NU**) at: **sheffieldmicrowaves@g3pho.org.uk**

Sheffield Transport Sports Club, Greenhill Main Road, Sheffield S8 7RH

Ray Fautley's Antenna Workshop

miffed by smith?

Taking the mystery out of the Smith Chart!

In Part 1, Ray Fautley G3ASG says that he's found the Smith Chart very useful – and encourages readers to try the calculation system themselves.

In the past, many authors have explained what the Smith Chart is and also how to use it but somehow I've never found their explanations easy or satisfying. The bits that I thought important to describe seem to have been considered as - "Well, you can see that, **can't you?**" However, my answer was often, "No – I just couldn't see **that at all!**"

So, my question to interested readers is: Do **you** find the Smith Chart: (**a**) impossible to use because you don't understand **how** to use it? (**b**) difficult to use because when you have read about it – the instructions appear to be too complicated to follow? (**c**) The chart is unnecessary because you're not interested in antennas, feeders or impedance matching anyway? If you're in the 'unecessary' category this article probably won't do very much for you but for the others – I can only try to help!

Although I used the charts quite often while working in radio laboratories – especially for helping with antenna and feeder problems – until now I haven't thought of trying to describe how they can be used to solve such problems myself. Well, it's now the time and I'll have a go!

What's A Smith Chart?

The Smith Chart is an aid and a tool used to show what's needed to match a source having a certain impedance to a load having a different impedance. For example, to enable a load to be matched to a feeder, where the load (perhaps an antenna) has an impedance which is different to that of the characteristic impedance (Zo) of the feeder (source).

Another use is for the chart is for determining what is required to match the shack end of an antenna feeder to the 50Ω required by the transmitter/receiver.

Characteristic Impedance?

So, what's meant by the characteristic impedance Zo? This symbol, Zo, is used to denote the characteristic impedance of any type of cable or feeder and its value depends on three things: For coaxial cables: (**1**) the thickness of the inner conductor, (**2**) the spacing between inner and outer conductors, (**3**) the type of dielectric separating the inner and outer conductors. And for twin wire cables: (**1**) the thickness of the conductors (**2**) the spacing between the two conductors (**3**) the type of dielectric separating the conductors and **Table 1** gives the Zo of some air-spaced feeder types:

Table 1

Feeder Type	Wire Spacing	Zo(Ω)
Open Wire	250mm (10in)	660
Open Wire	120mm(4.7in)	570
Open Wire	25mm(1in)	386

Nowadays, the most popular flat-twin cable in use by Radio Amateurs is probably the type having a spacing of about 8mm between the wires with polythene insulation. The Zo for this type is close to 300Ω. More recently a similar type having a Zo of 450Ω has been introduced and is becoming increasingly popular. Coaxial cables usually have a Zo of either 75Ω or 50Ω, the latter value being the most likely to be encountered these days.

Hopefully, by now I've helped to give you the picture regarding the characteristic impedance! However, even though just how the value of Zo is calculated from the wire diameter – spacing and type of dielectric isn't relevant to this article – it's still important to know the Zo value of the cable in use.

What's Normalising?

Normalising, what's that? You may ask! This is the next thing to make some sense out of. In fact it's an awkward term for a very simple operation!

In Smith Chart parlance, normalising means converting any measured resistance or reactance value to a fraction of the Zo and it's best understood (as usual!) by using examples. For the example I'll assume that the impedance measured at the feed-point of an antenna is 38Ω resistance and 25Ω capacitive reactance at the frequency of operation.

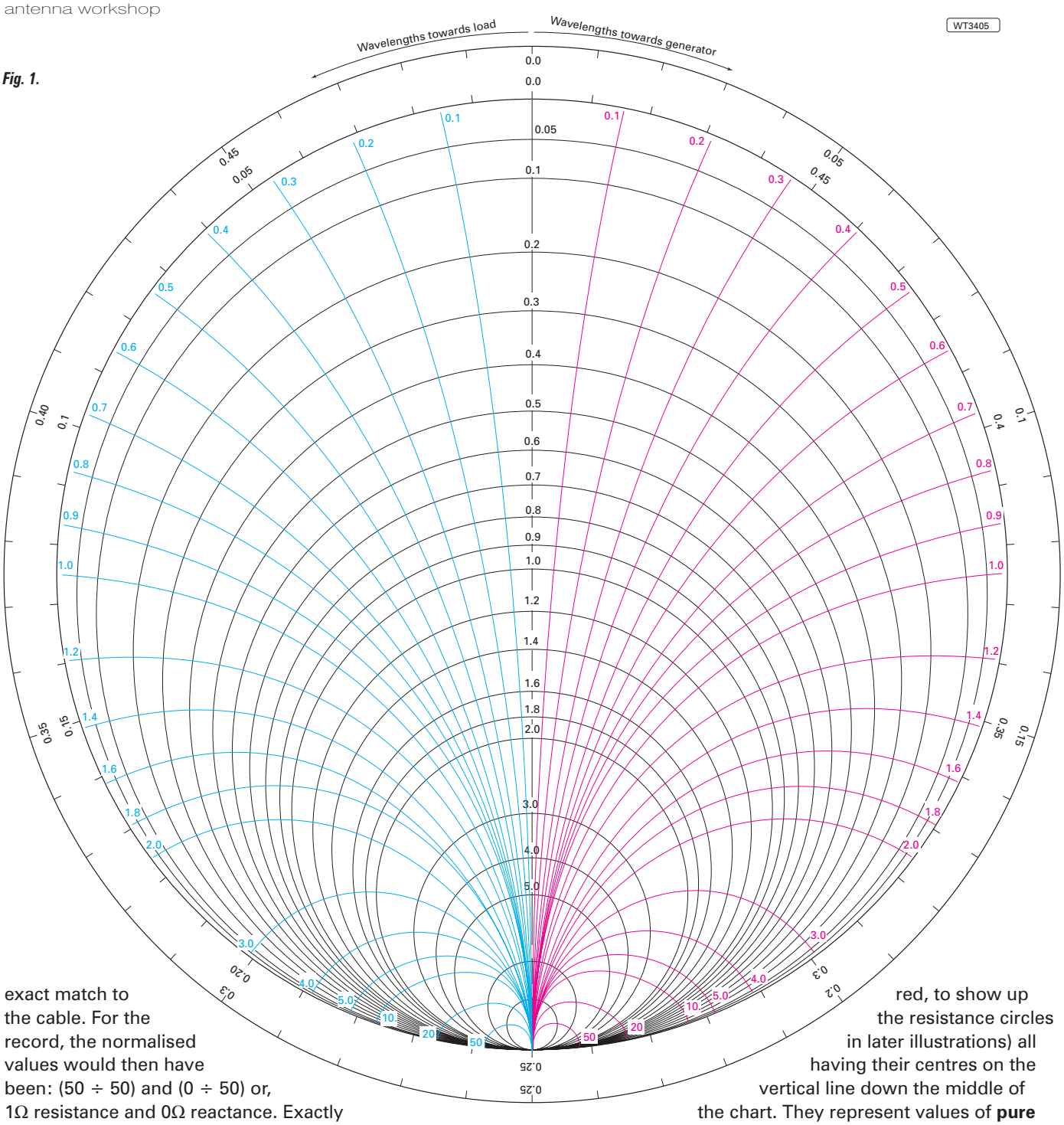
Conventionally, inductive reactance is considered to be positive and capacitive reactance negative. This gives the short form beloved by those mathematically oriented of (38-j25)Ω. The 'j' being used to indicate that the value is 'imaginary', whereas the resistive value is considered to be 'real'.

The reactive part of the impedance is shifted by 90° (either + for inductance or – for capacitance) relative to the purely resistive part. If the cable to be used has a characteristic impedance (Zo) of 50Ω, normalising the measured values means simply dividing each of them by the value of the Zo, giving (38 ÷ 50) resistance and (-25 ÷ 50) reactance, or 0.76Ω resistance and –0.5Ω reactance. Thus, the normalised values are (0.76-j0.5)Ω.

A second example: What happens if the antenna impedance is 98Ω resistive and 68Ω inductive reactance (98 + j68)Ω? The answer is not much! The normalised values become (98 ÷ 50) resistance and (+68 ÷ 50) reactance, or 1.96Ω resistance and +1.36Ω reactance, or (1.96+j1.36)Ω.

Note: If the load (antenna) had measured exactly 50Ω resistance and 0Ω reactance, no matching of any sort would have been necessary as the antenna would have been an

Fig. 1.



exact match to the cable. For the record, the normalised values would then have been: (50 ÷ 50) and (0 ÷ 50) or, 1Ω resistance and 0Ω reactance. Exactly what I'm trying to achieve for the normalised values!

Smith Chart Help?

"So", you'll probably ask me, "Where does the famous Smith Chart come in and how does it help?"

To begin my answer at the beginning, I ask readers to have a look at the complete, but simplified chart in **Fig. 1**. "What a complicated mess!", you'll probably then say! However, believe me, it can be simplified if it's looked by viewing the various bits one by one because, in fact, the chart consists of **three different charts** superimposed upon each other and one complete circular scale outside the whole lot. Three charts all on top of one another as well as an outside scale – that's why it looks so scary!

Pure Resistance

Please now look at **Fig. 2**. These are a series of circles (in red, to show up the resistance circles in later illustrations) all having their centres on the vertical line down the middle of the chart. They represent values of **pure resistance** and are labelled from 0Ω at the top of the chart (short circuit) which goes right around the outside circle; to the 1.0Ω circle with its circumference intersecting the vertical line at the centre of the chart; then to the small circle near the bottom which indicates 10Ω, and finally to the dot at the extreme bottom of the vertical line (a circle of infinitely small radius) which shows very high values of resistance (infinity Ω). Only a few of the many circles appearing on the complete chart (Fig. 1) are shown in Fig. 2 for clarity.

Of course, circles representing any value of resistance can be interpolated or approximated. Don't forget these are all normalised values (i.e., actual values of resistance divided by Zo). It looks as though the short circuit circle 0Ω (the extreme outer circle) meets the so-called infinity Ω point at the extreme bottom of the chart - **but actually that's no so!**

'Infinity ohms' (or open circuit) is actually represented

by a circle of infinitely small radius with its centre at the bottom of the chart. To all intents and purposes it's the same spot as the open circuit circle. This may appear a bit confusing – but such high values of normalised resistance, greater than 5Ω or 10Ω (meaning actual values of between 250Ω and 500Ω for a Zo of 50Ω) are not often encountered anyway. (How these circles are used will appear later!).

Pure Reactance

The next 'picture' to look at is **Fig. 3**. These green curves represent different values of Pure Reactance; those to the right hand side of the centre vertical line, (no reactance value) Positive Reactance (i.e., inductive reactance) and those to the left hand side, Negative Reactance (capacitive reactance).

The construction of the curves (they are actually arcs of circles) is achieved by first drawing a tangent to the bottom of the chart (actually as a horizontal line passing through the lowest point of the outer circle). Arcs of the circles falling within the periphery of the chart are drawn using the tangental line for the centres.

Each of the curves is labelled and starting at the extreme top of the chart where 0Ω reactance will be found. That circle – being of infinite radius – becomes the straight vertical line through the chart. Other curves of reactance are labelled +0.3Ω, +0.5Ω, etc., clockwise down to the bottom of the chart where it's infinity Ω reactance. They are the curves of inductive reactance.

Anti-clockwise from the top are the curves representing capacitive reactance values -0.3Ω, -0.5Ω, etc. Don't forget these are all normalised values and **Fig. 4** shows the resistance (red) and reactance (green) curves together.

Standing Wave Ratio

So, that's two of the three charts investigated – what about the third one? To start the explanation, a set of concentric black circles – all with centres at the very centre of the chart – is shown in **Fig. 5**. These circles represent lines of constant standing wave ratio or s.w.r.

Take a look at the vertical scale, which goes from top to bottom of the whole chart. Notice that **above** the centre, values on the scale are all **fractions** marked between 0.05 (right near the top) and 1.0. **Below** the centre the scale has numbers above unity from 1.0 to 20.0. These numbers, which I used as values for the resistance circles, (Fig. 2) are also used to represent s.w.r. values. Wait a moment! This means that each s.w.r. circle has **two** values! One marked **above** the centre and another **below** it. How is this explained?

Well, the answer is simple really (of course, it always is – when you know!) because **both** values mean/represent the same s.w.r. It just depends upon whether I prefer my s.w.r.s in fractions up to unity, or numbers above unity. For example, an s.w.r. of 1.5 can also be stated as an s.w.r. of 0.67, one value simply being the reciprocal of the other. However, nowadays the s.w.r. is usually expressed in numbers above unity. The diagram, **Fig. 6**, shows the resistance (red) , reactance (green) and s.w.r. (black) curves together.

Fractions Of A Wavelength

At this stage, I'm left to explain the final part of the chart – the circle outside the whole lot! Shown in **Fig. 7**, in blue,

Fig. 2.

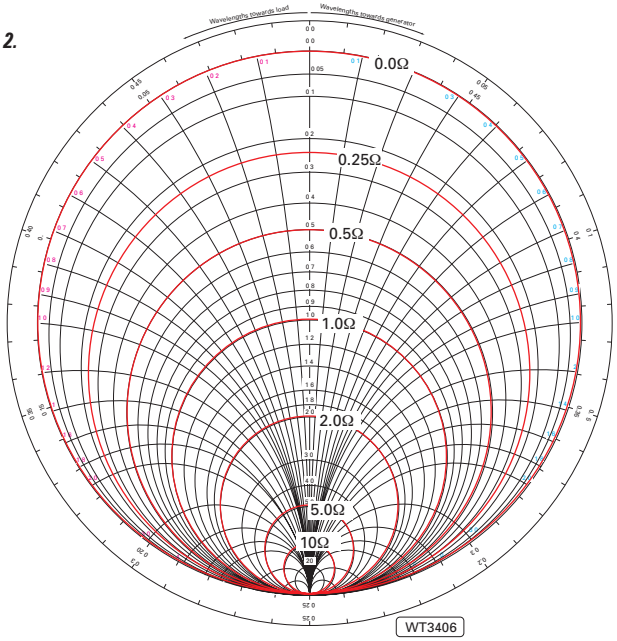


Fig. 3.

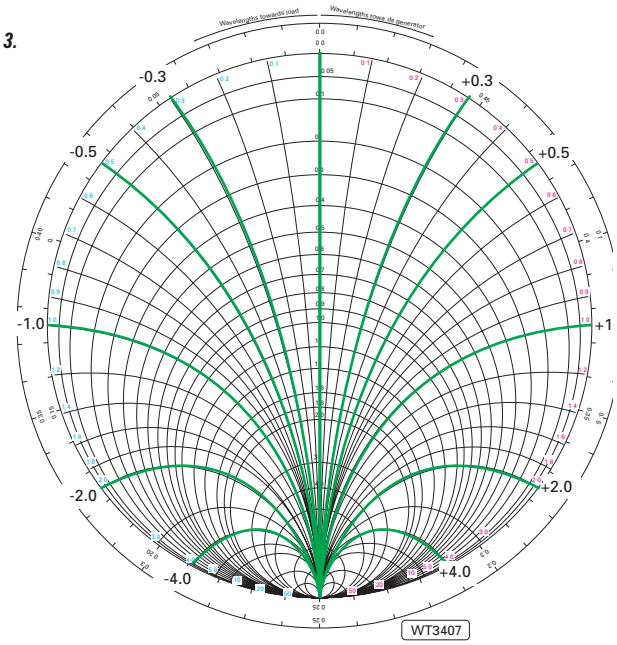
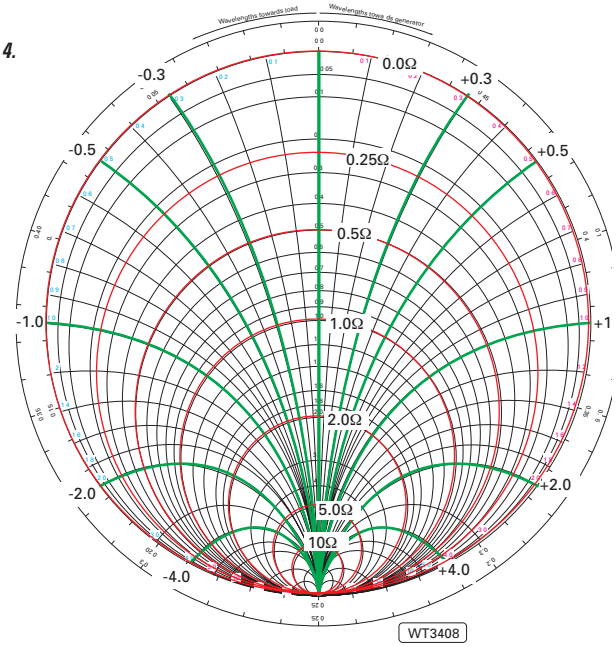


Fig. 4.



it's a measure of **distance**, not in metres or yards, **but in fractions** of a wavelength at the frequency of the signal used for the measurements.
At the top of the chart is 0λ and distance **clockwise** is indicated in steps of 0.05λ and finally back to the start 0.5λ, which is the same as 0λ because the pattern is repeated every half wavelength. This distance is in **wavelengths towards generator** (or source, which could be a transmitter or a signal generator) from the **load**.

Starting again at the top at 0λ, but this time looking at the inside circle, **moving anti-clockwise** indicates electrical distance in **wavelengths towards load** (which could be an antenna) from 0λ at the top of the chart, again in steps of 0.05λ and finally to 0.5λ which, again is the same as 0λ. Why this matters will emerge eventually – I hope!

So, I'm now talking about the electrical distance (in fractions of a wavelength) :

A: from the **load** (e.g. antenna) to the **generator** (or source) , which is 'Towards the generator' (clockwise) .

B: from the generator (or source) to the load (e.g. antenna) , which is "Toward load (anti-clockwise) .

The diagram, **Fig. 8**, shows how it looks when Figs. 2, 3, 5 and 7 are superimposed. So, there's quite a lot of explaining to do if any use is to be made of this jumble of circles and arcs!

Pure Resistance

Well, what's the simplest of all loads? What about a pure resistance of, let's say 50Ω, connected at the end of a length of 50Ω coaxial cable? I already know that this must be a perfect match (so I don't need any extra matching anyway) but how is such a resistance entered on the chart?

1: The first thing to do is to normalise the value of the resistance. As my cable has a Zo of 50Ω, the normalised value of the resistance will be: (50 ÷ Zo) = (50 ÷ 50) = 1Ω

2: As the resistance is pure, there's no reactance and the normalised reactance value is: (0 ÷ Zo) = (0 ÷ 50) = 0Ω

3: To plot the point on the chart representing the normalised value of 1Ω (or 1.0 ± j0) . (Please see **Fig. 9**.)

a: Find the resistance circle representing 1.0Ω. The top of this circle cuts the vertical line at the very centre of the chart. That's the resistance circle for 1.0Ω. **b**: Find the reactance arc representing 0Ω. This arc is part of a circle having an infinite radius. It's the vertical line down the centre of the chart. That's the reactance arc for 0Ω.

4: Put a dot where the resistance circle intersects the vertical reactance line. That's right! Exactly in the centre of the whole chart where the 'A' is marked on the simplified Fig. 9.

5: This point immediately gives us the information that the resulting s.w.r. is 1.0. How did I come to that figure? Now look at the dotted s.w.r. circles. Point 'A' is inside the circle representing an s.w.r. of 1.4. In fact, I know it's at the exact centre of the chart, i.e., the infinitely small circle – which is the dot right in the middle. That's the point representing an s.w.r. of 1.0 or unity.

What about another simple example? Let's say I have a pure resistance value of 25Ω – the normalised value of which is: (25 ÷ 50) = 0.5Ω Again there is no reactance component, so where's the point on the chart representing

Fig. 5.

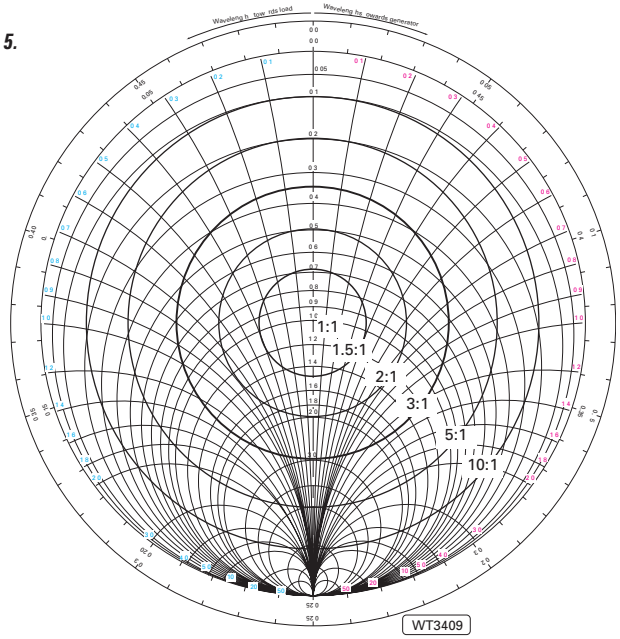


Fig. 6.

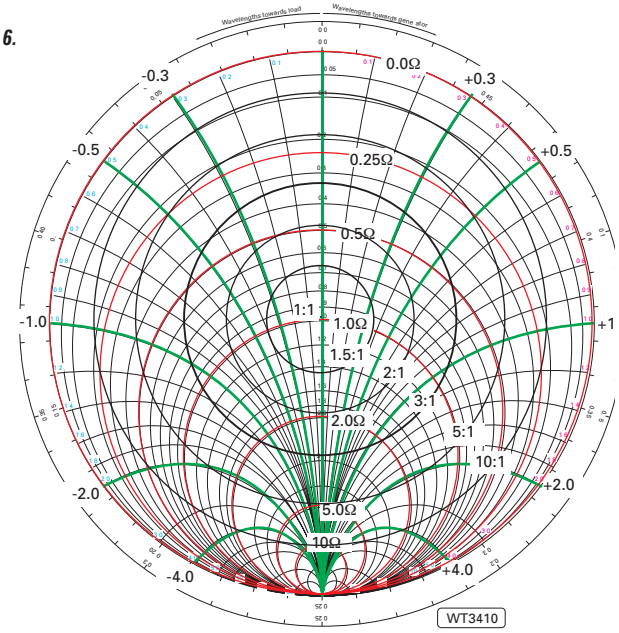
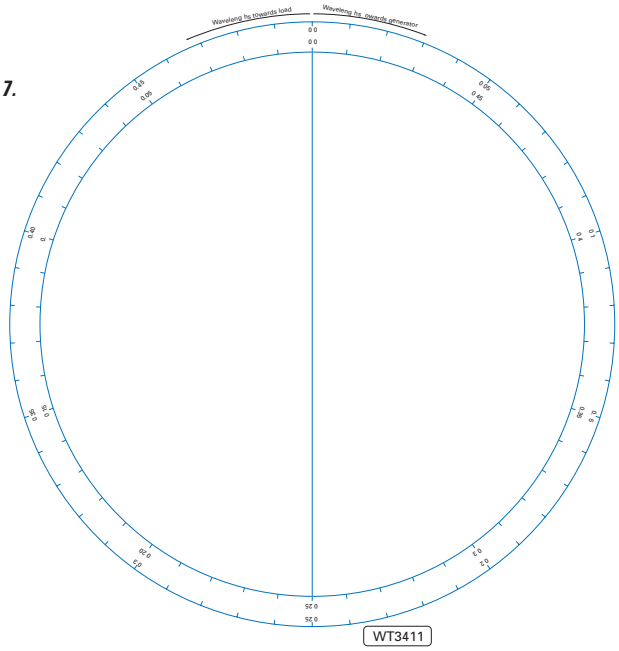


Fig. 7.



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0.5Ω? On Fig. 9 I can see the resistance circle labelled 0.5Ω. As the reactance is zero, the correct point is the intersection of the 0.5Ω circle and the 0Ω reactance arc – the vertical line. (It's indicated by the letter 'B').

Immediately, the resulting s.w.r. is revealed as 2.0, as the point 'B' falls on the s.w.r. circle representing an s.w.r. of 2.0. But that s.w.r. circle cuts the vertical line in two places, at 0.5 above the centre point and also at 2.0 below the centre point. Again, the two s.w.r. values have exactly the same meaning as previously explained.

Now it the readers' turn! Perhaps you can try plotting a few more resistance values such as 15Ω, 30Ω, 70Ω, 90Ω, 150Ω and 300Ω. Remember to normalise the values first, though!

Pure Reactance

My next step is to plot points representing pure reactance. The picture to look at is **Fig. 10**. Where would an inductive reactance of say, 25Ω (i.e. +25Ω) appear on the chart? The Zo of the cable is again say, 50Ω. To start –

1: First normalise the value: (+25 ÷ 50) = +0.5Ω.
2: The arc for +0.5Ω can easily be identified on the right-hand side of the chart.
3: A pure reactance will have zero resistance, so this gives away the position of the point I need. For zero resistance is represented by the outside circle.
4: Plot the point for +0.5Ω where the +0.5Ω arc touches the outside circle (0Ω resistance) at point 'C' as in Fig. 10.
5: What about s.w.r.? Again I look at Fig. 10. This shows the outer s.w.r. circle to be (infinite) .
6: The point 'C' on the chart indicates the s.w.r. as being infinite. This is to be expected as no power is dissipated in a purely reactive load, it's all reflected back to the source.

For another example, plot the position of a capacitive reactance of 200Ω.

1: Normalise the value. (-200 ÷ 50) = -4.0Ω.
2: Locate the –4.0 arc on the left-hand side of the chart in Fig. 10.
3: The resistance component being 0Ω, the required point is where the –4.0 arc touches the outer circle (0Ω resistance) i.e., point 'D'.
4: Again, the s.w.r. is infinite.

Getting the Idea?

Are you getting the idea now? I hope so! However, I think that's enough to take in for one lesson – but it wasn't that bad was it? I'll be discussing more, on complex impedances, next time. Cheerio for now. ●

Ray Fautley G3ASG
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Fig. 8.

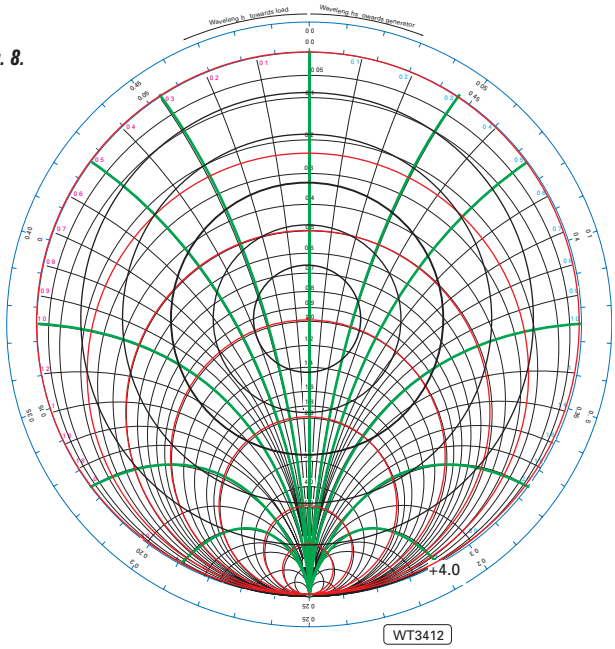


Fig. 9.

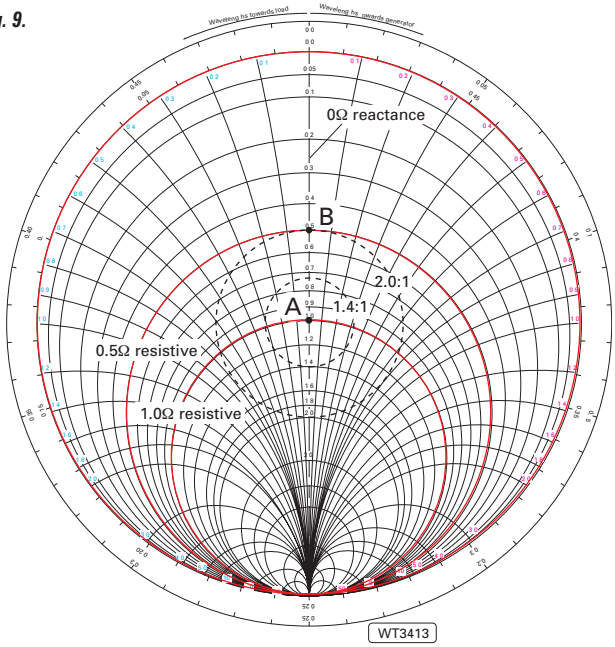
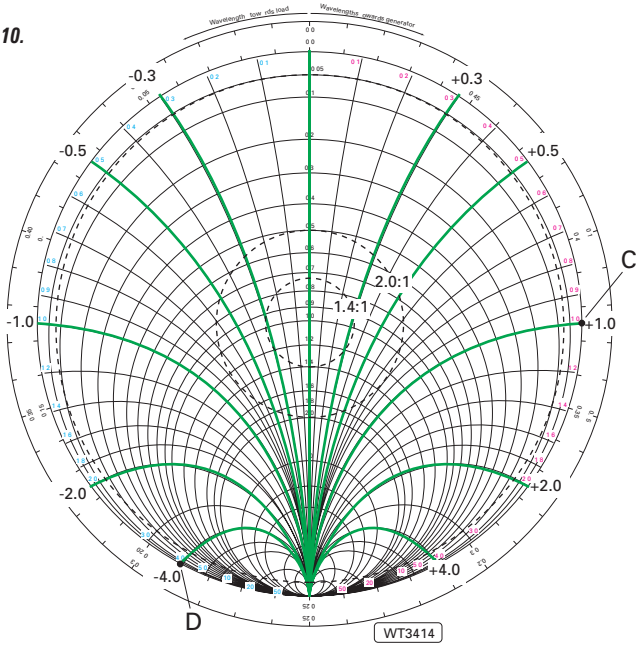


Fig. 10.



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Steve White, Radcom November.

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Amatuer Radio

in focus The Poldhu Club

A hearty radio welcome awaits you on the Lizard Peninsula in Cornwall!

Keith Matthew G0WYS, Secretary of the Poldhu Club shares the history of his rather special club and invites readers to visit Cornwall!

Most Radio Amateurs need no explanation of the significance of the Poldhu site on the Lizard peninsula in Cornwall. This is because Guglielmo Marconi chose the cliff-top location in 1901 as the site for his great transatlantic experiment. Success was achieved at 4p.m. on the 12 December that year, when Marconi and Kemp heard 'The three little dots that changed the world' on Signal Hill, St. John's, Newfoundland.

The Marconi Company finally left the Poldhu site in the 1930s, with only a monument on the cliff to mark the spot. That was the situation for many years and the original buildings are now only visible as foundations in the field.

Although the site has a long history, Poldhu Amateur Radio Club has a comparatively short one. A Raynet Group met at the nearby British Telecom's Goonhilly Earth Station during the 1980s and later these Amateurs formed the **Goonhilly Amateur Radio Club**. The club could not erect permanent antennas at Goonhilly and began to look for a more suitable location.

Poldhu Hotel

In 1990 the owner of the **Poldhu Care Home** (formerly the Poldhu Hotel) generously offered the Goonhilly group the use of a semi-derelict Second World War building in the grounds. The club accepted this offer and changed its name to the **Poldhu Amateur Radio Club**.

The wartime building needed a lot of work to make it weatherproof and to make it useable as a clubhouse. This was finally completed in time for an opening coinciding with the 90th anniversary of the first transatlantic signal.

The club used and improved the building over the next few years but there was no long-term security of tenure. As the centenary approached, it was suggested that we might be able to build our own clubhouse.

Carolyn Rule M0ADA, who was Chairman at the time, approached **The National Trust**, as it owned the 'Wireless Field' where the Marconi station had been located. The reactions of the Trust were encouraging and they offered some land. Additionally, **Marconi PLC** was anxious to help and very soon the idea of a visitor centre, which would provide a home for the club, was launched.

The National Trust researched available funds and – since Cornwall was an 'Objective One' area – it meant that there were matching funds available from this European Union scheme.

In what now seems like an amazingly short time, Marconi PLC agreed to equip the display area and the National Trust agreed to oversee the design and construction. We even had the road up to the new Marconi Centre resurfaced and our own car park constructed!

The club have the use of the building and in return agree to open it to the public on a number of afternoons a week. We are also responsible for the cleaning and internal maintenance of the portion of the building that's exclusively for club members' use.

Just In Time!

The Marconi Centre was opened 'on time' (just!) for the December 12th 2001 Centenary. We were honoured to have **Lady Mary Holborow**, the Lord Lieutenant of Cornwall representing **Her Majesty the Queen** and **Prince Guglielmo Marconi Giovanelli**, along with many other dignitaries at the opening ceremony.

Lady Mary was kind enough to send the letter 'S' to St John's Newfoundland at exactly 4p.m. – 100 years to the minute after the original was first heard. If the power was a little less, the frequency was somewhat higher! (14MHz)

We are twinned with the **Marconi Radio Club of Newfoundland** and we contact **VO1MRC** every year on the 12th, at 4p.m. We also work **KM1CC** on Cape Cod on the January 18th. The **South Wellfleet Marconi** station had its first two way contact with Poldhu on the 18th January 1903.

Other Big Day

The other 'Big Day' in our calendar is,

An aerial photo of the Poldhu site. The club building is in the centre, the Poldhu care home to the right.

Information about club events, contact details and opening times for the public are posted on the club website, **gb2gm.org.uk**
Keith Matthew G0WYS,
3 Marconi Close, Helston, Cornwall TR13 8PD.
Tel: 01326 574441

Send all your club info to
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: pwnews@pwpublishing.ltd.uk

of course, the International Marconi Day (IMD). This was inaugurated by the **Cornwall Radio Amateur Club** (CRAC) and has proved to be a lasting success story. From our experiences of the IMD club members always report it's good to work so many stations in such a relaxed manner!

Over the last few years we have also taken part in the **British Wireless for the Blind Fund's** 'Transmission' events. These have been organised by husband and wife team **Dave 2E0GSD** and **Mary Wall M3KBK**. In 2004 we were proud to receive the trophy for 'Most money raised by a club'.

Planning Permission

During the 1990s planning permission was granted for two 18m (60ft) masts, on almost the exact spot from where the original 1901 transmission was made. These now support a remotely tuned doublet and also two W3DZZ multi-band dipole antennas. We also have a three-element tri-band beam on a 12m (40ft) tower and a further tower supports 50 and 144MHz antennas.

Inside the building there are three radio rooms, appropriately labelled **Kemp**, **Paget** and **Franklin** to honour Marconi's assistants. The Kemp and Paget rooms are glass-fronted and visible to the public, while the Franklin is for the private use of club members.

The Kemp room is designated as the high frequency (h.f.) room, and the rotator for the beam is located there. The coaxial cable from the beam is taken straight in to the operating position. The rig there is a Kenwood TS-2000 with a Linear Amp UK 811H linear if needed. The Paget room contains an Icom IC-7400 and another Linear Amp UK unit, while Franklin is equipped with a Kenwood TS-480SAT and a 144MHz multi-mode.

Poldhu Beacons

For several years we have had a 2m beacon operating on 144.406MHz. This feeds a seven-element stacked Yagi array and is currently beaming towards the Caribbean.

We have received no Transatlantic reports so far, but we have great hopes that one day we might be the winners of the Brendan Trophy offered by the Irish Radio Transmitters Society for the first two-way 144MHz Transatlantic QSO! **Davey Davey-Thomas G3AGA**, was the prime mover in this project and as the beacon keeper puts in a lot of work ensuring that GB3SSS (What other callsign could be more appropriate?) stays on the air.

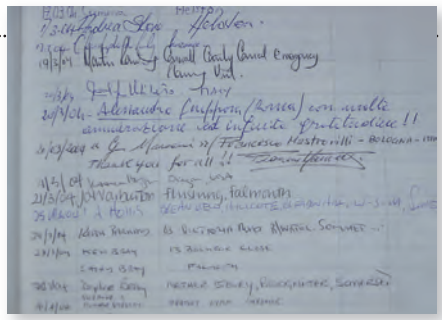
Last year (2007), was the 'Ionospheric Centenary' of the 1901 transmissions. Marconi succeeded when the shortest days coincided with a sunspot minimum. These conditions promised to occur again over the winter of 2006-7 and we received permission for a beacon (another GB3SSS) to be placed on 1.8MHz, the nearest frequency available to 860kHz, the best 'guesstimate' for Marconi's 1901 transmitter frequency.

The transmissions were monitored continuously at St. John's by one of our overseas members, **Joe Craig VO1NA**. Davey G3AGA, converted the doublet to a 'T', with an impressive array of radials as a counterpoise. The finishing touch was an electric fence to keep the farmer's cows at bay! The results appear to show that Marconi could have succeeded, with several strong reception reports from Canada during late afternoons.

Since the sunspot count has continued low for the year, it was suggested that since computer models predict that there was considerable energy radiated at higher frequencies by the 1901 transmitter we might try another beacon over the 2007-8 winter, this time on 3.5MHz. Permission was obtained from OFCOM in an impressively short time and **Andy Talbot G4JNT**, equally quickly, rewrote the beacon software for 3.597MHz. The callsign was again GB3SSS. (We hope to publish results soon).

Foundation Courses

We also run Foundation courses for new members at the Marconi Centre throughout the year. Additionally, we also have a very useful arrangement



The 'signature' of Marconi's double in the visitors book!

Guglielmo Marconi (portrayed by an actor 'look alike') visits the modern day Poldhu site!

with the nearby **Helston Community College** (A Specialist Technology College). We are given the use of a science lab for Intermediate and Advanced courses, together with electronic equipment as needed.

Membership

The club now has over one 100 members, and these are either full members living nearby or associates, who live in the rest of the UK or abroad and support the club. All receive the quarterly newsletter.

Informal club nights are Tuesdays and Fridays from 7 to 9p.m., with a more formal monthly meeting on the second Tuesday of each month. We get many visitors from all over the world and it's good to make friends face to face as well as over the air. If you are down our way on holiday, make sure you pop in and see us! ●

Harry Leeming's

in the shop

Harry puts on his magnifying specs and looks at a modern rig and discusses problems with low voltages and high current switching.

Recently I was asked to look at a Yaesu FT-767. This is a real bag of tricks, a high frequency (h.f.) transceiver with provision to fit modules for 50, 144 and 430MHz. There's so much packed into one case, that I find these rigs a bit of a nightmare to service and need my magnifying specs!.

The first problem on the FT-767 I was asked to look at, was that there was no transmitter output on h.f. Removing the transmitter output plug on the on the radio frequency (r.f.) board, and poking around with a diode probe, established that there was no drive at the output socket on the r.f. board.

The signal was coming to a full stop at the diode switch, see **Fig. 1**. Unusually this diode is switched into its conductive mode by a direct current (d.c.) voltage that arrives via the plug from the power amplifier (p.a.) unit, and at first this caused some confusion, as there could be no output with the plug removed!

Once I had sorted out as to how the circuit worked – and refitted the plug – the diode still didn't conduct and eventually the fault turned out to be a bad connection somewhere in the path to the diode. As is often the case when working with equipment like this, it was almost impossible to get to the underside of the board while the equipment was working. In the end I simply took pot luck and soldered every joint around this vicinity, fortunately all was then well and the rig worked perfectly on h.f.

No 144MHz!

The next problem was that the 144MHz unit was not transmitting, nor was it receiving any signals but yet it still sounded 'lively' on receive. This fault made me think back to the early 1950s when I started in the radio and TV trade at the tender age of 15. At first I was kept away from 'dangerous and complicated TV' sets but was given the odd radio to try and repair.

It was not long before I came across one that sounded 'lively' but would not pull in any stations. Puzzled, I asked for help and was enlightened as to the cause of the trouble. Although the intermediate frequency (i.f.) stage was active – thus producing the slight hiss' I could hear via the detector and audio stages – the 'frequency changer' valve, (the first oscillator and mixer to use modern terminology) was faulty, as it had an oscillator section that would no longer oscillate. A replacement valve cured the trouble.

Things might be a lot more complicated now but the principles of servicing still hold. In the case of the FT-767's 144MHz unit, of course, a simple valve oscillator did not generate the injection for the first mixer but a much more complicated phase lock loop arrangement.

No doubt some readers can glance at the circuit of these and immediately see exactly how they function. Unfortunately I'm not one of them! Usually however, it's not necessary to puzzle over exactly how the circuit works, and the following strategies enable most faults to be found in almost any synthesiser controlled rig that incorporates a phase locked loop (PLL)

A glance at the maker's alignment instruction for the PLL in any v.h.f. transceiver or add-on unit, will usually produce instructions similar to those in the FT-767's technical manual. "Tune to the high edge of the band and connect a high impedance d.c. voltmeter to TP2001. Adjust TC2001 for 8.2V on the meter. Retune to the low edge of the band and check that the voltage is between 1 and 2V".

The important point to check here is **not the exact voltage** but the fact that the voltage on the designated test point varies steadily as you tune across the band. If it does – and does not suddenly jump up or down at any point in the band – the PLL is in lock and you have a 99% chance that the first oscillator is on frequency and functioning correctly.

If the voltage does not change steadily – the PLL is out of lock then the first oscillator will be uncontrolled and probably miles off frequency. The 144MHz module in this case had around 1V at the test point and as this didn't vary with the tuning, it was

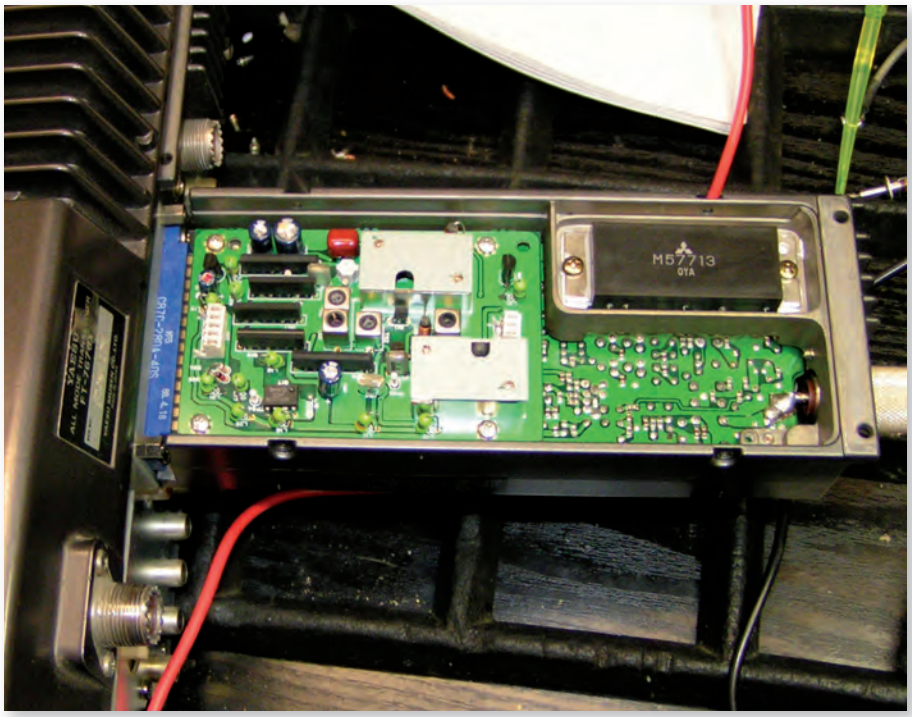


Fig. 1: The power amplifier module and diode switch assembly inside the Yaesu FT-767.

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Fig. 2: The FT-767 – taken with my old B&W camera!

certain that the first oscillator was out of lock. Theoretically there could be dozens of reasons as to why this was happening, but in practice it can usually be nailed down to one of two common faults.

No Reference Signal?

The first possibility was that there was no reference signal arriving at the PLL. With most v.h.f. rigs the simplest way to check this is to use a multimode wide range scanner and listen to see if all the crystal oscillators in the synthesiser unit are functioning. Just switch the scanner to single sideband (s.s.b.) and poke its antenna near to each crystal, when it should be possible to hear the oscillators loud and clear on the correct frequency.

I much prefer testing with a scanner rather than using probes and risking them slipping, shorting and causing damage, when an attempt is made to connect directly to the circuit. If one of the oscillators is not running, the most likely cause is a 'lazy' crystal. Hint: Touch a suspect crystal – very briefly – with a hot soldering iron so as to warm it up a little and quite often operation will then be temporally restored.

If it is the crystal fault the obvious cure is a new crystal – but with older equipment a replacement might not be that easy to obtain. Tip: A trimmer capacitor may be used to adjust crystals onto frequency and often – if this is tweaked – the crystal will operate more reliably.

Alternatively in some cases, there are fixed padding capacitors wired in parallel with the crystal. If these are removed – or capacitors of a smaller value fitted, the *Q* of the crystal will be increased and the stage will often then be found to operate reliably.

Doing this will throw the frequency out slightly but with many rigs it will be found that it's still possible to use other trimmers to get the frequency near enough, as especially with f.m. equipment, an error of a couple of kHz will usually go unnoticed. Incidentally, in the case of the FT-767 there's no reference oscillator in the 144MHz module as the rig's main reference oscillator is used and as the rig worked on 50MHz and h.f. this was presumed to be operating okay.

Next Common Problem

The next common trouble is that the free running frequency of the oscillator(controlled by the PLL) may be out of adjustment, resulting in the varicap diode having insufficient range to pull the oscillator back onto the correct frequency.

If the first oscillator is only a fraction off adjustment, quite frequently a rig will be found to either operate satisfactorily at one end of its tuning range, or to function at some particular temperature. In these cases a slight adjustment of the oscillator's trimmer will restore normal operation but in the case of the FT-767 there was no sign of lock. Never-the-less I decided to try adjusting the trimming capacitor and see what happened!

Then – while monitoring the voltage on the test point TP2001 – I gave a slight tweak to TC2001 and the voltage locked in at about 3V with the dial set at 145MHz. It then varied up and down from this value as I tuned around the band and the set came to life (the circuit had obviously drifted off with age). The next step was to set up the PLL as per Yaesu's alignment instructions. Or was it?

A quick check showed that the voltage varied by nothing like the amount stated in the FT-767 service instructions, when tuning from the h.f. to the low frequency (l.f.) end of the band. With the instructions – aimed at the Japanese or American service engineer – this was hardly surprising as their 144MHz band extends from 144 to 148MHz, and so the USA model has double the tuning range of the UK variant.

The important point when setting a PLL is not the exact voltage at the test point but – that whatever this voltage is set at – enables the oscillator to establish lock anywhere in the band. However, with older equipment this happy configuration often does not coincide with the service manual's recommendations!

Following my usual practice I set the tuning half way at 145MHz, with the rig in the s.s.b. mode receiving a harmonic of my workshop crystal calibrator. I then adjusted TC2001 and noted the highest and lowest voltage on the test point that gave lock and good reception

Problems

I like to hear about problems with older equipment, particularly pre-1990 Yaesu rigs. Please E-mail me, (add some radio related term in the subject heading, to differentiate against spam), or write and enclose a stamped addressed envelope. Remember that electricity is dangerous, if you are not familiar with safety precautions you must never work on your equipment whilst it is plugged into the mains. (Switching off at the wall socket does not necessarily make equipment safe)

I then set TC2001 so that the voltage measured was in the centre of this range. Next I left the rig overnight and made sure that when it was switched on from cold – that it would receive and transmit anywhere in the band – and that it also remained in lock after a few hours when it warmed up.

Beyond that, all I thought that could be done, was to put the rig back into use and hope that the fault that had caused it to lose lock is not intermittent. Those variable frequency oscillators (v.f.o.s) and voltage controlled oscillators (v.c.o.s) that drift or jump off frequency can be a real pain – but more about that some other time!

I come across quite a number of the older 144MHz rigs that are not functioning due to PLL troubles. I've no doubt one or two of my readers may have one and have decided that it's not worth the cost of getting someone to repair it. However, I encourage you to dig out the service instruction, or have a hunt on the Internet for them and it might be that a slight 'tweak' on the PLL trimmer, or attention to a lazy crystal is all that is needed.

Make Do and Mend

'**Bert**' arrived with an FT-902 that was intermittent on transmit. He told me that, "Sometimes I switch it on and it is fine, on other days there is no I/C reading (i.e. the p.a. valve's current meter) and it won't transmit!"

From my own experience I can say that intermittent faults are the nightmare of the service engineer! This is because it's possible to waste hours and the engineer just can't invoice 10 hours at £35 an hour to solder one joint! Fortunately, in this case I had an idea as to what the fault might be.

Like the FT-101 and the FT-901, the FT-902 has a heater switch on the front panel. The switch is rated at 250V at several amps but like most switches it's not that keen on switching low voltages with a high current over a long time. Valve filaments – in the same way as electric light bulbs – have a very low resistance when they are cold, resulting in a large switch-on surge.

If interested readers care to measure the resistance of the heater of a 6146 valve when it's cold, they'll find that it's less than an Ohm. And my rough calculations show that with two in series – plus the 12BY7A driver's heater in parallel – the surge for the first fraction of a second when the switch is closed must be in the region of 10 to 20 amps. After 15 or 20 years service the switch cries 'enough' and starts to be intermittent and this proved to be the case with Bert's rig.

Replacing the switch involves removing and refitting the entire front panel, the knobs and the nuts on many controls, together with quite a few connections. Rather a lot of work! The cost of this, plus a normal 'MOT' would amount to around two thirds of the value of the rig, hardly worth it. Personally, I could of course have just shorted out the switch but there's a better answer. More details next month! ●

Feature

Internet Linking for Radios

An old friend of mine, **Don G3YFS**, now sadly a Silent Key, introduced me to me idea of linking Radio Amateurs by computer, and by a telephone connection. Don used to tell me about systems, to allow Amateurs to talk to each other over the Internet without all the background noise that is Amateur Radio today.

So, I downloaded the then current version of the *Echolink* software (from the website **www. echolink. org**). I soon had my callsign verified and off I went, to explore the new opportunities on offer. I discovered the possibility of making DX contacts that would be almost impossible to achieve without the expense of huge antennas, power and irate neighbours to boot!

Real Radio

The Echolink concept will undoubtedly be subject to comments that it is not 'real radio', and yes I can go along with that to some extent. The only radio part that I know about, is the radio linking to a remote server! However, I have spoken to users about this aspect, and I have found that the system has enabled them to make and keep in contact with many other Amateurs, both here in the UK and abroad.

Many Amateurs that I've spoken to, are either bed-ridden or are living in sheltered accommodation. Some may also have no chance of erecting that huge mast and beam.

They can still speak with other Amateurs without having problems with planning, and other devious plots to keep them off the air!

The present system credits go to **Jonathan Taylor K1RFD**, who runs the system. There's quite a lot of information and detail available on the website, which makes good reading. I'll leave it to the reader to explore this aspect for themselves, as it would take too much space here! Voice signals from into a computer's soundcard are converted into a digital signal, similar to packet radio or a data stream.

The digitised sound packets then go via the Internet into the telephone system making their way to the recipient, where the packages of data are reconverted back into sounds, again in a soundcard. The operations and 'ends' are swapped over to make the contact a two-way communication.

It's not obligatory to have a computer, as Amateurs can call up a linked repeater radio station. Here operators call into the repeater that's linked to the remote station at the same times as local repeating.

Simple To Operate

The *Echolink* program is very simple to operate, downloaded and installing itself into a *Windows* environment to run the programme. Non-broadband internet access has enough performance for single contacts but a much faster broadband connection is preferable for multiple contacts in the conferencing mode.

In use, the screen shows a list of stations that are active or 'on'. There's a list that shows the linked and repeater stations, and by moving the 'bar' downward with the mouse, 'live' stations come into view. Having selected a station that you would like to try and speak with, all you do is to select that station on the list and double-click to connect. The computer will then try to make contact and it shows its progress on-screen.

If you're successful, you might hear a 'ping' as the contact is made and the station operator's name and details appear. The keyboard's space bar toggles between speaking and listening mode, when a green 'RX' is displayed. Then press the space bar, to 'transmit', you'll see a box appear, showing the strength of the signal going into the sound card. Be careful not to over-drive it, or the audio will sound awful at the other end. But remember politeness is still the watch-word!

Not a Replacement

The *Echolink* program shouldn't perhaps be thought of as a replacement for 'real radio' but as a system it's very useful, and a 'must have' as a standby at least! I've found it convenient before now, to go to *Echolink* to complete a QSO on 40m that has been destroyed by QRM or the band fading out!

I have been surprised several times, when connecting into the system to get a 'wake-up' call from ZL land or from the USA. And it's all thanks to Jonathan Taylor K1RFD, and to **Graemme Berne MOCSH** and others involved in developing the programme from the original *Ilink* program.

Jack King G4EMC explains the background to the *Echolink* program in this simple overview of linking radios via the Internet.

club news

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!

Send all your club info to

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Broadstone,
Dorset BH18 8PW
E-mail: pwnews@pwpublishing.ltd.uk

BEDFORDSHIRE

Shefford &DARS
David Lloyd. Tel: (01234) 742757
www.sadars.org.uk
The Shefford and District Amateur Radio Society meets every Thursday at the Community Hall, Ampthill Road, Shefford, SG17 5BD (next to the Chip shop).

April 24th is a talk on 20's Hi-F by Brian G8GHR, May 1st is Calibration and all that by Dennis M3JXM, 8th is Micro DXpeditions by Roger Weston G3SXW and 22nd is a DF Hunt Mobile. On September 25th, they will be holding their 60th anniversary celebrations and would like to hear from any past members of the club (see web site for full programme).

BERKSHIRE

Reading & DARC
Pete Milton. Tel: (01189) 695697
www.radarc.org
The Reading & District Amateur Radio Club meets on the second and fourth Thursday of the month at Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Berkshire RG5 4LY. April 24th is an Evening Shopping Trip to ML&S, May 8th is the Latest Commercial PMR Radio by Tom Grady and 22nd is Top Band Direction Finding by Bill Pechey and Brian Bristow.

CHESHIRE

Chester & DRS
Graham. Tel: (07930) 655 121
E-mail: info@chesterdars.org.uk
www.chesterdars.org.uk
The Chester & District Radio Society meets on Tuesday evenings at the Burley Memorial Hall, Common Lane, Waverton, Chester CH3 7QT. April 23rd is a Quiz Night as guest of Wirral Club and 29th is the Icom ICR1000 PC Controlled Radio by Brian Levitt. May 6th is the 60th Anniversary Dinner.

Halton RC
Sam. Tel: (01928) 714231
http://g7wfs.sytes.net/hrc/index.htm
The Halton Radio Club meets in The Play Centre, Norton Hill, Windmill Hill, Runcorne WA7 6LJ every Thursday from 7.30 to 9.30pm. There's plenty of parking and full disabled access. April 17th is a Video Night.

Macclesfield & DRS
Ray King. Tel: (01260) 278431
www.gx4mws.com
The Macclesfield & District Radio Society meets every Monday at the Pack Horse Bowling Club, Westminster Road, Macclesfield SK10 3AT at 8pm. April 28th to May 6th is a DXpedition to the Isle of Jura.

Stockport RS
David Simcock. Tel: 0161 456 7832
www.stockportradiosociety.co.uk
The Stockport Radio Society meets on the first and third Tuesdays at the Bramhall Air Scouts HQ, Leewood Hall, Benja Fold off Ack Lane East, Bramhall, Stockport SK7 2BX. May 6th is National Field Day Preparation meeting and 20th is a photographic slide show featuring the travels of Gerry Jarvis G0WGJ.

Warrington Amateur Radio Club
Paul Carter. E-mail: g7odj@warc.org.uk
www.warc.org.uk
The Warrington Amateur Radio Club meets every Tuesday at 8pm at the Grappenhall Youth and Community Centre, Bellhouse Lane, Grappenhall, Warrington WA4 2SG. April 15th is a visit from Mark Francis of Waters & Stanton.

CORNWALL

Cornish RAC
Ian Williams. Tel: (01872) 561058
E-mail: ianporsche964@aol.com
www.cornishradioamateurclub.org.uk
The Cornish Radio Amateur Club meets at the Church Hall, Church Road, Perranarworthal, Truro TR3 7QE on the first Wednesday of every month at 7.30pm. There is also a Computer Section that meets at the same venue and time on the second Monday of every month, except December. April 26th is International Marconi Day, May 7th is a visit to Goonhilly Earth Station, 12th Computer Section Meeting is a talk by Alex G4DEOon Bar Codes.

Poldhu ARC
Keith Matthew. Tel: (01326) 574441
E-mail: g0wys@yahoo.co.uk
www.gb2gm.org
The Poldhu Amateur Radio Club meets at The Marconi Centre, Poldhu Cove, Nr Mullion, Cornwall TR12 7JB. Tel: 01326 241656. May 13th is a talk by Adrian Snell and Steve Gascom on Military Vehicles and their radios.

COUNTY DOWN

Bangor and District ARS
Mike. Tel: 028 4277 2383
http://www.bdars.com
The Bangor and District Amateur Radio Society meets on the first Thursday of every month in 'The Boathouse', Harbour Car Park, Groomsport BT19 6JP at 8pm. Visitors and new members are most welcome. May 1st is a talk in Six Metres by Charlie GI4FUE.

COUNTY DURHAM

Bishop Auckland RAC
Mark Hill. Tel: (01388) 745353
http://barac.m0php.net/
The Bishop Auckland Radio Amateur Club meets every Thursday at 8pm in the Village Community Centre, Stanley Crook, Co. Durham DL15 9SN. Tuition for Foundation, Intermediate and Advanced licences is available. The club is registered as an RSGB exam centre.

Great Lumley AR&ES
David Barclay. Tel: 0191 3888113
E-mail: m0bpm@btinternet.com
The Great Lumley Amateur Radio & Electronics Society meets in the Community Centre, Front Street, Great Lumley, Chester-le-Street, Co. Durham DH3 4JD on Wednesday nights from 7 to 9pm.

DERBYSHIRE

South Normanton Alfreton and District ARC
A J Higton. Tel: (01773) 783658
E-mail: snadarc@linuxmail.org
www.snadarc.me.uk/
The South Normanton Alfreton and District Amateur Radio Club meets in the Village Hall, Community Centre, Market Street, South Normanton, Derbyshire DE55 2EJ. April 21st is a Junk Sale and 28th is a Bingo Night, May 5th is the Project Competition results (also the start of a photo competition, 19th is a Junk Sale, 21st is a Committee Meeting and 26th is an Inter Club Quiz night.

DEVON

Torbay ARS
Dave Helliwell. E-mail: g6fsp@tars.org.uk
www.tars.org.uk
The Torbay Amateur Radio Society meets Fridays at 7.30pm in the Teignbridge District Scout Headquarters, Wolborough Street, Newton Abbot, Devon TQ12 1JR. April 25th is a 90/10 Sale, May 2nd & 16th are Operating Night, 9th & 23rd are Natter Nights.

DORSET

Bournemouth RS
John. Tel: 07719 700 771
www.brswebsite.org.uk
The Bournemouth Radio Society meets on the first and third Friday of each month at the Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. Meetings take place in Room 5 at 8pm and members assemble in the bar from 7.30pm. Visitors are always welcome.

EAST SUSSEX

Brighton RC
Reg Moores. Tel: (01273) 503869
The Brighton Radio Club meets on the second and fourth Tuesdays of each month at the Vallance Community Centre, Conway Court, Sackville Road, Hove BN2 3WR at 7.30pm. Anyone wishing to know more are welcome to come along to a meeting, entrance is free.

Hastings E&RC
Gordon Sweet. Tel: (01424) 431909
E-mail: gordon@gsweet.fsnet.co.uk
www.herc.uk.net
The Hastings Electronics & Radio Club meets on the third Wednesday at the Taplin Centre, Upper Maze Hill, St Leonards on Sea TN38 OLQ at 7pm. April 18th is a Spring Auction at William Parker School, Parkston Road, Hastings at 7pm, entrance is £1.

ESSEX

Braintree & DARC
Keith. Tel: (01376) 329279
www.badars.org.uk
The Braintree & District Amateur Radio Society meets on the first and third Monday of the month in The Clubhouse, Braintree Hockey Club, Church Street, Bocking CM7 5LJ. April 21st is How to operate HF rigs and 28th is Club nets. May 5th is Mills planning and Safety Testing part 2 and 19th is the AGM.

Colchester RA
David Chambers. Tel: 07766 543784
www.g3co.ccom.co.uk
The Colchester Radio Amateurs meets at 7.30pm on alternate Thursdays at St Helena School and The Colchester Institute, Sheepen Road, Colchester, Essex CO3 3LE. Members and non-members welcome. April 17th is the ZL Special with Alan Cross G0HKG at the St Helena School.

Chelmsford ARS
Martyn Medcalf. Tel: (01245) 469008
E-mail: info2007@g0mwt.org.uk
www.g0mwt.org.uk
The Chelmsford Amateur Radio Society meets on the first Tuesday of each month in the Marconi Sports & Social Centre, Beehive Lane, Great Baddow, Chelmsford CM2 9RX at 7.30pm. May 6th is The Beacon Network by RSGB Board Director Leslie Butterfields.

Loughton & Epping Forest ARS
Marc Litchman. Tel: 020 8502 1645
E-mail: info@lefars.org.uk
www.lefars.org.uk
The Loughton & Epping Forest ARS meet Friday fortnightly at All Saints House, Romford Road, Chigwell Row, Essex IG7 4QD between 7.45 and 10pm. All visitors will be made most welcome. April 25th is Distributed Computing & the Search for Extraterrestrial Intelligence by Marc Litchman G0TOC, May 9th is an HF Night-on-the-Air and 23rd is a Bring & Buy Table-Top Sale.

HAMPSHIRE

Fareham & District ARC
Ken Sapsed. Tel: 023 9279 7240
E-mail: secretary@fareham-darc.co.uk
www.fareham-darc.co.uk/
The Fareham & District Amateur Radio Club meets on Wednesdays evenings from 7.30pm in the Portchester Community Centre, Westlands Grove, Portchester, Fareham PO16 9AD. April 16th is an evening with Steve G7HEP and 30th is an evening with Andrew G0AMS. May 7th is a Natter Night and Club Station Operating with G3VEF/G8KGI, 14th is an 80m Data Club Contest 7 to 10.30pm, 21st is My 2 Metre Rig by Dave G8IOJ and 28th is PICs by Derek G4JLP.

Horndean & District ARC
Stuart Swain. Tel: (02392) 472846
E-mail: g0fyx@msn.com
www.hdarc.co.uk
The Horndean & District Amateur Radio Club meets on the first and fourth Tuesdays each month in the Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants PO8 9SF at 7.30pm. Visitors are always very welcome. April 22nd is a talk by David Clark (ex-Radio Officer) on "The last voyage of the RMS *Queen Mary*", May 6th is a Natter night/social evening, 27th is a visit by the RSGB President and club member Colin Thomas G3PSM, he will be giving a talk "What has the RSGB ever done for me?"

HUMBERSIDE

Hull & District ARS
Raymond Penny. Tel: (01482) 504618
E-mail: sirraymond@sirraymond.karoo.co.uk
The Hull & District Amateur Radio Society meets every Friday at the Walton Leisure Centre, Walton Street, off Anlaby Road, Hull HU3 6JB.

KENT

Bredhurst RATS
www.the-brats.co.uk
The Bredhurst Radio Amateur & Transmitting Society meets on Thursdays at the Parkwood Community Centre, Rainham, Gillingham, Kent ME8 9PN at 8.30pm. If you are interested in joining the club, write to: Membership, The BRATS c/o The Club Room, The Parkwood Community Centre, Long Catlis Road, Rainham, Gillingham, Kent, ME8 9PN. May 15th is the AGM.

Bromley & DARS
Graham
E-mail: bdars@grahamc.net
www.bdars.org
The Bromley & District Amateur Radio Society meets in The Victory Social Club, Kechill Gardens, Hayes, Kent BR2 7NH (off B265, Hayes Lane, Bromley) on the third Tuesday of the month at 7.30pm. April 15th is An Erk's Existence (5 years in the RAF) with Peter G7UFQ and May 20th is SSTV with Martin G3OQD.

LANCASHIRE

Oldham RC
Christopher Cunliffe. Tel: 07749347142
E-mail: secretaryoarc@btinternet.com
www.oarc.org.uk
The Oldham Radio Club meets on Thursdays at Royton Air Training Corps, Hillside Avenue, Royton, Oldham OL2 6RF at 7:30pm. May 8th is the Foundation exam, 18th is 144MHz 1st backpackers (from Moss Moor), 29th is a committee meeting.

Ellenroad RC
David. Tel: (01706) 358650
E-mail: info@ellenroadradioclub.org.uk
http://www.ellenroadradioclub.org.uk/info.htm
The Ellenroad Radio Club (ERC) meets every Monday evening from 7 to 9pm at the Ellenroad Steam Museum, Elizabethan Way, Newhey, Rochdale OL16 4LG. The museum houses the UK's only fully-working cotton mill engine, complete with its original steam raising plant and 220ft high chimney. Newcomers are always welcome and made to feel at home.

LINCOLNSHIRE

Eagle RG
Eddie Lingard. Tel: 01507 472695
E-mail: e.f.lingard@btinternet.com
www.eagleradiogroup.com
The Eagle Radio Group meets at The Eagle Hotel, Victoria Road, Mablethorpe LN12 2AJ on the second Tuesday of each month, meetings start at 8pm. The group operates an open policy so, if you are in the area, pop in. May 13th is a talk by John M3ERG on Digital Modes.

Spalding & DARS
Graham Boor. Tel: 07947764481
E-mail: secretary@sdars.org.uk
www.sdars.org.uk
The Spalding & District Amateur Radio Society meets at the Castle Sports Swimming Complex, Spalding PE11 1QF on Fridays at 7.30pm.

LONDON

Cray Valley Radio Society

Bob Treacher. Tel: 020 8265 7735
www.cvrs.org
The Cray Valley Radio Society meets on the first and third Thursdays of the month at the Progress Hall, Admiral Seymour Road, Eltham, London SE9 1SL at 7.30pm for 8pm. April 17th is the AGM. May 1st is a talk on EMC (TBC), 15th is Knots for Radio Amateurs by Dave G4BUO and 19th is a Committee Meeting.

Southgate ARC
Donald F Berry. Tel: 020 8360 3614,
E-mail: dfberry@eggconnect.net
www.southgatearc.org
The Southgate Amateur Radio Club meets on the second Thursday of the month at Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London N21 3ER at 7.30pm. May 8th is a talk on GB2RS.

Wimbledon and District ARS
Jim Bell. Tel: 020 8874 7456
E-Mail: james@jbell5.wanadoo.co.uk
www.gx3wim.org.uk
The Wimbledon & District Amateur Radio Society meets on the second and lat Friday of the month at Martin Way Methodist Church, Buckleigh Avenue, Merton Park, London SW19 9JZ. Visitors are welcome whether they are licensed or not. April 25th is a Surplus Equipment Sale. May 30th is an Urban Fox Hunt from 8pm to 10pm.

THE LOTHIANS

Cockenzie & Port Seton ARC
Bob Glasgow. Tel: (01875) 811723
E-mail: gm4uyz@cpsarc.com
www.cpsarc.com/news.php
The Cockenzie & Port Seton Amateur Radio Club meets in the Thorntree Inn (Lounge Bar), High Street, Cockenzie, East Lothian EH32 0HP from 7pm till late. Organised talks are held in the Port Seton Community Centre, South Seton Park, Port Seton, East Lothian EH32 0EE. April 19th is a 10 Pin Bowling Night at Megabowl Kinnaird Park at 8pm, May 9th is the first 144Mhz DF Hunt meet in The Old Ship Inn Car Park (East) 6.30 for 7pm, 23rd is a talk & discussion on How to Improve Your Operating Skills (Port Seton Community Centre Resources Room 2 7.30 - 9.30pm) and 31st is Port Seton Gala Day – Community Centre Park 10am to 4pm.

Lothians Radio Society
Tony Sigouin. Tel: 07739742367
E-mail: enquiries@lothiansradioscoiety.com
www.lothiansradiosociety.com
The Lothians Radio Society meets on the second and fourth Mondays of the month in the Royal Ettrick Hotel, 13 Ettrick Road, Edinburgh EH10 5BJ from 7pm. Membership costs £12 per year and includes a free BBQ every June! April 23rd is a visit to Leith FM, May14th is an RSGB Talk and 28th DF Hunt by GM4DTH.

MERSEYSIDE

Wirral & District ARC
Tom. Tel: 07050 291850
E-mail: secretary@wadrac.com
www.wadarc.com
The Wirral & District Amateur Radio Club meets at the Irby Cricket Club, Mill Lane, Irby CH61 4XQ on the second and fourth Wednesdays of each month. Other Wednesdays are informal (D&W) meetings at a local hostelry. April 23rd is a Quiz with Chester and District RS, 27th is the N.Wales DF Challenge (Sunday) and 30th is a D&W at The Egremont Ferry, Wallasey. May 7th is a D&W at The Chimneys Hooton, 14th is a Radio Night, 21st is a D&W at The Green Lodge Hoylake and 28th is a Practice DF.

NORFOLK

King's Lynn ARC
Ray Dowsett, MBE. Tel: (01553) 671307
E-mail: ray-g3rsv@supanet.com
http://www.klarc.org.uk
King's Lynn Amateur Radio Club meets every Thursday at the Scout HQ, Chequers Lane, West Winch, King's Lynn, PE33 0NY off the A10 at West Winch at 7.30pm.

North Norfolk ARG
Tony Smith. Tel: (01263) 821936.
E-mail: g4fai@btinternet.com
www.radioclubs.net/nnarg/
The North Norfolk Amateur Radio Group meets in the Radio Hut at the Muckleburgh Collection Military Museum, Weybourne, North Norfolk NR25 7EG on Wednesdays and Thursdays from 10am to 4pm and some Sundays from 1 to 4pm. New members always welcome.

NORTHAMPTONSHIRE

Kettering & District Radio Society
Lorna Froggatt. Tel: 0153 676 2523
E-mail: LornaSteveLorna@aol.com
The Kettering & District Radio Society meets each Tuesday from 7 to 9pm in the winter at The Lilacs Pub, Church Street, Isham, Northants NN14 1HD and in the summer at the Carpetbagger Aviation Museum, Sunnyvale Farm Nursery, Harrington NN6 9PF. Foundation, Intermediate and Advanced courses are held regularly.

SHROPSHIRE

Salop ARS
Richard Golding. Tel : 01743 356195
The Salop Amateur Radio Society meets in The Telepost Club, Railway Lane, Abbey Foregate, Shrewsbury SY2 6BT on Thursday between 8 and 10.30pm. May 1st is a Natter Night, 8th is Fox Hunt No.1 start 7.30pm in Abbey Car Park. 15th is a Natter Night, 22nd is Members Talk Night, round the Table out of the Hat and 29th is a Quiz Night at the Powys Club HQ.

Telford & District ARS
Mike Street. Tel: (01952) 299677
E-mail: mjstreetg3jkx@blueyonder.co.uk
www.tdars.org
The Telford & District Amateur Radio Society meets on Wednesdays at the Little Wenlock Village Hall, Malthouse Bank, Little Wenlock. Telford TF6 5BG at 8pm. April 23rd is Getting the Club Projects going with G0VXG and 30th is a talk on Radio Astronomy (provisional), May 7th is an Open House/Committee, 12th is a Hamfest Committee meeting, 13th is Ten minute technical talks, 20th is a Social evening with food and 27th is a Bring and sell auction with G8UGL.

SOMERSET

South Bristol ARC
Len Baker. Tel: (01275) 834282
E-mail: g4rzy@msn.com
www.sbarc.co.uk
The South Bristol Amateur Radio Club meets at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol BS14 0LN. April 23rd is an introduction to RAYNET with Sean and 30th is an On the Air Evening. May 7th is a Morse Code Workshop, 14th is a Survey of Shack Equipment, 21st is a Summer Table Top Sale and 28th is an On the Air Evening Club.

Yeovil ARC
Gary.
E-mail: g.swain@tesco.net
www.yeovil-arc.com/
The Yeovil Amateur Radio Club meets at the Red Cross Centre, Grove Avenue, Yeovil BA20 2BE (on the corner where Grove Avenue meets Preston Road). April 24th is a Committee meeting and station on air and 27th (Sunday) is the QRP Convention, May 1st is Mobile telephones by G4RKY, 8th is Photo Quiz, 15th is RAD HAZ by G4DCH, 22nd is a Video Evening and 29th is a Committee meeting & station on air.

SOUTH GLAMORGAN

Barry ARS
Glyn Jones. Tel: 01446-774522
E-mail: glyndxis@talktalk.net
www.bars.btik.com
The Barry Amateur Radio Society meets on Tuesday from 7.30 to 10.30pm in the Sully Sports & Social Club, South Road, Sully CF64 5SP. May 27th is How Can I get on Top Band by Pat Provist MW0XMG.

SOUTH GLOUCESTERSHIRE

Thornbury and South Gloucestershire ARC
Tony. Tel: (01454) 417048
E-mail: tonytsgarc@beeb.net
http://jma-databases.co.uk/tsgarc/index.php/Thornbury_%26_South_Gloucestershire_Amateur_Radio_Club
The Thornbury and South Gloucestershire Amateur Radio Club meets in the United Reformed Church Hall, on the corner of Chapel Street and Rock Street, Thornbury BS35 2BA at 7.30 - 9.30pm. April 16th is a Video Night, 23rd is Radio Restoration by Mike M1DPB and 30th is an On the Air Night. May 7th is a Direction Finding Preparation Workshop, 14th & 28th are On Air Nights and 21st is a video night.

SOUTH WALES

Barry ARS
Glyn Jones. Tel: (01446) 774522
E-mail: glyndxis@talktalk.net
www.bars.btik.com
The Barry Amateur Radio Society meets on Tuesdays from 7.30 to 10.30pm in the Sully Sports & Social Club, South Road, Sully CF64 9TG. April 29th is How to Work Satellites by Ken Eaton GW1FKY.

SOUTH YORKSHIRE

Axholme Radio Club
John Fennell. Tel: (01427) 872522
E-mail: g4hoy@tiscali.co.uk
The Axholme Radio Club meets at Hollytree Farm, Westend Road, Sandtoft, Epworth DN9 1LB on Wednesdays at 10amm to 4pm, Thursdays at 7 - 9pm and Saturdays from 10am - 4pm (other times by arrangement).

STAFFORDSHIRE

Tamworth Amateur Radio Society
Colin Marks. Tel: (01827) 700893
E-mail: colin.marks2@ntlworld.com
The Tamworth Amateur Radio Society meets every Thursday at 7.30pm at St Francis Church, Masefield Road, Leyfields, Tamworth B77 8JB. April 17th the club station is on the air.

SURREY

Sutton & Cheam RS
John Puttock. Tel: 020 8644 9945
E-mail: info@scrs.org.uk
www.scrs.org.uk
The Sutton & Cheam Radio Society meets on the third Thursday of the month at 7.30pm in Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey SM1 2EY. In addition to monthly meetings, licence training courses are held at regular intervals in Banstead Surrey. April 17th is Loops and Other Small Antennas by Professor Mike Underhill G3LHZ. May 1st is a Natter Night and 15th is the AGM and Constructional Contest.

TYNE & WEAR

Angel of the North RARC
Nancy Bone. Tel: 0191 477 0036
E-mail: nancybe2001@yahoo.co.uk
www.anarc.net
The Angel of the North Radio Amateur Radio Club meets every Monday 7 to 9pm at Whitehall Road Methodist Church Hall at the corner of Whitehall Road and Coatsworth Road, Bensham, Gateshead NE8 4LH. The entrance to radio club room is through door at the side of building next to the car park. The car park entrance is on Whitehall Road.

Tynemouth ARC
Tony Regnart. Tel: 0191 280 1981
E-mail: tony.regnart@gmail.com
www.gx0nwm.co.uk
The Tynemouth Amateur Radio Club meets each Friday from 7 to 9pm at St. Hilda's Church, Stanton Rd, North Shields, Tyne & Wear NE29 9QB. It's known locally as 'the church near the fire station'. April 18th is the Annual General Meeting, 25th is the International Marconi Day Briefing and 26th is International Marconi Day. May 2nd is Portable Operating with Graham M0GAE and 9th is an Operating Night.

WEST MIDLANDS

Aldridge & Barr Beacon ARC
Roy Horton. Tel: (01922) 691646
E-mail: leslie137@btinternet.com
www.g0neq.co.uk
The Aldridge & Barr Beacon Amateur Radio Club is a daytime club and meets at the Aldridge Community Centre, Middlemore Lane, Aldridge, Walsall WS9 8AN on the first and third Monday of every month at 2pm to 4pm. They have a long wire and a 2 metre antenna for radio operation using the club callsign G0NEQ. April 21st is a Photoshop Master Video Show by Horace, May 5th there is no meeting (Bank Holiday) and 19th is an afternoon on the air.

Midland AX25 Packet Radio Users Group
Miles. Tel: 01384 254199
www.maxpak.org.uk
The Midland AX25 Packet Radio Users Group, MaxPak, meets on the first Monday of the month at The Sir Robert Peel, 104 Bell Lane, Bloxwich, Walsall WS3 2JS.

Sutton Coldfield RS
Andy Sherman. Tel: (01827) 875155
E-mail: peugeotnut@hotmai.com
www.hamradio.piczo.com
The Sutton Coldfield Radio Society Meets on the second and fourth Monday of the month at 7.30pm (no meeting on bank holiday Mondays) in the Sutton Coldfield Rugby Club, 160 Walmley Road, Sutton Coldfield, West Midlands B762QA.

Wythall Radio Club
Chris Pettitt. Tel: (07710) 412 819
E-mail: g0eyo@wythallradioclub.co.uk
www.wythallradioclub.co.uk
The Wythall Radio Club is based at Wythall House, Silver Street, Wythall, near Birmingham B47 6LZ. They meet every Tuesday at 8pm and meetings are informal and friendly. April 22nd is a Natter Night and 29th is a Quiz Night on General Knowledge and Radio. May 6th is the 2m Club Championship.

WEST SUSSEX

Horsham ARC
Andrew Vine. Tel: (01483) 272456
http://www.harc.org.uk/
The Horsham Amateur Radio Club meets on the first Thursday of the month at The Guide Hall, Denne Road, Horsham, West Sussex. April 17th is a Social at The Frog and Nightgown, Faygate, 24th is the 80m Data Club Championship and 26th is the HARC Grand Day Out (via Calais). May 1st is The Origins of the with G6DGK, G4JHI & G4TMC, 5th is 80m SSB Club Championship 7 - 8.30pm, 14th is 80m Data Club Championship 7 - 8.30pm, 15th is a Social at The Fountain Inn, Ashurst, 22nd is 80m CW Club Championship 7 - 8.30pm and 29th is a 2m DF Hunt.

Worthing & DARC
Roy or Joyce. Tel: (01903) 753893
www.wadarc.org.uk
The Worthing & District Amateur Radio Club meets every Wednesday at 8pm in the Lancing Parish Hall, South Street, Lancing, BN15 8AJ. There's a free car park at the rear and full disabled access. Visitors are always welcome. April 30th is GX3WOR on the Air.

WEST YORKSHIRE

Pontefract & District Radio Club
Colin. Tel: (01977) 677006
E-mail: info@pontefractradioclub.org
www.pdars.com
The Pontefract & District Radio Club meets every Tuesday from 7pm and Thursday from 8pm at the Carleton Centre, Carleton Grange, Carleton Road, Pontefract, West Yorkshire WF8 3RJ.

WILTSHIRE

Trowbridge & District ARC
Ian Carter. Tel: (01225) 864698
E-mail: ian.l.carter@btinternet.com
http://uk.geocities.com/tdarc@btinternet.com
The Trowbridge & District Amateur Radio Club meets at Southwick Village Hall, Southwick (nearest postcode is BA14 9QN). May 7th is Expedition to Everest Base Camp with Dave Mansbridge and 21st is a Natter Night.

WORCESTERSHIRE

Worcester RAA
Martin Carter. Tel: 07976 917987
E-mail: secretary@m0zoo.co.uk
www.wraa.co.uk
The Worcester Radio Amateurs Association meets on the second and fourth Tuesday at the Hallow Scout HQ, off Main Road, Hallow, Worcester WR2 6PP. Visitors, as always, will find a warm welcome at the new clubhouse, as will potential new members.

Club Secretaries

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!

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Amateur

radio personality

Tim Walford G3PCJ

Regular *PW* author Tim Walford G3PCJ chats to the Editor and reveals a truly varied career involving electronics and farming!

***Rob G3XFD**: It's my pleasure this month to feature Tim G3PCJ as our Amateur Radio Personality. Thanks for accepting the invitation Tim! But just how long have you lived in your beautiful Somerset farmhouse?*

Tim G3PCJ: Thanks for the inviation Rob and it's a pleasure, although as you know I don't like 'blowing my own trumpet' so to speak! My family moved to existing farm and house in Long Sutton in 1949 when I was seven and my first electrical job (aged seven) was to install limited battery powered light as there was no mains electricity supply! I then made an old non-working system using a generator and 24V batteries and generator system to work.

***Rob G3XFD**: Obviously, your interest in electricity and electronics started at an early age Tim but when did you get your Amateur Radio Licence?*

Tim G3PCJ: I Obtained the G3PCJ licence while still at School in 1959. At that time I made several items of home-brewed valved equipment and I still have – and use – a Heathkit dipper from that time. I was never too keen on c.w. in those days so, much operating was done on a.m. then using 6V6, 6L6s, etc. I let my licence lapse about 1962/3.

***Rob G3XFD**: Where did you go from school Tim?*

Tim G3PCJ: From there Rob, my further education took me to Bristol University from 1959 to 1963 and I gained a Bachelor of Science 2-1 degree in Electrical Engineering. During my studies I gathered an interesting quote from our Professor, who was a man for the heavy electric motor, "Nothing under half megawatt is worth bothering with", is what he told us! My own Thesis was on op-amps and low frequency audio filtering with twin variable coupling state variable filters – and this turned out to be useful when I was designing a c.w. filter 40 years later!

***Rob G3XFD**: Having chatted to you many times when I've visited as a guest of you and your delightful wife **Janet**, I know you've had some exciting adventures Tim. Of those adventures, which do you remember with the most pleasure?*

Tim G3PCJ: I think it has to be my Student trip to Africa when I helped drive a 1930 Austin 16-6 through Spain and along North Africa, taking the boat down the River Nile to Sudan, and on to Kenya towards Cape Town, with three other students. The car got there safely but I got jaundice and had to return home from Tanzania for an enforced break! While recovering at home, I mechanised an automatic calf-milk feeder with a Meccano timer driven by a gramophone motor – the whole thing became known as the 'Twinkle tit' and much of it is in the Walford Electronics (WE) museum now!

***Rob G3XFD**: Once recovered from the jaundice and equipped with your engineering training, where did your skills take you Tim? I understand you had a number of interesting jobs!*

Tim G3PCJ: Yes, I certainly travelled Rob! I had Student Vacation jobs with AEI at New Parks, Leicester and with BBC, at the Rampisham

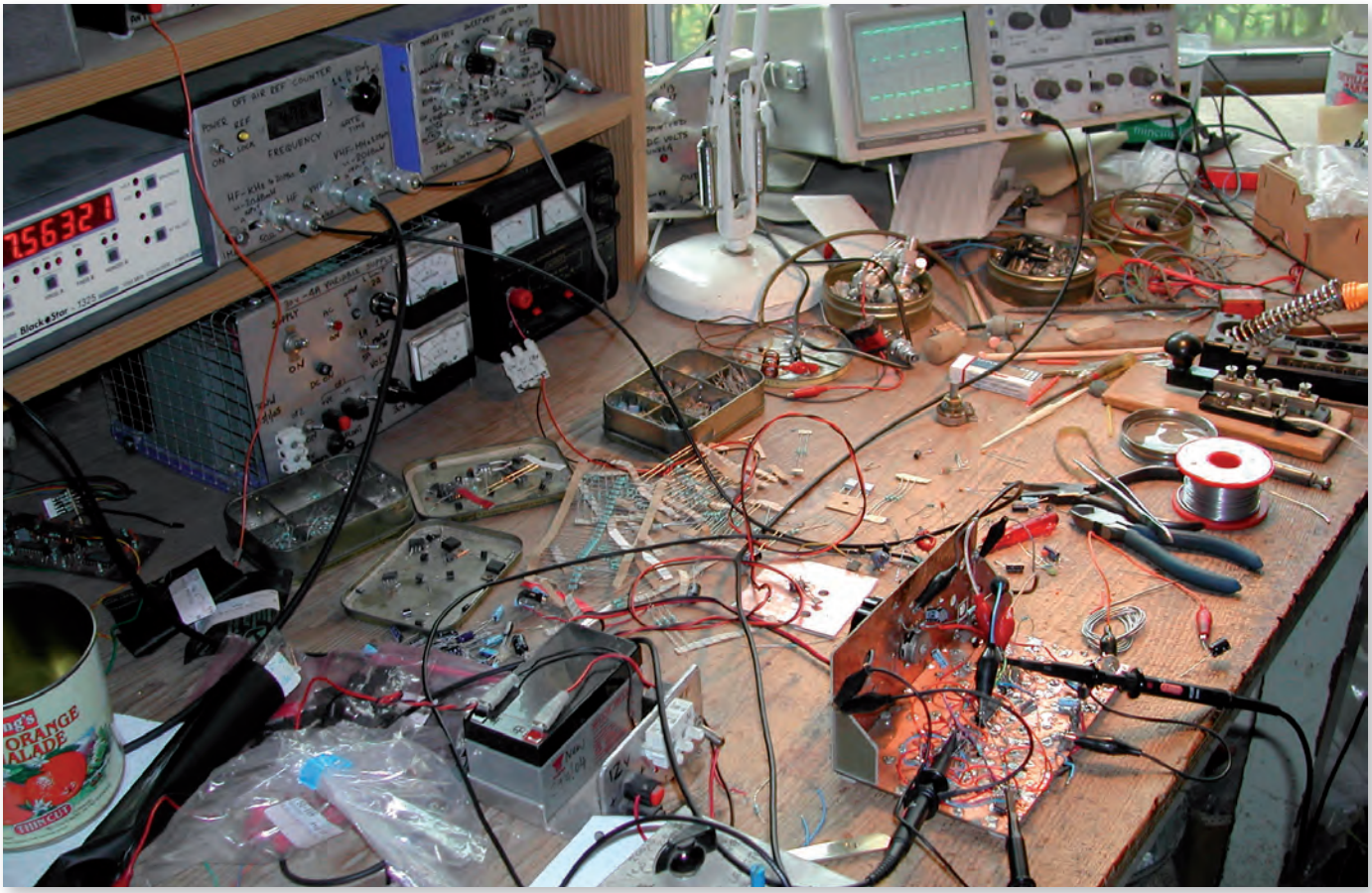


Fig. 2: Where it all beigns – the G3PCJ design desk!

short wave transmitter site and in London from 1963 to 1974. I also worked with Ferranti Ltd at Bracknell, digital systems division, where we designed and had built the division's first integrated circuit computer. It used an existing logic design but a physically totally new integrated cicuit processor using TO5 MECL-1 logic, new core memory, mechanics and four layer printed circuit boards. It had 24-bit 'words' with many instruction functions and three field address (not like common single address modern designs) so it could do two separate fetches, and mult/div and put results into a third memory location, all in one instruction which took 330nS (3MHz clock!). The first machine went to Heathrow for flight control use and had 4096 words of memory equivalent to just 12K bytes for data and program! We went onto to design warship computer weapon systems, and were heavily involved with many classes of ships later used in Falklands and founded the firm's Weapon Systems Engineering group, etc.

***Rob G3XFD**: Fascinating Tim! I think that you then became involved with work for the Fleet Air Arm – but a little later than my time with the Fairey Gannet aircraft?*

Tim G3PCJ: Yes, but my work was with rotating wing aircraft Rob, when between 1974 and 1979 I had moved to Dorset and joined Westland Helicopters in nearby Yeovil in Somerset, working on payload avionic systems for military helicopters. My main claim to fame was helping to change the Ministry of Defence's ideas of using the *Sea King* helicopter (with a major upgrade) for service till about 2025. Eventually, the MOD realised that they needed the new aircraft that's now known as the *Merlin*, which has been in service for several years now. I helped to get it into the Project Definition stage and then changed tactics for farming!

***Rob G3XFD**: So you eventually ended back at the farm?*

Tim G3PCJ: Yes, from 1979 until to the present day when I started farming under Father's tutilage and moved to Long Sutton. My wife Janet and I with our son **Charlie** – our daughters **Victoria** and **Beckie** help out when they're home – farm 250 acres of beef on the Somerset Levels and corn, wheat, barley, and beans with a few sheep. The Farm has grown now to 285 acres and there's a heavy emphasis on conservation matters due to the very wet Somerset Levels and other environmental features. We planted 25 acres of woods on wet field corners, etc., and a new 3.5 acre orchard with walnuts, apples (dessert, cider, cooking and crab), plums and pears. We also dug a three acre conservation lake in 2006. We then changed from doing all own work oursleves to using farming partnerships with others for corn, beef/sheep and now specialist breeds for local markets instead of commodity supermarket types.

In 1982, we started converting redundant Victorian barns for letting as business units for other businesses to rent. I then started helping with the Royal Bath and West of England Agricultrual Society from about 1982, eventually running the Society's Conferences and remained on the Society's Board until 2008. I was also on the Somerset Branch Committee of the Country Land and Business Association from 1983 till 2003, with various head office Committee and branch chairmanship.

Fig. 3: Janet Walford always makes visitors feel welcome!

***Rob G3XFD**: You're obviously a busy chap Tim! When did you start Walford Electronics?*

Tim G3PCJ: I started Walford Electronics seriously in 1980. My first project was an 'acre-meter' for working out the area covered by a tractor with an implement attached. It's not commercial and now resides in the WE museum! I reclaimed the G3PCJ radio licence to help keep my brain active while physically working on the farm, made many radio projects inspired by the ARRL books and joined the Yeovil Amateur Radio Club in 1980.

My first serious attempts at kits for others appeared from about the 1981 QRP Convention onwards. I had an early dabble with two metres but later decided to stick with h.f. mainly (despite many competitors who have since gone out of business). I've created many kit designs, as each kit has relatively short life. I've written for *Radcom*, *Sprat* and *PW* intermittently from the 1990s – and for *PW* the Tiny Tim was first project and then came the *PW* Cadet experiments, etc.

***Rob G3XFD**: Your kits are very distinctive and – like myself – you prefer the 'open' style of construction. What's the reasoning behind your styling?*

Tim G3PCJ: My kit designs have very simple mechanics so that the emphasis is on the best performance from the electronics, maximising the value of what the buyer decides to spend. I do the electronics and leave the kit builders to enhance the mechanics if they wish, which they are more likely to be able to do! My kit range covers test gear, very simple regenerative receivers, direct conversion receivers and double sideband transmitters, superhet transmitter-receivers, transceivers and multiband rigs.

***Rob G3XFD**: You always seem to have new ideas on the way Tim – and those projects always seem to attract the dedicated traditional constructors – but the kits require a lot of hard work on your behalf don't they?*

Tim G3PCJ: Yes Rob, new designs are always on the go in my workshop. It's the design work that I enjoy the most, using new devices to advantage in novel ways. I started my *Hot Iron* subscription newsletter about 14 years ago and founded the Somerset Supper Competition in 2005. The problems of finding new leaded components are getting worse, as all the new stuff is surface mount – not wanted by my customers (nor micro-processors) as they're not repairable nor buildable!

My empahsis is on building and testing in stages. Of course, I have to use brand new components and they're not purchased from rallies as surplus as the kits need to be reputable and repeatable – hence they're not always cheap – but as ever 'you get what you pay for'. The extensive detailed instructions with much testing (by a very keen small band of dedicated helpers) also mean costly paperwork and I etch my own quality p.c.b.s using hand drawn photo masters and ultra–violet etch resist. The boards are then hand drilled by my faithful helper Brian the Drill – **Brian Purkiss G7SFY**! I don't provide a screen-printed components placement guide, so the builder has to think more about the role of parts and as a result gets a better understanding of how the circuit works.

***Rob G3XFD**: By using local Somerset names for your projects you've helped our understanding of west country geography Tim – so what's the name of the next place – or should I say project?*

Tim G3PCJ: All projects are called after places in Somerset – hence they're called the Somerset Range of kits. Currently I'm working on a new major design called the Minster, a multi-band phone and c.w. superhet with many extras, etc. I usually have about four projects in mind, ready for development into viable projects at any one time. But I'm not giving the names away just yet!

***Rob G3XFD**: I look forward to learning a little more of the Somerset geography Tim! Thanks for spending so much of your time chatting to me!*

Tim G3PCJ: It was a pleasure Rob and even though your grandchildren have had the 'grand tour' of Walford Hall' I look forward to your next – longer – visit! ●

Tony Nailer's

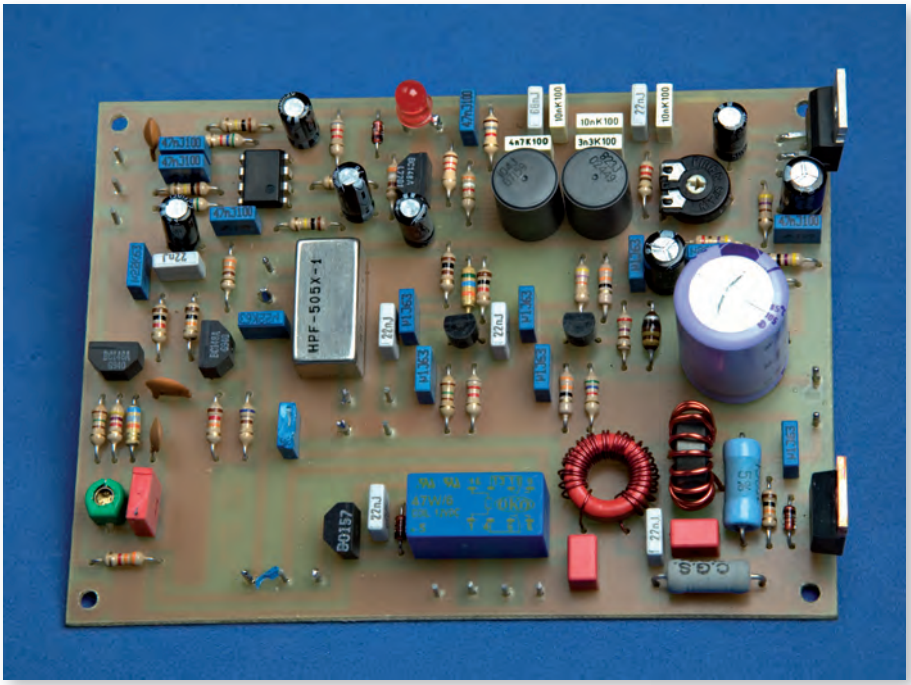
doing it by design

Tony Nailer G4CFY provides the final part of his design of a 1.8MHz amplitude modulated transmitter-receiver.

Welcome to Doing it by Design (DiBD) and the final part of the Top Band project. However, when I started this project I have to be quite frank and admit that I didn't realise just how involved it would turn out to be! As a designer, I make use of – where possible – bits of circuits I have developed before and just put them together to produce the result required.

The receiver part was quite easy as a large portion was extracted from the **Mellstock 4 Metre AM** receiver project. The pre-selector is really just a glorified pair of top coupled tuned circuits.

The variable frequency oscillator (v.f.o.) was based on the **Portland VFO** published in the March 2006 issue of *PW*, except this one is tuned with a conventional air spaced variable capacitor. Stability is really excellent due to the same considerations being applied in the 1.8MHz version as before.



The complete 1.8MHz transmitter.

Transmitter Trials

Much of the trials and tribulations during of the project development were dealt with in the previous DiBD in the March 2008 issue of *PW*. Development of the two transistor and power i.g.f.e.t. was done using a signal generator as the radio frequency (r.f.) source. Separately from this, a stable 455kHz oscillator was used together with a diode ring mixer, the v.f.o., and the pre-selector to produce a clean variable frequency signal.

The home-made mixer worked but was a bit too lossy. It also required winding toroids and, no doubt, readers will remember I asked the 'toroidophobics' not to panic because toroids are used! I then obtained a quantity of packaged ring mixers similar to the Mini-Circuits SBL-1.

One problem I encountered involved the output stage of the amplifier, where the low value resistor in series with the supply de-coupling capacitor was getting very hot. Unfortunately, there was no cure for this as taking it away allowed the de-coupling capacitor to resonate with inductance in the circuit and produce spurious sub harmonic oscillation! Increasing the value caused more heat to be generated and reduced the de-coupling efficiency of the capacitor. However, by trial and error, I arrived at a capacitor value at 22nF and a value of 4.7Ω, 2.5W.

Once I had the amplifier stability perfected, I discontinued the use of the signal generator, and 'married' the amplifier to the mixed and filtered source. The final result was excellent and there was no problem here at all.

What I did find during the long periods of testing, was that the series 1n5 capacitor, and shunt 3n3 capacitor in the output network got quite hot and this coincided with a fall in output power. Clearly what was happening was that the polyester capacitors were changing value when hot and causing a mismatched load. So, in place of these I tried mica, polystyrene, and high voltage ceramic types.

However, the high voltage ceramic capacitor got just as hot as the miniature boxed polyester type! Two factors appeared to be the cause of this – one is dielectric loss, the other is inductance, which manifests itself as power factor.

The polyester capacitors had a power factor of 0.007 but were economical. Polystyrene types had a power factor of 0.0005 but are very expensive £1.5 to £2 each. Micas were not given a power factor rating – but were also over £1 each!

Eventually I found a boxed polypropylene capacitor with a power factor of 0.0004, a tolerance of 5% and a host of other good characteristics. Size wise they are twice the thickness of the miniature polyester types. Best of all they can be included in the kit at about 60p each!

I then purchased a small quantity of each value and fitted them into the development circuit. It turned out to be very successful as running the amplifier for considerable periods of time the capacitors were only warm and the power output didn't drop.

The Modulator

Prior to the commencement of the Top Band a.m. project I was confident that either single-in-line amplifiers (as used in CB radios) or the 5-pin TO220

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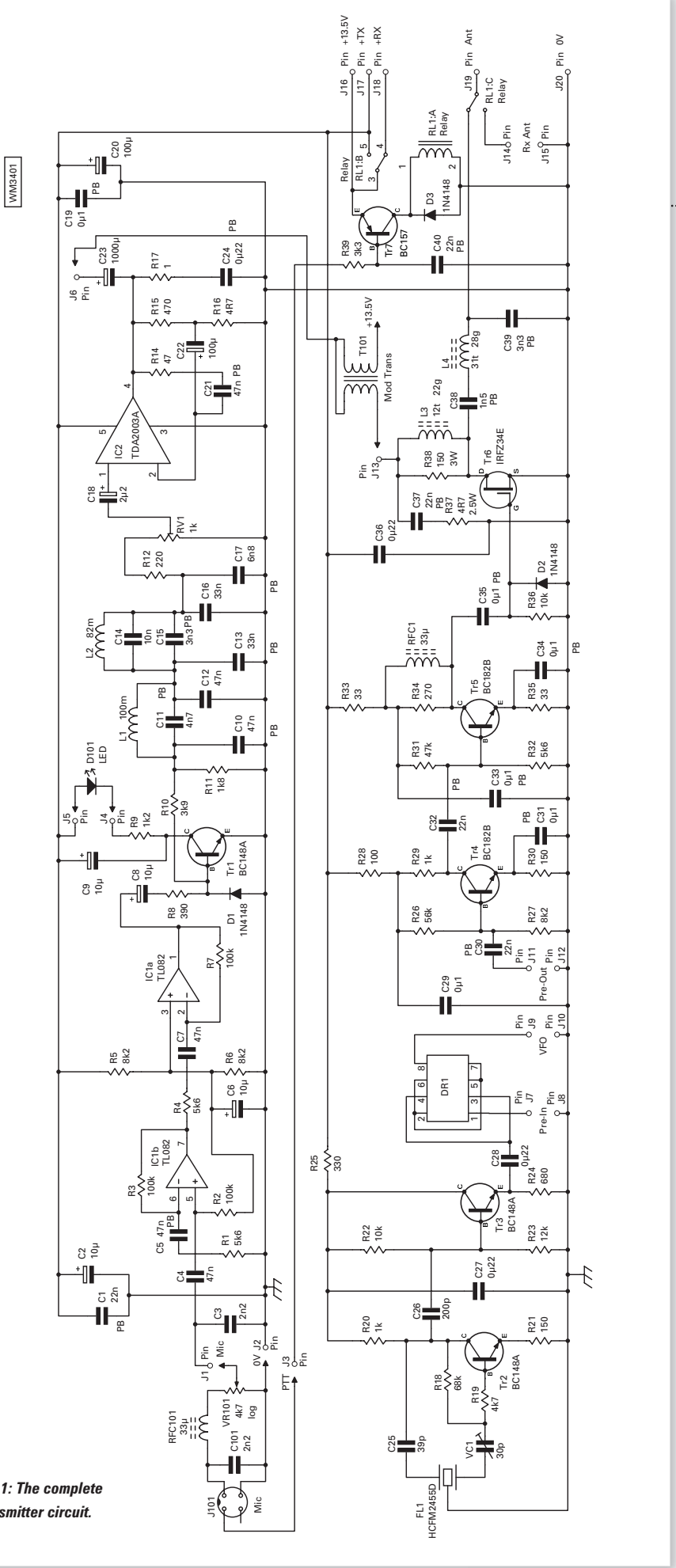


Fig. 1: The complete transmitter circuit.

Pentawatt package amplifiers (as used in car radios) would be suitable for the task.

Searching the catalogues for readily available types revealed the TDA2003 as being suitable for the job. I then obtained a couple of TDA2003V and then built a circuit strictly in accordance with the data sheet. Driving a 10Ω 5W resistor proved the circuit functional.

The gain setting resistors were 220 and 2.2Ω, giving a ratio of 101:1, setting the gain at 40dB. I have an old data book, which has the gain setting resistors **after** the load coupling capacitor, so no d.c. flows in them. Unfortunately, driving a transformer connected to the positive rail would preclude me from using this arrangement.

In the latest data sheets the feedback resistors are **directly** connected to ground, and the negative input to the device taken through a 470µF capacitor. So, as I didn't wish to draw an unnecessary 30mA though these resistors, I increased their values to 470 and 4.7Ω respectively. This allowed me to also reduce the value of the input coupling capacitor to 100µF while the circuit continued to function as before.

The modulation transformer, as used in the Mellstock transmitter, was connected between output and the supply rail and its output loaded with the 10Ω 5W resistor. All appeared still to be good!

The series 39Ω resistor and 39nF capacitor from output to input set the high frequency response too high. However, by trial and error I found that 47Ω and 47nF gave an upper cut-off frequency of around 4kHz.

In parallel with the load, there's a 1Ω resistor in series with a 100nF capacitor, which loads the output at high frequency. Increasing the capacitor value to 220nF reduced distortion at high output swings. After this work the amplifier was now as good as I could get it and produced a rail-to rail output swing for an input signal of 100mV.

The Modulation

The 1.8MHz transmitter was then married to the audio amplifier and tested using an audio oscillator. I then found that the modulation was clean and clear of any spurious signals but could only be increased to about 75% before noticeable distortion occurred.

Using my oscilloscope I found that the distortion occurred when the amplifier output was driven into saturation. Unfortunately, this meant that the ratio of the auto-transformer was not high enough. Instead of 1:2, it probably requires 1:3. Again, unfortunately I can't find an economically priced transformer of the right power rating.

There's a 100V line transformer available with 4, 8, and 16Ω tappings, which might do the job but it's rated at 30W and this will cost about £20. I intend to buy and test one of these and will offer it as an option if it achieves 100% modulation.

Audio Processor

The input stages of the processor up as far as the clipping indicator light emitting diode (l.e.d.) were taken from the Mellstock transmitter. The active low pass filter following this was discarded and in its place I used the elliptic low pass filter, which was the subject of DIBD in the July 2007 issue of *PW*. A quick look at that article and the comparison graph between the active and elliptic filter justified its use in the Top Band project.

The clipper in the processor will produce a symmetrically clipped signal of about 2V p-p. The filter, as previously designed, required source and load of 1.2kΩ and this can be neatly provided at the output end using a 680Ω resistor and grounded 470Ω trimpot. At its input a series 8.2kΩ resistor and a shunt 1.5kΩ resistor will give the required reduction of signal level and have a parallel equivalent resistance of 1268Ω.

Final Circuit

All the pieces were then in place and complete, so I drew up a final circuit of the transmitter. A relay was included to provide antenna and supply rail switching for the receiver and transmitter. The complete transmitter circuit is shown in **Fig. 1**. A companion parts list is also provided.

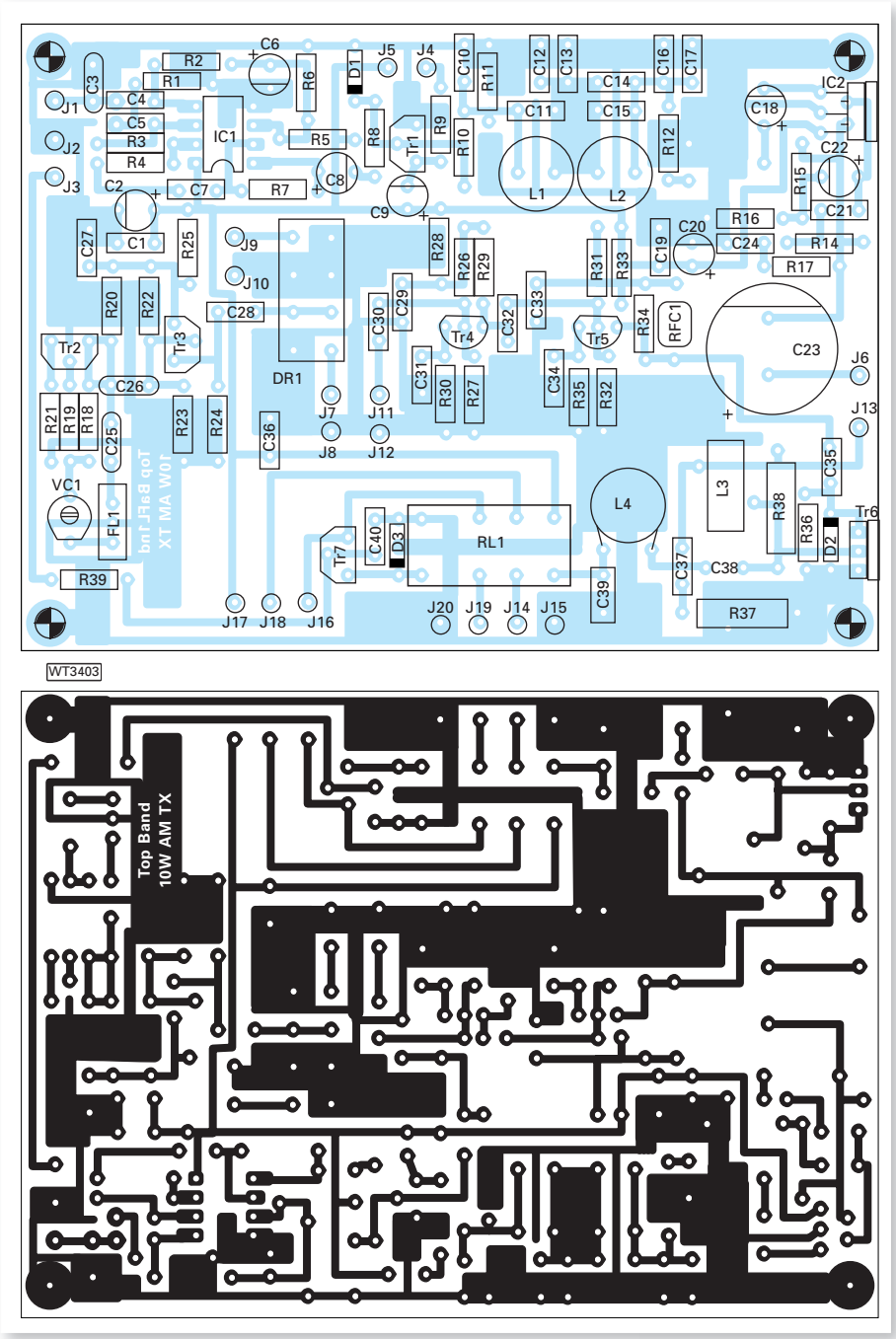


Fig. 2: The final p.c.b. layout artwork and component placing.

Components not on the printed circuit board (p.c.b.) are given identification numbers beginning with 100.

I then produced a p.c.b. layout, taking particular care so that high earth currents of the audio amplifier and power output stage don't flow through the lower power audio and r.f. stages. The final layout artwork and component identifications are shown in **Figs. 2** and **3**.

Note: The effects of bolting the p.c.b. into a metal box have not been evaluated at the time of going to press. However, if necessary, the earth pads adjacent to the low power stages can be isolated if instability occurs.

Finally, bringing together all the modules of this project I include, in **Fig. 4**., the assembly wiring to produce the complete transceiver. Please remember that it's important that the negative supply wire is terminated at the antenna socket and that the coaxial cable from the antenna socket to the transmit board also picks up this earth return and takes it to J20.

I hope you enjoy building your version of the Top Band transmitter-receiver. It was quite an interesting and challenging design exercise for me so I hope you enjoy using it on the air!

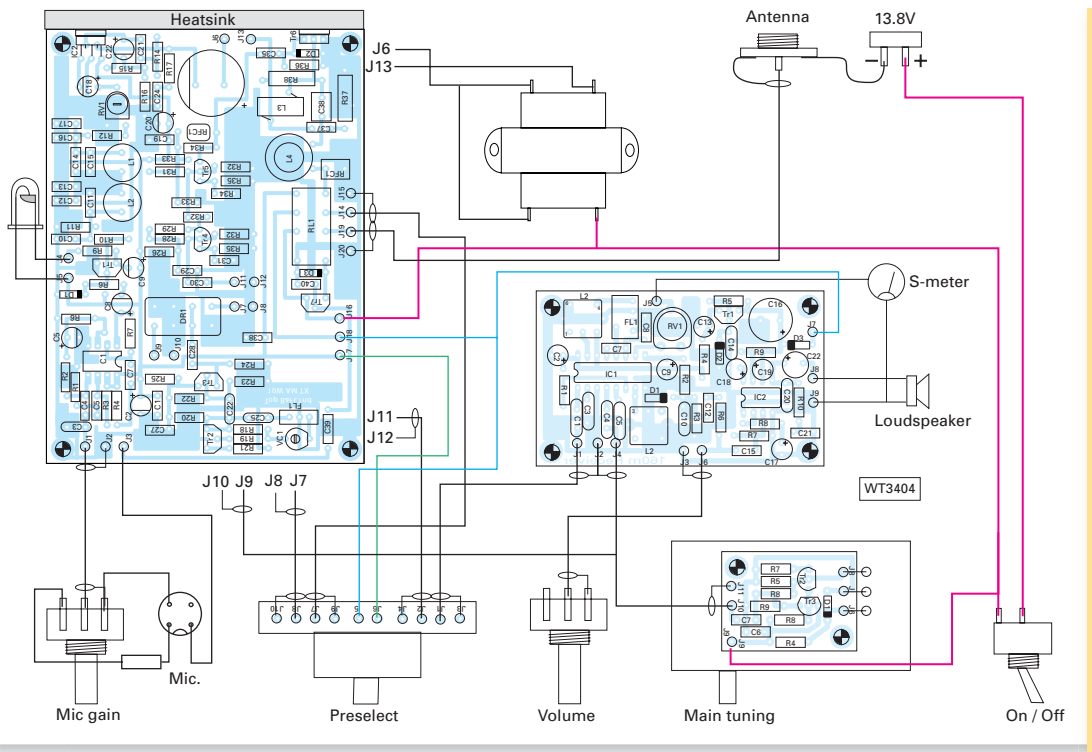


Fig. 3: Diagram showing all modules of the 1.8MHz project that make a complete transceiver.

Kits & Bits

Printed circuit boards are available for all the sections of the project. Complete kits of parts for all the boards are also available as board and parts kits. Components not on the boards come under the heading hardware and are available as separate options.

Transmitter p.c.b £9, p&p £1. Transmitter p.c.b and parts kit £48, p&p £1.50. Modulation transformer £9, p&p £2.50. Microphone gain potentiometer (4.7kΩ log type) £1.50. The radio frequency choke (r.f.c.) and capacitor for the microphone input cost £1. The 4Y-1 heat-sink (undrilled) costs £4, P&P £2. Complete transmitter kit costs £63.50, with p&p at £3.

Shopping List

The 1.8MHz a.m. transmitter

Resistors

3	R1, 4, 32	5.6kΩ
3	R2, 3, 7	100kΩ
3	R5, 6, 27	8.2kΩ
1	R8	390Ω
1	R9	12kΩ
1	R10	3.9kΩ
1	R11	1.8kΩ
1	R12	220Ω
2	R24	680Ω
1	R14	47Ω
1	R15	470Ω
1	R16	4.7Ω
1	R17	1Ω
1	R18	68kΩ
1	R19	4.7kΩ
2	R20, 29	1kΩ
2	R21, 30	150Ω
2	R22, 36	10kΩ
1	R23	12kΩ
1	R25	330Ω
1	R26	56kΩ
1	R28	100Ω
1	R31	47kΩ
2	R33, R35	33Ω
1	R34	270Ω
1	R37	4.7Ω 2.5W
1	R38	150Ω 3W
1	R39	3.3kΩ
1	RV1	1k trimpot
1	VR1	4.7kΩ Log

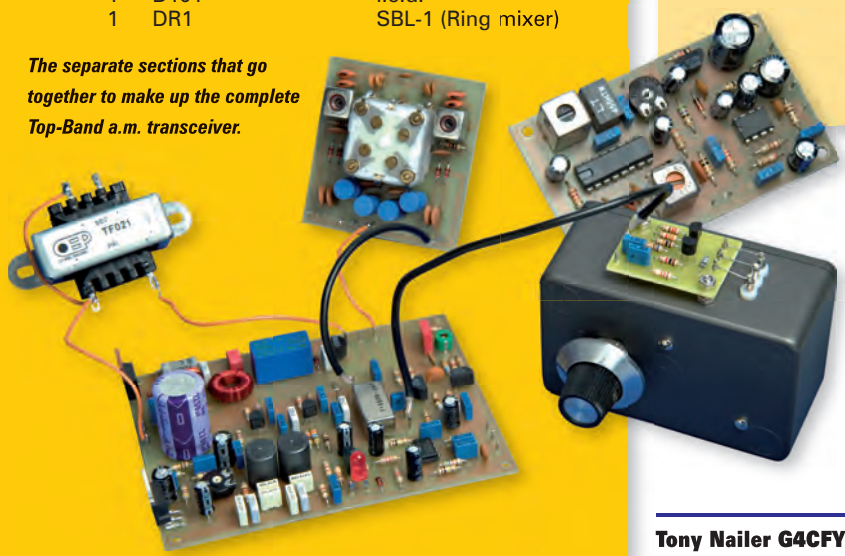
Capacitors

5	C1, 30, 32, 37, 40	22nF PB
4	C2, 6, 8, 9	10μF
2	C3, 101	2n2
6	C4, 5, 7, 10, 12, 21	47nF PB
1	C11	4n7 PB
2	C13, 16	33nF PB
1	C14	10nF PB
1	VC1	30pF Murata

Semiconductors

1	IC1	TL072
1	IC2	TDA2003A
3	Tr1, Tr2, Tr3	BC148A
2	Tr4, Tr5	BC182B
1	Tr6	IRFZ34E
1	Tr7	BC157
3	D1, D2, D3	1N4148
1	D101	l.e.d.
1	DR1	SBL-1 (Ring mixer)

The separate sections that go together to make up the complete Top-Band a.m. transceiver.



Inductors

1	L1	100mH 10RB radial
1	L2	82mH 10RB radial
1	L3	12t 22s.w.g. on FT50-61
1	L4	31t 28s.w.g. on T50-2
2	RFC1, RFC101	33μH axial

Miscellaneous

1	FL1	HCFM2455D
1		Chassis plug
20	J1-20	Pins

Modulation transformer (see text)

Tony Nailer G4CFY

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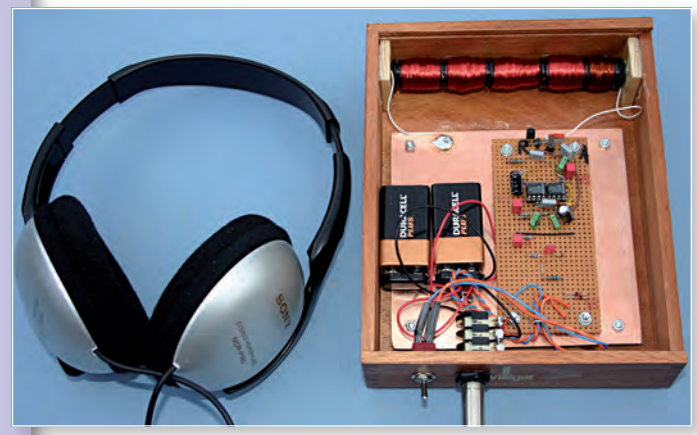

The 1kHz receiver with headphones.

Longevity and ever longer wavelengths seem to go together! Ten years ago, it was 136kHz. Six years ago, it was the Swedish Alexanderson alternator transmitter using the historic callsign **SAQ** on 17.2kHz from Grimeton. Tempted in 2005, I built a converter and received the Russian beacons on 11.9kHz. Now, I'm on 1kHz!

Readers may well ask (and I'll understand), "Why, in God's name, would anybody wish to listen on 1kHz?" Well (in answering) apart from age, and dropping down to direct curent (d.c.), year by year, my Irish licence makes no mention of 'Amateur Radio'. Officially, I'm licensed as a 'Radio Experimenter' and I feel that's justification enough!

It's rarely that I come across a radio receiver circuit devoid of oscillators and a mixers. And, as 1kHz is still within the audio frequency response of my ears, there was no need for frequency conversion on this 1kHz receiver project.

Receiver Specification

Since wavelength related, open-wire type antennas, quarter waves and so forth for 1kHz, are far, far longer than any suburban garden I know of, I opted for portability using a ferrite rod antenna. I had experimented with loaded long wire antennas from the shack, and failed miserably due to the harmonics of the mains and every other malignant manifestation of electro-magnetic vermin!

At my home, in Greystones on the County Wicklow coast, all the mains harmonics of the world seem to congregate on my bench! From long experience, I knew even before I began, that deep within the Wicklow Mountains, far from mains supplies and far from the madding crowd, I could perhaps find the place to go. Hence, the receiver is battery powered and apart from the antenna, it was plain sailing to design and build the remaining circuitry.

Circuit Description

In the best and the oldest traditions of radio receiver design, my circuit, **Fig. 1**, begins with a tuned circuit and ends with a pair of headphones and the ferrite rod antenna was salvaged from a large, old large transistor radio. I wound 100 turns on the bare rod, resonated it with a 1% capacitor, established its resonant frequency, calculated its inductance and, afterwards, calculated the relative permeability of the rod, which worked out at 47, from the formula: L in nanoHenry = K multiplied by N squared. (N being the number of turns, and K being the relative permeability of the ferrite rod).

I have a personal rule of thumb, that the inductive reactance of a ferrite rod coil should be at or around 5k, at the required frequency. This – believe me – comes from the art of radio rather than its science!

At 1kHz, an inductive reactance of 700mH would satisfy my rule of thumb. Being lazy, as well as old, I opted for 100mH, amounting to 1,500 turns. I wound it – suffered winding it – and I tried it, only to know again what I already knew – that I needed at least 700mH!

Since I have no access to a lathe-type coil winder or a turns counter, I wind turns by hand. That's how I've developed the callused fingers of the Ancient Mariner.

More precise calculations offered the prospect that 4,612 turns would be enough. Naturally, I opted for that. To wind 4,612 turns by hand is no trivial undertaking, particularly while under attack. (Please allow me to digress).

I have a nice office within our home that I'm obliged to keep tidy as readers will understand! Fortunately, I have an outside summer shack for wood, tools, wine kits, components, salvaged wire, cigar boxes, swarf and shavings.

In the summer shack – during the winter – I commenced to wind 4,612 turns. I lit the shack heater to ward off hypothermia and as the shack heated up a venomous brood of wasps hatched out! Believe me, as my fingers grew tired, keeping count of turns and keeping the turns already wound tight, while engaged in hand-to-hand mortal combat with wasps, is no mean achievement!

The capacitor, C1, is 22nF and resonated my coil at 1,022Hz. It would have been a simple matter to pad the 22nF capacitor with a suitably chosen smaller capacitor for 1000Hz, but I was more than pleased, given that the initial test with 100 turns was a small test compared with 4,612

Ted Crowley EI3CY – prompted by his Irish 'Experimenter's Licence' – tunes down to the very low frequencies

turns (errors would have increased by a factor of almost 50).

The coil is wound in five sections: four of 1,000 turns each and one of 612 turns. The insulated copper wire, of 0.2mm in diameter, was salvaged from the pump motor of a dish washer. The spacers between banks of turns are rubber grommets, pushed along the ferrite rod.

The ends of the wire are sleeved with pieces of plastic insulation and held in place by pushing them beneath the two end grommets – rather tricky! I then sprayed the rod itself with clear motorcar lacquer, as was the finished coil.

The coil is wound in banks so that the 'hot' end is not over – or close to – the 'cold' end. The 'cold' end becomes the 'cold' end only by virtue of being grounded. Note: If any budding constructor suffers from insects (or wasps) it's essential not to allow the resident nuisance to cause turns to be wound clockwise and then anti-clockwise, to do so will ruin the coil!

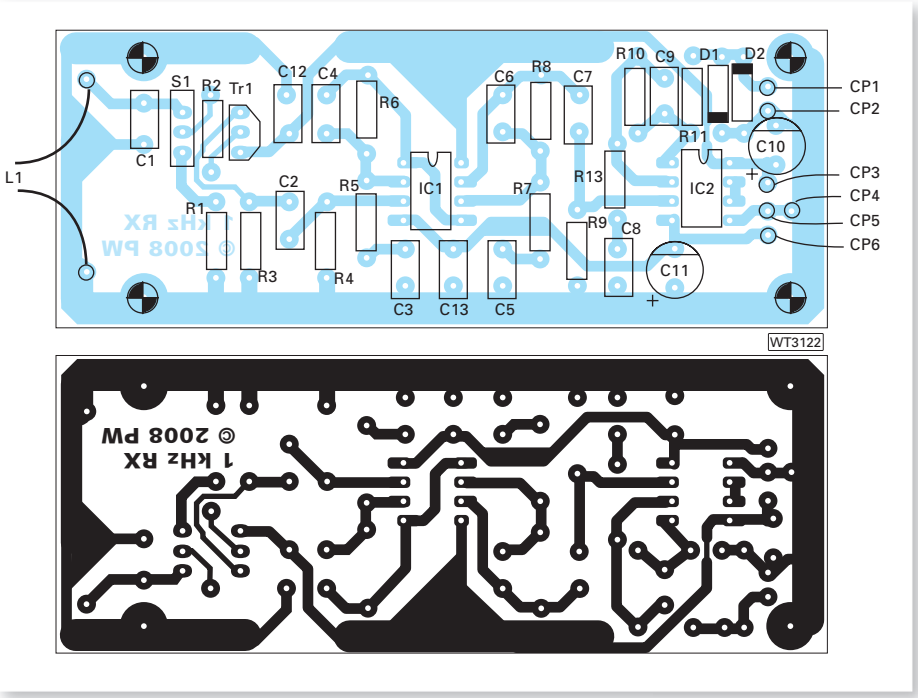

Fig. 2: The p.c.b. artwork diagram and overlay of Ted's 1kHz receiver.

The switch, S1 and R1 can be omitted. Instead, wire directly from C1 to R2. Note: There's no difference between pins of non-polarised capacitors and resistors, other than that my computer aided design (CAD) package, *Ranger 2*, enjoys numbering them.

The resistive value of R1 should equal the measured d.c. resistance of L1. The resistors, R1 and 2 may be of the same value. Incidentally, it's worth mentioning that I included R1 and S1 to enable me to optimise the amplifier without being swamped by mains harmonics.

The f.e.t., Tr1, (2N3819) presents a massively high input impedance to the signal voltages received by L1. It prevents loading of L1, and the ruining of its own *Q* of 70. A coil with a *Q* of 70 at 1,022Hz gives a bandwidth of 14.6Hz, between 3dB down points and combine this with the bandwidth of the amplifier and it provides a pretty impressive narrow overall bandwidth, with fast-falling skirts.

Even though L1/C1 are the primary definers of the overall frequency response of the receiver, since the amplifier follows L1/C1, it contributes amplifier noise that L1/C1 have no power to reduce. So, the frequency response of the amplifier should be as narrow as possible to keep amplifier noise down.

The capacitor, C2, blocks the source voltage at pin 1 of Tr1 from reaching the non-inverting input of IC1a, at pin 3. There are two op-amps in IC1 and 2. Both are utilised in IC1 and, at present, only one in IC2. The circuit around each op-amp is similar.

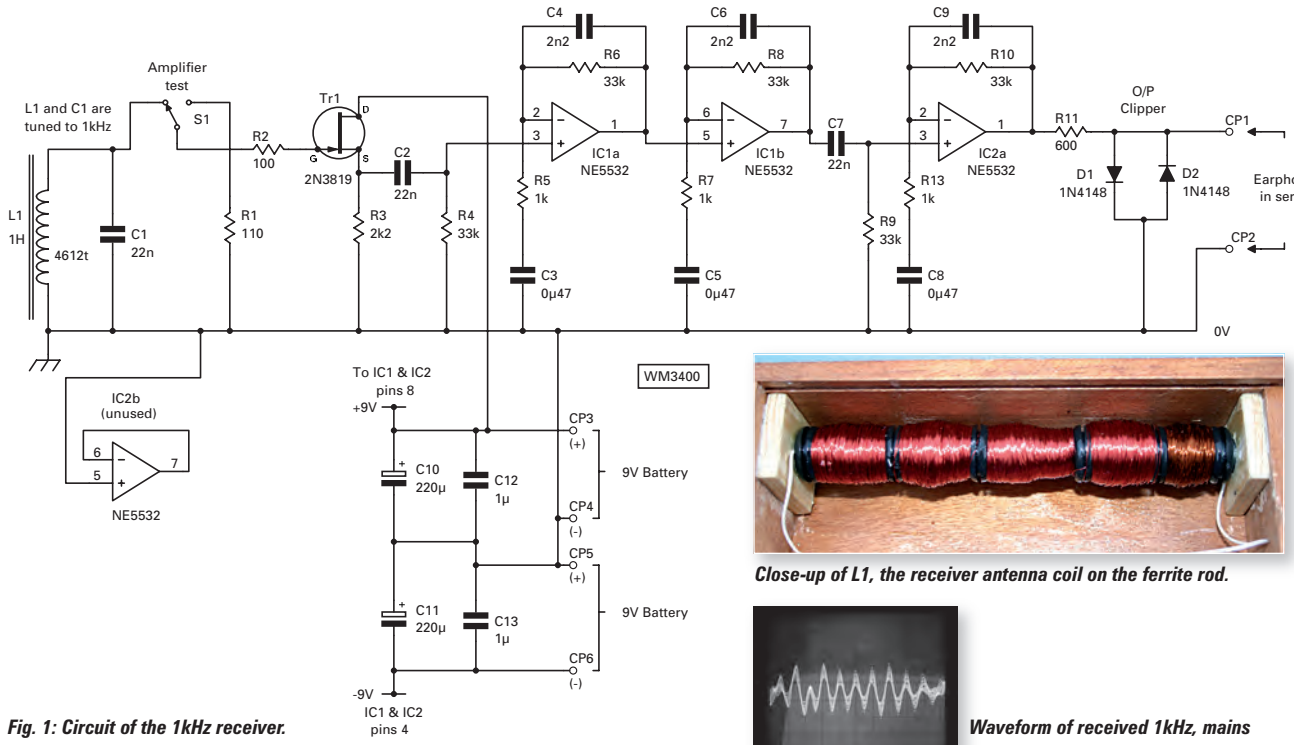

Fig. 1: Circuit of the 1kHz receiver.

Close-up of L1, the receiver antenna coil on the ferrite rod.

Waveform of received 1kHz, mains harmonics.

Taking IC1 (pins 1, 2 and 3) for example: R5 and C3 roll-off the frequency response below 350Hz. The capacitor, C4, and resistor R6 roll-off the frequency response above 2.5kHz. Apart from blocking d.c. voltages, C2 and R4 as well as C7 and R9 give additional low frequency roll-off.

The frequency response of the entire, three stage amplifier, may be further narrowed down, closer to the resonant frequency of L1 and C1, and thus further reducing amplifier noise and increasing the sensitive of the over-all receiver; there's more to receiver sensitivity than gain alone. You may use the TL072 op-amp instead of the NE5532. The TL072 is noisier than the NE5532.

In Excess Of 90dB

The overall amplified gain is in excess of 90dB. Within the shack, the amplifier output is unbearable to listen to when S1 is switched to L1/C1. Warning: It should not be listened to, due to the harmonics of the mains and the damage they could do to our hearing. As a gesture towards my own hearing, I included the bi-phase clipper, D1 and 2, after R11, but even this leaves a lot to be desired.

Some constructors may be tempted to include an audio transformer and to match impedances between the third op-amp output and the headphones. Even though there's a signal loss across R11, the stray pulsating magnetic fields around a transformer – no matter how well shielded it might be – will be received by the sensitive ferrite rod antenna and are likely to send the entire receiver into oscillation.

Similarly, a power amplifier, and a loud speaker, unless the latter is far removed from the receiver proper, is out of the question. Placing the headphones too close to the receiver enclosure sends it into instability, even though the circuit (in spite of its high gain) is stable.

Indeed, the receiver is so sensitive that it picks up the radiated magnetic field from my watch at a distance of a metre (3ft). The watch hands are rotated by a miniature electric stepper-motor. Each one-second pulse to the motor is clearly audible and it has become a handy – if rough – test signal far from the bench on the high mountains of County Wicklow.

Non-Magnetic Box

The receiver should be boxed within a non-magnetic shielding material. Mine is in a wooden cigar box and it has a sliding transparent Perspex lid.

In the photograph, you'll notice that I've mounted the perforated receiver board on a copper ground plane. All the grounds on the perforated board are taken to its four mounting bolts, and they are all thoroughly connected together through the underlying copper. I'm fussy like that – especially with grounds. Maybe I've overdone it? When I refer to 'grounds', nothing is grounded to the actual ground. Ground, in this case, is simply the common rail for all the circuits; (to the 'deck' to old salts such as me.

The Results

Apart from hearing the 20th harmonic of the mains at hundreds of metres from the nearest mains supply and the occasional crash of lightning, nothing much is heard. Still, 11km (7 miles) south of Greystones, by the sea on the Dublin/Rosslare railway line and 11km from the end of the Dublin Area Rapid Transit (DART) 1.5kV d.c.electrification at Greystones, the rails still emit strong harmonics of the mains!

A screened signalling cable – buried beside the railway line in concrete troughing – was heard bleeping at regular intervals. That's the nearest I've came to receiving a deliberately made, man-made signal on 1kHz!

Owing, I suppose, to the earth's magnetic field passing through the ferrite rod, any movement of the rod generates voltages across the coil and as a result the receiver is highly microphonic. If I touch it I can hear the touch as if it were a microphone!

Amplifier Frequency response (excluding L1/C1):

Frequency level relative to 1kHz

25Hz	34.00dB
50Hz	33.70dB
100Hz	33.45dB
150Hz	29.70dB
200Hz	21.70db
300Hz	11.70dB
400Hz	06.20dB
500Hz	03.20dB
600Hz	01.70dB
700Hz	00.70dB
800Hz	00.20dB
900Hz	00.00dB
1,000Hz	00.00dB
1,200Hz	00.30dB
1,500Hz	01.95dB
2,000Hz	04.70dB
2,500Hz	07.80dB
3,000Hz	11.00dB
4,000Hz	16.70dB
5,000Hz	22.20dB
6,000Hz	26.50dB
7,000Hz	29.70dB
8,000Hz	31.20dB
10,000Hz	33.20dB

From almost a mile distant I've heard a dog barking faintly, in the headphones. This is, of course, audio pick-up and not radio frequency (r.f.) reception as desired.

Raindrops falling on the Perspex lid sound like Lambeg drums within the operator's head. Listening while close to the sea and in strong winds is hopeless. This is due to microphony and the user hears only the waves crashing on the shore and the howling of the wind. Both mask the desired 1kHz radio signals.

The Madding Crowd

Unless you're a Radio Amateur protected by impenetrable bogs, dense woodlands, permanent snows and listening high on rarely frequented mountains, you are likely to encounter two kinds of people. Some see you, and beat a hasty retreat, believing, no doubt, that they've had their first close encounter with a Martian.

Then, there's the sort I met – who gladly befriend Martians, who know what you're up to, and who proceed to enhance your knowledge by describing the cat's whisker wireless receiver their eccentric great-grand uncle constructed, two years before a certain Irish-Italian wireless experimenter was born. "With your interest in radio, you'll recall his name," my mentor prompted me.

Out of sheer frustration, I replied, "Ah yes, I think I know who you're talking about. Wasn't he the Jameson girl's lad?"* Then, he, also, beat a hasty retreat.

Editorial comment:** Jameson's 'girl' was not only a member of the famous Irish Whiskey family – she was also Guglielmo Marconi's mother!* ***G3XFD/EI5IW.

Future Projects

Future projects including receiving Schumann resonances on 7Hz, and either 60Hz or the harmonics of 60Hz from the American or the Japanese mains supplies. There's also the radiation from the Swedish electric railway system, all on a frequency of its own.

It should be possible to digitally delay the mains harmonics by 20mS, the duration of a mains cycle, and to cancel a current burst of harmonics, thus leaving nothing other than signals that are not cyclic on a 50Hz basis. We'll see! You'll be relieved to hear, I hope, that I'm not holding my breath in immediate anticipation of bagging any of these worthy projects but in the meantime armed with this receiver we can track the source of much interference! Have fun! ●

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A Versatile Active Analogue Filter

Over the many years I've been constructing projects, the need for versatile audio filtering has been paramount. Some years ago I built a simple notch filter consisting of a switched potentiometer controlling an active feedback circuit with a tuning range giving about 3kHz bandwidth of sharply tuned notch. However, over the years the criteria has changed somewhat so this circuit design was no longer suitable.

My main requirements were a notch/peak filter that could be switched into or out of circuit dependent on the band conditions. Although my latest project is fitted with a good 600Hz c.w. filter there are times when I really do need to 'peak up' a weak signal or notch out the stronger interfering just to the side of my working frequency.

A 1974 Circuit

After trawling through several books my attention was drawn to a circuit originally designed by **DJ6HP** way back in 1974 – therefore I make no claims on originality. However, I thought with some minor circuit modifications it might be suitable. So the project was born!

One or two problems needed to be resolved as the original design used a dual power supply and several 741 operational amplifiers. My requirement was for the filter to work from a single rail power supply and secondly to use different op amps to reduce the component count.

I checked for suitable operational amplifiers as the 741 – although versatile – is not one of the quietest devices around. Additionally, I wanted a single switch operation for both functions as I saw no point in cluttering up the front panel.

A couple of prototypes were then constructed to evaluate the design and although they worked they were not really up to scratch. Eventually, after some hand wired modifications to one of the prototypes I came up with a design that fitted the G4GNQ bill!

In the original design the bandwidth is quoted as 300Hz to 2.4kHz with a variable *Q* factor of around 4:1. However, after some evaluation I found this wasn't to my requirements and I adjusted the value of the feedback capacitors in the tuning capacitors to give an improved frequency coverage of approximately 300Hz – 3kHz.

My prototype testing was conducted with some narrow band audio selective test equipment as well as 'on the air' evaluation. Needless to say, I was very impressed by the results and all the test figures, which incidentally are in dBm are set out at the end of the article. (0dBm = 1 mW into 600Ω).

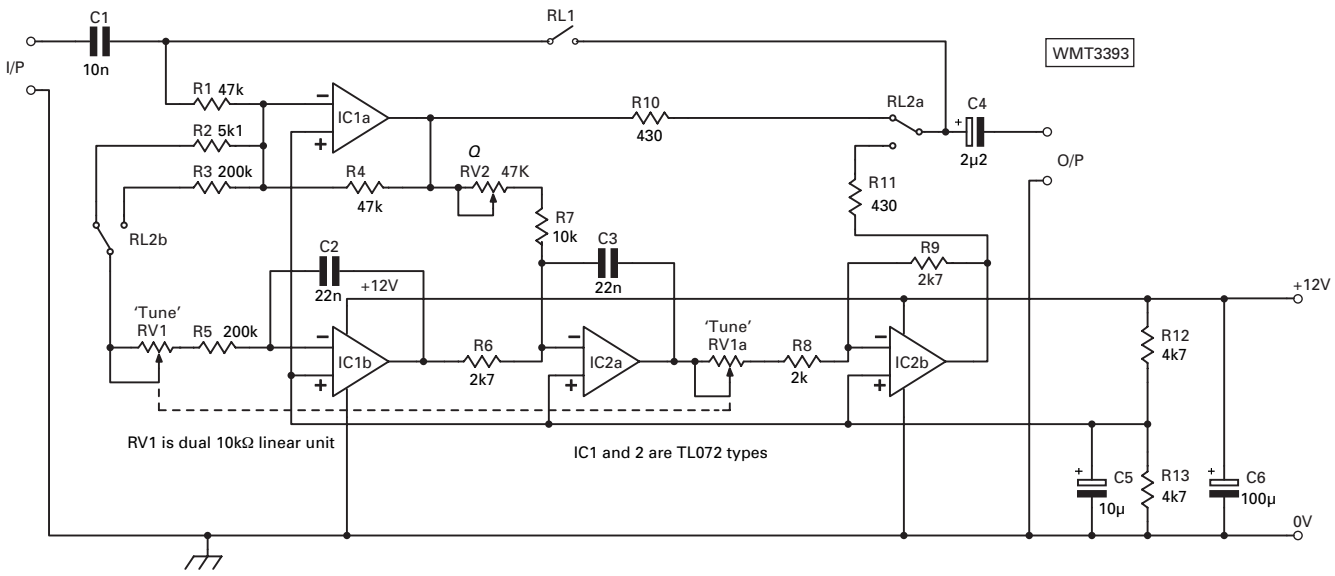

Fig. 1: The circuit diagram of the peak/notch filter, uses the quieter TL072 f.e.t. op amps rather than the original, and noisier, '741 types.

Geoff Sims G4GNQ demonstrates in a very practical fashion that the constructor doesn't need to go digital to make an effective filter.

Fig. 2: The p.c.b prototype that Geoff created

Fig. 3: The track pattern of the prototype.

Shopping List

Resistors	Capacitors
R1 47kΩ	C1 10nF
R2 5.1kΩ	C2 22nF
R3 200kΩ	C3 22nF
R4 47kΩ	C4 2.2µF
R5 200kΩ	C5 10µF
R6 2.7kΩ	C6 100µF
R7 10kΩ	**Semiconductors**
R8 2kΩ	ICs 1 - 2
R9 2.7kΩ	TL072
R10/11 430Ω	
R12/13 4.7kΩ	
RV1 Dual 10kΩ lin	
RV2 47kΩ Lin.	

Test results

Function	Notch	Peak
300Hz	-24dBm	+ 20dBm
400Hz	-20dBm	+ 20dBm
600Hz to 1.5KHz	-25dBm	+ 19dBm
2.0KHz	-24dBm	+ 17dBm
2.2KHz	-25dBm	+ 16dBm

Circuit Concept

The circuit concept is based around four operational amplifiers, with the first two working as a tunable audio circuit. The remaining op amps work in conjunction with the first two amplifiers, one for the notch operation and one for the peak operation.

Switching between the notch/peak mode is achieved with a dual relay – thus reducing the number of fly leads. A second relay controls switching in and out of the peak/notch circuit. And to make things really easy – all the connections to the board are via 0.1in pin and sockets.

Tuning of the filter is done by a dual gang potentiometer with the variable *Q* factor operation effected by a second single potentiometer.

A resistor is used to prevent any overloading of the amplifier and bµffers the input of to the first op amp. It also ensures that no noticeable change in the perceived audio level from the loudspeaker. This input is also shared between the output feedback resistor and the dual relay that switches between the output of op amp one and four.

The output of op amp 1 is permanently connected to the *Q* factor circuit control and this in turn goes to the input of op amp 3. Additionally, the output of op amp 1 goes to the notch contact on the dual relay. (The changeover contact on the dual relay is connected to the audio output).

Finally, a second relay controls whether the circuit is operational or not. The end result is that I then had a single four core cable to a dual centre off switch controlling both notch and peak. (The audio in/out are connected to the board by two single core screened cables).

Op amps 2 and 3 form the basic tuning circuit with one half of the dual potentiometer connected to input of op amp 2 and the second half of the potentiometer connected to the output of op amp 3.

The fourth op amp performs two functions. The main function is to bµffer the output from the tuned audio circuit. The output of the amp also goes to one of the changeover contacts on the dual relay and the input of op amp 2. The second half of the output goes via a resistor to the c.w. output contact on the same relay.

My choice of op amp for the circuit was the TL072. These are low noise f.e.t. op amps offering high input impedance and the capability of single rail power supply operation.

Power requirement is a single 12V supply with a divider circuit to provide correct operating conditions for the + inputs of the op amps. These four inputs are connected to a common point and fully de-coupled to prevent instability or 'motor boating'.

So, you don't need to go digital to make an effective filter – try it out for yourself! ●

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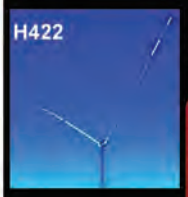

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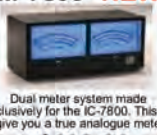

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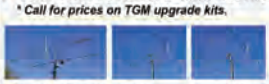

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The Rev. George Dobb's

carrying on the practical way

This month the Rev. George Dobbs G3RJV tries the TDA2822 integrated circuit audio amplifier suggested by G1TEX.

When amplification is needed – George suggests trying TDA2822 chip recommended by G1TEX!

"The secret to creativity is knowing how to hide your sources"
Albert Einstein (1879 – 1955)

I would hardly describe this column as creative but I can certainly say that one of my problems is finding enough ideas to make an offering every month! So, to help to maintain the flow I keep a folder of possible ideas and topics and these come from a wide variety of sources.

Our readers are kindly people and I get a steady flow of ideas, tips and little circuits they send to me for sharing with other readers. Many of these have formed the basis for some of my better contributions!

So, dear readers – please keep sending me your letters and E-mails. However, it's helpful to remember that this column is a just a teasing length (to keep you interested!) and time is limited as the deadlines are alarmingly close to one another.

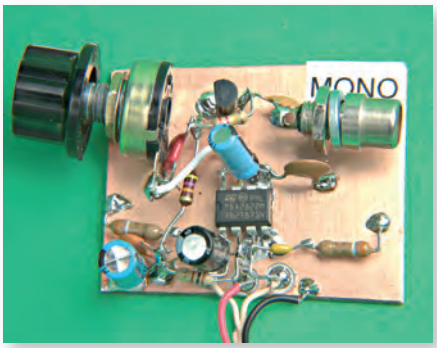
Swann Source!

My source for this month's column is close to home! Some time ago *PW*'s own Technical Editor, **Tex Swann G1TEX**, asked me if I had ever tried using the TDA2822 audio amplifier integrated circuit (i.c.). Tex suggested that it might be the sort of device I could use in this column. I hadn't tried the chip, so I obtained some of the chips and the manufacturer's data sheets.

Tex was quite right – the TDA2822 is an interesting – and inexpensive – device that's just the sort of thing that might interest *PW* readers. So, I extend the invitation to offer future suggestions to *PW* staff as well as *PW* readers! I promise to reveal my information sources so, like Tex, you will be credited for your help.

Regular readers will know that I often use little audio amplifiers in this column and I recall a time when building an audio amplifier was a major task in any circuit – but in these days of i.c.s it's different. For many applications, we simply have to decide which audio amplifier chip to use and gather the external supporting components.

The stereo version of the TDA2822 utilising feedback as in Fig. 4.



The mono project using the circuit of Fig 5.

There are many audio amplifier chips to choose from – but I confess to a simple approach for many of the basic circuits I describe in these columns. My two questions are: "Is it inexpensive?" and "how many the extra components?" Usually, I've ended up using either the LM380 or the LM386. Typical circuit diagrams are shown in **Figs. 1a** and **b**.

The LM380 and LM386 are audio amplifiers with fixed gains of 34dB and 26dB respectively. The gain of the LM386 can be increased to 46dB (x200) by adding a 10μF capacitor between pins 1 and 8 as shown in Fig. 1a. Both i.c.s are cheap to buy but the LM380 comes in a 14-pin dual-in-line (d.i.l.) package and the LM386 in the smaller 8-pin d.i.l. configuration. This is not necessarily detrimental to the choice of the LM380 because the three centre pins on each side (3,4,5 and 10,11,12) form a heat-sink which allows it to run higher power than the LM386.

The LM380, which can be used with a supply up to 22V, will drive an 8Ω speaker to at least 1.4W of audio output operating from 12V. Whereas – using a 12V supply – the LM386 is only capable of about 1W of output. Having said that, the commonest types of LM386 chips (those with a -1, -2 or -3 suffix) are not rated for operation at 12V or above.

Only the LM386-4 can be used at 12V and above. If you come across an LM386 without a suffixed number, assume it's **not** the LM386-4 and you'll probably be right.

Over the years I've used the chip I have found the LM386 to be prone to instability – often due to earthing problems. It likes shorts leads and the power input decoupling capacitor needs to be as close to pin 6 as possible. I often add additional higher frequency decoupling at pin 6 – usually a 100nF capacitor. So, as they say, "You takes your pick!"

I admit to preferring the LM380, not because of its great output (I rarely need that) but because it's easier to tame. Incidentally, the LM386 is also rather noisy and most manufacturers quote 10% harmonic distortion.

Data & Circuit Applications

Bearing in mind my audio chip experiences, I was interested in Tex's suggestion of the TDA2822, so I downloaded the manufacturers data sheets and some circuit applications. It looked very promising. The TDA2822 usually comes in the 8-pin d.i.l. configuration, although there's a less common 16-pin d.i.l. version.

Some manufacturers use the designation TDA2822M to identify the 8-pin d.i.l. version. Not only that, it's a dual amplifier designed for stereo applications.

The chip can be operated with a surprisingly wide supply voltage (1.8 to 9V), which is very useful for the many battery powered projects I describe. The amplifiers are 'clean' as the total harmonic distortion is quote at 0.5%.

Power output is a little low, at about

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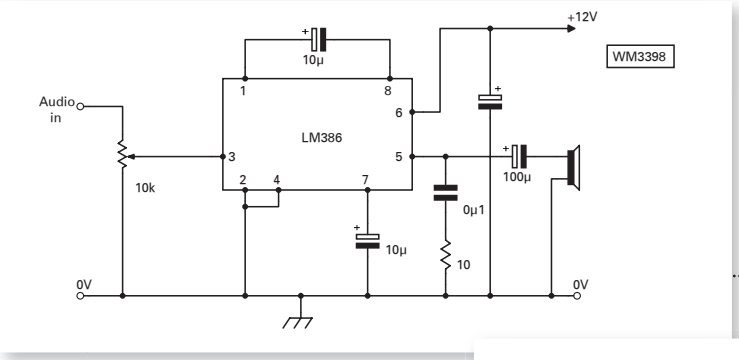


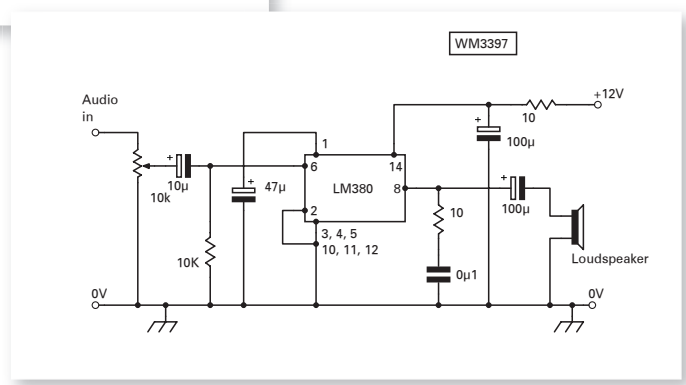


Fig 1: Typical circuit diagrams for either the LM380 or the LM386 are shown here.

650mW in stereo operation with just over 1W if both amplifiers are used in a bridge circuit (both of these figures are for a 6V supply). With a 3V supply it's capable of about 35mW (0.035W) into 32Ω headphones. This may not appear to be very much audio power – but it's indicative of the main application of the TDA2822 chip is for personal audio listening.

The diagram, **Fig. 2**, shows the TDA2822 in stereo configuration. The package contains two operational amplifiers. The power supply, Vcc, enters at pin 2. Notice that a fairly large (100µF) decoupling capacitor is attached to pin 2 and it's important to place this capacitor as close to the pin as possible with a short lead to pin 2.

The inverting inputs at pins 5 and 8 (marked negative on the operational amplifier symbols) are also decoupled to ground with 100µF capacitors and again long leads should be avoided. The resistors R1 and 2 provide a voltage load at pins 6 and 7; the non-inverting inputs. The outputs appear at pins 1 and 3 and are coupled to the loudspeakers or stereo headphones via 470µF capacitors.

Each of the outputs has a Zobel Filter; C6 – R3 and C7 – R4. A Zobel filter is a simple series resistor – capacitor network connected in parallel with the driving coil of a loudspeaker or headphone. A loudspeaker or headphone has a driver coil to convert the audio signal voltages to a magnetic field that moves the diaphragm in sympathy with the audio signal. This produces the required sounds.

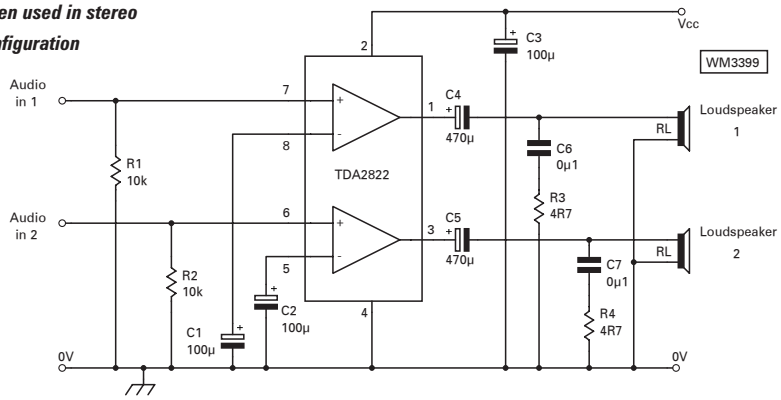
The 'voice coil' as it's often called, is an inductor, the impedance of which increases with frequency. Inductors do the same! So the Zobel filter is placed across the inductor to flatten out this effect and the simple filter helps the amplifier to maintain stability.

Bridge Application

The diagram, **Fig. 3**, shows a TDA2822 used in a bridge configuration. Amplifier bridging is simply using both operational amplifiers in the TDA2822 to drive a single loudspeaker and the technique requires inverting the signal on one amplifier.

In the case of Fig. 3, the inversion is done by C1 and 4. The outputs are shared by connecting pins 1 and 3 to the loudspeaker. Note that both outputs (pins 1 and 3) require a Zobel Filter for the reasons given above. The output in the bridged configuration is almost twice the stereo output. and since most radio applications require a mono amplifier, this is probably the most

Fig. 2: Showing the TDA2822 when used in stereo configuration



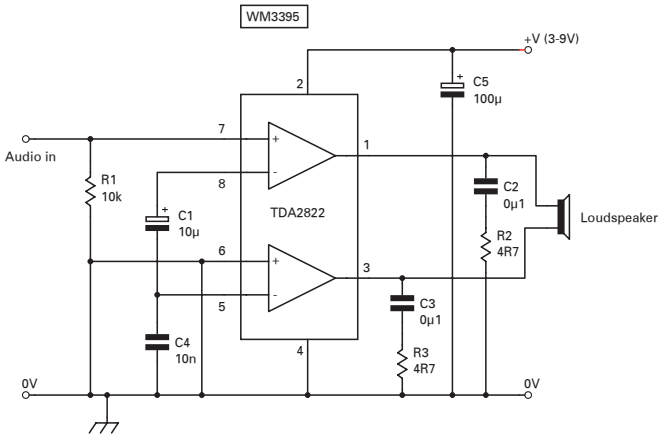


Fig. 3: Showing a TDA2822 when used in a 'bridge' configuration. In this mode, both amplifiers are used without output capacitors and the loudspeaker has no 0V connection.

useful circuit for the projects I deal with in this column.

The application circuits I've mentioned would serve well as a complete amplifier but in addition I offer a couple of extra practical circuits for readers. The diagram, **Fig. 4**, shows a stereo amplifier with some external feedback. The feedback is provided by resistors R1, 2 and R3 and 4.

With R1 and 3 at 1kΩ, the gain of the Fig. 3 circuit is about 10 times. Removing R1 and 3 will produce a gain of about 100. I suggest that readers try values of between 1 and 10kΩ to achieve a gain that's up to the maximum desired audio output. (This will help to keep the signal-to-noise ratio of the amplifier as high as possible for the required application.

The input shows a 10kΩ volume control potentiometer for both amplifiers. Ideally these should be ganged potentiometers so that both inputs can be controlled with one knob. Adjusting the feedback resistors to optimum signal-to-noise ratio, as I've described is best done with the input potentiometers set to full input.

If the amplifier is driving a pair of stereo headphones, some extra resistance may be required in series with each headphone to reduce the output level. A resistor of about 100Ω in series with each earpiece unit should do the job but this depends on the impedance and sensitivity of the headphones. Modern lightweight stereo headphones can have a wide range of sensitivity, usually depending on how much you pay for them!

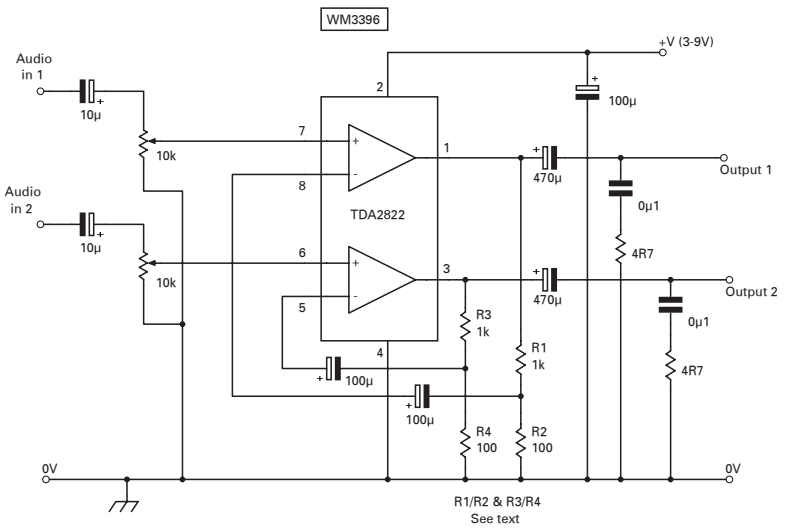


Fig. 4: The diagram shows a stereo amplifier with some external feedback, provided by resistors R1, 2 and R3, 4. Using the feedback resistors the gain is adjustable from about 10 to 100 times.

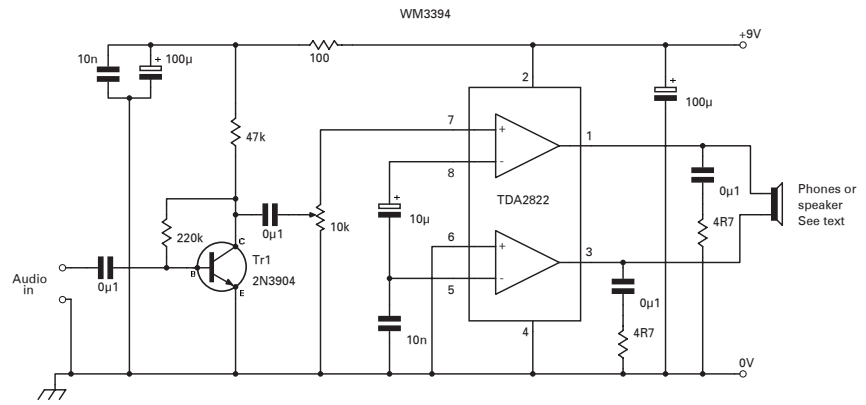


Fig. 5: This circuit shows the TDA2822 configured as a bridge amplifier and driving a small loudspeaker or stereo headphones. Ahead of the TDA2822 is a simple pre-amplifier.

Stereo Amplifier?

What would we radio constructors require a stereo amplifier for? Well – some interesting effects can be had from radio signals by applying differing filter techniques to both channels. This technique will result in a slightly different effect on the same signal in each ear – sometimes called the binaural effect.

The binaural technique can produce a sound which some operators claim helps in the decoding of Amateur Radio c.w. (Morse) signals. Fans of binaural receivers say the signal will sound as if it's inside your head! I leave readers to experiment.

The most obvious application of the TDA2822 for most of the circuits we deal with in this column will be using a bridge configuration to produce a mono amplifier. A possible practical circuit is shown in **Fig. 5**.

The circuit shows the TDA2822 configured as a bridge amplifier and driving a small loudspeaker or stereo headphones. Ahead of the TDA2822 is a simple pre-amplifier, although the circuit could be used without the pre-amplifier if the extra gain not required. In which case, simply begin the circuit with the coupling capacitor into the 10kΩ logarithmic potentiometer. The TDA2822 used alone would probably work for many simpler receiver applications.

The pre-amplifier is a generic *npn* type transistor and although I've named the common 2N3904, many other types would serve the purpose. (Try using a 2N2222, BC547, BC108, or whatever similar nature can be found).

The power supply is shown as a 9V battery but the amplifier is still useful at 3V (two AA cells). With only 3V the expected audio output is in the order of 15mW – but still enough for a pair of headphones. Incidentally, at 3V the quiescent current drain (current on stand-by) is a mere 1mA, so the batteries will last a long time.

Power Supply Decoupling

The pre-amplifier circuit is rather rudimentary and power supply decoupling – using the 100Ω resistor with the 100µF and 10nF capacitors, is essential. The gain of the pre-amplifier can be adjusted by changing the values of the 220kΩ biasing resistor (base to collector) and the 47kΩ load resistor (collector to power supply). Readers might want to try a more sophisticated circuit in front of the TDA2822. There are plenty to choose from!

The quick 'ugly' style lash-up of the circuits in Figs 4 and 5 worked well for me and showed the potential of the TDA2822 for simple projects. They are inexpensive, so take the advice of Tex G1TEX and give this chip a try! ●

Roger Cooke's

morse mode

Roger Cooke G3LDI
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Roger Cooke G3LDI welcomes Morse fans to the column that has the 'special ingredient' for operating on the key.

Welcome to May's *Morse Mode* (MM)! By now – any reader who is relatively new to Morse should be familiar – if not totally at ease with the alphabet and numbers and basic punctuation if the suggestions in the previous MM columns have been followed. Once these are recognised – without even thinking about them – it's just lots of practice and dedication that will set you on your way to becoming a good operator on the key.

I always quote the saying, 'Winners never quit and quitters never win'. So, once the keen student has selected a suitable program to use, I suggested that they always keep the speed above that can be read at 100% accuracy. Don't forget that when you (the individual) are reading with 100% at a certain speed, you'll not improve as there must be some brain-strain in order to improve your speed!

Positive Feedback

Feedback on MM has been positive so far and **Daniel M0ERA**, wrote and told me about a program that might help. Computers are now powerful enough to generate Morse audio files on demand.

Morse enthusiast **Fabian Kurz DJ1YFK**, wrote the program ***ebook2cw*** which allows the conversion of any text into MP3 audio files. The program runs on *Linux* or *Windows*. The MP3 files in turn can be played with any computer or dedicated MP3 players like Apple iPods.

Apart from E-mails or practice material like example QSOs and callsign lists, Fabian's program can even be used to convert complete books! Fortunately, electronic libraries like **gutenberg.org** offer thousands of digitised books for free. The resulting Morse audio books are ideal to speed up Morse skills and practice copying in your head without pen and paper. Try **http://fkurz.net/ham/ebook2cw.html** and **http://fkurz.net**

Modulated Continuous Wave?

Dave Gemmell ZS6AAW wrote to ask about modulated continuous wave (m.c.w.). Apparently reading this column down in South Africa has jolted Dave back into action again! As for using m.c.w., this is the mode I use for my local GB2CW broadcast on 144MHz.

The m.c.w. mode is the easiest way of running a GB2CW broadcast on the 144MHz band using frequency modulation (f.m.). There are several suitable computer programs that I use for this method and I think this is also allowed in South Africa, so I suggest you go for it Dave!

The GB2CW Broadcasts

The GB2CW broadcasts are going well and we have several new volunteers – following the instigation of this column! We could always use more – so please consider offering **your** services for your part of the UK! Interested? E-mail me and I'll send you further details.

Please let the volunteer know that you are listening! It's more satisfying to know there is an audience. Several are transmitting on 3.5MHz so they should have a good coverage. Following the rejuvenation of the GB2CW project, the RSGB is promoting a Morse certification scheme. As soon as this is under way I'll be reporting full details.

The best way to receive Morse – especially on the air – is to use a pair of headphones. This cuts out all external noise and QRM and it can be very relaxing to be in a world of your own, **Fig. 1.**

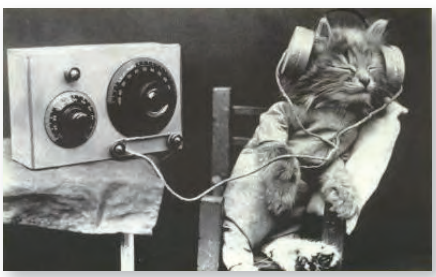

Fig. 1: A 'cool cat' receiving c.w.

Once the individual has decided on their own personal timetable for practice, I encourage them to try to stick to that same time and period religiously every day. It will soon become second nature, something that must be done! Nobody said that learning Morse was easy and the hard work is down to the individual.

Just attending a class or listening to a GB2CW broadcast once a week will do no good at all! It will take the individual a while to achieve around 12w.p.m. and achieve solid copy but this is the speed at which I normally start to teach sending.

I'm a firm believer in using a straight key (the traditional up and down key) to start with, because formation of the characters and words and text is extremely important. Once the individual can do this properly on a straight key, they can then learn how to use a paddle. Try to obtain a good straight key, something akin to my old brass pounder, **Fig 2**, which is a heavy straight key.

The heavier the key is the better, as it will not 'walk around' the desktop as it's operated. Each student should be shown how to hold the key by an experienced c.w. operator and I'll cover that more in the next column.

I send 73 to all and and may the Morse be with you!

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Count on us!

David Butler's

vhf dxer

Share your news, views and reports with fellow readers. Reports to David by the last Saturday of each month please.

This month David Butler G4ASR has reports of poor propagation but is looking forward to better conditions in the spring!

Propagation during February is always quite poor and so it proved to be this year! Ionospheric events were few and far between with brief Sporadic-E openings being reported on February 8th, 9th, 10th and 15th and auroral backscatter openings on February 10th, 28th and 29th.

It was contacts via meteor scatter that provided most of the DX opportunities on the 50MHz and 70MHz bands. There was a smattering of tropospheric openings on the 144MHz and 430MHz bands especially during the periods of February 8th –10th and February 15th-18th. Other than that it was a fairly uninspiring month for the v.h.f. operator!

The 50 & 70MHz Bands

A total of four Sporadic-E (Sp-E) openings were reported on the 50MHz band during February but all were brief in nature. This is understandable as the winter Sp-E season is pretty much over by the end of January.

An opening on February 8th was reported by stations in southern England and the Channel Islands to parts of southern Germany near to the Austrian border. This opening lasted no more than 30 minutes but an event on the following day, February 9th, was reported to have lasted for nearly two hours. However it caught most stations on the hop and precious little activity was noted. Some of the stations known to have worked into southern England included those of HA1FV (Hungary JN87), SP6ARE (Poland JO81), SP6MLK (JO80), S51DI (Slovenia JN76), UZ5DU (Ukraine KN18) and 9A5CW (Croatia JN65).

Two Sp-E openings were reported on February 10th, the first between 1315-1330UTC to S57RR (Slovenia) and a later session between 1600-1730UTC to the s.s.b. stations of CT1FFU (Portugal IM59), EA1AHO (Spain IN52) and F6GPT (France IN94). Finally on February 15th between 1720-1825UTC stations in G, GD, GU and GW mentioned making c.w. and s.s.b. contacts with IS0GQX (Sardinia JM49), IW2OHY (Italy JN45), IW4BET (JN54), IK5QLO (JN53) and IK5RLP (JN52).

Auroral Backscatter

Auroral (Au) back-scatter openings were spotted by the station of **David Gillies MM0AMW** (Argyll IO75) at 1728UTC on February 10th and at 1736UTC on February 28th. In both instances all that was heard was the Faroe Islands beacon OY6BEC (50.035MHz) peaking around 53A.

A marginally better auroral opening was reported by UK station between 1615-1715UTC on February 29th. A handful of Scandinavian stations that included LA8NK (Norway JO48) and OZ1DJJ (Denmark JO65) were worked on c.w., the best mode to use during an aurora.

Other 50MHz stations known to have been worked from the UK during February included DL3WJ (JO60), EA3AKY (Spain JN11), F6EBH (France JN19), HA2RD (Hungary JN87), IK4GBU (Italy JN54), LA9UNA (Norway JO49), OE3MPL (JN78), OY3JE (Faroe Islands IP62), SP9HWY (Poland JO90) and 5Q7A (Sweden JO65) via meteor scatter and JR6EXN (Japan PM53) via moon-bounce.

Unfortunately none of the auroral or Sporadic-E activity reached as high as the 70MHz band and operators had to resort to scattering signals off meteor trails to make contacts further away. The meteor rate is always very poor during February with no major showers and the lowest daily rate of sporadic (non-shower) meteors throughout the entire year. However two new countries became operational on the 70MHz band during the month and this provided the impetus for stations to try a bit of meteor scatter (m.s.) work.

Although Estonian Radio Amateurs gained access to the 70MHz band on December 23rd 2007, it wasn't until February 8th 2008 that the first ES-station actually became operational. Their allocation is between 70.140 to 70.300MHz, with 100W output (Class A and B) and 10W output for the entry level class (D). **Gennadi Klevtsov ES3RF** (KO29) was the first Estonian station to become active during February.

Gennadi uses a modified Yaesu FT-847 transceiver that produces 60W output into a 5-element YU7EF Yagi. All contacts so far have been made using JT6M digital modulation and have included the UK stations of G0CHE (IO90), G3SHK (IO90), G3VYF (JO01), G4DEZ (JO03), G4FUF (JO01), G4PBP (IO82), G4YTL (IO92), G7CNF (IO81), G8VYK (JO01), GD0TEP (IO74), GM3NKG (IO85), GM4ISM (IO85) and GW8ASD (IO83).

During February the 70MHz station of ES3RF managed to contact 10 DXCC countries of DI2PM (Germany), LX1JX (Luxembourg), OK1CO (Czech Republic), OZ3ZW (Denmark), S51DI (Slovenia), 9A1Z (Croatia) and G, GD, GM and GW.

A total of 20 Radio Amateurs in the Czech Republic have recently gained temporary access to the 70MHz band for a 12-month period ending on December 31st 2008. They have been authorised to use the band 70.200 to 70.300MHz with a maximum of 10W effective radiated power (e.r.p.). Incidentally, the term e.r.p. is not directly equivalent to the power that is actually radiated, but is a quantity that takes into consideration transmitter power and antenna directivity or gain. For example if you use an antenna that has 0dB gain (a dipole) then you need to run 10W transmitter power into it to achieve 10W e.r.p. Conversely, a 6-element Yagi of 10dB gain will require a transmitter power of only 1W to produce 10W e.r.p.

Stations known to have been active from the Czech Republic during February were OK1CO (JO80), OK1COM (JN79), OK1DO (JO60),

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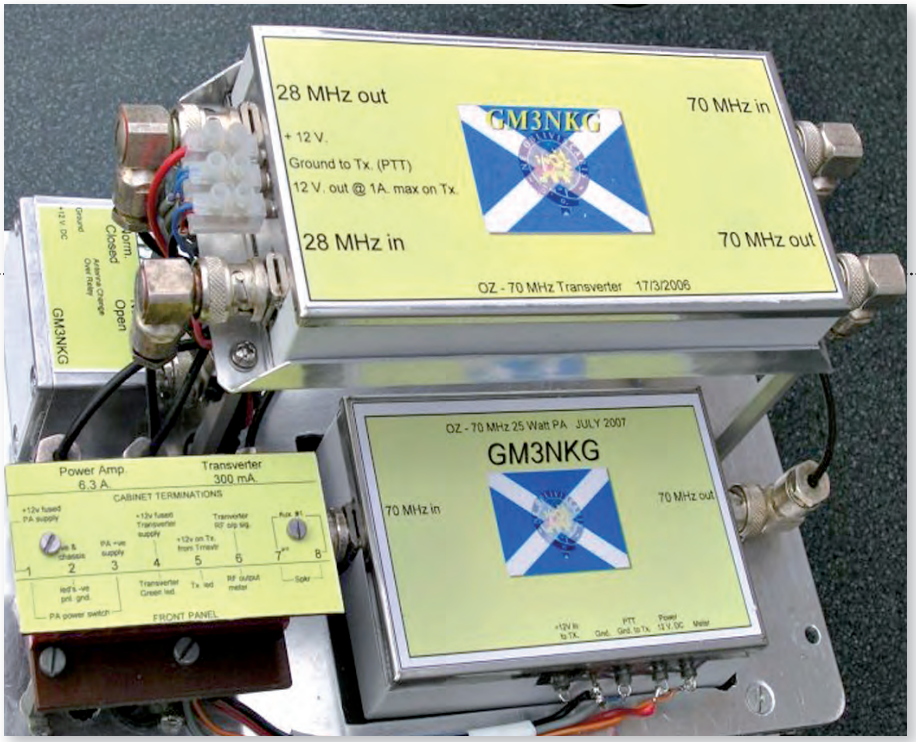

Fig. 1: The 70MHz transverter constructed by GM3NKG.

OK1KT (JO70) and OK2POI (JN99). The first contacts to be made from the UK were between G4DEZ and OK2POI at 0448UTC on February 28th, GW8ASD and OK1KT at 0915UTC on February 28th and GM4ISM to OK1KT at 0956UTC on March 1st.

Apart from the AKD4001 f.m. transceiver and Icom IC-E90 tri-band handheld (that needs modifying to work on Four Metres) and innumerable ex-PMR a.m. and f.m. radios that have been converted for the 70MHz band there are no commercial c.w. or s.s.b. (multimode) transceivers currently available that cover this band. However some operators are now modifying the discontinued Yaesu FT-847 transceiver to give up to 85W output on the 70MHz band. Details of this modification can be found on the web site of **Marc Vlemmings PA1O www.vlemmings.com** and the Four Metres website **www.70mhz.org** The easiest way of operating c.w. and s.s.b. is by using a transverter and the photograph, **Fig. 1**, shows the popular OZ-design constructed by the station of GM3NKG. It enables all the features of an h.f. transceiver to be used on the 70MHz band. There are many ready made and kit transverters available and The Four Metres website also has details of these.

Editorial note: Tony Nailer G4CFY's *Poundbury dedicated 70MHz s.s.b. transceiver kit (the design was published in* PW*) is now available. I have one and recommend the kit to readers. See the Spectrum Communications advert in this issue.* ***Rob G3XFD.***

The 144MHz Band

Before turning to your reports of recent tropospheric conditions, I'd like to mention an E-mail I recently received from **Sergey Lysenko UR5LX**. He recalls that during a tropo opening on December 22nd 2006 he heard **G7RAU** on 144MHz for over 20 minutes and working Polish stations in the SP7, SP8 and SP9 call areas. The distance between the two stations was an astonishing 2596km – but frustratingly UR5LX couldn't attract his attention!

The following year – on December 19th 2007 – Sergey noted a similar occurrence with UK 144MHz stations working into the Baltic States of Belarus (EW) Estonia (ES), Kaliningrad (UA2), Latvia (YL), Lithuania (LY), Russia (UA) and the Ukraine (UR). Sergey reports that his c.w. QSO with the station of **GM0TGE** (IO87) at 2600km was the longest distance tropo contact ever made from Estonia on the 144MHz band. Sergey therefore suggests that the month of December may be a good time for UK stations to make tropospheric contacts into Ukraine and similar areas.

Prompted by the E-mail from UR5LX I decided to look further back into my records and noted that on December 23rd 2005 there was a good tropo opening, only this time it was to southern France. However in the period December 6th – 10th 2004 there was a tremendous opening from the UK to Austria (OE), Belarus (EW), Croatia (9A), Czech Republic (OK), Denmark (OZ), Italy (I), Poland (SP), Sweden (SM), Switzerland (HB9) and Ukraine (US).

The longest distance contact during the December 2004 opening was established on December 9th 2004 between the stations of **G4CBW** (IO83) and **US5WU** (KO20) over a path of 1843km. So I endorse exactly what Sergey UR5LX has mentioned in that you should keep a look out for weak but very long distance stations during tropo openings in December!

Unfortunately tropospheric openings on the 144MHz and 430MHz bands in February were nothing like that experienced at the end of last year. During the period February 8th –10th operators in central and eastern England reported making 144MHz contacts with stations in Denmark, Norway, Sweden, France and Switzerland. Stations situated in southern England and Wales found that the path to southern France and Spain was also open.

Nothing further than 900km was worked during the February opening that included the 144MHz stations of EA1DDU (IN73), EA1UU (IN83), F6BYJ (JN05), F0FHU (JN06), HB9SJV (JN36), HB9QQ (JN47), LA2PHA (JO38), LA4YGA (JO48), OZ5TG (JO45), OZ1BNN (JO55), SK6BA (JO67) and SM7GVF (JO77).

Another period of enhanced tropo conditions was reported in the period February 15th –18th. At the beginning of the opening on February 15th a number of operators in southern England reported a good opening into Scotland with contacts being made on s.s.b. with the 144MHz stations of GM0HTT and MM5DWW both located on the Orkney Islands (IO89) and with MM5AJW (Wick IO88). As the opening developed, additional paths into Denmark, Sweden, Germany and Poland were created although all

Fig. 2: The 144MHz antenna array of Simon Smith 2E0VAG.

were restricted in length to less than 1000km. Amongst the DX contacted on c.w. and s.s.b. were the 144MHz stations of DO2HSP (JO53), DH5BS (JO63), OZ5TG (JO45), OZ9FW (JO65), SM7FMX (JO65), 5P5Z (JO55) and SP3IYM (JO82).

Godfrey Manning G4GLM (London IO91) mentioned that the weather pattern had been dominated by a stable high pressure area over Europe for some days. On February 18th he noticed that the street lights were starting to obscure in the early stages of radiation fog. This is sometimes a good indicator of a lift in tropo conditions.

Tuning across the 144MHz band Godfrey heard a very strong s.s.b. signal from the station of ON6ID (Belgium JO10). The distance was quite short, approximately 300km, but there was no fading or flutter on the signal and it was so strong it could well have been a local station.

Low Power Moonbounce

Last month I reported that **Angus Young M0IKB** had made a 750,000km Earth-Moon-Earth (e.m.e.) contact with the 144MHz station of KB8RQ in Ohio, USA. At the time of the QSO Angus was only running 25W into a 7-element Yagi located inside the loft space.

In response to the M0IKB news I have received details of a similar 144MHz e.m.e. contact. **Simon Smith 2E0VAG** (London IO91) mentions that with the help of **Kevin G1KAW** they set up a low-power e.m.e. station in his small back garden.

The photograph, **Fig. 2.**, shows the 144MHz antenna array consisting of two 9-element F9FT Yagis bayed horizontally and matched together by a Procom coaxial cable phasing harness. A guyed Strumech head unit supported the assembly that also contained a Kenpro elevation rotator and Hygain azimuth rotator for tracking the Moon.

In the shack a computer was used to provide tracking information and also to generate the JT65 (*WSJT*) digital modulation. This was then fed to a SignaLink SL-1 sound card interface into a Yaesu FT-897D multimode transceiver running 50W output.

The attempt, Simon's first at bouncing a signal off the Moon, was made during the American Amateur Radio Relay League (ARRL) e.m.e. contest in November 2007. At 1800UTC he started watching the N0UK reflector **www.chris.org/cgi-bin/jt65emeA** (This is useful as it helps to locate where inaudible JT65 stations are transmitting.).

As the Moon rose above the roof line of the house Simon and Kevin started copying "CQ" signals from RN6BN, a large Russian e.m.e. station. They commenced calling using the standard 1-minute periods and within 45 minutes all QSO messages had been correctly received and the contact was completed!

Simon said that he was 'over the Moon' (!) at making this contact. As I reported last month, hundreds of JT65 contacts are being made via the Moon by stations running less than 100W to a single long boom Yagi and contacts have been made with as little as 5W output. So what are you waiting for?

Deadlines

That's it for this month. Ionospheric conditions will soon be showing a marked improvement on the v.h.f. bands. Sporadic-E openings on the 50MHz band should be observed during the last week of April and will gradually build up into daily openings throughout May.

Expect to see Sp-E openings on the 70MHz band from the middle of May onwards. If Sp-E conditions seem particularly good then keep a special look out on the 144MHz band during the last week of May. Please send your reports or any news to me before the last Saturday of the month.

73 to you all. ●

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Ben Nock's

valve & vintage

This month Ben Nock G4BXD delves into a Dutch receiver, realises he's lacking in Hungarian and looks at an American set.

Ben Goes Dutch and Hungarian this month!

A warm welcome once again to the Valve & Vintage shop, this being my second time 'on duty' in 2008 and I hope the year has started well for you all. The later part of 2007 did see some new additions to the 'Kidderminster Kollection' but as space is getting very tight now I really must start sorting out all the duplicates I have!

The problem I have, is that the examples that arrived some time ago, even years ago, are now buried amongst my other equipment. It's becoming so cluttered that I'm having trouble actually lifting and separating some of this gear. Perhaps I should really take up stamp collecting, it's a much lighter weight hobby – especially for the older enthusiast!

A Dutch Connection

Not withstanding the lifting problem – I still seem able to find heavy sets

Fig. 1: The GRC-3030 with dynamotor (motor-generator) power supply.

Fig. 2: Inside the GRC-3030, the receiver is on the left and the rear panel, with the transmitter on the right and centre.

– and I spotted the example in **Fig. 1**, for sale in Holland while I was visiting and decided I had to have it! Not that its anything fantastic but it just looked nice. The seller was happy to post it but when it arrived in Kidderminster I was amazed to find that there was no packing material at all!

The seller had simply found a cardboard box of the right size and that was his 'packing'. Luckily, as it's a military set it survived quite happily. However, I don't think one of the modern plastic cased jobs would have faired so well.

The radio is a GRC-3030, a Dutch-made set of the early 1950s, which was made to replace the likes of the Wireless Set 19 in a portable role. It bears a resemblance to the 19 set in that the complete station consists of

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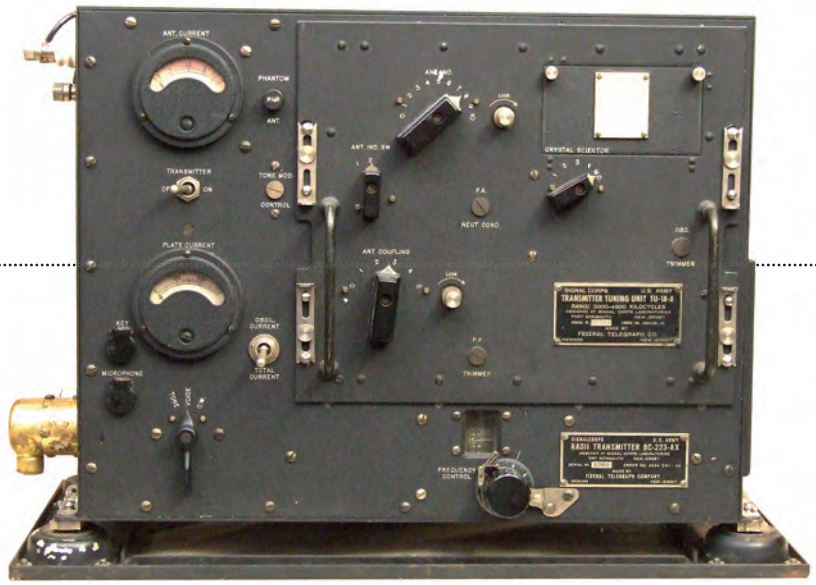

Fig. 3: The BC-223-AX transmitter.

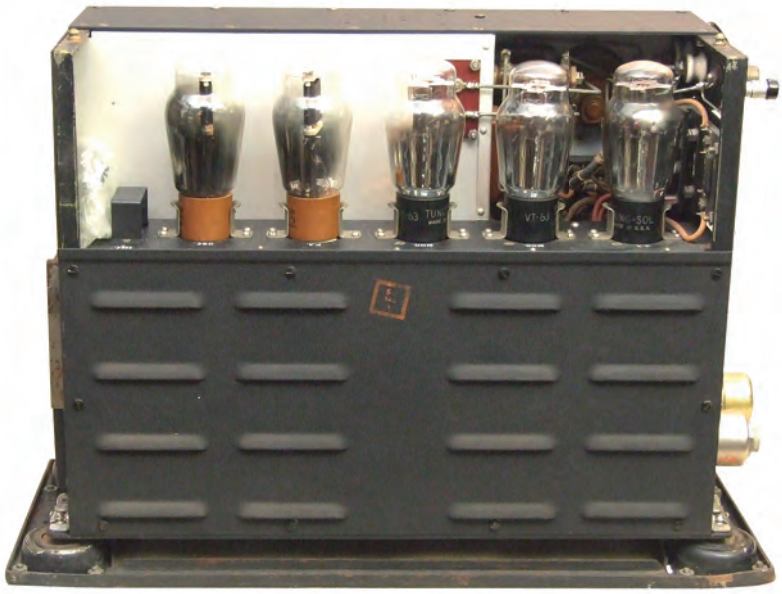

Fig. 4: The valves inside the BC-223-AX transmitter, easy access if replacement needed.

the radio, an external power supply, a junction box and crystal calibrator. The radio covers 2 to 12MHz and provides amplitude modulation (a.m.), Morse telegraphy (c.w.) and modulated continuous wave (m.c.w.) with a transmitter output of approximately 10W. The photograph, **Fig. 2**, shows an internal view of the GRC-3030.

The receiver is a single conversion superhet design mainly using 6BA6 valves, while the transmitter has an 807 in the output, which is anode and screen modulated by a pair of 6AQ5 valves. The power supply runs off a 24V d.c. supply and contains two rotary generators providing 275 and 500V d.c. for the high tension (h.t.).

As with many military sets of the period, the modulation level is quite low. The a.m. transmissions were only intended for close communication and any long distant communications would have been catered for by telegraphy using Morse, therefore a high level of modulation was not needed. Furthermore, most military sets are under-run to extend life and time between services, – unlike Amateur Radio use where we always try and squeeze the last milliwatt out of our sets!

I wanted to increase the microphone gain to make the set more readable on the Amateur bands and I decided to add a single transistor amplifier for the microphone. This turned out not to be as easy as I thought it would!

The GRC-3330's audio stage is common to the receiver and transmitter, the screen voltage on the 6AQ5 valves is reduced during receive then switched to maximum during transmit to increase the audio level. The input of the audio stage is connected to the receiver detector, the microphone and the m.c.w. tone oscillator at the same time.

Adding the microphone pre-amplifier worked fine on the transmit audio but caused feedback and howling on receive. The eventual solution was to use a small relay, wired across the main transmit-receive relay which connected the output of the microphone amplifier only during transmit. With this in place quite good reports were received from various on air contacts with **Mervin GW8TBG** and **Mike G1EDP** and members of the 'Boatanchor' group on 3.625MHz.

American Connection

I was very pleased when I recently acquired an early Second World War transmitter, an American made BC-223-AX, which arrived in quite excellent condition. The transmitter, **Fig. 3**, covers 2-6MHz using plug-in tuning units, i.e. 2-3MHz (TU-17), 3-4.5MHz (TU-18) and 4.5-6MHz (TU-19), operating either a.m. or c.w. at 10W.

Valve type 801 (VT62) are used for the oscillator and the power output amplifier and three of type 46 (VT46) are employed for the modulation. The valves are easily accessible by removing a cover at the rear, and **Fig. 4** shows this.

The complete station would have included the BC-312 receiver along with either the PE-135AX dynamotor or PE-125AX vibrator unit. The whole station, jeep mounted, could have run off 12 or 24V batteries but the transmitter actually needs just 8V for the valve heaters and the power units contained a dropping circuit for this requirement.

A high voltage supply – of 500V – is also needed. Luckily, I was able to find the correct plugs for this set so I will be able to operate it without the need to modify or solder additional connections.

In addition to being fully tuneable

over the range of the plug-in unit, the rigs can can hold four crystals for exact frequency control. I've not actually powered the set up yet so I have no idea just how stable the it will be using the variable frequency oscillator, (v.f.o.) – but more on that in the future.

Incidentally, from what I've been told from various other collectors in the USA, the 223 had a short life in military service. They were quickly replaced by other sets.

Small Is Nice!

Just to prove I can find new sets that do not require three Sumo wrestlers to lift them – how about the cute little receiver in **Fig. 5**? The R-1262, is a four channel 30 to 80MHz very high frequency (v.h.f.) frequency modulated (f.m.) receiver weighing just 350g and measuring 128 x 70 x 30mm (5 x 2.75 x 1.2in).

The set came with its headphones, two clip-on 9V rechargeable batteries and a small handbook containing a block diagram and operating instructions.

The actual country of origin is not known but the handbook is written in Hungarian. The set might be Hungarian made or from the Communist Bloc collective and no doubt someone will let me know.

The receiver is a double conversion design, with 10.7MHz and 455kHz intermediate frequencies (i.f.s). The set came fitted with four channels, around 33, 42, 70 and 71MHz (from what I can make out) and the radio frequency (r.f.) section of the set automatically tunes to match the crystal selected. My Hungarian is, unsurprisingly, sparse so can any readers with any knowledge of Magyar help?

Internally the set is pristine and **Fig. 6** shows the neat printed circuit board and layout. The 9V rechargeable battery clips to the bottom of the set and the on/off function is combined with plugging in the headset. The only other control is the channel selector. Hopefully in the future I will get round to inserting crystals to get the set onto the 50 and 70MHz Amateur bands.

Fig. 5: The R-1262 receiver and headset.

Fig. 6: Inside the R-1262, a compact design, with the four crystals visible on the lower left.

And Finally

Well that's about it for my stint on duty the V&V shop. I hope you've enjoyed the selection I have bought you and there are more pictures at **www.qsl.net/g4bxd** if you like to view some more. As always, I can be contacted direct at **62 Cobden Street, Kidderminster, Worcestershire DY11 6RP**, or via E-mail at **military1944@aol.com** Cheerio for now! ●

Carl Mason's

hf highlights

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

Have you noticed that radio reception is different at night compared to that during the day? This is because of the way the various layers of the ionosphere respond differently to the loss of the sun's radiation. The 'grey line' is the name given to the line that goes around the Earth separating daylight from darkness.

Propagation along this line is very efficient and one reason for this is that the D layer, extending from about 40 to 65km (25 to 40 miles) above the surface of the Earth in the lowest region of the ionosphere. This layer absorbs high frequency (h.f.) signals during daylight but it's quickly overwhelmed by the air around it if the ionising radiation from the sun is removed. The D layer disappears rapidly on the sunset side of the grey line, but has yet to build upon the sunrise side of the line.

Above the D layer are the reflecting E and F layers which are up to 400km (250 miles) above the surface. These are the layers we use for communicating on short wave as they are so far up in the Earth's atmosphere that they can stay ionised much longer after sunset.

Radio Amateurs and short wave listeners (s.w.l.s) alike can increase their chances of long distance communications to all areas of the world at dusk by regularly monitoring the grey line as it moves around the globe. Using their skills they call or listen for that distant or rare station which might otherwise not be heard.

Grey line operating can be an interesting but it's a 'deep' subject and far too large for me to discuss here in detail. However, a resource available to us 'online' and one of these is the 'grey line' map. There are several around but I suggest readers try **www.smeter.net/propagation/views/current-gray-line.php** for the current map or **http://dx.qsl.net/propagation/** a site which has a collection of propagation information gathered from many different sources.

Radio Convention

There's still time to book a visit to the **33rd International Exhibition for Radio Amateurs** at Friedrichshafen in Germany, which is Europe's largest meeting for those interested in Amateur radio. And this year the convention will take place on 27th to 29th June. As usual there's going to be a large number of commercial exhibitors on site, together with a flea market and a long list of lectures and presentations that will be made over the weekend. More information is available online at **www.darc.de/ausland/new/HR2008**

The DX News

This month's DX news begins with **Rashad Iskandarli** who is in Kazakhstan, the ninth largest country in the world, where he has extended his United Nations **4J9M** licence until the 23rd April. There's still time to work him on the h.f. bands and the

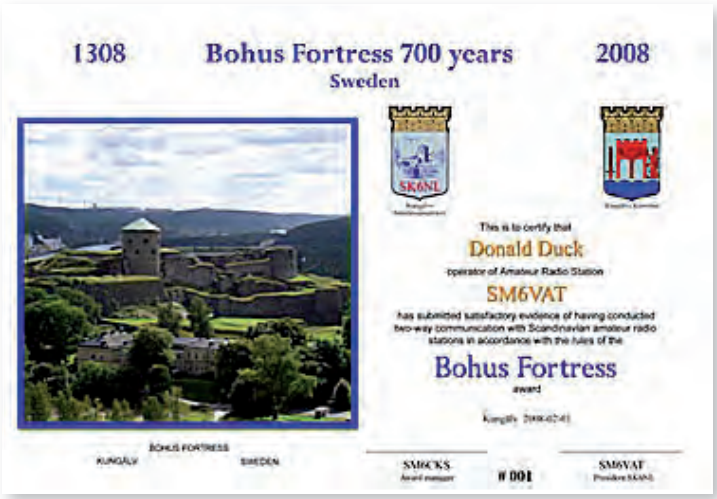

Fig. 2: The Bohus Fortress Award from Sweden

Fig. 1: The IA3GM QSL Card being 'aired' by Luigi Lenardon IV3LQN during the year.

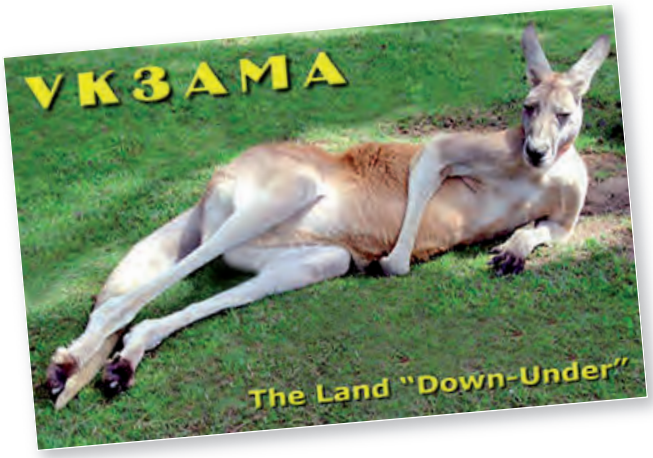

Fig. 3: VK3AMA worked by Lee Carberry M0HOK using PSK31 on 10MHz.

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Fig. 4: HG7CN worked by Keith Winward 2E0JKD on 14MHz c.w.

QSL route is via **Alexander Spielmann DL7EDH, Hubertusstr. 5, D-5095 Denkendorf, Germany**.

Amateur Radio operators in Oman, in the Middle East, have been given permission to operate on 10MHz and **Chris Dabrowski A45XR** has been very active on this band since early February. Chris says, "If you work me and require a QSL direct, I prefer IRCs. If you send 'something green' in an envelope then please seal it properly! Bureau cards are okay, although this route can be extremely slow." The direct address is **PO Box 2038, CPO 111, Oman**. Please **do not** send any cards via Chris' home call SP5EXA. A log search for A45XR's activity on the band is available at **www.a45xr.spdxc.org/index.php**

A special callsign **AY0DX** will be aired by **Dario Abrego LU3DR** from the city of Tandil in Argentina until December 31st. The special call is to mark the centenary San Jose School founded on 1908 and the first school of this order in Argentina

In Italy, **Luigi Lenardon IV3LNQ** is operating once again as **IA3GM** on all the h.f. bands during the year to commemorate **Guglielmo Marconi** and his Yacht *Elettra* which was equipped as his laboratory and where Marconi made most of his experiments. You can QSL via Luigi's homecall direct to **PO Box 3959, 34148 Trieste TS, Italy**.

Members of the **Kungälv Radio Club SK6NL** in Sweden (**www.sk6nl.com**) will be active as **SF700BF** during the year to celebrate the 700th anniversary of the Bohus Fortress. Kungälv was a medieval town near Gothenburg and the site of a fortress called Bohus. In 1308 this part of the world was the southernmost area of Norway and the fortress was built to protect Norway from the Swedes.

The castle is still standing after 700 years and it has never surrendered to anyone in its long history, even though it has witnessed 14 sieges. An outer wall was added in the 16th Century although some of the structure is now missing as it once served as a stone quarry.

Activity will be on all h.f. bands and using all modes. A nice award is available, the rules are simple and it's open to anyone – including s.w.l.s. All you need to do is to make contact with 10 Swedish stations and the station **SF700BF** on any band and using any mode. If you have any questions then you can E-mail **award@sk6nl.com** and your log extracts should be sent together with 5 (Five Euro) to SK6NL, **Skalebracke 140, SE 442 49, Kungälv, Sweden**.

Finally, in Norway **Svein Rabbevag LA9JKA** reports that he's "very active" from Jan Mayen (EU-022) as **JX9JKA** until October 8th. He will be operating both s.s.b. and digital modes on all h.f. bands with QSLs going via the bureau.

New QSL Manager

It's important to remember that QSL managers play an important role in our hobby and one such person is **Irving McWherter K3IR**. Irving has taken over the QSL duties from **Pietro De Volpi Snr K3PD** due to Pietro's illness (We wish Pietro a speedy recovery).

Irving is now manager for the following calls: 5N0NAS, 5Z4ES, 9Z4DI, BX2/NE3H, C95WH, EL2JH, FM5WE, OX3SA, T32Z, T88RZ, TA3DD, VP2MNI, VP5FEB, ZL2MAT, Z21FO, Z21GC, Z21GX, Z22JE, ZS4U, ZS6CCY and ZS9X. Cards are fine either direct to 11910, Coronada Place, Kensington, MD 20895-2323, USA or through the bureau. Please note that any QSL cards received by mail without sufficient return postage will be sent back via the bureau.

Your Reports

Now we come to your reports and **Ted Trowell G2HKU** on the Isle of Sheppey (North Kent) starts this month's reports with 1.8MHz c.w. stations TF3CW (Iceland) EU-021, CT3/OM3RM (Madeira Island) AF-014, CN2R (Morocco) and OH0Z (Aland Island) EU-002 QSL via W0MM and all contacts were made around 2100UTC using a Ten Tec OMNI V and 70W to a G5RV antenna.

The 1.8MHz log of **Leighton Smart GW0LBI** in Trelewis, Mid Glamorgan notes that he used his Yaesu FT-100 and 21m (70ft) long wire antenna and did well with just 1W c.w. Leighton listed UA2FT (Kaliningrad), ES5QX (Estonia), OZ1CT (Denmark), LA5HE (Norway), OK7GU (Czech Republic) and PI4CC (Netherlands).

Doubling his power to 2W, Leighton added HA8DZ (Hungary), HB9CV (Switzerland), RL3FT (European Russia), S51IV (Slovenia), LY2VA (Lithuania), DK2NV (Germany) and YL7X (Latvia).

Operating at 100W Leighton worked W8LRL (USA) in Kearneysville, West Virginia, 9H1XT (Malta) EU-023, VE9DX (Canada) and EA8FK (Canary Island) AF-004 with all stations worked between 2130 and 0030UTC.

In Worcester Park, Surrey, **Eric Masters G0KRT** used his Kenwood TS-570DG and 30W s.s.b. into a modified W3EDP antenna and logged D6DTW (Comoros) AF-007 at 2009, while c.w at 100W found DL3ARM (Germany) 2116, OL4A (Czech Republic) Radio Club Tes Litvinov at 2129, EA6SX (Balearic Islands) EU-004 at 2136 and PA3EBC (Netherlands) at 2144UTC.

Moving to 3.5MHz Eric had amplitude modulation (a.m.) QSOs with Stuart G0TBI near Stourbridge at 1505, G3GGK in Cambridge at 1700 and Dave GW4GTE in Flintshire at 1716 while F6BAL (France) also made into the log using c.w. at 2024UTC.

The 7, 10 & 14MHz Bands

On the 7MHz band **Peter Leng G0SVO**, Gosberton, Spalding was pleased to contact two new s.s.b. countries including ET3SID (Ethiopia) 2120 and 5N8NDP (Nigeria) at 2232 QSL via IK5JAN using a Yaesu FT-1000MP driving a Ranger 811 amplifier at 400W to a G5RV. Ted G2HKU used the key once again finding LA5EKM/MM in the North Sea at 1700 followed later around 2200UTC by 7X4AN (Algeria), YV5DRN (Venezuela), P40LE (Aruba) SA-036 QSL via K2LE and VQ5FOC (Turks & Caicos Islands) NA-002 QSL via W9VNE.

The 10MHz band was in, "fair shape", according to Ted who logged EA6/DL6RO (Balearic Islands) at 1610 and VK6BN (Australia) in Swan View, Western Australia at 2200UTC both using c.w.

Lee Carberry M0HOK in Stockton-on-Tees, using PSK31, was also on the 10MHz band and was pleased to work Laurie Cowcher VK3AMA (Australia) in Chirnside Park, Victoria at 1541 who is also a keen Data operator. Lee got a 599 report despite, "poor band conditions" at the time using 30W from a Yaesu FT-897D and a half size G5RV. Moving to 14MHz, Lee worked OH3AXE at 1230UTC using MFSK16.

Also on the band was **Martyn Medcalf M3VAM** in Chelmsford, Essex who worked Radioclub-Kazanlik SBA LZ9X (Bulgaria) at 1003, (QSL via LZ1RB). This was followed later by SI3A (Sweden) 1321, OH0JFP (Aland Island) at 1952, OZ3Z (Denmark) 2004, IZ1LBG (Italy) 2014, DP6A (Germany) 2029, EA1IR (Spain) 2213, LY8O (Lithuania) 2218, T93M (Bosnia-Herzegovina) 2223, QSL via K2PF or DJ2MX and S50K (Slovenia) at 2229UTC using an Icom IC-746, and his SGC-237 automatic antenna tuner (a.a.t.u) into a half-size G5RV antenna.

In Middlesbrough, Teeside in North East England, **Keith Winward 2E0JKD** used his IC-746 and 30W c.w. to a fantail dipole array working UY1CI (Ukraine) 0920 and RX4HJ (European Russia) 0925, although **QRZ.com** lists this call as Soyuz Radiolyubitelej Russi,

Fig. 5: EA6SX worked by Eric Masters G0KRT on 1.8MHz c.w.

Fig. 6: OK7GU worked by Leighton Smart GW0LBI on 1.8MHz c.w. with just 1W

Asiatic Russia! (If anyone can shed some light on this then please let me know). Keith then worked HG7CN (Hungary) at 1025, followed by 9A5BS (Croatia) at 1430 and IZ130LO (Italy) at 1441UTC.

Keith has also been busy setting up a new Amateur Radio and Hobbyist Group for Middlesborough – so if you live in or around the area and are keen to find out more then contact Club Secretary **Gary Seymour M3UXJ**, via **PO Box 452, Middlesbrough TS1 9BJ**, for further details.

The 18 & 21MHz Bands

The 18MHz band provided Lee M0HOK with C56JC (The Gambia) at 1634 (QSL via ON4LAC) using PSK31 and Ted G2HKU with PY7WC (Brazil) and KR5V (USA) in Fairview, Texas around 1700UTC.

Eric G0KRT used s.s.b. at 100W to work UA9MHN (Asiatic Russia) 1104, K1IED (USA) in South Windsor, Connecticut, UR3IFD (Ukraine) 1430 and IZ0IFO (Italy) at 1441UTC.

On 21MHz Ted worked CX7CO (Uruguay) on c.w. at 1600 while Martin M3VAM found s.s.b. station CU2A (Azores) EU-003 at 1357 (QSL via OH2BH).

The 28MHz Band

The higher bands have been suffering of late but Eric G0KRT managed to work several Italian calls using s.s.b. at 100W, including IK5EKL 1629, IZ4IRJ 1631 and IK4DCX in Rimini at 1640. And while using frequency modulation (f.m.) he 'bagged' I5KAP at 1646 and IZ5EBL in Lamporecchio, 30km west of Florence at 1650UTC.

Signing Off

Well that's it for another month and it is good to see a variety of modes being used by our reporters to work the h.f. bands. Thanks to all of these for their logs.

I must remind readers to please use my 'new' E-mail address for reports and any correspondence from now on as I'll not be accessing my previous **Freeserve** address. If you do contact me remember to include a name and callsign together with your contact details if you want a reply.

Finally, my thanks must go to **Mauro Pregliasco I1JQJ/KB2TJM** editor of the *425 DX Newsletter* for all the DX information. Until next time I wish you all good DX.

73, Carl GW0VSW

●

Colin Redwood's

what next?

Colin Redwood G6MXL has advice and help for anyone who's new to contesting whether it be on h.f. or v.h.f.

For many Radio Amateurs, contests are an important aspect of the hobby. Some Amateurs only have a limited amount of time to operate, so participating in a contest will certainly bring many contacts in a short time and contests are also be an excellent club activity.

Most contests are organised by national societies such as the **Radio Society of Great Britain** (RSGB) and its counterparts world-wide. In addition, specialist societies such as the **British Amateur Television Club**, **Worked All Britain** and magazines such as *Practical Wireless* and the American based *CQ* magazine also run contests.

Multiband & Multimode

Some contests are multi-band, multi-mode and others are single-band, single-mode, with others in between. The duration of a contest is typically either a few hours, 24 hours or a whole weekend.

There are contests on most of the high frequency (h.f.) Amateur bands almost every weekend. In addition there are also contests on all of the very high frequency (v.h.f.) ultra high frequency (u.h.f.) and super high frequency (s.h.f.) bands during the course of the year.

To start with I would suggest just making a few contacts during a contest to learn the basic techniques. Contacts during contests are usually brief and absolutely to the point. Little more than the barest minimum required by the rules of the contest is exchanged.

So, telling the other station that your name is Peter, your QTH is Birmingham, the weather is cloudy, your rig is the latest ITF-2008 and your antenna is a 6-element Yagi, won't win you friends among the contesters!

What intending contesters **do** need to know is the information that **is** required to be exchanged. Normally this will include the callsign, the report and a serial number. However, to find out more, entrants need to read the rules of the contest.

Finding The Rules

Finding what the rules are for a Hungarian or Spanish DX contest (for example) may not be particularly easy. However, to help there are a number of sites on the internet that have rules for most h.f. contests and the most complete that I've found is at **http://www.sk3bg.se/contest/**

I advise that intending contesters should read the rules of the contest and make sure they're understood and that the station to be entered is eligible to enter. Rules for RSGB contests are published in the society's journal *RadCom*. The rules are usually split between *General Rules* – which apply to all RSGB contests – and rules that are specific to a contest in addition to the *General Rules*. Incidentally, please note that there there are separate General Rules for h.f. and v.h.f. /u.h.f. contests. And remember that no matter who is organising the contest, the rules will contain vital information!

Date and Time: The date, start and end time. Be careful to note whether the times are in local time or in UTC (Co-ordinated Universal Time, usually stated as UTC). Remember that in the UK – during British Summer Time (BST) – our clocks are one hour ahead of UTC.

Eligibility: Who can enter? What sections? Who can you work? Most RSGB contests only accept entries from RSGB members or groups of RSGB members, although non-members are very welcome to make contacts and send in a check-log. The rules will make it clear whether the contest is for single operators (that's people operating without assistance from others) or for multiple operators (where a club can participate).

The rules will also indicate whether the entrant can operate only from a fixed location (normally their registered station address) or only portable and away from the registered location using temporarily erected antennas).

The larger contests may have multiple sections so that an entrant can find a section in which they can operate and compete with other stations in similar circumstances (e.g. multiple operator, portable, less than 100W, etc.). In some contests, only certain stations the entrant works will result in points (e.g. UK stations, Commonwealth stations, etc.).

It is important that each entrant understand which bands and modes are permitted for the contest. For example. most Amateurs will probably be aware that contests are not organised on the 10MHz (30m), 18MHz (17m) and 24MHz (12m) bands – the World Amateur Radio Congress (WARC) bands. Additionally, many contests will confine themselves to a either c.w. (Morse) or s.s.b. (single sideband 'phone) or data or television modes on a single or small number of bands. Relatively few contests cover all the non-WARC h.f. bands with both c.w. and s.s.b.

Exchange: The Exchange section of the rules will describe what information has to be sent and received by each station during a contact in order for it to be treated as a valid contact for the purposes of the contest. Usually this will be a report and serial number as a minimum.

The serial number should start at 001 for the first contact and increases by one for each subsequent contact made. For example the 31st contact made will have serial number 031. In addition most v.h.f./u.h.f. contests will also require Locators to be exchanged (see last month's *What Next?*) and some h.f. contests will want CQ Zone, etc.

Points: Contesters will also need to know how to gain points during a contest. Examples of the way points are determined include one point per QSO, one point per kilometre distance between the stations, three points per QSO with DX and one point per QSO with the contester's own country, etc. In addition there may be multipliers – so I'll explain!

Multipliers: Multipliers are typically Locator Squares, DXCC Countries, and Post Codes. If entrants are participating seriously then they'll want to maximise not only their points from each contact but also their multipliers. For example, working a string of German stations may not get you the highest overall score if there's a multiplier for each country worked.

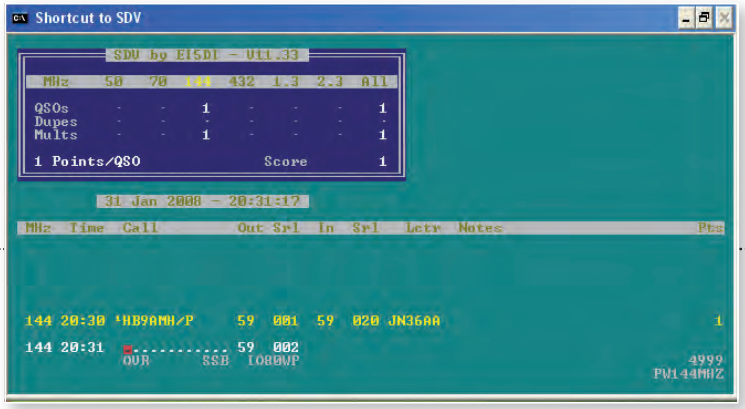

Fig. 1: Using SDV by EI5DI, a simple logging program.

Colin Redwood G6MXL
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: what.next@pwpublishing.ltd.uk

During the Contest

During the contest, there are broadly two techniques that stations employ to achieve their best results. The first is to find a clear frequency and call "CQ Contest" for the duration of the contest, working stations that answer the calls. This is usually a good technique for well equipped stations.

For beginners – and those with low power stations – I suggest tuning up and down the band listening for stations calling "CQ contest" and then going back to them with the callsign (phonetically if using phone). A mixture of these two techniques can also work well. As with so many aspects of Amateur Radio, it pays to listen to others to learn the best operating techniques. Take care and time and make sure that logging is completed accurately.

Make sure what the required exchange is and give the information in the requested order, as this is what the distance station is expecting to hear. In a v.h.f./ or u.h.f. contest this is usually report, serial number and locator (e.g. 'Mike Three Alpha Bravo Charlie Stoke Portable you are Five Nine Zero Zero Two in India Oscar Nine Zero Alpha Romeo').

Don't try to rush the exchange – the operator must ensure that they and the other station have all the information. So, make sure the correct callsigns are given. When operating portable, make sure the '/P' is sent or say, 'stroke portable' every time with the callsign being used. Use phonetics in 'phone contests. If the callsign doesn't belong to the operator (perhaps a club or contest group callsign is being used) make sure that the correct callsign is used and not your own!

In the heat of the contest, it's worth remembering that each Amateur must still comply with the conditions of their licence. Please adhere to the bandplans and remember that not everyone will want to participate in the contest!

Submitting The Log

When the contest is finished, the log has to be submitted to the contest adjudicator within the time limit specified in the rules. Typically this will be between two and four weeks of the end of the contest.

These days, adjudicators have a very strong preference for logs on computer files. They will often only accept logs in certain formats. The hand-written paper log is becoming a thing of the past for many contests!

There are a number of computer logging programs that will allow operators to log their contacts either during or after the contest. The choice of program or form of logging to use is entirely personal, although my preference is to use computer logging at home but paper logging if I am out operating portable.

The rules will also make it clear what should be done if a duplicate contact (contacting the same station twice on the same band in the same contest) is made. Usually duplicates should be clearly marked and no points claimed. The same applies for incomplete contacts. Warning: Don't re-use a serial number of duplicate or an incomplete contact with another contact.

When entering the contacts into a computer after a contest, take time to be careful and make sure the details of each contact are keyed in accurately. It's all too easy to mis-key the details! I usually do about 30 to 50 contacts at a time and have a break and I think it's amazing how many duplicates I can work even with a relatively small number of contacts!

In submitting an entry, don't forget to provide any additional information requested in the rules. Typically this will be a summary of the equipment used, location operated from and – most importantly – the name, callsign used for the contest, the contest title and the section entered. If it's a 'first time' entry, I would suggest that the adjudicator is informed of this fact, so that they can do an initial check that everything appears to be in order.

Final tip: Read the Rules again before submitting an entry! Make sure that the logs are E-mailed or posted to the correct address – simple errors at this stage can invalidate many hours operating and the preparation of the logs.

Published Results

Eventually the results will be published and it's useful to look through the results and compare how you – or your club station – got on with other stations nearby. Even if you have not done particularly well, usually there are some interesting comparisons to be made with similarly equipped stations.

Have a go

If any of my *WN?* readers want to 'have a go', the annual *Practical Wireless* 144MHz QRP contest can be highly recommended to beginners to contesting. This year it takes place on **Sunday June 18th from 0900 to 1600UTC**. The rules will be in the June 2008 issue of *Practical Wireless*. We look forward to meeting readers 'on the air'. Good luck!

●

Colin's waiting to hear from You!
I like to solve problems with anything to do with amateur radio! I can answer questions and publish my findings here for the benefit of all *PW* readers.

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.

TRADERS TABLE

The equipment for sale on this page is secondhand or ex-demonstration

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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

4m (70MHz) FM TRANSCEIVER key model KME-80. 16/32 channels. CTCSS, 15W output, fully programmed and aligned. complete with speaker/microphone, £45 collected or carriage at cost. Tel: Bob G8VOI 02392 250830 (Waterlooville).

DIAMOND SUPER WIDEBAND ANTENNA type D-130N. 25-1300MHz, £25. HF whips: 1 x 80m, £15. 1 x 40m, £15. 1 x 160m, £30. Sold independently or lot for £70. Tel: 01228 577046 (Cumbria).

DURAL MAST 30ft ground post. SS rigging, Terilene Halyard, £20. G3OJV compact triband dipole, £5. 50ft RG-8U PL-259 ends, £5. 2mtr 70cm vertical RH-200E glove, £10. 2mtrs 4-ele quad loop antenna free, £40 the lot or o.n.o. Tel: 01761 232062 (Holcombe Radstock).

ICOM PRO-3 mint condition, £1300. Lowe HF-225 mint condition, £150. Yaesu FRG-7700 nice condition, £100. Tel: John G4XYY 01937 844197 (West Yorkshire).

KENWOOD R-2000 communication receiver. In very good condition, £90. Also, Yaesu FRG-7 communication receiver in very good condition, £65. Tel: James 0116 2862889 (Leicester).

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SOMMERKAMP FT-102 1.8-30MHz. Amateur bands transceiver, slight fault, band switch. 100W, manual, ETM 8C bug, Welz ATU, external speaker, Hansen power meter, £200 o.n.o.
Tel: Walter G0ENC 01425 274217 (Dorset).

STATION SPEAKERS two Watson SP-2B 3.5mm plugs. Rugged 8Ω. Size: 120 x 180 x 110mm. As new, £40. May separate.
Tel: Alan G3MBL 01284 827379 (Bury St. Edmunds).

THORN EMI SE-7300 multi-track data recorder. Uses 1 inch tape up to 120ips. Weighs over 40kg. Needs some attention. Collection from Luton, Bedfordshire. Offers invited.
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BC-342 or BC-312 RX. Nice condition. Tel: 01745 570538 (North Wales).

BC-348 MOUNT AND PLUG DM-28 Dynamotor. Also, interested in a good original J, N, or Q model. Best prices or have exchange R-1116A DM-21 Dyno for 342 N.O.S.
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Tel: Andy 01453 886466 (Gloucester).

OC45 MULLARD white spot on dome. OA90 Mullard, black body, red sholder.
Tel: Godfrey G4GLM 020 8958 5113. 63 The Drive, Edgware, Middlesex HA8 8PS.
E-mail: cgmm2@btinternet.com

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PLEASE WRITE IN BLOCK CAPITALS

CARD NUMBER

VISA SWITCH AMERICAN EXPRESS MasterCard

Signature..... Security number

LAST THREE DIGITS ON THE BACK OF THE CARD

Switch issue number (if on card) .....

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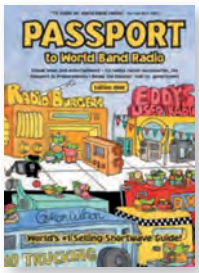

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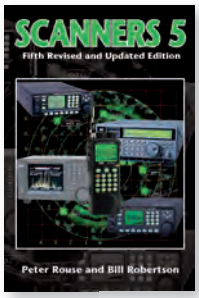

This latest edition continues the well-respected tradition of the Scanners series of books. Again being virtually re-written, it reflects the changing nature of radio communication and how, with readily available equipment, one can tune into all matter of two-way radio communications. All around us the airwaves are buzzing with messages, and this book provides useful and authoritative information on what equipment to choose, the importance of antenna type and siting, and how to get the very best from your system. Portable, mobile and base monitoring is detailed, and how to tune into a wide variety of users ranging from land-based walkie-talkies to orbiting space stations using simple receiving equipment. Monitoring trunked and encrypted transmissions is also detailed, showing how these can also be received and decoded. Finally, the use personal computers with scanners is covered in a comprehensive sections, showing how this combination can allow many types of radio signals to be decoded that would not be possible by using a receiver alone.
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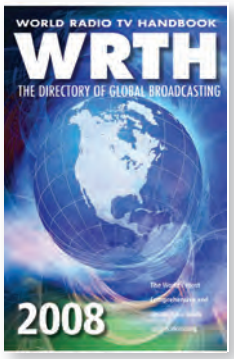

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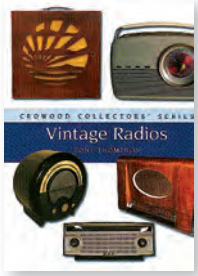

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Rob Mannion's

topical talk

Rob looks at the bad operating practices that the mis-named 'Band Police' cause within the Amateur frequency allocations.

Roy Walker G0TAK/2E1RAF (Letters this month) is a keen supporter of *PW*, a busy author and a gentleman! I've met Roy face-to-face, exchanged many E-mails, spoken to him on the telephone and heard him in action on the Amateur bands. So, as readers may have already surmised I have no reason to accuse him of being a 'LID', the favourite term of the 'Band Police' who, along with hiding behind the anonymity provided by radio communications, often seem to have a very limited vocabulary in any language!

Some time ago in Topical Talk I commented on the appalling behaviour of the 'Special Branch' of the 'Band Police' who seem to be on duty during contests. On these occasions it could be argued that there's some justification for a polite warning to be issued when a misguided operator has strayed out of the band plan for the mode they're using. However, any justification seems to disappear in a moment as the 'Policeman' (while maintaining their anonymity) bluntly identifies the problem and a full scale shouting match ensues, thus denying the use of that part of the band to anyone other than themselves.

After 40 years on the bands I've never (ever) heard a 'Band Policeman' fully identify themselves and try to act in a polite manner. On the other hand, the 'offender' (if they can be called such) have usually identified themselves before the arrival of the officious nuisance.

International Co-operation

In the past I have urged everyone in the hobby to work together internationally and to co-operate to reduce the problems associated with bad behaviour on the bands. Yes, **it is** very annoying to find an s.s.b. station calling "CQ" where the band plan suggests c.w. However, common sense and polite Amateur Radio operating – in the true spirit of our wonderful hobby – should ensure we can all operate using the mode we choose with full co-operation of other operators.

In my opinion nothing – absolutely nothing – warrants the dreadful operating standards of the 'Band Police'. In fact I think that they can be compared to the vigilantes in public life of various countries, who have meted out mob rule 'justice', often causing terrible injuries (sometimes death) to people who have been proved afterwards to be completely innocent of any crime.

I think that the only way we can effectively 'police' the Amateur bands, is by setting up an international group of monitors with representatives from all countries who are members of the **International Amateur Radio Union**. Some nations (notably the USA) already have semi-official monitors, while here in the UK we have the **RSGB's Intruder Watch** whose remit could be extended to monitor bad behavior and offer advice.

My idea is that when poor operating standards have led to an identifiable Amateur, who is causing problems to other band users, the band monitors will list the problems and contact the licence holder of the callsign involved by writing to them offering advice in a polite and non-aggressive way. Nobody likes to be 'told off' but I'm sure that (it still happens when the police don't rely on camera-based enforcement systems) we all would appreciate being given a warning rather than being summoned to court!

The type of monitoring I'm suggesting would, of course, rely on the co-operation of **Ofcom** in the UK, especially when address details are withheld. However, as Ofcom don't have the staff or incentives to continually monitor us, I'm sure that co-operation would be forthcoming.

Obviously, band monitors in the UK would have to take details of non-British stations who are causing problems. This information would then be passed to the national society of the country involved. These actions may offend some people, although I think it's far preferable to the foul language and verbal abuse on the bands. We all make mistakes on occasions and we can learn from them. In fact, my father was so concerned with his effervescent son's errors he suggested that I would be very wise in old age **if I learned anything** from my mistakes!

Rob Mannion G3XFD/EI5IW

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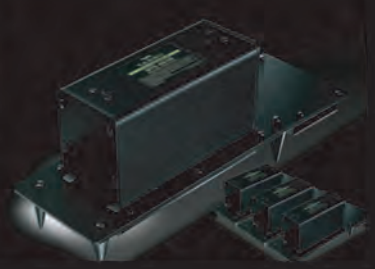

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