March 2007 £3.35 ISSN 0141-0857

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pw

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Working DX

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Special purchase and once stock is gone, there will be no more. A fully functional 2m VHF transceiver with 1750Hz tone for repeater use. Not only do you get a dry cell case, we also give you a 12V Ni-Cd pack and hod charger, warranty, handbook and rubber duck type antenna

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HORA C-408 70cm FM Handheld

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* HF + 6m, 2m, 70cm
* CW, SSB, AM, FMN, FMW, PACKET, DIGITAL
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Compact IntelliTuner
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1.8-30MHz 1500W Balanced Line Antenna Tuner

SGC

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

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

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

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The Original Long Wire SmarTuner - 1.6 - 30MHz, Power Input 3 - 200W

HEIL

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

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HSTA-706 for Icom modular
HSTA-KM for Kenwood modular
HSTA-K8 for Kenwood 8-pin
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HSTA-KHT for Kenwood
HSTA-IHT for Icom handhelds
HSTA-VX for Yaesu handhelds

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ICOM IC-R5

*150kHz-1310MHz
*AM, FM, WFM
*1250 Memories
*Name Tagging
*AM Ferrite antenna
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£159 C

ICOM IC-R20 £289 C

150KHz-3304.999MHz, 1,250 memories

ICOM IC-R3 £339 C

0.495-2450.095MHz, 450 mems, TFT colour display

YUPITERU MVT-7300

*Frequency 531 - 1320MHz
*NFM/WFM/NAM/WAM/USB/LSB/CW
*1000 memories
*500 pass-band memories
*8.33kHz airband spacing
*16 programmed steps
*Descrambler function
*Telescopic whip antenna
*C/W Ni-Cads & Charger

£199 C

YUPITERU MVT-3300

*66 - 88MHz/108 - 170MHz/300 - 470MHz/806 -1000MHz
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*200 Memories
*100 Search Pass memories
*10 band memories
*10 Priority channel memories
*Scan/Search speed 30 per sec.

£99 C

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Don't settle for cheap "Del-Boy" copies

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11-15V Variable.
20A continuous
23A peak, 100 - 260V AC in. 2 x Meters
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The Ultimate Icom! **0% Interest!***

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

200W HF Built-in AC PSU

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IC-756PROIII — Buy Now Pay Later!

0% Interest!*

HF + 6m 100W All-Mode

£1999 D

IC-7000 — Buy Now Pay Later!

0% Interest!*

HF/VHF/UHF All-Mode Transceiver

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

Deal1 - IC-7000 with Watson Power-Mite portable psu. **£949.95 D**

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IC-7400 — Buy Now Pay Later!

0% Interest!*

100W HF-VHF **Rig Only**

£1,199 D

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

IC-718 — Buy Now Pay Later!

0% Interest!*

100W HF Transceiver

£439 D

IC-706 — Buy Now Pay Later!

0% Interest!*

HF/VHF/UHF All-Mode Transceiver

£749 D

IC-703 — Buy Now Pay Later!

0% Interest!*

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

KENWOOD

TS-2000 — Buy Now Pay Later!

0% Interest!*

All-Mode Multi-Bander

£1295 D

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

TS-2000X - As Above but fitted 23cms **£1739 D**

TS-480SAT — Buy Now Pay Later!

0% Interest!*

100W HF+6m

£679 D

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

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

bhi DSP Noise Cancelling

bhi NES10-2 MkII SPECIAL OFFER!

Speaker and programmable DSP unit. Offers dramatic noise reduction.

Was **£99.95** Now **£89.95 C**

bhi ANEM

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

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bhi NEIM-1031

Noise Eliminating In-Line Module.

£129.95 C

bhi NEDSP-1061-KBD

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

£89.95 C

bhi NEDSP-1062-KBD

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

£99.95 C

Icom VHF/UHF Mobile/Base

ICOM IC-E208

VHF/UHF FM Dual Band Mobile Transceiver

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

£215 D

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

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

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

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

Kenwood VHF/UHF Mobile/Base

KENWOOD TM-271E

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

Built-in CTCSS & DCS encoder / decoder.

£187 D

TM-G707E £249 D
Dual Band 2m & 70cm with detachable front

Yaesu VHF/UHF Mobile/Base

YAESU FT-7800E

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

YSK-7800 Remote Cable Only £24.95

£219 D

FT-1802E *NEW!* £125 D
*2m FM Mobile transceiver *5, 10, 25 50W
*DTMF Mic Supplied as standard

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

FT-8900R £329 D
*2m, 70cm, 6m & 10m Quadband FM Mobile transceiver *Independent dial for each band

Yaesu ADMS Software

Programming Software For Your Radio

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

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

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

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Icom VHF/UHF Handhelds

ICOM IC-E91

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

£239.95 C

IC-V82 7W 2m Digital £159 C
IC-U82 70cms Digital £159 C
IC-E90 6/2/70cm £189 C
IC-T3H 2m 5W £129 C
IC-E7 2m/70cm Wide Rx £169 C

Kenwood VHF/UHF Handhelds

KENWOOD TH-F7E

- 144-146MHz Tx/Rx: FM
- 430-440MHz Tx/Rx: FM

Up to 6W out with Li-ion battery and **"scanner" style coverage from 100kHz to 1300MHz** including SSB on receive!

£199.95 C

TH-K2E 2m 5W £105 C
TH-K2ET 2m 5W FM £145 C
TH-K4E 79cm 5W FM £139 C

Yaesu VHF/UHF Handhelds

YAESU VX-7R

LIMITED SPECIAL OFFER

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

£209 C

VX-6E 2m/70cm wide rx 5W £169 C
FT-60E 2m/70cm wide rx 5W £129 C
VX-2E 2m/70cms miniature £115 C
VX-150 2m w/ 16-key pad £99 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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Software Defined Transceiver

Nothing Else Comes Close!

£6,000 in hardware form - £995 as above! What a choice!

If you have heard my recent talks you will understand how exciting this SDR-1000 software defined transceiver is. Just load the FREE software, connect up the SDR-1000 transceiver to a suitable soundcard and you are ready to go. It will transform your enjoyment. There are regular FREE updates for customers to download. Call our sales desk for a FREE demonstration CD and operate the radio on your PC using a supplied 80m RF sound file. The FlexRadio SDR-1000 would cost you around £6,000 in hardware form! Part Exchange welcome. Peter Waters G3OJV

The Concept:

All modulation and demodulation takes place in your PC. IF filtering and other DSP processes also take place in the PC. Ancillary controls such as AGC, ALC, audio processing, control functions, metering and displays are likewise done within your PC. And everything can be updated FREE as new software versions appear.

SDR-1000 comprises transceiver (100W or 1W) software and PC control cable connector. You need to add a suitable PC professional soundcard like the Delta-44 and 3.5mm stereo connecting leads (soundcard leads and PC speaker adaptor lead kits recommended) plus any Yaesu 8-pin microphone.

Check These Features!

Rx - 12kHz to 65MHz
Tx - 1.8MHz to 52MHz (Ham)
Power - 1W - 100W (500mW 6m)
IMD - 99dB
MDS - 130dBm (14MHz 500Hz)
Modes - SSB CW AM FM
*Realtime Panadapter
*Click on Spectrum Display Tune
*Filter shape factors 1.05:1
*No ring filters down to 25Hz
*AGC after brick wall filter
*Graphic Equaliser & Compander
*Variable bandwidth Tx filter
*Iambic Memory Keyer

Prices

SDR-1000 100 Watts		£995.00
SDR-1000 1 Watt		£649.00
SDR-1000 Receiver		£649.00
Auto ATU		£199.00
Delta-44 Soundcard		£99.00
Yaesu MH-31B8 mic.		£39.95
Shuttle VFO Knob		£99.00
Soundcard leads		£24.95
PC speaker adaptor lead		£4.95

Software Defined Receivers

WiNRADiO

* *Unmatched in value and performance*
* *Choose from either internal PCI module (i) or external module (e)*
* *Software included and requires Windows 98 or later with PC speed 500MHz or above*

No hardware design can match them at anywhere near this price!
Uses your exising PC soundcard.

From £385.95!

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

FEATURES OF ALL MODELS:
AM AMN AMS SSB CW NFM 1Hz tuning steps. Real time spectum display, with plug and play installation. The first IF is 45MHz. The 2nd IF and beyond is totally software defined including all selectivity, demodulation and other DSP functions. This makes for easy download updates. You also get *3 scan modes; S-meter reading S-points - dBm or uV; dual Loop variable speed AGC; manual IF gain; unlimited memory; audio filter; dual real-time spectrum scopes; multifunction squelch; plus bandwidths of: 0.5, 2.5, 3, 4, 6, 12 and 220kHz. External module versions connect via USB and need 12V DC. Internal versions mount on a PCI card. Antenna input is 50 Ohms.*

WR-G303 9kHz-30Mhz Dual Conversion

The basic HF receiver that is an ideal for ham radio and general listening and offers amazing value.

PCI Version **£385.95 D**

External Version **£454.95 D**

WR-G313 9kHz - 30MHz (Upgraded WR-G303)

Additions and upgraded spec inc. *Test & Measure features; Bandwidths variable 1Hz-15kHz; 600 Ohms line output. 180MHz extension option.*

PCI Version **£699.95 D**

External Version **£809.95 D**

WR-G305 9kHz-1800MHz

An amazing wideband receiver at a really great price. Now includes graphic hit counter.

PCI Version **£469.95 D**

External Version **£539.95 D**

WR-G315 9kHz-1800MHz (Upgraded WR-G305)

Adds IF Shift & Notch Filter; IF spectrum record, Noise Blanker; Bandwidth variable 1Hz - 15kHz; 90dB dynamic range, 500ch per sec scanning and 0.5ppm 0 - 60C

PCI Version **£1499.95 D**

External Version **£1699.95 D**

NRD-545 from Japan

100kHz - 30MHz SSB CW FM AM

The Hardware radio with Software IF filtering.

Truly awesome performance with variable selectivity down to 10Hz. Features include up to 106dB dynamic range, DSP notch filtering, direct keypad entry, mute for use with transceiver, triple conversion, (70.455MHz - 455kHz-20kHz), 10Hz tuning steps and readout, RTTY demodulated output via RS-232, 1000 memories, RF attenuator, 50 & 600 Ohm antenna input. AC input 230/115V AC. 330 x 130 x 285mm. **£1399.95 D**

Software Defined Receiver £19.95!

NEW SoftRock-Lite v6.2

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

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

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

Prices

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

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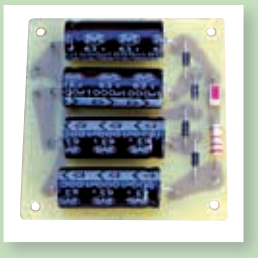
Practical Wirelesscontents

March 2007
On Sale 8 February
Vol. 83 No. 3 Issue 1199
(Aptil 2007 Issue on sale 8 March)

60 Practically Yours
75 Years of Heritage & History
Looking back at some rather special news items, articles and other material covering the period from 1980 to 1989 in Practical Wireless.



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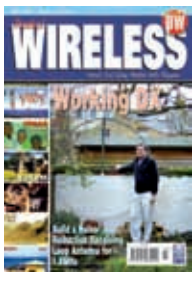

Cover Subject
This month, why not try your hand at building a loop antenna specifically designed by Geoff Cottrell G3XGC to improve your station on 1.8MHz. If you're thinking of chasing that long distance contact make sure you read Pat Allelly GW3KJW's article on Working DX.

Design: Steve Hunt
Photographs: Geoff Cottrell G3XGC, Pat Allelly GW3KJW.

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

Keylines

Rob G3XFD introduces another issue of great radio reading as *PW* continues its 75th year of publication.

As I write this in mid-January, I'm looking back at the fast receding 2006 Christmas holidays. And, if you're like me, you're probably wondering just why the festivities take so long to approach and then they're gone in a moment!

Despite the rapid passing of the Christmas holidays, it's a time of the year everyone on the magazine looks forward to. Indeed, it's the only time when nobody is working on an issue of *PW*!

I took full advantage of the long holiday and thoroughly tidied up my shack, completing a kit that had been on the bench for several years and then spent many hours on the h.f. bands. Most of my operating was done using low power (not QRP) c.w. at around the 10W mark and I particularly enjoyed working on 7MHz.

During my extended operating periods I was delighted to work a number of Amateurs who had progressed onwards from the Foundation Licence to the Intermediate Licence and were also enjoying c.w. In fact, several newcomers to the c.w. mode specifically told me our QSO was one of the first they had tried.

Nowadays, I'm not at all fast on c.w. (working at around 12 to 15w.p.m. mostly) and because of arthritis in my left arm I've found it increasingly difficult to use a 'pump' hand key. However, despite the fact I've now got a good quality electronic keyer with the appropriate 'sideswiper' iambic key unit, it's taken me a long time to become familiar with the new keying action. Despite this, I found that because there wasn't so much physical effort involved I could stay on the air for much longer periods.

During the many hours I spent on c.w., operating at the comfortable speed I've already mentioned - I enjoyed making new friends. A good number of these new friends told me they appreciated a call from me, especially as I tried my best to reply to them at the speed of their own sending. Several of the new c.w. operators mentioned that my reduced sending speed helped them and this made me think - just why can't we all try slowing down a bit when necessary?

Slow Down Please!

There's no shame in sending Morse slowly and the operator who does so, doesn't lose credence by sending at a more relaxed pace. Indeed, by showing that they can send slower (and maintaining good keying) an operator can more effectively demonstrate their skills.

When I'm working in the shack I often have my rig tuned to the c.w. end of the band I'm listening to. Most of us spend more time listening than we do transmitting (think about it!) and although I have had a number of friends (the late **G3CTM** was one) who could remember a QSO without writing it down (I don't have a 'tape recording' facility in my brain), I can listen in to a c.w. QSOs and get the relevant details such as RST reports, QTH and so on as I work.

Listening to some of these QSOs, it has struck me that one operator is often sending at much faster a rate than the other station. Surely good sense and manners dictate we should send – or try to send – at the same speed! There's no shame in sending a request such as QRS. And even though it means 'Shall I send more slowly', it's quite acceptable to send it as a request.

I've noticed over the years, that once a QRS has been sent, the speed merchant has quickly changed frequency to find someone to match his or her supercharged c.w. If this happens I suggest you don't worry! If we are to encourage new, keen. c.w. operators on the bands we must surely help them?

I think that the occasional lost QSO and disgusted speed merchant equates to falling of our first bicycles! Although perhaps battered and bruised we always got back on if possible and became proficient cyclists! We must remember the times we've fallen and help those who are (at least) trying the extra facilities provided by c.w. Let's encourage them and demonstrate our skills at the same time by sending at the same speed of the other operator.

Supersonic Senders!

Very often, usually in the DX portion of the c.w. sectors, I listen to 'supersonic senders' transmitting long series of "CQ" calls hoping to work someone. And although I may be getting very old, slow and creaky it seems to me that this particular brand of speed merchant rarely achieve as many QSOs as you would think – because they are demonstrating their prowess on the key and don't have any time to listen!

By listening for good quality Morse keying at a speed I can reply to, I've had many enjoyable QSOs. Perhaps, we could try listening a little more often rather than sending out 'CQ'. By doing so we'll hear one of the many others CQ's (perhaps a DX station) and achieve good results. Try it and see for yourself and let me know just how well you got on!

Rob Mannion G3XFD/EI5IW

Send in your thoughts and win a voucher!

letters

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

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

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

Falklands War Reminder

Star Letter

● **Dear Rob**

Falklands War 1982 Historical Reminder – Page 29, January 2007 issue *PW* - I'm writing to provide some additional information to the article.

In 1966 Cable & Wireless (C&W) installed new transmitters and receivers in the Falkland Islands that enabled the opening of a radiotelephone service between Port Stanley and London for one hour per day. The telegraphy service was also upgraded from RTTY to 96 Baud ARQ to provide higher reliability for its customers, mainly the British Governor and the British Antarctic Survey. A little later C&W also opened a telephony service to Buenos Aires.

Although the service to London would have been an independent sideband (ISB) 'composite' transmission, telegraphy on one sideband and telephony on the other sideband, the 'phone service was received in the UK at Baldock receiving station. After Baldock closed in 1972, the service, both telegraphy and telephony, was transferred to Bearley receiving station, near Stratford-upon-Avon.

During my time as a technician at Bearley (1975-79), Port Stanley was a very reliable service with telegraphy running from 1000 – 0100GMT each day and the telephony 1400 –1600GMT. When the Junta in Buenos Aires sent a gunboat into Falklands waters (sometime around 1977/78) we were the first to know as the telegraphy circuit was temporarily extended to 24-hour continuous operation to ensure the Governor had immediate contact with London. In 1981, Bearley radio station closed and the remaining high frequency (h.f.) circuits (Aden, Salisbury/Harare and Port Stanley) were transferred to Somerton.

Until the Argentine invasion in 1982, the Falklands was still a quiet backwater and the telephone service had only grown to four hours per day. For four weeks after the invasion C&W staff managed to keep the London telegraph circuit in operation alongside circuits to Buenos Aires.

When the war ended the huge numbers of troops wanting to call home warranted something more than a single h.f. telephone circuit! The extra service came in the form of a satellite link opening on 8 December 1983. I hope this information is useful and if you need any further details or clarifications please let me know. Yours sincerely and happy New (75th) Year!

Paul Hawkins G4KHU
Templecombe
Somerset

Absolutely fascinating Paul! Thank you for your update. Please join me on the Topical Talk page for further comment. ***Rob G3XFD***.

No Stripboard Problems In Glasgow!

● **Dear Rob**

I'm writing regarding the problems discussed in *PW* regarding the use of stripboard for construction. I also have the 'Stripboard Magic' program. A full working copy is still available as a free download from various websites.

Many thanks for a great magazine, especially the aerial/antenna projects. I also enjoy the really simple receiver projects that sometimes pop up (I'm not confident enough to try the more complex designs). I've still not got my licence as I have problems getting out, so getting to one of the local clubs is a problem for me.

I don't mind you passing on my details including E-mail address to anyone who can't track the Stripboard Magic program down. I would also like to hear from anyone you might know in the Glasgow/ Lanarkshire areas who might be able to help me gain my Foundation Licence. That would be a really big bonus!

John Bain
13 Mitchell Avenue
Cambuslang
Glasgow
G72 7SQ
E-mail johnpbain@btinternet.co

Thanks for your advice and help John. I'm sure someone will be in contact with you as soon as PW is published. Good luck with the Foundation training! ***Rob***.

Antennas & Aerials

● **Dear Rob**

I was interested to see the subject of 'aerial' versus 'antenna' being raised by **Tony Nailer G4CFY** in *PW* February 2007 edition. My assumption is that they had been simply the UK and US terms for the same thing. I say 'had been' after following up some references in a 1919 *US Bureau of Standards* publication. (This appears to be the US counterpart of the UK's *Admiralty Handbook of Radio Telegraphy)*.

I then had a glance through the rest of the document and was rather surprised to see both aerial and antenna in use when describing a radiating system. The radiator in question was what we would these days call an inverted 'L'.

As far as I could make out in the limited time that I had available, aerial was being used to describe the vertical section and antenna the horizontal part. Talking it over with a local Amateur, he mentioned that the yardarm of a ship was sometimes referred to by old sailing types as being an 'antenna'.

This caused me to look the word up in my Latin/English dictionary where I found that the translation of antenna is given as 'yardarm'. It seems that describing insect feelers as antennae dates back to the 17th century when it was adopted for this purpose in scientific documents, there being no other suitable Latin word. Just why a seafaring term came to be used in a radio context is open to question!

My feeling is that it was because the Navies of the world were amongst the first to see the advantages of radio communications so a lot of the 'official' people involved in the early days were seafaring types. The similarity between a yardarm and an elevated horizontal wire

letters

may well have seemed obvious to them.

Putting two inverted Ls together to form a doublet changes the aerial part of the radiator to a balanced feeder, which then plays no part in the radiation. Perhaps this is when the radiator became simply an antenna! If my assumption is correct, I suppose we should really describe a horizontal radiator as an antenna and a vertical one as an aerial!

Tony Plant G3NXC
South Yardley
Birmingham

An interesting theory Tony! When I was serving in the Royal Navy's Fleet Air Arm, it all seemed so simple. Aircraft had radio antennas and ships had radio aerials – the terms seemed to fit well! ***Rob***.

The Riddle of the Sphinx

● **Dear Rob**

I was most intrigued to see the article from **Ben Nock G4BXD** (January 2007 *PW*), about the Sphinx single sideband equipment. I first heard about the Sphinx from **G8BI** himself, as I lived in the same town as him in the 1970s and often frequented his shack with a school friend of mine.

Bob, as G8BI liked to be called (or even RAB as his full initials ran) had done much in early s.s.b. and early v.h.f. work had been in the RAF at ZB2A in the 1940s. He had also been in the Azores and worked at Murphy Radio before they were taken over by Pye.

Bob was a good friend and mentor to my friend and I, introducing us to the world of 144MHz f.m. and h.f. mobile operation. Unfortunately, he passed away around 1977 and it seemed fitting that Ben G4BXD wrote and used his article almost in remembrance of the 30th anniversary of his death. In fact, Ben's quotes from the article brought back Bob's voice and mannerisms, long forgotten but now fondly recalled. To Ben, my thanks and to G8BI, 'vale' as the old S*WM* obituaries used to put it.

Larry Stringer G4GZG
Ongar
Essex

Droitwich 198kHz Data Transmissions

● **Dear Rob**

I read with interest your Topical Talk in the January 2007 issue of *PW*, regarding the BBC 198kHz transmitters and the data transmissions carried on the signals and after some research found the following information.

As you stated, three transmitters are on 198kHz (1515 m) to provide national coverage of Radio 4, Droitwich (500kW) in England, with Burghead (50kW) and Westerglen (50kW) in Scotland. The transmitted carrier frequency is maintained to an accuracy of 1 part in 10^{11}.

Digital data is transmitted by directly modulating the 198kHz carrier and provides 16 different data channels. One channel is used to transmit an accurate time code. The programme audio signal and data signal are independent of each other and the broadcast audio quality is not affected by the data transmission. The audio is used to amplitude modulate (a.m.) the carrier wave, whereas the data signal is transmitted by phase modulation of the carrier wave. (The first trials of the radio data system took place in 1979).

Data modulation of the 198kHz carrier uses bi-phase encoding where a data bit '1' is signified by 20 milliseconds of phase advance of the carrier followed by 20 milliseconds of phase retard. Conversely a data bit '0' is signified by 20 milliseconds of phase retard of the carrier followed by 20 milliseconds of phase advance. The phase deviation of the 198kHz carrier is ±22.5° and this phase shift changes over several milliseconds rather than an as an abrupt phase change.

The use of bi-phase modulation avoids any net phase shift of the carrier when averaged over a period of one second or more. Thus the frequency stability of the carrier remains and its use an accurate frequency reference is not compromised.

Radio Data: The data is sent in 50-bit synchronous packets, with synchronous transmission there are no inter-packet gaps. Each 50-bit data packet contains a prefix code (1-bit), which is always transmitted as a '1', channel identification (4-bits), 32-bits of data, and CRC error detection (13 bits). When there is no data to be transmitted a filler packet consisting of alternate '1' and '0's is transmitted.

Transmission data rate is 25-bits per second, thus each 50-bit data packet takes two seconds to transmit. Therefore there are potentially 30 self-contained packets of data that can be transmitted each minute. These packets are numbered 0 to 29 for reference, with the data carried in each packet allocated to any one of 16 different data channels.

Apart from the time packet, information destined for any other channel can be transmitted in any order. Several packets of data sent sequentially and allocated to the same channel are allowed.

Time Data: Channel 0 is allocated to the time data and this information is always transmitted in packet 29. This packet is the last packet in the minute sequence so that the boundary between packet 29 and the next packet is the minute edge.

The time code transmits the time in UTC and the time difference between UTC and UK local time. This time offset is rather generous as it allows a local time offset of up to ±15 hours from UTC.

Apart from transmitting time data the only other known application is the radio switching system (Radio Teleswitching) used by the Electricity Association on behalf of the electricity supply companies. It uses time-coded data transmitted for the remote switching of domestic night time storage and water heaters and setting tariff rates on the electricity meters for off-peak electricity usage.

The conclusion is that the modulation method for the data does not affect the use of the signal as a frequency reference as the averaged phase-change over a second is zero.

Incidentally, I used to live in the south of Birmingham not far from Droitwich and with a good earth and 115ft of wire antenna I managed to get 1V d.c. from the output of a simple crystal set tuned to the old 200kHz (kc/s, in those days).

When I was at school in the 1960s, the physics teacher (who had an Amateur licence) organised a visit round the site. The 200kHz transmitter at the time was rated at 400kW, provided by two 200kW transmitters in parallel. The engineer showing us round explained that when they wanted to do maintenance on one of the transmitters they just turned it off. I asked, "Don't you lose any listeners?" He replied with the remark, "Only a few fringe area listeners and we're not too concerned about them!"

Keith Wevill G4UKW
Bradford
West Yorkshire

Thank you Keith! ***Rob***

rallies

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

February 11
Wakefield &District Radio Soceity
Contact: John Carter
Tel: (01924) 251822
Wakefield & District Radio Society are holding their Northern Cross Mobile Rally at Thornes Park Athletics Stadium on the A642 Horbury Road, Wakefield WF2 8TY. The dealers are on the ground floor and there is good disabled access. The Bring & Buy has booking-in from 1015. Doors open 1030 with disabled access also at 1015. There is ample parking on site and admission is £2.50.

February 18
Swansea ARS Amateur Radio Show
Contact: Roger
Tel: (01792) 404422
The Swansea ARS Amateur Radio Show will be held at the Afan Lido, Aberavon seafront, Port Talbot, South Wales SA12 6QN (1mile from M4 J41). Doors open at 1030. There will be a Bring & Buy and free car parking.

news & products

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

Radio Amateurs Invalid and Blind Club

The Radio Amateurs Invalid and Blind Club (RAIBC) exists to help Radio Amateurs and short wave listeners (s.w.l.s) with disabilities to enjoy the hobby to the full. To this end, the RAIBC runs a number of h.f./v.h.f. nets for members, it provides assistance in the form of all three radio exam stages on audio CD, an education officer and a DVD course for the Intermediate exam.

Where appropriate, the RAIBC also supplies radios and modified equipment on loan for the disabled as needed. They publish a quarterly magazine, *Radial*, which is also available on audio CD and as an E-mailed PDF. In addition to this, they also distribute the *Reading Rattle*, which contains abridged audio versions of *Practical Wireless, RadioUser* and *Radcom,* They also give general advice and support for Amateurs and s.w.l.s who are disabled.

The current committee is keen to modernise the RAIBC to enable it to continue to assist the disabled in the fast changing world in which we live. Great strides have already been made, however, in order to continue to carry out the aims of the charity, they do need more support. This can be in the form of joining the RAIBC as an associate member or, perhaps, donating equipment, which can be re-used by members or sold to raise funds if suitable. Also, if individuals are willing to collect donated equipment, assist a disabled member in setting up their radios or provide a friendly face to a housebound member, this would also be greatly appreciated. Please also tell disabled individuals who are Amateurs or s.w.l.s that the RAIBC exists and may be able to help them.

If you would like to know more about the RAIBC, please visit their website at **www.raibc.org.uk** or telephone **0208-204 2347**.

New 50MHz Transceiver

Garex Electronics have informed the Newsdesk that production of the AKD 6001, a 50MHz (6m) f.m. transceiver has been resumed. This follows the re-launch of the 4001, a 70MHz (4m) rig, in mid-2006. Stocks of both rigs are available from Garex and selected dealers.

The 6001 is the fully updated model with repeater shift, 10kHz channel spacing and c.t.c.s.s. Also available is the plug-in update module for earlier 6001 production models, which lack the latest features. The module uses a higher capacity PIC plus an EEPROM to store the c.t.c.s.s. data. The AKD 6001 costs **£169.965** plus £7 P&P and the plug-in board costs **£24.95** including P&P.

Full details are available from **Garex, PO Box 52, Exeter EX4 8WX. Website: www.garex.co.uk**

news snippets

Can You Help?
Keith Wevill G4UKW has contacted the newsdesk to see if fellow *PW* readers can help him out.

Keith says "I have, over the last 30 years in the electronics industry, amassed a large collection of data books ranging from discrete devices to analogue, logic and r.f. devices from many of the major manufacturers and some of the not so well known manufacturers. These are taking up space and as I don't use them I now wish to dispose of them. Rather than take them straight to the tip for recycling as waste paper, I would like to offer them through your magazine to any radio club(s) or individual(s) who would like them, either the lot or individually. They are free of charge but would have to be collected from the Bradford area or carriage would be at cost. Bearing in mind there are lots of them ranging from thin A5 books to thick A4 books this could be expensive. The list is available by contacting me direct on **(01274) 815281** or by post at **6 Henacre Wood Court, Queensbury, Bradford, BD13 2LJ"**.

European Union
Radio Amateurs from Romania and Bulgaria have been celebrating their individual nation's membership of the European Union by operating a series of special event callsigns. The two East European nations became full members of the European Union on 1 January 2007. The Special callsign **LZ2007EU** is being aired from the headquarters of the Bulgarian Federation of Radio Amateurs from 1 January until 30 April.

Radio Bulgaria's DX Editor, Dimiter Petrov LZ1AF, will be using the special event callsign LZ50DX until 31 December 2007 to mark the 50th anniversary of Radio Bulgaria's DX Program, which started on 17 November 1957.

Japanese Scientific Research Expeditions
Look for the special event station **8J1ANT,** which will be active until 31 March to celebrate the 50th anniversary of the Japanese Scientific Research Expeditions in Antarctica. The 8J1ANT special station will be active from the JARL building in Tokyo, operated by JA Amateurs.

news & products

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at the *PW* editorial offices
or E-mail:
pwnews@pwpublishing.ltd.uk

Summits On The Air

Barry Horning GM4TOE has achieved 'Mountain Goat' status in the Summits on the Air (SOTA) programme with an activation of Carn na Loine GM/CS-105, 548m (1800ft) above sea level, on 30 December 2006. Barry took 154 SOTA activations to reach the 1000-point landmark, a relatively low number but he mainly focussed on high points value summits, averaging around 900m or about 3000ft above sea level.

He has clocked up some miles too, with long approaches along estate tracks being required before climbing up onto the fells. Barry has mainly used 7MHz s.s.b. and 5MHz (NoV) s.s.b. for his SOTA operations.

New Source of Radio Activity

The **Hog's Back Amateur Radio Club** launches at the end of March 2007. Situated in Crondall on the border of Hampshire and Surrey, the new club hopes to encourages a wide range of interests, especially supporting on-air activity for its members.

The club will offer many activities such as regular operating evenings, construction sessions, training courses, auction nights and guest speakers. Expeditions to places of interest such as Bletchley Park, BBC Monitoring Stations as well as sites for portable operations are all in demand.

Secretary, **Simon Lambert M0XIE** explains, "Our members can enjoy radio activities that they might not be able to engage in as individuals. Encouragement supported by local know-how is vital, especially for new Amateurs and even for lapsed Amateurs inspired to rejoin the hobby. This means supporting our members' interests is paramount."

The opening meeting in late March will include a comprehensive introduction by the founders, inviting vital feedback from guests as to what they seek in the new club. It will provide an opportunity to see the excellent facilities at the club and to chat over a drink and a bite to eat. For up-to-date details and directions visit **www.hogsback-arc.org.uk**

Irish Jubilee DXpedition 2007

The AFRI75 Irish Radio Transmitters Society (IRTS) 75th Jubilee DXpedition 2007 is a DXpedition to Swaziland between 16 and 25th March 2007 to celebrate the 75th Jubilee of the **Irish Radio Transmitters Society**. The DXpedition will be QRV for St Patrick's Day and for CQ WPX. The callsigns in use will be published as soon as they are available.

The expedition leader is IRTS vice president **Paul Martin EI2CA**. The members signed up to the expedition are: **Peter EI7CC, Aidan EI8CE, Paddy EI8BFB, David EI4DJ (GI4FUM), Rory EI4DJB, Brendan EI3GV, Pete GI4VIV** and Paul EI2CA.

Please note that this expedition is to celebrate the IRTS 75th Anniversary and is a fun event. Some of those involved have not tried this sort of thing before and want to get home in one piece! The planned numbers of QSOs will be commensurate with the skill and experience of the team members and the time available for radio operations bearing in mind that it is also a holiday for some!

More details of callsigns and proposed frequencies will be available soon. There will also shortly be a full DXpedition website available on the IRTS web pages.

This photograph was taken at a team meeting on Sunday 14 January. The team members are: back row from left - GI4FUM/EI4DJ, EI2CA, EI8CE, GI4VIV. Middle row from left - EI7CC, EI3GV, XYL of EI7CC and front row - EI4DJB

silent key

John Cook G0EQM

Friend and neighbour of John Cook, **John Curzon G8GTH**, sent the following in memory of G0EQM.

"John Cook died suddenly on 27 December of cancer. We knew he had been taken ill, having been diagnosed just before Christmas but were shocked how suddenly it developed.

John lived with his wife **Lesley** at Friston, Eastbourne, East Sussex. He was a founder member of **East Dean & Friston Computer and Camera Club**, which started in September 2000. At the Club, John dispensed helpful advice and guidance to members and contributed greatly with talks on Music - his favourite pastime - in June 2001 and May 2006. He also presented talks to the Club in May 2005 and was on the panel of experts at our meeting in January 2004. His talks will stay on the Club Meetings CD in his memory.

As a Radio Amateur, G0EQM0, he used to like experimenting with his hand-held on both 144 and 430MHz while out walking his two dogs, often holding a 3-element Yagi in his left hand while using the radio in the other!

Radio controlled model boats were another of his hobbies and he could often be seen at Princes Park pond in Eastbourne when the weather was favourable.

We shall all miss John's expertise, always dispensed with his inimitable dry humour."

John Curzon G8GTH

The PW Editorial team extend their sympathies to John's family and friends at this sad time. Editor.

Scouting 100 Radio Award

The Scouting 100 Radio Award is awarded for contacting Scout stations during 2007, the Centenary year of Scouting. This is an international award and it's also available to listeners, with the same requirements as for the operator award.

The objective: to help celebrate the centenary of Scouting through the medium of radio; to help publicise the Centenary and to provide Radio Amateurs with the opportunity of gaining another award (although not intended for profit, any surplus made will go to support Radio Scouting in developing countries).

The Award began at 00:00:01 on 1 January 2007 and will finish at 23:59:59 31 December 2007. The Award is available through all bands and all modes, within the terms of the individual's radio licence. The Award is also available through Echolink and IRLP modes. It can be endorsed for any special modes or bands such as 'all satellite contacts', 'all QRP contacts' an so on. Activity for the Award should be focused around the Scout frequencies.

Stations are required to contact Scout and Guide stations to count for points as follows:

Each ordinary Scout station counts as one point. Special Event Scout stations count as two points. The World Jamboree, Gilwell Park and Brownsea Island stations count as five points.

Your logs should be verified as being accurate by two other local Radio Amateurs. Normal log information is required with the following additional information: Name, Scout details and age of the operator of the station you contact. Your age should also be submitted when applying for Awards. Female operators can send 'YL' as their age!

The Award is supported on-line by a website - full details of the award are also available there. Take a look at: **www.scouting100award.org**

An Honour Roll list of Award holders will also be published on the website.

Vibroplex Miniature Morse Key

Waters & Stanton are pleased to announce that they are stocking the new Vibroplex V-CM miniature Morse key. This comes from the famous Vibroplex factory in the USA and has the same level of engineering as the standard range of keys and paddles.

The V-CM is ideal for portable work with radios such as the FT-817. Its compact design makes it a 'go anywhere' key. It's fully adjustable in both travel and spring tension. The V-CM is available from Waters and Stanton for £59, **call (01702) 206835** or more details.

club news

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

BRISTOL

South Bristol ARC
Contact: Len Baker G4RZY
Tel: (01275) 834282
Website: www.sbarc.co.uk

The South Bristol Amateur Radio Club members meet at Whitchurch Folkhouse, East Dundry Road, Whitchurch, Bristol BS14 0LN on Wednesday evenings at 1930hours. The club is very active, offering a comprehensive programme of events. Forthcoming meetings include: **Feb 14:** Technical Matters with **Len G4RZY**; **21st:** Mid-winter table-top sale and **28th:** On the Air evening.

LONDON

Wimbledon & District ARS
Contact: Jim Bell M0CON
E-mail: james@jbell5.wanadoo.co.uk
Tel: 0208-874 7456
Website: www.gx3wim.org.uk

Meetings of the Wimbledon & District Amateur Radio Society are held at 2000 on the first and last Friday of each month at Martin Way Methodist Church, (corner) Buckleigh Avenue, Merton Park, London SW19 9JZ. Visitors are always welcome to the club, whose members say that their new venue has much improved parking, which makes life much easier. Forthcoming meetings include: **Feb 9:** On Air and construction and **Feb 23:** Radio Astronomy by **Evan Duffield.**

SHROPSHIRE

Telford & District ARS
Contact: Mike Street G3JKX
Tel: (01952) 299677
E-mail: mjstreetg3jkx@blueyonder.co.uk
Website: www.tdars.org.uk

Members of the Telford & District Amateur Radio Society meet at the Community Centre, Bank Road, Dawley Bank, Telford, Shropshire TF7 2AX every Wednesday at 2000hours (unless otherwise stated and subject to amendment). Future meetings include: **Feb 14:** HQ closed, visit to Mid-Cheshire ARS; **21st:** Under £5 construction competition (boxes and knobs not counted) and **28th:** Safety for Home & Shack Electrics with G0UFE & G4NKC. Why not go along and join in?

WEST SUSSEX

Worthing & District ARC
Contact: Roy and Joyce G4GPX
Tel: (01903) 753893
E-mail: info@wadarc.org.uk
Website: www.wadarc.org.uk

The Worthing & District Amateur Radio Club meet every Wednesday at 2000hours in the Lancing Parish Hall, South Street, Lancing, West Sussex BN15 8AJ. The club welcomes anyone with an interest in radio communications and associated subjects, whether licensed or not. The club also arrange training for those wishing to take the Radio Amateur Foudation, Intermediate and Advanced licences.

news snippets

***Radcom* Editor Steps Down**

Alex Kearns M3LSZ has stepped down as *RadCom* editor to pursue a career as a web developer in London. Alex took over as *RadCom* editor in July 2005 and made a number of significant changes to the magazine, including a redesign in January 2006 and introducing a popular new home-brew column. He also designed a web solution for RSGB radio clubs. RSGB general manager **Peter Kirby G0TWW** said: "Alex has left his mark on both *RadCom* and the Society in the time that he has been with us and we wish him every good fortune in his future career."

Alex said: "I have enjoyed immensely my time at the helm of *RadCom*. I am now taking up a profession that is transforming the world is a similarly revolutionary way that radio did in the 20th century." *RadCom*'s technical editor, **Giles Read G1MFG**, will be taking over as interim editor following Alex's departure. He can be contacted at **giles.read@rsgb.org.uk**

*The **PW** team would like to take this opportunity to wish Alex all the best for his future career.* Editor

RadioActive Show

The RadioActive Show is the new name for the **Mid-Cheshire Amateur Radio Society**'s (MIDCARS) annual Spring Rally, to be held on Sunday 29 April. Concerned over falling attendances in recent years at their popular Winsford event, MIDCARS has taken the radical decision to change to a larger and more accessible venue at the Civic Hall located in the town centre of Nantwich in Cheshire. They have also changed the date of the rally.

The RadioActive Show will have over 80 stands of top traders and exhibitors as well as a series of seminars and demonstrations to suit all levels of interest, including presentations by specialist groups and clubs for the more experienced visitor. And, of course, they will be continuing with their ever popular Bring &Buy stall. For more details contact: **Roger** on **(07747) 618131**or **E-mail: info@RadioActiveShow.co.uk**

Five Star DXers Association

The Five Star DXers Association has released details about its planned 3B7C DXpedition to St. Brandon Island (Indian Ocean) in 2007. The plan is to operate 12 stations from St. Brandon from Friday 7 September to Monday 24 September. **Neville Cheadle G3NUG** and **Don Beattie G3BJ** will jointly lead the DXpedition. For more details check out: **www.3b7c.com**

BNC Screw type plug (Small entry) £1.25
BNC Solder type plug (Small entry) £1.25
BNC Solder type plug (Large entry) £3.00
N-Type plug (Small entry) £3.00
N-Type plug (Large entry) £3.00
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PL259 Chassis socket (Square) £1.00
N-Type Chassis scoket (Round) £3.00
N-Type Chassis scoket (Square) £3.00
PL259 Double female adapter £1.00
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PL259 T-Piece adapter (2xPL 1XSO) £3.00
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BNC to N-Type adapter (Male to female) £2.50
SMA to BNC adapter (Male to female) £3.95
SMA to PL259 adapter (Male to PL259) £3.95
PL259 to 3/8 adapter (For antennas) £3.95
3/8 Whip stud (For 2.5mm whips) £2.95

Please add just £2.00 P&P for connector only orders

PLEASE PHONE FOR LARGE CONNECTOR ORDER DISCOUNTS

5ft Poles Heavy Duty (Swaged)

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These heavy duty aluminium (1.8mm wall) have a lovely push fit finish to give a very strong mast set
1.25" set of four 5ft sections £29.95
1.50" set of four 5ft sections £39.95
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Tripod-2 *(free standing with 2-OD for use with 2" joiner or 1.5" pole inside)* £69.95
Tripod-3 *(free standing with 3" OD for use with 2.5" pole inside)* £79.95
6" Stand Off Bracket *(complete with U Bolts)* £6.00
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12" Stand off bracket *(complete with U Bolts)* £12.00
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18" T & K Bracket *(complete with U Bolts)* £17.95
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36" T & K Bracket *(complete with U Bolts)* £29.95
Single chimney lashing kit *(suitable up to 2 mast)* £14.95
Double chimney lashing kit *(suitable up to 2 mast)* £19.95
3-Way Pole Spider for Guy Rope/ wire £3.95
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Mast Sleeve/Joiner *(for 1" pole)* £6.95
Mast Sleeve/Joiner *(for 1.25" pole)* £7.95
Mast Sleeve/Joiner *(for 1.5" pole)* £11.95
Mast Sleeve/Joiner *(for 2" pole)* £13.95
Earth rod including clamp (copper plated) £9.95
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EGG-XL *(extra large porcelain egg insulator)* £5.95
CAR PLATE *(drive on plate to suit 1.5 to 2" mast/pole)* £19.95

Cable & Coax Cable

RG58 best quality standard per mt 35p
RG58 best quality military spec per mt 60p
RGMini 8 best quality military spec per mt 70p
RG213 best quality military spec per mt £1.00
H100 best quality military coax cable per mt £1.25
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20 amp red/black cable 20 amp per mt 75p
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Please phone for special 100 metre discounted price

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MB-1 1:1 Balun 400 watts power £24.95
MB-4 4:1 Balun 400 watts power £24.95
MB-6 6:1 Balun 400 watts power £24.95
MB-1X 1:1 Balun 1000 watts power £29.95
MB-4X 4:1 Balun 1000 watts power £29.95
MB-6X 6:1 Balun 1000 watts power £29.95
MB-Y2 Yagi Balun 1.5 to 50MHz 1kW £24.95

Duplexers & Antenna Switches

DX-720D Duplexer *Port 1: HF + 6 + 2m (1.6-150MHz). *Port 2: 70cm (400-460MHz). *Connection: Fixed 2 x PL259 & 1 x PL259 ..... £19.95
MX-72 Duplexer *Same spec as DX-720D but with PL259 fly leads £29.95
MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz) £59.95
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CS401 Same spec as CS201 but4-way £39.95
CS401N Same spec as CS401 but with N-type fittings £59.95

Antennas Rotators

AR-300XL Light duty UHF\VHF £49.95
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RC5-1 Heavy duty HF £329.95
RC5-3 Heavy Duty HF inc pre set control box £419.95
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RC26 Alignment Bearing for RC5-1/3 ..... £49.95
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All mounts come complete with 4m RG58 coax terminated in PL259 (different fittings available on request).

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3.5" Pigmy magnetic PL259 fitting £9.95
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5" Limpet magnetic PL259 fitting £12.95
7" Turbo magnetic 3/8 fitting £12.95
7" Turbo magnetic PL259 fitting £14.95
Tri-Mag magnetic 3 x 5" 3/8 fitting £29.95
Tri-Mag magnetic 3 x 5" PL259 fitting £29.95
HKITHD-38 Heavy duty adjustable 3/8 hatch back mount £29.95
HKITHD-SO Heavy duty adjustable SO hatch back mount £29.95
RKIT-38 Aluminium 3/8 rail mount to suit 1" roof bar or pole £12.95
RKIT-SO Aluminium SO rail mount to suit 1" roof bar or pole £14.95
RKIT-PR Stainless PL259 rail kit to suit 1" roof bar or pole £24.95
PBKIT-SO Right angle PL259 pole kit with 10m cable/PL259 *(ideal for mounting mobile antennas to a 1.25" pole)* £19.95

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Flexweave high quality (50mtrs) £27.95
PVC Coated Flexweave high quality (50mtrs) £37.95
300Ω Ladder Ribbon heavy duty USA imported (20mtrs) £14.95
450Ω Ladder Ribbon heavy duty USA imported (20mtrs) £17.95

(Other lengths available, please phone for details)

Miscellaneous Items

CDX Lightening arrestor 500 watts £19.95
MDX Lightening arrestor 1000 watts £24.95
AKD TV1 filter £9.95
Amalgamating tape (10mtrs) £7.50
Desoldering pump £2.99
Alignment 5pc kit £1.99

Telescopic Masts (aluminium/fibreglass opt)

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed £99.95
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed £189.95
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed £99.95
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed £179.95
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed £189.95

HF Yagi

HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts £399.95

ADEX-3300 3 BAND 3 ELEMENT TRAPPED BEAM FREQ:10-15-20 Mtrs GAIN:8 dBd BOOM:4.42m LONGEST ELE:8.46m POWER:2000 Watts £329.95

ADEX-6400 6 BAND 4 ELEMENT TRAPPED BEAM FREQ:10-12-15-17-20-30 Mtrs GAIN:7.5 dBd BOOM:4.27m LONGEST ELE:10.00m POWER:2000 Watts £599.95
40 Mtr RADIAL KIT FOR ABOVE £99.00

Mini HF Dipoles (Length 11' approx)

MD020 20mt version approx only 11ft £39.95
MD040 40mt version approx only 11ft £44.95
MDO80 80mt version approx only 11ft £49.95
(slimline lightweight aluminium construction)

HF Verticals

VR3000 3 BAND VERTICAL FREQ: 10-15-20 Mtrs GAIN: 3.5dBi HEIGHT: 3.80m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) £99.95
OPTIONAL 10-15-20mtr radial kit £39.95

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN: 3.5dBi HEIGHT: 6.50m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) £119.95
OPTIONAL 10-15-20mtr radial kit £39.95
OPTIONAL 40mtr radial kit £14.95

EVX5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 7.30m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) £169.95
OPTIONAL 10-15-20mtr radial kit £39.95
OPTIONAL 40mtr radial kit £14.95
OPTIONAL 80mtr radial kit £16.95

EVX6000 6 BAND VERTICAL FREQ: 10-15-20-30-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 5.00m RADIAL LENGTH: 1.70m(included) POWER: 800 Watts £299.95

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) GAIN: 3.5dBi HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts £319.95
80 MTR RADIAL KIT FOR ABOVE £89.00

(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

Trapped Wire Di-Pole Antennas
(Hi grade heavy duty Commercial Antennas)

MDT-6 FREQ:40 & 160m LENGTH: 28m POWER:1000 Watts £59.95
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts £49.95
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts £59.95
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts £99.95
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts £49.95
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts £89.95

(MTD-5 is a crossed di-pole with 4 legs)

ALL PICTURES ARE FOR REFERENCE ONLY

Doing it by Design

This month, Tony Nailer G4CFY is taking an in-depth look at transmitter filters. Often an overlooked technology - filters can really help you fight the EMC 'war'!

A signal in a transmitter is generated at low level using specifically selected band-pass filters. After generation it is necessary to amplify the signals. Unfortunately, all amplifiers produce some distortion, some a lot more than others. This distortion manifests itself in the form of harmonics.

Single device amplifiers produce large levels of harmonics, starting with the second. This is at twice the signal frequency. There's really no such thing as the first harmonic, unless the fundamental is considered the first by definition.

Push-pull amplifiers largely cancel out even harmonics, second, fourth, sixth and so on. This means that the third harmonic is the largest signal level after the fundamental.

Transistor amplifiers, adjusted for the best compromise between efficiency and harmonic generation, normally work over the whole of a half cycle plus a portion of the next half cycle. This is normally referred to as Class AB operation, because it's part way between working over the whole of both half cycles, Class A, and working over a single half cycle, Class B.

Push-pull operation (where each transistor works on a successive half cycle) is the best way of achieving a near Class A performance, with high efficiency and low harmonic generation.

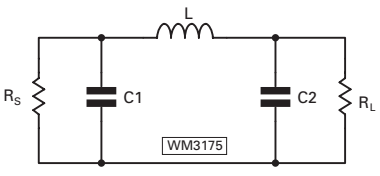
Unfortunately, power transistors are not very linear devices anyway! As you drive them to higher collector currents they produce lower gain. This means that the lower levels of a cycle will be amplified more than the peaks of the cycle. The effect is that the output wave shape shows a compression of the peaks. When analysed this is observed as the harmonics.

The harmonic output from a Class AB amplifier usually has the second harmonic 15 to 20dB down from the fundamental and successive harmonics 5 or 6dB lower than the previous one. Viewed on a spectrum analyser it looks like half a fir tree!

In earlier days Radio Amateurs could get away with harmonic outputs from transmitters at -40dB with reference to the full carrier. This was actually a benchmark used by both the American Federal Communications Commission (FCC) and the British Post Office Radio Interference Service.

Since 1990 and the introduction of EMC legislation, the requirement has become much tighter. The allowable emissions vary with types of apparatus and operating frequencies but generally now have to at least 60dB down from the main carrier.

Low-pass filters using the Pi configuration in one, two, three, or even four sections have been used to reduce the harmonics to acceptable levels for many decades.



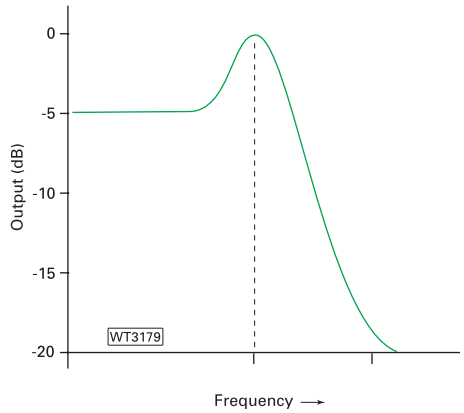


Fig. 1: The humble π-section, with its characteristic peak, isn't the easiest low-pass filter to calculate and is more suited to valved transmitters, than transistorised ones.

Single Pi Section

As a rule of thumb it is possible – with good layout and screening – to achieve a 20dB attenuation of a second harmonic for every Pi section of a filter. Back in the days of valves, using something like an 807 or a 6146B, with harmonic output at about 20dB down, it was possible to achieve the –40dB benchmark with a single Pi section low pass filter.

The Pi section used for matching a power amplifier to a transmission line in this case is not a smooth constant level pass band followed by a gentle roll-off. Instead it has a peak at the operating frequency due to the *Q* of the circuit. Consider it more like a parallel tuned circuit where the low frequency side has been sacrificed for a better high frequency roll-off, see **Fig. 1**. The peak in the response increased the difference between pass band and stop band, making it easier to achieve the desired 40dB harmonic attenuation.

Unfortunately, the humble Pi-circuit, though only formed by three components is not easy to calculate, and over the years a number of sets of equations have been published, but most do not work for a wide variety of situations. Those used here are derived from the *ARRL Handbook* (1996) pages 13.6 and 13.7.

Designing A Pi Section

Let's again consider the case of a valve amplifier stage running on a 600V rail with an anode current of 100mA. In this case the direct current (d.c.) input would then be P = V*I. P = 600 * 0.1 = 60W. If the efficiency was 66% (typical of a new valve in Class AB1) the Pout = 60 * 66/100 = 39.6W.

The source resistance of the stage is then $R_S = V^2/2 * Pout$,

$R_S = 600^2/2 * 39.6 = 4545\Omega$. The Pi

network then will be required to act as a filter and provide the transformation from the Source Resistance R_S of 4545Ω to a load resistance R_L of, let's say 50Ω.

Frequency of 14.2MHz. R_S = 4545Ω.
R_l = 50Ω.

Getting the *Q* of the components correct is difficult. A formula which works is *Qo* = SqRt (4*R_S/R_L). In this case *Qo* = SqRt (4*4545/50) = 19.06. Let *Qo* = 19.

However, this is not the end of the *Q* saga! A value of Q1 is used to calculate the input capacitance, whilst a value of *Q2* is used in the calculation of the output capacitor and inductor.

Let N = R_S*RL. N = 4545*50 = 227250.
Let M = R_S-RL. M = 4545-50 = 4495.

Q1 = [R_S**Qo* – SqRt{N**Qo*^{2} – M^2}]/M,
Q1 = [4545*19 – SqRt{227250*19^2 – 4495^2}] 4495,
Q1 = [86355 – SqRt{227250*361-20205025}]/ 4495,
Q1 = [86355 – SqRt{61.832*10^6}] / 4495,
Q1 = [86355 - 7863]/4495 = 17.46.

Now
Q2 = *Qo* – *Q1*. *Q2* = 19 – 17.46 = 1.54.
C1 = *Q1*/2*π*f*Rs.
C1 = 17.46/2*π*14.2*10^6*4545,
C1 = 17.46*10^{-6} / 405510,
C1 = 0.000043μF = 43pF.

C2 = *Q2*/2*π*f*RL,
C2 = 1.54/2*π*14.2*10^6*50,
C2 = 1.54*10^{-6} / 4461,
C2 = 0.000345μF = 345pF.

X_L = R_S**Qo*/(Q1^2 + 1), X_L = 4545*19 / (17.46^2 + 1),
X_L = 86355/305.85 = 282Ω.

L = X_L / 2*π*f, L = 282 (2*π*14.2*10^6),
L = 3.16μH.

Double Pi Section

A version of the double Pi section filter, which has been popular for a number of years, is the harmonic half-wave filter. This requires the source and load to be equal value and it acts like a half wavelength of transmission line. If terminated with the characteristic impedance it will present the same value at the other end.

The characteristic of the filter is a classic low-pass shape with a flat pass-band and a smooth roll-off into the stop-band. This characteristic is similar to that of Butterworth filter. It's made of two Pi sections joined together and comprises five components and is also referred to as a five element and second order filter. This form of the filter gained popularity with transistor output stages, which used low *Q* tuned networks or transformers to match the amplifier output to the line impedance, followed by this filter.

Note: Output harmonic levels of transistor stages are typically –15dB relative to full carrier. The use of this filter could then take this to –55dB. This level is not really good enough for transmitters above about 5W but is quite good enough for QRP rigs. (See **Fig. 2**). This version was used in the 7MHz DSB Transmitter, DiBD November 2006 *PW*.

Another reason for the popularity of this filter is the ease of design. With an effective *Q* of 1 all the formulas become much simplified. The reactances are all prescribed as follows;

X_{C1} = X_{C3} = 50Ω, X_{C2} = 25Ω, X_{L1} = X_{L2} = 50Ω.

Let R_S = R_L = 50Ω. Let f = 14.2MHz.

C1 = C3 = 1/2*π*f*X_{C1},
C1 = 1/2*π*14.2*10^6*50,
C1 = 10^{-6} / 4461, C1 = 0.000224μF. (Use 220pF).
C2 = 2*C1 = 448pF. Use 2*220pF in parallel.
L1 = L2 = 50/2*π*f,
L1 = 50/2*π*14.2*10^6,
L1 = 50*10^{-6} / 89.22 = 0.56μH.

Triple Pi Section

Now, as we move on to the triple Pi section it gets really complicated, as we depart from the smooth pass band and roll-off, and move to one with improved stop-band attenuation at the sacrifice of increased ripple in the pass-band!

The way to overcome the difficulties, is to think of the filter as being made up from a combination of a high *Q* stage (as discussed in the single section Pi filter) together with low *Q* stages (as discussed in the harmonic half-wave filter). This type of filter is known as the Chebychev filter.

Coefficients, which are the inverse of the *Q* factor, are used to calculate the elements of the Chebychev filter. It's also referred to as a 7-element and third order filter. (See **Fig. 3**). Note here that the components are numbered according to their element number.

Years ago, I discovered an article in the ARRL's *QST* journal for December 1979, entitled *Low Pass Filters for Amateur Radio Transmitters* by **Edward E. Wetherhold W3NQN.** This gave the design equations for the 7-element Chebychev Filter, which I subsequently incorporated into my own program to run on *GWBASIC*.

With so many variables I found it difficult to obtain practical values for the capacitors and really tedious to keep re-running the program. I then added a 'FOR TO' and 'STEP' loop for the reflection coefficient so it would generate a family of 20 designs. All that's required is for me to input the cut-off frequency and a starting value of reflection coefficient.

The listing is included here for those who have *QBASIC* or *GWBASIC* and wish to transcribe it into a working file. A disk containing the executable file *GWBASIC.EXE* together with *CHEBLIST.BAS* is available at low cost.

To run the disk from *WINDOWS*, it works quite well clicking on My Computer, then A Drive, then *GWBASIC*. Then press F3 key, type in CHEBLIST and hit the Enter key.

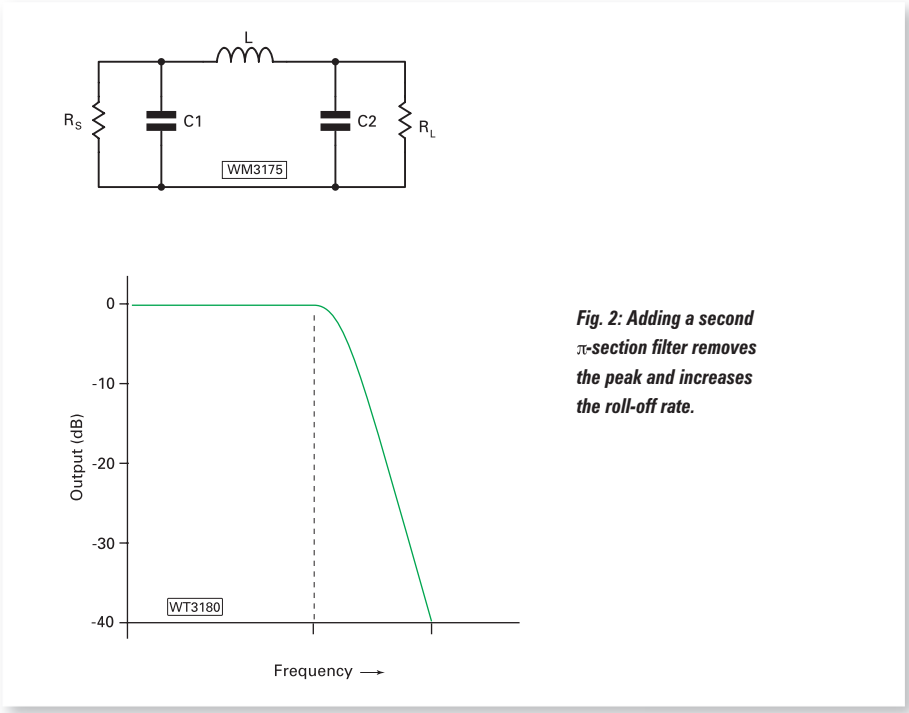


Fig. 2: Adding a second π-section filter removes the peak and increases the roll-off rate.

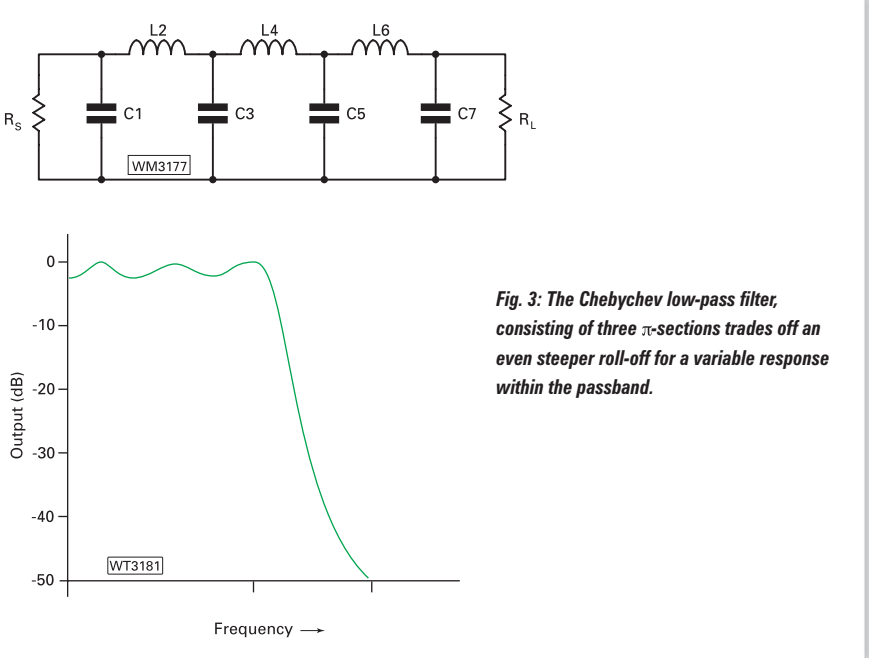


Fig. 3: The Chebychev low-pass filter, consisting of three π-sections trades off an even steeper roll-off for a variable response within the passband.

Type RUN and Enter key. The program will open and ask for the operating frequency in MHz. Put this in and hit Enter. The program will ask for Reflection Coefficient, I usually type in 0.5 then Enter again.

The program will produce a table of filters with values of reflection coefficients from 0.5 to 9.5. Also it shows v.s.w.r. as seen at the input to the filter. I normally choose a filter around the 1.1 v.s.w.r. value as a good compromise between efficiency and practicality. You can run the program again by entering RUN and then enter, or you can end the program by typing SYSTEM and hitting the Enter key.

It's unrealistic to expect to achieve the theoretical values of stop-band attenuation unless rigorous screening is used. The 3-section filter is often used open on a printed circuit board (p.c.b.) with the coils spaced apart well and arranged at right angles to minimise coupling.

One of the easiest ways to produce the required inductance is to use toroids. No, - please don't panic (I have been told by **Rob** the Editor how unpopular these things are with readers, but they are available and cheap and the number of turns are easily calculated).

Another advantage is that they have a closed magnetic field and hence much lower cross talk to adjacent coils. When used in these filter applications they will produce better results with less screening than air-wound coils.

Ideally Suited

The single section Pi filter with high *Q* is ideally suited to tuned applications where the centre frequency will always be optimally matched to the load. The attenuation is not very good but it's still the best way to match a valve to a transmission line. It could be used in conjunction with a harmonic half-wave filter to meet the modern level of harmonic suppression.

The two section Pi filter is a very useful device and particularly useful with QRP transmitters. It's easy to set up and with only limited attenuation performance, say 35 to 40dB, and is fairly tolerant of physical layout. If well laid out and screened it will provide good stop band attenuation to very high frequencies. The harmonic half-wave version has constant impedance throughout the stop band.

The three-section Pi filter is the minimum now required to achieve modern levels of harmonic suppression for transmitters above, let's say 5W. To operate correctly it requires component values to be very close to the design values. It also requires good screening between sections and toroids are recommended to reduce unwanted coupling.

The Chebychev filter has ripple in the pass-band, that's accepted in compensation for steepness of cut-off. In many cases the filter is used in applications where the stop-band to very high frequencies is important but the pass-band of interest is only that close to the cut-off frequency. In this case the pass-band ripple is of no consequence. Impedance throughout the pass-band is not constant and is proportional to the ripple. The higher the ripple, the worse the impedance variation.

There is such a massive amount of material regarding filter types that no single article like this can do justice to the subject. It's my hope that you will find this article of particular value in designing output filters for your own homebrew gear.

Finally, for the semi-serious student of filter design, I have to recommend the *ARRL Handbook 1996,* which includes tables of normalised filter designs, and which I have used from time to time, particularly to check if my programs also produce the correct results.

•

Program Disk

The *GWBASIC* and *CHEBLIST* program on 3in floppy disk, £5 by post, or £4 by E-mail. Cheques payable to:
A.J. Nailer,
12 Weatherbury Way,
Dorchester,
Dorset DT1 2EF.

Tony Nailer G4CFY
To subscribe to my readers' list, send a blank e-mail to: **pw-g4cfy-on@pwpublishing.ltd.uk** with the word subscribe in the subject box. When you receive confirmation from the server you can then send e-mails to **pw-g4cfy@pwpublishing.ltd.uk** and your comments will be answered by myself or the *PW* team.

Roger Cooke G3LDI reports on his experiences with a multiband vertical antenna

The EVX8000 eight-band vertical antenna

The EVX 8000 vertical antenna, together with the 3.5MHz option, arrived as a box of various lengths of aluminium tubing, rod, and radials. As you can see from the picture in **Fig. 1**, it pays to lay it all out and run a checklist before proceeding to construct the antenna. With an antenna of this nature, with varying lengths of tubing to connect together, it also pays to have some extra Penetrox (graphite based electrically conductive grease) on hand to help conductivity in the joints.

I recommend that when you receive an antenna of this sort in kit form you carefully inspect all the tubes first before assembling as I did. Some of the holes will certainly need cleaning off with a small file and may also need help with alignment. I chose a nice sunny day so that I could get onto my grass with plenty of room for a portable workbench! These are always a very useful accessory to have on hand when assembling antennas, as it saves bending down or crawling on the ground.

The EVX 8000 can be operated at a height of only 3m above ground level. Erecting it- in the opinion of Roger G3LDI - is best done with the help of a friend!

The antenna comes with a four-page leaflet to help assembly, written in poor English, so obviously the antenna is not made in the UK. For example, the characteristics are listed as 'Caratteristiche', the mounting U-bolts are referred to as 'stirrups' and one sentence reads…"It is important to fasten not excessively the screw in order to avoid to damage the pipe", quaint English perhaps but the message is conveyed!

I've only mention the comical wording as an amusing comment really, the English used is far better than if I had to translate it into an Eastern European language myself! Additionally, it has no detrimental effect on the performance of the antenna. However, it does pay to carefully read the instructions a couple of times before assembly!

Quoting from the leaflet the manufacturers state that the…"Construction is of 'anti-corrosion aluminium and stainless steel". The antenna weighs 7kg and is fed at the bottom with 50Ω coaxial cable into an SO-239 socket with a claimed power rating of 2kW using single sideband (s.s.b.).

Assembling The Antenna

Next, I started assembling the antenna. Tools needed for the job include screwdriver, pliers, small file, and an adjustable spanner, or preferably a selection of normal spanners. Adjustable spanners are not ideal because they do have a tendency to spoil the nuts when they slip.

The 3.5MHz (80m) additional assembly is simply screwed into the top of the vertical. I advise that Penetrox or something similar is put on the thread and also make sure that extra unit screwed in really tight. I speak from experience, as I forgot to tighten it correctly and the voltage standing wave ratio (v.s.w.r.) was jumping around as it was being monitored. I then had to take the antenna down and do what I have just suggested!

The radials can be left off until the antenna has the mounting fixtures on the pole. This is good sense as the antenna is mounted on the bottom 305mm (12in) and with the antenna being 5 metres long, it is not easy to handle.

I've now got a duraluminium pole, set into a concrete base

Roger Cooke G3LDI reports on his experiences with a multiband vertical antenna supplied by Moonraker. After setting the antenna up he was pleasantly surprised at the results.

for testing low mounted verticals and I have about 3m (10ft) sticking out of the ground. It took quite an effort for two of us to mount the antenna. We found the best way was to loosely install the mounting hardware onto the bottom of the antenna and with the two of us (one holding the antenna and dropping it over the stub mast) the other could then tighten up the hardware.

It isn't easy trying to hold onto a five metre long antenna using just your foot at the bottom to steady it, so it really is a two-man job. The radials can be installed afterwards and please also make sure that they're tight!

The radials have an open end into which radial extending aluminium rods are inserted and held in place with 'shagreened'* metal rings with a screw. Again a liberal coating of Penetrox helps before tightening these, plus of course, varying the lengths of the radials is how tuning is effected. The ends of the radial extender rods have rubber caps placed on them. The antenna is shown in the heading photograph, is shown erected 3m above ground level.

Roughened surface (originally referring to the rough surface of leather made from fish-skin).* ***Editor*.

Fig. 1: The antenna arrived safely and Roger G3LDI took advantage of his newly trimmed lawn to check everything was ready before assembly.

Band (MHz)	CHA	EVX
28.0	5-8	5-8
21.0	5-4	5-4/5
24.890	5-7	5-8
18.068	5-6	5-5
14.0	5-4	5-3
10.1	5-8	5-9 +10dB
7.0	5-3/5	5-9
3.5	5-9 + 10dB	5-9

Table 1.

Tuning & Preparation

I was then ready to start the tuning and preparation for going on the air. An MFJ- 259B analyser was used to check for resonance. I had a pleasant surprise in that each band was already resonant.

A decision must be made whether to tune for the c.w. or s.s.b. sections of the bands covered, this will obviously be a compromise but that is to be expected. Bandwidth on the lower frequencies is quite limited, roughly 25kHz and again that is to be expected. However, it's possible to use the antenna on each of the eight bands and I was quite happy with the test results.

To be honest, I'm always quite reluctant to try vertical antennas; this is because invariably I'm disappointed with the results compared to my directional beam antennas. Despite this, a multiband vertical is a useful receiving antenna anyway, as they are useful for checking each band with a single antenna to check that there's activity.

However, it's always going to be a problem trying to compete with antennas that provide gain, such as multi-element arrays, beams and so on. You should not buy any multiband vertical thinking you're going to 'crack' the pile-up" because you won't. On the other hand, if you wish just to get contacts with a general-purpose antenna – that's all you need to worry about.

Pleasantly Surprised!

I was pleasantly surprised when using the antenna on the air. I was slightly sceptical at mounting it only 3m above ground but it does make a really useful general purpose receive antenna. I worked lots of stations, mostly in Europe and mostly on c.w. on 3.5MHz through to 18MHz. I did work on 21 and 28MHz but conditions weren't favourable and there was very little good propagation. Incidentally, I did make sure it would work on all bands by checking with a local station, **Dave Johnson G3MPN** who confirmed conditions were poor but he could also hear me.

I had another vertical to review; the Comet CHA250-B and I compared the two. The results are in **Table 1**, which I have also produced in my review of the other antenna. I make no apology for reproducing it in this review because I think it will help the newly licensed Amateur to choose a vertical antenna with more confidence.

To be frank, there was not that much difference in the performance of either antenna. I think the choice would be limited by the physical size of garden and how easy it would be to mount the chosen antenna.

Most of my contacts were on c.w. using just my Yaseu FT-1000MP. It's much easier to make contacts on c.w. than on s.s.b. and if you do try to bust a pile-up, you'll have to exert some patience. I managed it on a few occasions but it did take time. I think that the the EVX8000, a general purpose vertical for eight bands for around £400, is an ideal antenna for introducing a beginner, with a restricted garden, to the h.f. bands. ●

Product EVX 8000 eight band h.f. vertical antenna.

Company Imported by Moonraker.

Contact Sales on (01908) 281705.

Pros & Cons

Pros: Ideal for the beginner on h.f., providing a good general-purpose antenna.

Cons: Won't compete with higher gain antenna.

Price £319.95 plus £7 P&P Additional 80m radial kit.

Supplier My thanks go to Moonraker for the loan of the review antenna.

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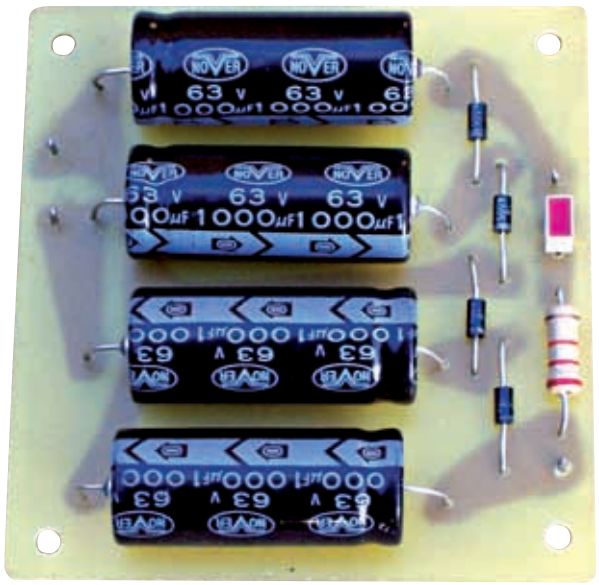
A High Current Voltage Quadrupler



Voltage multiplier circuits have been around for a long time and conventional wisdom is that they are only suitable for low current applications, such as valve (tube) bias supplies typically feeding very high input impedance grids and taking only a fraction of a mA. Amateur literature indicates that this is limited by the existence of high capacitance, high working voltage electrolytics, capable of handing large ripple currents.

I wondered if modern capacitors (and diodes) now make high current versions of these multipliers feasible. My initial aim was to produce a circuit suitable of supplying h.t. to battery valve radios, say about 100V at 20mA with low ripple, from a low voltage transformer. I'm pleased to say, that I easily exceeded this target.

Voltage Range

Without being too dramatic about it, I think there's a tricky voltage range in which it's difficult to generate a smoothed d.c. voltage efficiently using easily obtainable components. The range is probably between 70 and 150V where low voltage transformers can't generate enough voltage and valve transformers generate too much voltage and hence are inefficient when the excess voltage has to be dropped.

My solution, way back in 1990 (Power Supply for Battery Radio), published in *PW* May 1990) was to wind my own transformer secondary on a Maplin transformer kit. Sadly, this kit is no longer available. It's in this range where this quadrupler circuit fits, generating the correct voltage efficiently.

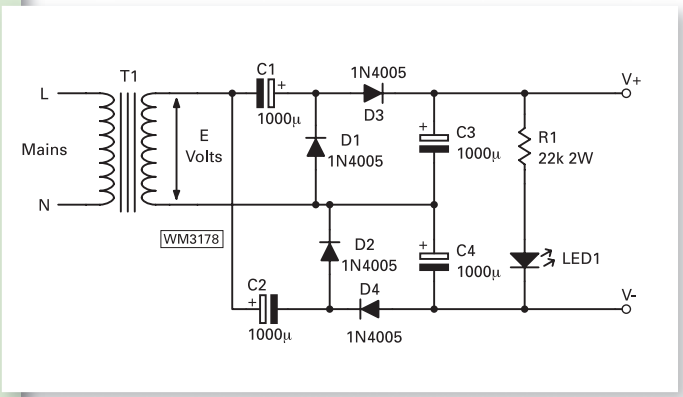


Fig. 1: The circuit of a voltage quadrupler, the maximum output voltage is four times the peak value of the input voltage.

The Circuit

The schematic for a full-wave voltage quadrupler circuit is shown in **Fig. 1**. This form has the advantage that each of the output capacitors (C3 and C4) needs only to have a voltage rating of half the total output voltage. This is important where an output voltage of around 100V is required, as high value capacitors are freely available with a working voltage of 63V.

Another advantage of the full-wave circuit is that the a.c. ripple on the output is at 100Hz, (or twice the input frequency). It's therefore easier to remove a 100Hz ripple than a 50Hz one by filtering. The way this circuit works is explained in many textbooks or can be found on the Internet.

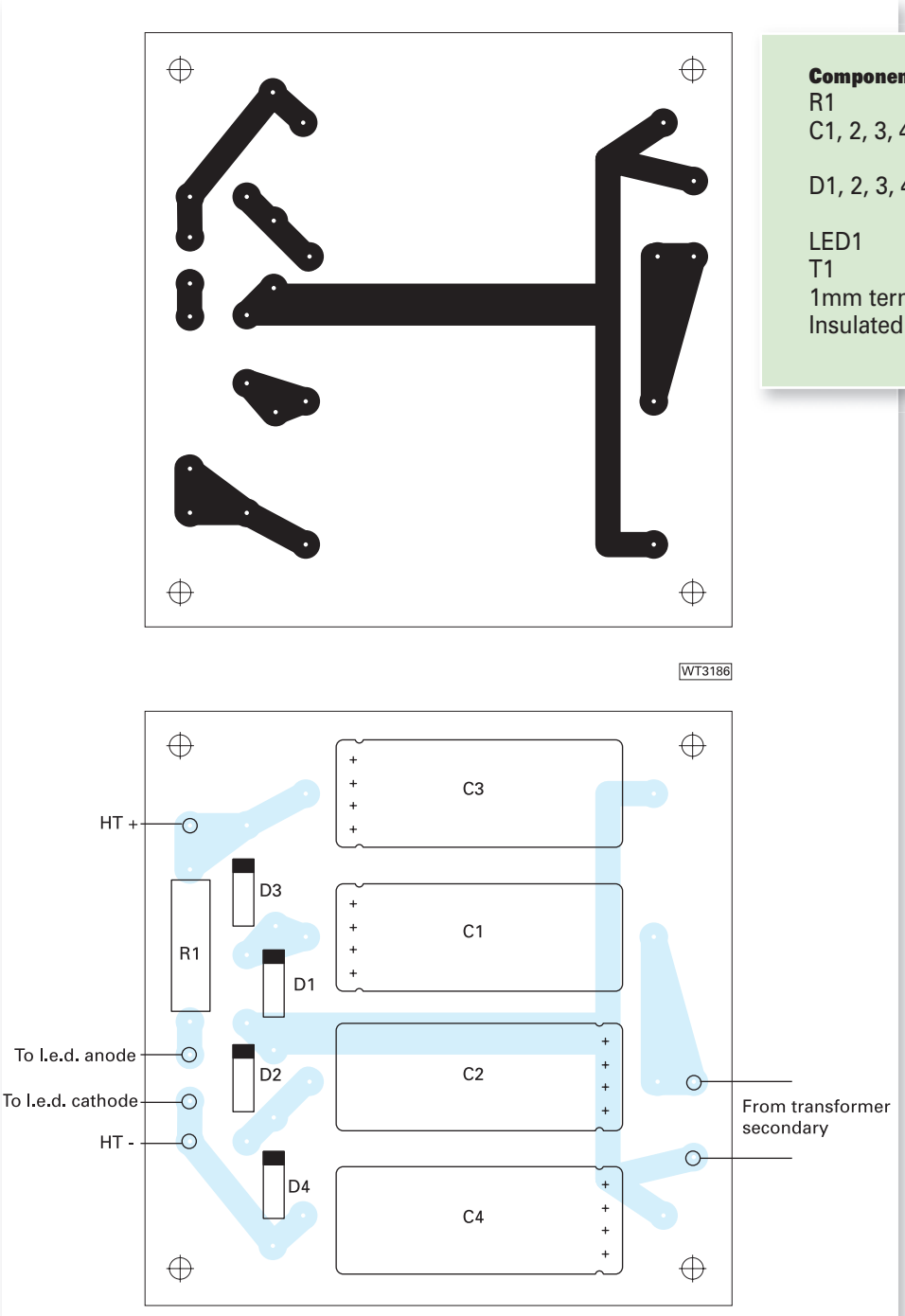
Resistor R1 acts as a bleeder resistor, discharging the capacitors when the circuit is switched off and feeding about 5mA through power-on indicator LED1. If a constant load is connected to the quadrupler, then R1 and the l.e.d. will probably not be needed.

If *E* is the RMS voltage (i.e. the voltage you measure with an a.c. voltmeter) of the transformer secondary, the no load output voltage of this circuit should be 4x*E*x1.41, or four times the peak voltage of the secondary.

Surge Current

One design consideration of this type of multiplier is the surge current through D1 and D2, which see the very low impedance loads of uncharged C1 and C2 as the circuit is switched on.

Stefan Niewiadomski presents a power supply project suitable for battery valved projects, that doesn't need a special transformer.



Component List

R1	22kΩ 2W resistor
C1, 2, 3, 4	1000μF 63V axial electrolytic (see text)
D1, 2, 3, 4	1N4005 or similar 1A diode (see text)
LED1	Red l.e.d.
T1	Transformer (see text)

1mm terminal pins.
Insulated connecting wire.

Fig. 2. Be careful that the capacitors and diodes are mounted the right way round and use 1mm pins for the off-board connections. If you use 1N540x type diodes for D1-D4 you may need to open up their mounting holes as their leads are quite thick.

The p.c.b. layout maintains isolation from ground for both the positive and negative outputs. Either of these can be connected to ground using a ground tag, depending on the needs of the equipment you are feeding. I haven't shown any case or p.c.b. mounting details, as these will vary from application to application.

Fig. 2: The track pattern and overlay for Stefan's prototype. You could draw the tracks with an etch-resistant pen, or even use plain p.c.b. material with wired interconnections.

So far I've had no problems with the 1N4005s I used, but the 1N540x series of diodes have surge ratings of 30A, compared with 3A of the 1N400x series. The 1N540x diodes therefore might be a safer option if this is of concern (where 'x' is the final number denoting its working voltage).

Another way round this potential problem is to include a low value resistor in series with the transformer secondary supply to the multiplier. I experimented with the effect such a resistor has on the d.c. regulation of the supply and this is shown in the Test and Results section.

Construction

The layout of the circuit is not critical and can easily be built on stripboard or tag board. The track pattern and component overlay for a p.c.b. version of the quadrupler are shown in

Test & Results

I tested the voltage quadrupler with a number of transformers I had to hand and plotted both d.c. output and a.c. ripple voltages versus output current, as shown in **Fig. 3**. I tried the 1000μF 63V capacitors shown in the components list and some 47μF 450V capacitors I had to hand. The advantage of the latter capacitors, in theory at least, is that they make high output voltages possible. But please remember to use the '7' series of diodes in this case.

Plot lines show that with the 1000μF capacitors, output currents of up to 100mA at 120-105V are achievable, with less than 1% a.c. ripple. The no load output voltage was accurately predicted by the formula on page 20 (2nd Column, 4th paragraph). I found that d.c. stabilisation is very good (less than 10% voltage reduction from 0-100mA) and the circuit still provided about 95V at 200mA. All the components ran cool, even with extended use into the 200mA load.

One plot line (b) shows the effect of a 4.7Ω resistor in series with the transformer secondary, added to limit the switch-on surge current through the diodes. It can be seen that the d.c. regulation worsened but interestingly, the a.c. ripple is reduced for a given output current.

You can see in Fig. 3 that using 47μF capacitors, much lower output currents are available before the d.c. output voltage falls appreciably and the a.c. ripple increases considerably. The transformer and diodes used for these tests

were identical to the 1000µF case, so the reduction in d.c. regulation and increase in a.c. ripple was entirely due to the lower value capacitors. The conclusion here is that higher output voltages are possible with these capacitors but at much lower currents (say up to 20mA), as conventional wisdom would suggest.

I've shown in **Fig. 4** the results that I obtained when using a couple of 12V transformers and 1000µF capacitors. My first measurements were taken using an RS 12V 20VA secondary, when a low current d.c. voltage of 69V was obtained. This is very close to the theoretical expected as the measured secondary voltage of the transformer was 12.5V(a.c.) and therefore the theoretical voltage should be 12.5 x 1.41 x 4 = 70V. The output voltage was well regulated up to 70mA, which was the highest current I checked. At the 70mA level, the output a.c. ripple was about 1V peak-to-peak, at 100Hz.

The second 12V transformer I tried, was a Maplin YN14 12V 250mA, which is physically a very compact unit. You can see that that the d.c. regulation is rather worse than with the larger transformer, ranging from 79V at no load to about 52V at 50mA. However, up to about 20mA, the regulation (about 10%) and ripple (about 200mV peak-to-peak) is still acceptable in most valve applications.

Conclusions

The voltage quadrupler circuit as shown, gave surprisingly good results with a range of low voltage transformers and was capable of high output currents with good d.c. regulation and low a.c. ripple. The 20V secondary transformer tested indicates a useful d.c. output range of 100-120V and the 12V transformers look useful around the 60-80V output voltage range.

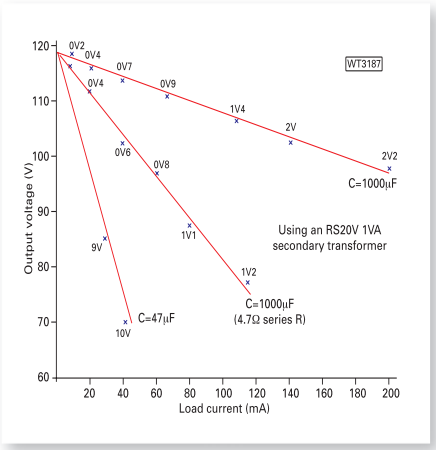


Fig. 3: Plots of output and ripple voltage levels for differing combinations of transformer and filter capacitors.

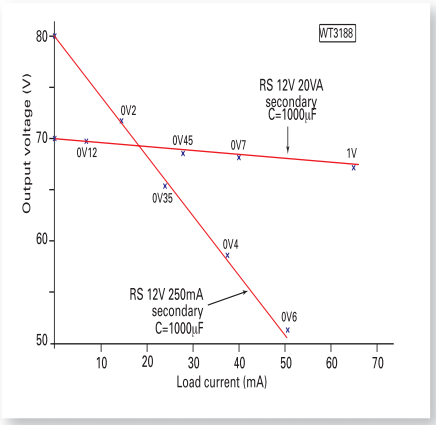


Fig. 4: Plots of output and ripple voltage levels when using two different 12V secondary transformers.

It seems reasonable to assume that a 15V transformer would fill a 80-100V requirement. Worries about switch-on surge currents through the diodes can be alleviated by the use of a low value resistor in series with the transformer secondary. (Note though that they do affect the regulation of the circuit).

I feel that the various voltage needs can be adequately covered by this circuit, using just a variation of the transformer. The results shown here should be applicable to voltage doublers and triplers, if these will produce the voltage you need from the transformer you have to hand using fewer components. ●

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Working the DX

How many times have you switched on your transceiver only to find that there are very few, if any, high frequency (h.f.) signals audible and that to all intents and purposes you seem to be the only person left alive in the world? What do you do in this situation?

If you're like me, you may have at first panicked! Perhaps the rig is faulty or the antenna has fallen down or perhaps the next-door neighbour has cut through the coaxial cable feeder? Then common sense kicks in and a few tests are conducted. First, you can listen to the world-wide network of h.f. beacons on 14.1, 18.110, 21.150, 24.930 and 28.2MHz, Even if you cannot read high speed Morse, the more beacons you hear in three minutes the better the conditions. The website **www.ncdxf.org/Beacon/intro.html** provides much information on this exceeding useful system

Additionally, if you find that your transceiver is transmitting as normal - then the problem must be on the far side of the antenna and the main suspect could be the ionosphere. The ionosphere is that wonderfully useful layer of ionised gas molecules that surround the earth, helping to protect us from harmful radiation and also acts on radio frequencies in different ways, dependent on frequency and the sun.

Propagation At HF

At h.f. frequencies, normally up to the 30MHz region, radio signals travel (propagate) in two main ways. One propagation mode involves a ground-wave, the lower the frequency the further it travels but it's still generally short range.

The other main propagation mode is via a refracted (gentle 'bending' rather than a reflection we see from a mirror) signal off an ionised layer that, for long distance (DX) working, is roughly 200 to 300km above the earth and is known as the F1/F2 layer. This layer acts as a 'reflector' for h.f. signals, 'bending' them back towards the earth some 4000km away.

Pat Allely GW3KJW is keen to help newly licensed Amateurs experience the thrill of a rare DX contact.

The more intense the ionised layer, the stronger will be the received signal at the far end of the 4000km 'hop'. There is a slight problem, however, the sun's activity is variable and does not emit the same amount of radiation constantly. Actually, it's not constant from day-to-day and generally the sun's radiation varies from low to high and then back to low over an 11-year cycle. This cycle is of great interest to Radio Amateurs wishing to transmit of certain bands at different times of this 11-year cycle.

The more radiation, the more ionisation and at the peak of the cycle (the last peak was in 2000) the better the conditions on the higher bands right up to 50MHz (6m). During this period contacts could be made around the world on 28 and 50MHz with power levels of just a few watts, so intense was the degree of ionisation.

Hop & Skip?

Earlier in the article I said that the 'hop' or 'skip' distance was about 4000km. However, if this is the case - how did the signals get around the world? The answer is that when the reflected signals return from the ionosphere they again reflect off the surface of the earth. They are then reflected back up to the F1 layer and back down again (sometimes this process is repeated) and this is known as 'multi-hop propagation'.

As the intensity of the sun's radiation diminishes, the F1 layer will not reflect the transmitted higher frequencies. Your signals will then travel through the F1 layer out into space and eventually may be heard by some Radio Amateur living about 50 light years away (though don't expect a QSL card!). However, the lower frequencies will still be reflected back but as the cycle reaches its lowest activity point, all the higher bands are similarly affected leaving only the lower Amateur bands to carry the DX traffic.

All is not lost, however! There's always the E layer to look forward to and to collect those nearby countries that may not be acquired by F layer propagation because they are within the skip distance (that's in the area between your antenna and the spot your signal returns to earth).

For some, as yet unknown reason, in the summer months (generally from May through to August) the E layer, which is at 100km above the earth sometimes

Pat Allely GW3KJW is an inveterate DX chaser. In this article he passes on some of his many years of experience to help others. Pat is particularly keen to help the newly licensed Amateur share the thrill of a contact with rare DX.

becomes intensely ionised and acts as a superb reflector of radio signals up to v.h.f. During one of these openings (known as Sporadic-E or Es) signals can be heard on 28, 50 and 144MHz at enormous strengths allowing you work - even on low power - those near continent contacts not normally workable on those frequencies.

Variable Star

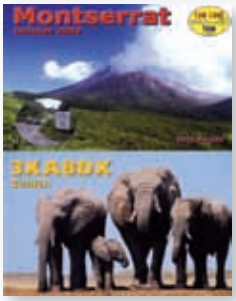
The sun is a variable star and is subject to all sorts of nuclear actions. It produces vast sunspots (the cooler bits) and throws out great spumes of electro-magnetic particle energy known as the solar wind. This travels away from the sun at speeds measured at up to 700km per second and sometimes into the orbit of our planet. Should the earth encounter this radiation it affects the ionosphere in spectacular fashion.

The energy is attracted to and by the earth's magnetic field and is most intensive at approximately the latitude of the Arctic and Antarctic circles, approximately 67° north and south. Here auroras occur, circling the earth and forming wonderful crowns of varying light. The aurora acts as a reflector of h.f. and v.h.f. signals but as it's constantly moving both in height and intensity communication by this method somewhat of a challenge! The aurora layer is quite low, below the E and F layers and because of this communication by these layers is not possible on h.f. But it's quite a different story on 28, 50 and 144MHz where contacts can be made by pointing a directional antenna towards the north-east (from the UK) and reflecting a signal back to someone who is also pointing their antenna to the aurora at its nearest.

Because the reflective layer is constantly shifting, the transmitted signal hits it at different distances, causing the reflected signal to be received with frequency shift. The 'auroral' effect gives received signals a raucous quality, which once heard can never be mistaken! On s.s.b., the received signals can be described as listening to 'giants whispering', whilst on c.w. a rough very impure tone is received. The quality of the auroral 'phone signals makes it difficult to comprehend at first but practice makes perfect! While on c.w. there's no difficulty in reading the signals, although because the aurora tends to absorb a lot of signal, high power together with high-gain antennas are required.

Magnetic Storms

Magnetic storms, which often result in an aurora, also have the effect of stopping communication via the F layer. These conditions may persist for a few days but often before the onset of a magnetic storm the h.f. bands may restrict activities to as low as the 3.5MHz band in frequency. This usually happens about two days before the recognised magnetic storm when extremely strong solar ultraviolet (UV) radiation reaches the orbit of the earth and causes intense ionisation of the D-layer (the lowest layer).



The extremely strong UV radiation results in radio waves being absorbed before reaching the F layer. Alternatively they could be reflected back at high angle, giving extremely 'short hop' propagation. This phenomenon is known as a sudden ionospheric disturbance (s.i.d.), and is a weird occurrence to experience.

I was on 3.5MHz one day talking to a friend about 8km (5 miles) away and another friend about 322km (200 miles) from my QTH in North Wales. Both had been S9 then the distant station disappeared, along with all other signals on 3.5MHz with the exception of my close neighbour, who I was receiving on ground wave. About 30 minutes later the band struggled back to life but conditions were 'down' for the next few days on the higher bands.

Finding The DX

All the vagaries of atmospheric conditions must be considered when searching for the often elusive DX station. However, there are other ways of finding out what is happening on the various odd frequencies, and the value of a computer is proved as Internet facilities now come in handy!

There are two websites I find to be of particularly great use. The first site is concerned with propagation, aurora and 'grey line' predictions, which can be found at **http://dx.qsl.net/propagation/propagation.html** This site tells you the state of the sun, the important flux figures (an indication of how good propagation may be), forecasts for the next few days, real time aurora graphics, and many more helpful insights into the sun's activity and a real time graphic of the earth showing the grey line as it progresses across the planet. Using this site you'll be able to see straight away what is the best time to try to contact a selected part of the earth.

The second site is a DX cluster site known as DX Summit and can be found under **http://oh2aq.kolumbus.com/dxs/** This is an 'up-to-date and time' DX cluster where anyone can input information about rare DX stations that are currently on the air. The site is updated every three minutes and lists what's happening on all the Amateur bands. For instance, if I were to work a New Zealand station (ZL) on 7MHz c.w., I could then go to this website and input the callsign of the ZL station, the frequency, my own callsign, time and a small extra piece of information, such as QSL manager or name.

The information would then appear on the cluster and anyone interested could tune to that given frequency and try their luck! This technique often results in huge pile-ups and is frowned upon by the purists who believe in searching the band without an aid. However, I'm not a purist so, I don't care! If I can work another DXCC entity (a recognised Amateur Radio country), I'll use any help I can get and I hope you will too - adding those fascinating DX contacts to your logbook. Good DX hunting!

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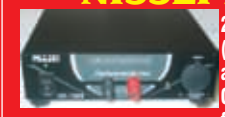

28A at 13.8V yet under 2kgs. (H 57mm, W 174mm, D 200mm approx). Fully voltage protected. Cigar socket & extra sockets at front/rear. Ultra slim.

NISSEI HAVE BECOME RENOWNED FOR PUTTING QUALITY FIRST, YET MAINTAINING A GOOD PRICING STRUCTURE. A TRULY SUPERB POWER SUPPLY UNIT

'Smallest version to date' now with cigar socket.

£69.95 Del £10.00

★ Star buy ★
2 for £100.00

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SANGEAN ATS-909

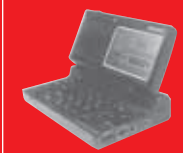
IDEAL FOR NAVTEX RECEPTION

A superb performance all mode synthesized world receiver with true SSB and 40Hz tunning for ultra clean reception. Other features include RDS facility, 306 memories and WFM. Incl's case/earphones/wind-out antenna. A truly remarkable receiver, especially on SSB – you'll be amazed.

Incls free 240V Power Supply

£139.95 P&P £10

SONY SW-100E



240V Power Supply £24.95

★ Miniature portable all mode SW receiver ★ Station presets for 50 frequencies ★ Synchronous detector ★ Tuning in 100Hz + 1kHz steps ★ Includes compact antenna/ stereo earphones/carrying case. Superb SSB performance.

OUR PRICE **£179.95** P&P £10

REALISTIC DX-394

Send SAE for review

★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps (down to 100Hz) ★ 240 or 12V ★ Digital S-meter ★ Attenuator ★ Key pad entry ★ 160 memories ★ Noise blanker.

OUR PRICE **£249.95** P&P £10

HF TRANCEIVERS

YAESU FT-817 ND

100kHz-440MHz (with gaps). All mode transportable. Includes NIMH battery/ charger. Latest spec.

£345.00

FT-817ND + case + CW filter.....£379.99
FT-817ND pack + MS-1228.....£429.00

KENWOOD TS-570DGE

Last few left. Brand new.

OUR PRICE **£789.00**

ICOM IC-7400

One only. As new, private sale

OUR PRICE **£849.00**

YAESU FT-857D DSP

The ultimate HF excitement in a small package. HF + 6m + 2m + 70cm. Incl's digital signal processor unit. Incl's optional DSP unit.

RIG ONLY

FT-857D + ATAS-120....£689.99 **£529.99**

FT-857D + MS-1228 PSU.....£575.00

YAESU FT-2000

Latest marvael of technology from Yaesu. With Built-in power supply and specification to shock even the professionals!

Free extention speaker & deck microphone

£19950.00

YAESU FT-897D

HF + 6m + 2m + 70cm all mode. An amazing DSP Tcvr for base/mobile or portable use. Very little has been left out!

CRAZY PRICE

FT-897D + MS-1228 £629.00 **£585.00**

ATAS-120 remote antenna.....£219.99

D-308B DELUXE DESK MIC

(with up/down). Many amateurs (over 4000) have been pleased with it's performance. Includes 8-pin round Yaesu mic lead. Icom/ Kenwood & other leads available. Replacemaent foam windshields £3 incl P&P

Truly remarkable audio on both SSB & FM/AM

£49.95 P&P £7.50

ACCS

MFJ-259B

HF digital SWR analyser + 1.8-170MHz.

NOW **£169.99** P&P £7

Optional case.....£22.99
MFJ-901B Superb versitile ATU.....£69.99
MFJ-902 Compact ATU.....£59.99
MFJ-16010 Random wire ATU.....£39.99
MFJ-260C 300W dummy load.....£39.99
MFJ-264 1.5kW dumm load.....£69.99

MFJ-949E

NOW **£110.00**

- 1.8-30MHz 300W ATU
- Large cross needle meter
- 30/300W PEP power meter
- VSWR
- 3-way antenna selector
- Internal balun

MFJ-969

300W **£169.99**

HF + 6m rollercoaster ATU

SGC BARGAINS

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

OUR PRICE **£239.99**

SGC-239 Mini tower ATU (1.8-30MHz).....£169.99
SGC-230 (HF-200W) ATU.....£319.99
SGC-237 HF+6m Tuner.....£269.99
SGC-231 HF+6m (Deluxe).....£319.99

VHF/UHF TRANS

ALINCO DJ-596

2m + 70cm Handie. Includes: (NIMH) Battery/ Charger. Wide + narrow switchable. High power (4.5W) OP as standard. (DTMF keypad as standard)

Now includes free remote mic **£129.95**

Optional case.....£16.99
Cigar lead.....£19.99
Optional headset (Boom mic).....£24.99

YAESU FT-7800E

2m/70cm Tx (Rx:-108-1000MHz) Superb 50/35W FM mobile (AM Rx).

FT-7800 + YSK-7800 (in-car kit). **£219.00**

FT-1802

2m/70cm, FM (50W) mobile.

£125.00

YAESU FT-60E

2m/70cm Tx (5W). Rx:- 108-520/700-1000MHz. Includes Nicad battery and charger & antenna.

CRAZY PRICE **£125.00**

Optional Micro antenna (shown).....£16.99
Optional case.....£16.99
Cigar lead.....£21.99
Optional speaker mic.....£23.99

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W).....£79.95 P&P £6
RS-102 1.8-150MHz (200W).....£49.95 P&P £6
RS-402 125-525MHz (200W).....£49.95 P&P £6
RS-3000 1.8-60MHz (3kW) Incls mod meter.....£59.95 P&P £5
RS-40 144/430MHz Pocket PWR/SWR.....£29.95 P&P £4
DL-30 diamond dummy load (100W max).....£26.99 P&P £4

YAESU VX-2E

Tx:- 2m/70cm. Rx:- 0.5-999MHz. Includes battery (Li-/on) + charger.

OUR PRICE **£109.99**

Optional speaker microphone. £23.95Optional plastic case.....£12.99

YAESU BARGAINS

VX-7 2/6/70.....£199.99
VX-120 2m hand-held.....£95.00
FT-8800E.....£259.00
FT-8900.....£319.00

SUPER-GAINER RH-9090

SMA 40cm flexible whip that is ideal as replacement. Tx:- 2m + 70cm. Rx:- 25MHz-2.9GHz

OUR PRICE **£28.95** P&P £4.00

SUPER-GAINER RH-9000

BNC 40cm flexible whip for the ultimate in gain. Tx:- 2m + 70cm (Rx:- 25MHz-2.9GHz).

OUR PRICE **£24.95** P&P £4.00

YAESU G-450C

Heavy duty rotator for HF beams, etc. Supplied with circular display control box and 25m of rotator cable.

OUR PRICE **£299.99**

G-650C..... our price £339.99
G-1000DXC..... our price £429.99
G-5500 (azimuth/elevation) rotator ..... our price £499.99
GC-065 thrust bearing..... £48.00
GC-038 lower mast clamps £25.00
8 core heavy duty rotator cable £1.00/mtr

New station log books (A4) £4.99 P&P £2.00
5 log books £20.00 P&P £6.50

D-308B DELUXE DESK

(with up/down). Many amateurs using this mic (over 4000) have expressed extreme pleasure with it's performance. Includes 8-pin round Yaesu mic lead.

Spare foam windshield £3.00 **£49.95** P&P £7.50

Yaesu 8 pin round to modular adapter (8 pin)..... £19.99
Yaesu 8 pin round to 6 pin modular adapter..... £19.99
A-08 8 pin "Alinco" round..... £9.95
K-08 8 pin "Kenwood" round..... £9.95
I-08 8 pin "Icom" round..... £9.95
IM-08 Modular phone "Icom"..... £9.95
KM-08 Kenwood modular lead..... £9.95

AR788

Quality rotator for VHF/UHF. Superb for most VHF-UHF yagis, 3 core cable required. 3 core cable 50p per mtr.

OUR PRICE **£44.99**

AE-201 thrust bearing..... £17.99

CAROLINA WINDOM

CW-160S (160-10m) 40m long..... £121.95 P&P £8.50
CW-160 (160-10m) 80m long..... £119.95 P&P £8.50
CW-80 (80-10m) 40m long..... £95.00 P&P £8.50
CW-80S (80-10m) 20m long..... £105.00 P&P £8.50
CW-40 (40-10m) 20m long..... £84.95 P&P £8.50

CUSHCRAFT BARGAINS

Delivery £12.00

MA5B Mini beam 10, 12, 15, 17, 20m..... SPECIAL OFFER £339.95
A4S 4 ele beam (10 - 20m)..... £499.99
A3S 3 ele beam (10-20m)..... £429.00
R-8E Vertical (40 - 6m) "special"..... SPECIAL £425.00

FIBRE GLASS POLES

Del £10.00

1m 1¼" £10.50 2" £12.50 Longer lengths
2m 1¼" £20.00 2" £24.00 available – phone

COPPER ANTENNA WIRE ETC

Enamelled (50m roll)..... £16.95 P&P £5
Hard drawn (50m roll)..... £16.95 P&P £5
Multi-Stranded (Grey PVC) (50m roll)..... £13.95 P&P £5
Flexweave (H/duty 50 mtrs)..... £30.00 P&P £5
Flexweave H/duty (18 mtrs)..... £15.95 P&P £5
Flexweave (PVC coated 18 mtrs)..... £18.95 P&P £5
Flexweave (PVC coated 50 mtrs)..... £40.00 P&P £6
Special 200mtr roll PVC coated flexweave..... £99.00 P&P £10
Copper plated earth rod (4ft)..... £13.00 P&P £6
Copper plated earth rod (4ft) + earth wire..... £18.99 P&P £6
New RF grounding wire (10m pack) PVC coated..... £12.50 P&P £5
8 core rotator cable (heavy duty)..... £1.00 /mtr

CAR BOOT MAST SET

Once they've gone, they're gone! 5 section (15') 4.5m 1⅛" slot together mast set. Collapsed length 0.92m (3') makes this ideal for travelling.

£24.99 Del £10.00

2 for £39.99 del £12.50 3 for £45.99 del £15.00

Q-TEK COLINEARS (VHF/UHF)

P&P £10.00

X-30 GF 144/70, 3/6dB (1.1m)..... £39.95
X-50 GF 144/70, 4.5/7.2dB (1.7m)..... £54.95
X-300 GF 144/70,6.5/9dB (3m)..... £69.95
X-510H GF 144/70, 8.5/11dB (5.4m)..... £120.00
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m)..... £79.95

MOBILE ANTENNAS

Del £8.50

DB-7900 2m/70cm (5.5/7.2dB) 1.6m (PL-259)..... £39.99
DB-770M 2m/70cm (3.5/5.5dB) 1m (PL-259)..... £24.99
PL-62M 6m/2m 1.4m (PL-259)..... £23.99
PL-627 6m/2m/70cm (1.7m) up to 7.2dB (PL-259)..... £44.99

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Baluns 1:1 or 4:1 or 6:1..... £29.99 each P&P £4
Traps 80m or 40m or 20m..... £29.99 pair P&P £4

QS-300

A fully adjustable desk top stand for use with all hand-helds. Fitted coaxial lead with BNC + SO239 connections.

£12.50 P&P £4 3 for **£30.00** P&P £7.50

DIAMOND CP-6

A superb (diamond quality) 6 band trap verticle antenna with trap radials – "rotary" trap system allows "flat wall" mounting. 80m/40m/20m/15m/10m/6m. 200W SSB, HT 4.6m

SEND SAE FOR DATA SHEET

OUR PRICE **£219.99**

Q-TEK PENETRATOR

"We've sold 100s all over Europe"

★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or ground radials required ★ (200W PEP).

ONLY **£179.95** Del £10.00

SEND SAE FOR LEAFLET

Standard G5RV

Full size - 102ft (now includes heavy duty 300Ω ribbon)..... £28.95
Half size 51ft (now includes heavy duty 300Ω ribbon)..... £24.95

DELUXE G5RV

P&P on either full/half size £6.50

Double size - 200ft (160-10m)..... £84.95
Full size - 102ft (80-10m)..... £42.95

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end)..... £25.00 P&P £4.00 (a pair)

In-line "RF" choke balun (for G5RV's)..... £32.99

COAX BARGAINS

RG-213 Military spec x 100m.
£74.99 or 2 for £135.00
RG-58 Military spec x 100m.
£35 or 2 for £50.00
Coax stripping tool (for RG-58)..... £4.00

NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc. *Simply close shut over cables and notice the difference!* Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.

2 for £10.00 or 6 for £25.00 (P&P £3.50)

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/ OD35mm. 6 for £12.00
12 for £20.00 P&P £3.50
50 for £40.00 P&P 7.00

LOW LOSS PATCH LEADS

£3.50 P&P

Connectors	Length	Price
PL-259 - PL-259	0.6m	£5.99
PL-259 - PL-259	1m	£6.99
PL-259 - PL-259	4m	£9.99
BNC - BNC	1m	£6.99

REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF..... £20.00
DC-2 Standard 2-pin/15A fits most VHF/UHF..... £10.00

YAESU REPLACEMENT MICS

MH-IC8 8 pin Yaesu mic (8-pin round)..... £24.99
MH-4 4 pin fits older HF, etc. (4-pin round)..... £19.95

COAX SWITCHES

(P&P £4.50)

2 way CX-201 (0-1GHz) SO239..... £19.95
2 way CX-201 'N' (0-1GHz) 'N'..... £24.95
4 way CX-401 (0-500MHz) SO239..... £69.95
4 way CX-401 'N' (0-500MHz) 'N'..... £79.95

METALWORK & BITS

(DEL Phone)

2" mast-floor base plate..... £13.50
6" stand off brackets (no U-bolts)..... £6.99
9" stand off brackets (no U-bolts)..... £9.99
12" T & K brackets (pair)..... £18.99
18" T & K brackets (pair)..... £22.99
24" T & K brackets (pair)..... £26.99
U-bolts (1.5" or 2") each..... £1.50
8mm screw bolt wall fixings..... £1.70
8-nut universal clamp (2" to 2")..... £6.95
2" extra long U-bolt/clamp..... £4.50
2" crossover plate with U-bolts..... £11.99
15" long (2") sleeve joiner..... £11.99
3-way guy ring..... £3.99
4-way guy ring..... £4.99
Heavy duty guy kit (wire clamp, etc.)..... £29.99
Set of 3 powder coated heavy duty fixing spikes..... £24.99
30m pack (4.4m) 480kg B/F nylon guy..... £12.50
Roll of self-amalgamating tape..... £6.50
Nylon dog bone insulators..... £1.00
Very large nylon insulators..... £2.00
PL-239 (small of large entry)..... £1.10
N-type plugs (high quality)..... £3.95
Copper plated earth rod (1.2m long with wire clamp)..... £13.99
Copper plated earth rod (as above) + 10m earth wire..... £19 .99

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to awvoid tangling. (Fits up to 2" mast)..... **£8.99**+ P&P £4.50

30m pack (4.4mm) nylon guy rope £12.50
132m roll 4.4m nylon guy (480Kg b/f)..... £40.00 Del £7.50

NEW EASY FIT WALL PULLEY

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

£8.99 + P&P £4.50

Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on WALL BRACKET £2.99 P&P £1.00

30m pack (4.4mm) nylon guy (480kg)..... £12.50
132m (4.4mm) nylon guy (480Kg)..... £40.00

BARGAIN WINCH

500kg brake winch. BARGAIN PRICE **£59.95** Del £8.50

Winch wall bracket..... £19.99

TELESCOPIC MASTS

6 section telescopic masts. Starting at 2½" in diameter and finishing with a top section of ¼" diameter we offer a 8 metre and a 12 metre version. Each mast is supplied with guy rings and steel pins for locking the sections when erected. The closed height of the 8 metre mast is just 5 feet and the 12 metre version at 8 feet. All sections are extruded aluminium tube with a 16 gauge wall thickness.

8 mtrs **£139.99** 12 mtrs **£169.99** Carriage £12.00.

NEW 20' SLEEVED MAST SET

A heavy duty-sleeved, mast set that will tightly slot together. 4 x 5' (2" dia) 16 guage heavy duty aluminium tubes. (Dimensions approx).

£49.99 Del £10.00.

TWO FOR £90.00 DEL £12.50

HEAVY DUTY SWAGED MAST SET

New extra heavy duty 2" mast set. 4 sections x 5½ foot slot together.

£54.99 each.

TWO FOR £95.00 DEL £15.00

ALUMINIUM POLE CLEARANCE

We have sets of 4 (2") poles (3 of which are swaged) that slot together to make a (approx) 20' pole. Each section is approx 5' long – some have small dents in – some have been swaged slightly off centre – hence the price.

3 SETS FOR £49.99 DEL £15.00

SET PRICE **£23.99** Del £10.00

ALUMINIUM POLES

20 foot (collection only) 2"..... £44.99
10 foot (collection only) 2"..... £29.99
2.4m (2") Ally pole..... 24.99
5 foot (2") Ally pole..... £9.99

SPEAKER MICS

M-U120
Fits most handies. Alinco, Kenwood, Yaesu.

£14.99 P&P £3.00

Ms-107K
Fits Kenwood handies.

£14.99 P&P £3.00

TH-887 HEADSET

ADAPTERS FOR MOBILE TCVRS AVAILABLE – PHONE

Superb headset for most handies. 887K (fits Kenwood) £24.95. 887 fits most twin sockets. Alinco, Icom, Yaesu, etc. **£24.95** P&P £3

LIGHTNING ARRESTOR

SP-350V

Replacement fuses £5.00

DC-1000MHz (400W through power). SO-239 fitting.

£22.95 P&P £3.00

MFJ-1118 metered

High current distribution unit..... £64.95

MFJ-1117

DC High current distribution unit..... £39.99

UNIDEN UBC-780XLT

25-512/760-1300MHz. AM, FM, WFM. Ideal seperate monitor.

Airband ham radio & more Send SAE for review

CRAZY PRICE **£179.99**

Providing the definitive answer to a very puzzling acronym!

Just what is a LID?

I've often heard Amateurs in QSO asking, 'What's a LID?' In this short article I'm setting out to answer it for you! Basically, the acronym refers to an operator who **L**acks **I**ntelligence **D**isastrously (LID).

One of the most common manifestations of the LID type is the Amateur who, (right after you've answered the "CQ"), gives you a report and then without finding out how well they are being received, launches into a very long,' over'. In doing so they are apparently assuming that (because of your original call) that they're being received perfectly.

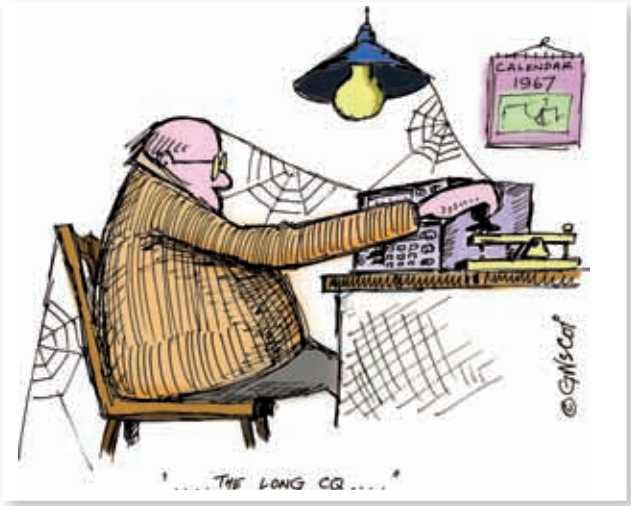
Mistaken Belief

The LID operator's often mistaken belief of perfect reception can cause problems and usually leads to either multiple repeats being requested (for words lost in QSB and QRM) or, due to an attack of apathy brought on by the knowledge that you have contacted a LID. This often brings about (on c.w. anyway) a complete nonsense QSO, which occurs when each partaking operator just sends rambling 'overs', which convey no really useful exchange of intelligence and are in effect Morse (or voice when on 'phone) practice!

Later on, our LID may reflect that the station worked was rather a selfish type who didn't discuss the LID's well-chosen gear, etc. However, it'll be more than likely after several such QSOs that the LID will begin to feel that there's something missing in their operating skills. Unfortunately, they may never realise what it is until some kind soul explains the reason for the problems. But when an attempt like this is made 'Murphy's Law' usually comes into operation and QSB and QRM make it impossible to 'get the message over'!

Many Forms

'Liddish' operation has many other forms and one of the lowest of the genre is the long "CQ". This is often encountered on the DX bands and it's usually of European source*. It often goes like this – "CQ, CQ, CQ, CQ, CQ…", etc., etc, and has been known to cause boils to break out on the neck of listeners who become entranced by the repetition, waiting for the "CQ" to end and who cannot force themselves to get their receiver off the frequency or leave the shack for a bath or shower.



John Worthington G3COI - hiding deep in Shropshire, far away from nuisance operators - sets out on the quest to provide the answer to 'what's a LID?' using his own very special brand of humour!

You may know the feeling – you hear this regular rhythm "CQ, CQ, CQ" and you know it comes from a nondescript station who you definitely don't want to work as they are 'two a Eurocent'. But you still cannot go until you hear the wretched LID's callsign which, perhaps after what seems the millionth "CQ" they finally give.

** **Editorial suggestion**: G3COI asks that all European complaints should be addressed directly to him (**not the PW office**) together with a €20 note! **G3XFD**.*

Perhaps We Are Wrong?

Perhaps, we are wrong in labelling these poor fo k and that they've also fallen under the spell of their own "CQ"? Maybe they just cannot squeeze out their call because it's held back by some fearful inhibition? If so, why are there so many of them? Maybe it's because (although they have socialised medicine) it doesn't include psychiatry?

Anyway, I beg that all non-LIDs ignore (as quickly as their willpower will allow) the long 'CQer' in the hope that eventually the LIDs will give up Amateur Radio and become a regular football supporter where their penchant for chanting will allow them to merge happily into the crowds.

Arthritic Thumb?

Next on the list of Liddery is the operator with the arthritic thumb. This type of operator may belong to the ranks of the 'Pass it to you Sid, after George . . .' net or they may be the other 'Push-to-talk' type of LID, with an attitude that doesn't allow them to use the traditional polite 'over-to-you' protocol.

In either case this type of operator insists on saying their piece! It's usually delivered mostly at length, with their thumb literally anchoring the rig to transmit, almost pressure-welding the contact switch into place.

However, with such practice members of this branch of the International LID Association (ILIDA) are placing themselves in the hands of fate because any of the following could happen:
A: The antenna could fall, rendering the lecture inaudible.
B: The other station being worked may have to go QRT quickly
C: The other operator may want a repeat but has to wait and so may well forget what they wanted a repeat of!

List Endless

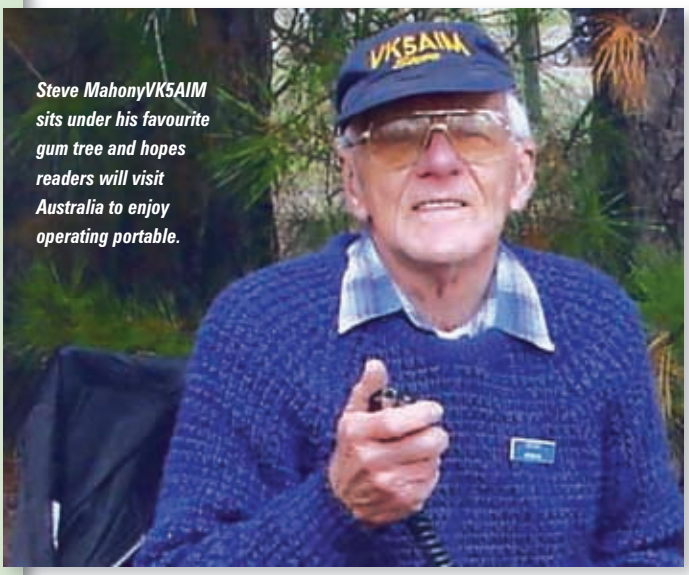
The list I've provided is probably endless (but I don't make long overs!) and the 'long over ' type of LID reacts with astonishing variety when taken to task. Some excuses I have heard would better grace the script of a leading sit-com!

Actually, the best excuse I've heard of so far is the reply from a LID that the operator kept their thumb hard down simply because they revelled in the sound of their own voice. (Actually, I think this particular LID fancied being a BBC announcer!).

Time's up! I've had a long 'over' and I must close now as someone has been calling "CQ" for the last 15 minutes after giving up on me (I forgot we'd made a sked).

•

Under the Australian Gum Trees with portable amateur radio



Steve MahonyVK5AIM sits under his favourite gum tree and hopes readers will visit Australia to enjoy operating portable.

Fig. 1: Ready to load up and go! Steve's 'Suzie' car (engine capacity 850cc!) is a willing workhorse. Believe it or not- everything shown in the photograph fits in the car - including the VK5AIM version of the PW Tenna-Tourer mast base. Steve says that he's never had to leave his wife Sue behind and that she never complains about over-crowding!

As I know just how much the *PW* Editor **Rob G3XFD/EI5IW** enjoys working portable with Amateur Radio, I thought you might like to know what we do down here in VK Land. Of course, we have plenty of space to go /P and we also have good weather conditions (most of the time). Maybe I have been washed out, blown away, or sun burnt a few times on field days but most of the time the weather is excellent for /P activity. Despite this, I'm always ready to enjoy a trip with the help of our hobby, **Fig. 1**.

You don't need a 30m (100ft) tower to support your antenna when you're operating portable. Here in VK you have plenty of Gum trees, from 2m tall saplings to 200 year-old 20m tall beauties!

In the past, I've used all sorts of things for weights, from tennis balls, and fishing 'sinkers', to 'Gibbers' (an Australian name for a ball-sized stone). Just attach a light line (I use 'builders line' as used by bricklayers to lay an accurate line of new bricks, etc.).

You have to be careful of the weight on its return from going over the tree branch four to six metres up. I can remember my field day companion swearing about getting wire antennas up for field days. When asked what the trouble was, he said, he felt the breeze as the stone attached to the line he had thrown, came whizzing back inches from his face! The light line can be used to haul up a heavier line supporting the ends and or the centre of the dipole. I often joke to my companion to watch out for 'Koalas' when throwing stone into Gum trees.

Editorial note: *Although I can't use a catapult myself nowadays, there's an excellent advert on the American QRZ.com website for the E-Z Hang an especially designed version, specifically designed to help get wires over roofs, trees, etc. It comes complete with built-in line reel, strong line and a brightly coloured weight. The catapults are highly recommended by /P operators who use them (the website is* ***www.ezhang.com****/). You could shoot the weight over the tree and lasso your Koala at the same time Steve!*

Dipole Antenna

When operating /P my friends and I use a 3.5MHz dipole antenna with connecting links (switches if you like) enabling us to also use it on 7 and 14MHz. All we need to do is to just open or close the links for the band

Here in the UK we have a well-known saying, 'Well and truly up a gum tree'. However, Steve Mahony VK5AIM prefers to be under the Gum trees operating portable Amateur radio equipment!

we want to use. I have even used a light green plastic coated hook-up wire, with a scruffy tennis ball on the end. Thrown up into the nice trees running along the centre of a lawned caravan park.

When we're on the air, I use my antenna tuning unit (a.t.u.) and an earth spike driven into the well-watered lawn. **Note:** In this situation please be aware of drinking water standpipes, they're not always metal these days! If you forget, you may get radio frequency (r.f.) 'Bites' off your gear! You have not got a true earth and you need one!

Caravans & Subterfuge!

While on the subject of operating from a caravan site, I have an interesting experience involving a little subterfuge! It occurred when I owned and used a Yaseu FT-747 transceiver, because it was easy to make the rig appear like an ordinary radio as it had a speaker grill on the front.

On the occasions I've inadvertently caused TVI to a television in a nearby caravan (Why, on a good holiday, anyone would want to watch TV I don't know!) someone would come searching for the TVI source. When this happened I would quickly unplug the microphone, cover the socket with a little black cap and then push the memory button to instantly go to a broadcast station. No transmitter to be seen and there were no neighbour problems!

No Good Trees?

For v.h.f./u.h.f. sites or h.f. locations where there are no suitable trees I've made up a pivoting base plate. It consists of a 458mm (18in) square steel plate with another smaller plate hinged at one edge. On the centre of this plate is welded a 152mm (6in) section of steel tube 50mm (2in) in diameter, **Fig. 2**.

A tapped hole in the side of the tube allows for a locking bolt to be screwed in. Another bolt is welded to the big plate and goes through a hole in the hinged plate, allowing it to be locked down with a wing nut. Four holes in the corners permit four stout pegs to pass through and anchor it in place. We have tied bright coloured flags to these pegs so that we don't lose them, **Fig. 3**.

I have various poles/masts that fit into the mounting plate tube. The best are two 4m long fibreglass poles 55mm in diameter, **Fig. 4**. They are ex-mobile 'phone transmitter antenna covers. When all the copper and brass collinear elements were removed for scrap metal, nobody wanted the fibreglass poles.

The poles are strong and light and with guy rope plates at the joint and the tip, it's quite easy for one person to pull the mast upright with two sets of different coloured nylon guy ropes supporting the assembly. Next, with a spare piece of rope (cut to equal the radius of the guy rope anchor pegs) all I have to do is to just drop a loop over the centre tube of the base plate (and before inserting the mast) take the other end out to its limit and use this as a guide to hammer in the three or six guy rope pegs at 120° intervals. All the guys have bright coloured flags on them as this allows my wife and I to find them easily when we pack up.

To raise the mast I attach the six coloured guys to their respective pivoting guy plates, also painted to match their guy ropes. I always push/pull the mast up into place and roughly tighten up the guy ropes without any antennas first. This makes it so easy. I can then attach the various antennas, route the coaxial cables, then pull the mast up to the tension of the other two anchored guys, attach the others to their pegs and there it is - one easily assembled and erected mast!

The final job is to go around and tension up each guy to stabilise the mast, but that's easy. All I have to do is to just screw the wing nut down all the way on the pivoting plate and the job is done.

My wife, **Sue**, has bought me some of that bright foam plastic swimming support tube, about 50mm in diameter to cut into 300mm lengths to slip over the guy ropes so you can see them in the dark, especially in the twilight. One club member has suggested buying three of those solar powered garden lights and to place them at the guy rope pegs, as a safety measure!

Fig. 2: The VJK5AIM mast base with warning flags for use on caravan sites. The 'Armstrong' mast rotating system is shown mounted at waist height, complete with safety marker to ensure caravan site users don't walk into it.

Fig. 3: Yellow flag markers show where the guy pegs are placed. The flags act as a warning to passers-by and also reduce the chanced of the pegs being left behind.

Rotating Antennas

For v.h.f./u.h.f. operations we attach a cross arm; see Fig. 2, to the mast at about waist height to make for easy rotation of the antennas. This is usually set in alignment with the boom of the Yagi antennas for 'beaming on'. Incidentally, the 'beaming on' device arose after someone complained about weak signals on receive and I discovered that he was receiving my transmissions off the back of the beam!

Another tip is to label the coaxial cables for the various bands. There's nothing worse than to go on the air and see the transmitter's v.s.w.r. meter needle go hard over and you discover that the 50MHz coaxial cable is plugged into the 144MHz transceiver!

The PW Tenna-Tourer

I have also made a copy of the *PW* 'Tenna Tourer' portable mast base. It's been made so popular by Rob G3XFD and **Tex G1TEX** and in the UK is produced to order by **Tennamast (Scotland) Ltd.** With my home-

brewed version and two section 6m aluminium mast together with a small dual-band 144 and 430MHz Yagi beam antenna, I can easily raise and lower the system myself. I then operate a one-man portable AR station while my Sue knits at a quiet and pleasant location nearby!

Don't forget that once you get away from the big towns and cities you lose all that QRM from electronic appliances and it's wonderfully quiet. One time out in the bush I set up and there was so little noise I checked everything for antenna faults and found everything was in order. However, soon afterwards along came another vehicle and its ignition noise pulses really rattled the speaker! I couldn't get to the volume control quick enough!

Fig. 4: The fully assembled fibreglass pole mast ready for mounting of the antenna. The ubiquitous gum trees in the background provide the much-needed shade from the glaring sun in Australia.

A Final Chuckle

I'll finish off with a chuckle that came about with one particular /P operation. The story involved a time when my wife Sue was researching family history nearby (yes, I have one third English, one third Scottish, a little less Irish, with a dash of German blood in me) and I had set up my multi-band dipole on 7MHz, connected up to the trusty IC-706 and switched on. I could hear nothing so I checked the a.t.u. the coaxial connectors and the dipole. There seemed to be nothing wrong.

Sue must have heard me muttering to myself about the lack of signals and asked, 'What's wrong?"

I replied, "The band is dead!"

"Well, you will set up near a cemetery", she said with a laugh! We both enjoyed the joke, had a cuppa and a biscuit before packing up and moving on. Later I found out that on that day we had a big 'solar flare', which wiped out the entire h.f. radio spectrum and it was nothing to do with the nearby cemetery!

Sometimes you can get visitors when you're operating /P. Some are interested; others may know about Amateur Radio and will enjoy a chat. 'Oldies' are amazed at the small size of the modern transceiver such as the IC-706 or FT-100.

Here in VK-land, if you are well out in the bush most four-wheel vehicle drivers know about radio. This is because they usually have h.f. radio on board, supported by the 4WD VKS-737 network covering Australia.

All you need is a folding table, a couple of comfortable folding chairs (good weather), a modern all band transceiver connected to an antenna mounted in the gum tree. Once you've set up under the shady tree you can have a very pleasant afternoon. Come and try it for yourself in Australia! •

Planning Permission for the Radio Amateur

Whether you're a DXer or 'rag chewer', one common thing all active Radio Amateurs have in common is the need for an effective antenna system. If radio frequency interference (r.f.i.) is not an issue most neighbours are fairly tolerant of wire antennas (provided they are not too much of an eyesore) and they are unlikely to attract the attention of the local Planning Department unless the system is reported to them. However, if you are planning something more ambitious, such as a beam or a mast, you will almost certainly need to apply for planning permission.

Urban Myths

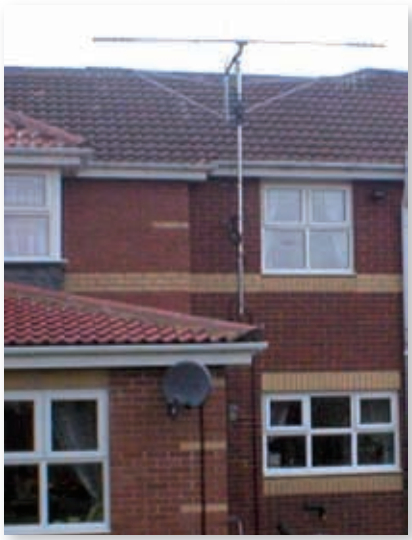
There are a lot of urban myths regarding planning permission and some Amateurs are lucky enough to have fairly sophisticated antenna systems without seeing the need for planning permission. One school of thought goes, 'If you don't ask for planning permission from the Council, they can't be tempted to say no!'

Since the worse thing that is likely to happen to you (if you get caught without planning permission) is that you'll be asked to apply for planning permission retrospectively (or in rare occasions be asked to take it down) the 'don't ask' approach may be tempting. However, it's a potentially expensive strategy as eBay and the second-hand item section of *PW* and *RadCom* often contain adverts for abandoned antenna projects that didn't get planning permission.

Strictly speaking most amateur radio antennas are classed as 'development' and you will require planning permission unless it comes under the following categories.

1: It is present for less than 28 consecutive days in the year.
2: It is deemed 'minimalist', mostly small wire antennas or types that look like TV antennas but some Councils allow more.
3: It is deemed 'permitted development'. This can include ground mounted antennas up to 3m in height or wall mount masts that do not protrude above the ridge of the roof, but not if any part of the antenna is wider than 1.3m.
4: It is truly portable, with no fixed guy wires and easily moved. The degree of permanence is the determining factor with this type of installation.
5: It has been present for at least four years as part of a residential dwelling that is not a listed building and you can prove it. Proof can often be as simple as a letter of support from your neighbours.

However, if you've 'got away with' more - I wish you more power to your elbow!



Len Paget GM0ONX explains that. "There are virtually no legal precedents in place for Amateur Radio masts, leading to some very strange and inconsistent decisions by planners. The Force 12b beam antenna system and tower (left photograph) was granted Planning Permission with minimal restrictions. However, the MQ3 Minibeam (right photograph) failed at the appeal stage as it was considered to be 'detrimental' to the visual amenity of the area, despite the fact that the system was not visible from the front of the house (this is the view from the garden). However, if the antenna had been slightly smaller it would have been considered as 'permitted development'.

Regular *PW* author Len Paget GM0ONX is also the Chairman of the RSGB Planning Advisory Committee. Len has much useful advice to help us get over any problems, even if you don't want a 30m tower in your back garden and only require a v.h.f. beam!

Applying For Planning Permission.

Although planning guidance issued to Council Planning Departments by Department for Communities and Local Government, The Scottish Executive and The Assembly for Wales all indicate that radio frequency interference (r.f.i.) would not be considered as a valid reason for refusing planning permission, you still have little chance of getting planning permission if you are causing r.f.i. to any of your neighbours.

Neighbours would simply object on other grounds - usually visual amenity. So my advice is that you should spend as much time and effort as it needs to get r.f.i. problems sorted out well in advance of your planning application.

Applying for planning permission itself in not that painful an experience, apart from the cost of the planning fee! Before submitting your application it's best to speak to your local planning officer to seek his/her advice on what type of installation is most likely to be most acceptable.

A 'softly, softly' approach is best at this stage as comparatively few planners will have had any experience of our type of application. Explain fully the need for the antenna and why it has to be as large as it is. Even a small high frequency (h.f.) Minibeam will seem huge to most planners!

Householder Application

Most Councils have a shortened 'Householder' application form, **Fig. 1**, for minor developments. When filling out the section of the application form detailing the proposed works it's better to describing it as an 'Amateur Radio antenna and support mast' rather than a 'tower' to differentiate it from a cellular telephone masts that attract a lot of poor publicity these days.

In addition to the application form you will have to include a set of plans, **Fig. 2**, showing your proposals in relationship to your house and a location plan. The exact number of copies, type of plans and scale to be used will be detailed in your planning application pack received from the Council.

Describe the proposals as generically as possible and avoid brand names and technical terms wherever possible, as this will mean nothing to a planner. Ask if you can describe your antenna as a maximum size or cross sectional area to allow experimentation.

A letter of support from your neighbours would be a great help in getting planning permission. All things being equal, planners are more likely to grant planning permission if no one has objected to your proposals.

By law all owners, occupiers and lessees of adjoining land bordering your house must be informed that you have made a planning application and a form will be provided for this in your planning application pack for this purpose. Notifiable neighbours include those directly across the road, to the sides and the rear of any part of your home. You should discuss your proposals fully with these neighbours in advance of submitting the application to allay any concerns they may have.

What Happens next?

What happens next your may ask? The process starts when your application is checked by the Council to see if it contains all the required information, including all drawings (to the correct scale), neighbourhood notifications, etc., and payment for application has been made. If you have omitted any information the Council will write to you requesting the information and halt the planning process until they receive them.

If you have correctly submitted your application you will be given a target date for completion of your application, usually about two months.

Who Makes The Decision?

The next question may be, 'Who makes the decision?' In answering the question, it depends on the Council and many planning applications are considered by the Council's 'Planning Committee', which is comprised solely of Councillors.

Recommendations are given to the Councillors by the Planning Department but they're not obliged to follow them. Incidentally, if your Councillor is on the Planning Committee he/she is not permitted to discuss your Planning Application prior to it going before the Committee.

In other Councils planning decisions are left as an 'Officer's decision' and the Planning Officials deliberate on the application.

If your application is to go before a Planning Committee you should find out if there have been any objections to your application. If there have been objections, objectors often have the right to speak at the planning meeting.

If objectors speak against your application you have a right of reply if you attend the meeting. You, however, may not speak if there

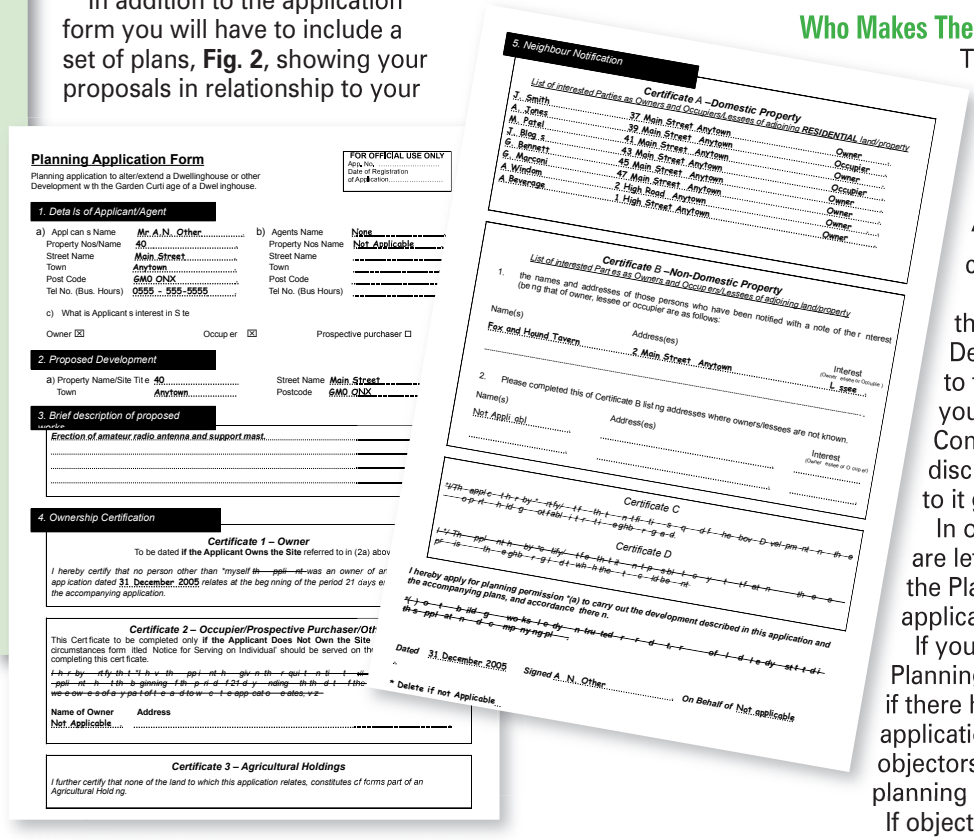


Fig. 1: A typical planning 'householder' form.

have been no objections, unless you are invited to do so.

Permission Granted

When permission is granted it's extremely unusual to receive unrestricted Planning Permission. Conditions, such as requiring the mast to be lowered (if not in use) or removed if no longer required are common. You may also be required to re-apply for planning permission every five years.

The Council must tell you why the restriction has been imposed and this condition is usually on the grounds of visual amenity. You can appeal these restrictions in exactly the same way as if your application was refused if you believe they are unjust. But you will have to fully address the reasons given for the condition, refute them or give an alternative proposal to address their concerns. **Note:** If you do appeal, your **whole application will be reviewed – not just the conditions.**

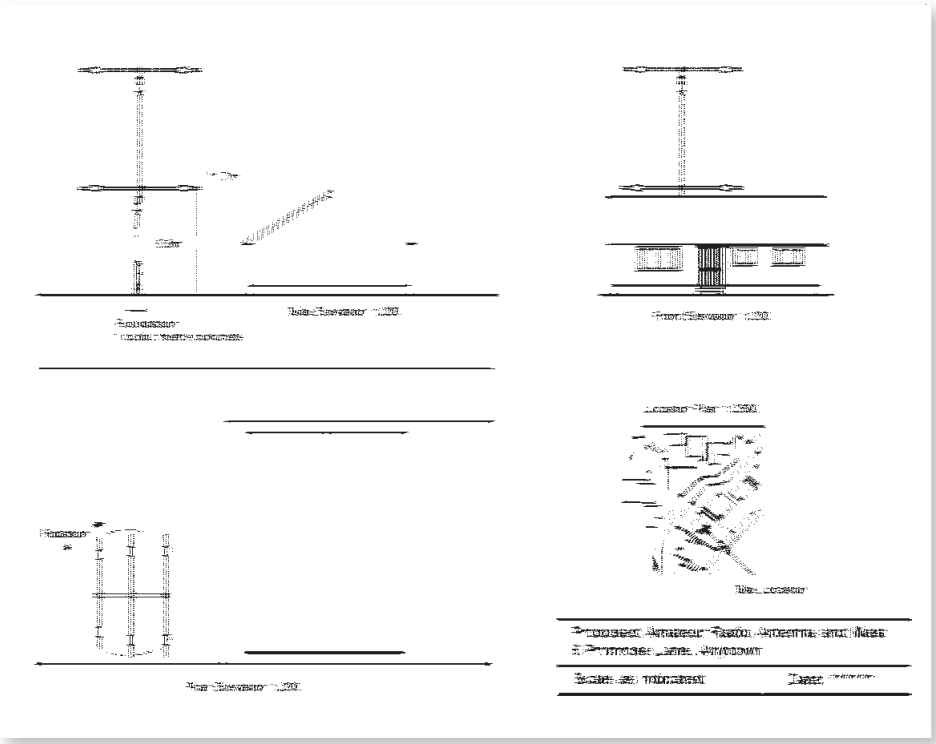


Fig. 2: A detailed set of plans showing the proposed development in relation to the property are essential for success in the planning procedures.

Permission Refused?

If planning permission is not forthcoming, you will be told why your application was refused. Refusal is usually on the grounds of 'an adverse impact on the visual amenity of the area' (antennas are only 'pretty looking' to Radio Amateurs!).

My advice is that you should consider that they have a valid point and look to see what has been successful elsewhere within the same Council area. You are allowed one free re-application within 12 months of your original application. You should discuss with the local Planning Department what alterations, if any, are required to improve your likelihood of success.

If you decide to appeal you can only appeal on the grounds that the reasons for refusal were unsound, i.e. they allowed a similar development elsewhere in a similar area, failed to comply with the local plan, planning law or guidance. You can also argue that the visual amenity of has not been **significantly affected** or could be minimised with planning restrictions (such as lowering the mast when not in use).

Appeals are made to The Planning Inspectorate in England and Wales or The Scottish Executive Inquiry Reports Unit (SEIRU) in Scotland. If you are a member of the RSGB you can contact them and ask to be referred to the Planning Advisory Committee who can advise you of the best course of action.

Making an appeal is not as daunting as it sounds and is usually all done by 'Written Submissions'. It's simply a matter of filling out a form and supplying the requested information. You must appeal within six months of the date of refusal and adhere strictly to the timetable given for the process. No alterations to your proposals can be considered as part of the appeal.

The Appeals Process

The appeals process ensures that the Council involved will reply to the Planning Inspectorate/SEIRU to the points you raised in the appeal application form, to justify their decision. The Planning Inspectorate/SEIRU will then ask you to respond to the points raised by the Council in their reply, **but only to those points**.

The typical period to complete this process is about **20 weeks**. You must pay your own expenses but otherwise it's free, however you should be aware about 70% of all appeals fail. **Note:** If you can provide all your information in an electronic form you can now make your appeal 'On-Line'.

The Planning Inspectorate/SEIRU will appoint an independent planning inspector to review the case. The Inspector will usually wish to visit the proposed site. You or your agent will have the right to be present during the visit.

If the Planning Inspector interviews any objectors (or the Council) you will have the right of reply to any issues raised. My advice is that (especially in the event of any provocation) you should conduct yourself in a professional manner and try to address any issues raised as fully as possible. Try to make a good impression as you'll only get one shot at it!

Effectively Final

For most of us the Planning Inspector's decision is effectively final. Although you can appeal against the Planning Inspectors decision (if you believe he/she is mistaken in his/her judgement) this is very expensive process as it's heard before a Judge at the High Court and for most of us this is ruled out on the basis of cost.

If however, if it's still less than 12 months from your original submission and you haven't used up your 'free go', you can make a revised submission free of charge and go through the whole process again.

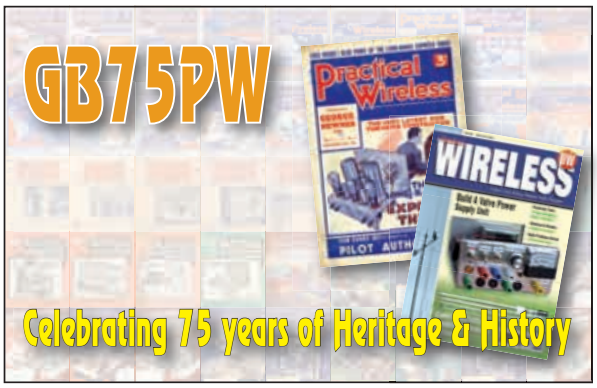
I hope you've found the article helpful. There's no need to be frightened off by the planning permission process and by following the guidelines I've provided here I'm sure you'll find it less daunting! •

On the Air with GB75PW

celebrating 75 years of *Practical Wireless*

At long last the 75th anniversary year is here and everyone on *PW* is very keen to say a big 'thank you' to our loyal readers. Some of you have been reading *PW* for well over 60 years and I often feel very much a 'junior' when I meet such valued supporters!

A number of our readers suggested that I might like to try setting up a Special Event (SE) station during 2007 – without realising it had been on my mind for some time! The biggest problem for me was the physical effort needed to set up and operate a large scale, relatively high power station but this has been overcome and everything is well under way.



The GB75PW QSL card, featuring a montage of historic front covers - over the period from 1932 through to 2007.

Help From RSGB

As soon as I approached the **Radio Society of Great Britain** (RSGB) the response was immediate. **Peter Kirby G0TWW** the General Manager responded with, "We'll give your application our full support". This reaction was very reassuring, especially as I had suggested in a recent editorial that we could 'work together' in a more friendly and efficient manner. Since then the RSGB's **Sylvia Manco 2E1CYL** has been very pleasing to work with as the arrangements got under way.

The RSGB's assistance and support is essential because I particularly wanted **GB75PW**. Numbers such as '75' have to be considered by Ofcom (as they aren't freely available) before a Notice of Variation (NOV) is granted. I also requested that the NOV would be granted for a number of months during 2007, finishing at the end of September. This is when *PW* finally reaches its 75th anniversary of its original publication, which was on 24 September 1932.

As soon as everything is confirmed I will announce the fact in *PW*, on our website and the **Southgate ARC's** website.

Win Green Site

Initially, I'm planning to operate from the **National Trust's** (NT) site at Win Green (NGR ST925205) on the Wiltshire/Dorset border. The National Trust's Marlborough (Wiltshire) office has proved to be very helpful arranging for me to get permission to operate from the site's car park.

At this point I must admit that I've been on a particularly 'steep learning curve' recently, as I had no idea just how much there is in organising an SE station! For example, the first thing that the NT's District Office asked me was, "Do you have Public Liability Insurance"? In fact I had already asked **Alan Burgess** our Finance Manager's advice (his job title hides the fact he's also our Personnel Manager, Company Secretary et al!).

Another requirement from the NT was for a 'Risk Assessment' to be made. This is a fairly recent safety procedure that many Amateur Radio clubs have already come face-to-face with when assessing risks for health, safety and insurance purposes.

I first came across the Risk Assessment procedure at my Church (*All Saints* in Southbourne, Bournemouth) when we had to carry out the procedure and (far from being a nuisance formality) we were then able to fully understand that various fire escape routes, emergency exits and other areas could pose a risk to people using the Church. We also discovered possible safety risks that nobody had ever considered a problem!

We may think bureaucracy is taking over, but the Risk Assessment is one idea that's sound. This is because it makes you think of possible dangers, a consideration that's important when other people are involved in our activities (For example - we know it's advisable not to touch antenna wires when they're in use – but other people may not be aware of the hazard!).

The nearest community of any size to Win Green is the ancient Dorset hilltop town of Shaftesbury. The town is famous for the picturesque and steep Gold Hill, which often appeared in the *Hovis* bread adverts - accompanied by a Yorkshire accented 'voice over'! However, Win Green is just in Wiltshire and because the county borders wiggle about a great deal in the area, my favourite144MHz *PW* QRP Contest site - literally only 400 metres away - is in Dorset!

Of course, readers will be welcomed if they decide to drive up the nearby steeply curving 'Zig –Zag Hill' or from either the Salisbury or Bournemouth directions. I'll be delighted to see you and - along with tea and coffee facilities being available - you may like to enjoy operating the station itself.

Rob Mannion G3XFD provides news about *PW's* Special Event station - GB75PW. The station is planned to be operational between March and September 2007 from various locations and Rob hopes that licensed *PW* readers will have the opportunity to operate the station themselves!

Fig. 1 (far left): The modified Tenna-Tourer mast base.

Fig. 2 (left): The Clarke Mast Ltd. 10 metre telescopic (pneumatically erected) mast. This will support both h.f. (dipole) and v.h.f. antennas for GB75PW.

There are beautiful views from the site over towards the south coast, the Isle of Wight, Hampshire and West Sussex. In the other direction there are views over Dorset, Wiltshire, Somerset and onward towards Wales and Ireland. It's a superb v.h.f. site and on some occasions I'll be operating on 70 and 144MHz.

Saturdays and some weekdays (on my days off) are the most likely but Sunday operation isn't possible for me because of other commitments. When you hear that I'm active with GB75PW - please come and join me. You'll be made very welcome indeed!

Other Locations

By providing notice to Ofcom, I'll be able to operate GB75PW at other locations, perhaps during club visits and so on. (I'll keep readers informed on this situation). However, one of the most important locations to attempt operation from will be the *PW* office in September!

The biggest problem we'll come across when operating GB75PW from our offices will be erecting antennas. And although we'll have to use temporary antennas, we are determined to operate on the h.f. bands from Arrowsmith Court on Monday 24 September! (Again, I'll provide more details on this later)

Special QSL Card

We shall, of course, be marking the occasion of GB75PW with a special QSL card and the design is shown on page 36. My thanks go to **Steve Hunt** (Art editor) for his work on the card and his design reflects the magazine's front covers over the years.

Anyone wishing to have a QSL card for a contact or listeners' report can get one by sending their own QSL card to the *PW* offices along with an s.s.a.e. (50p stamp) and I'll get a GB75PW card back to you as soon as possible. Cards for GB75PW via the bureau will be dealt with by the RSGB' Special Events Bureau section, kindly operated by **Michael Evans MW0CAN**. Obviously, QSL Cards sent by foreign bureaux to the RSGB QSL Bureau will take longer than cards sent direct.

Equipment Supply & Support

The GB75PW station is receiving much support from well-known colleagues within Amateur Radio. **Icom UK Ltd.** have very kindly agreed to loan an IC-756PROIII transceiver, while **Mike Devereux G3SED** of Nevada is helping by loaning a top-of-the-range antenna tuning unit (a.t.u.), plus other antenna related 'necessities'. **Tony Nailer G4CFY**, courtesy of his newly acquired business, **G2DYM Aerials**, is providing traps for the dipole antenna. Thank you for your support everyone!

From the Win Green site I'll be operating GB75PW from my car, with the help of my newly modified Tennamast (Scotland) Ltd., Tenna-Tourer mast base, **Fig. 1**. It has been modified so I can use it to support a lightweight Clarke Mast Ltd. 10 metre (when fully extended) pneumatic telescopic mast system. Readers familiar with the Tenna-Tourer base will notice that the main upright support has been lengthened. This was done in a most professional way by local Amateur, **Dave Mason G3ZPR** (from the **Poole Club**), who has been incredibly helpful! (Thanks Dave!) In fact, Dave has also built me a new main mast base and his engineering skills are first class.

The photograph, **Fig. 2**, shows the modified Tenna -Tourer base with the pneumatically-erected mast mounted in place. When it's used in conjunction with my car, the vehicle's offside front wheel holds the bottom frame to the ground, enabling a 10m high centrally supported dipole (or a lightweight v.h.f. antenna) to be mounted.

Petrol-electric generators will supply power for the outdoors operations. For lower power operating (less than 100W and mainly on v.h.f.) I'll use my 750W capacity generator as it's easy to use and lightweight! For higher power operation (particularly on h.f.) I'll use a 2kW petrol-electric generator. Although much heavier to carry, this is absolutely ideal for heavy duty, all day operation.

The entire station is designed to be carried within and operated from my car, making it easy to be set-up by one person. I've also fabricated a special operating table to mount on top of the front passenger seat and there will be plenty of room in the rear passenger seats for anyone kind enough to come and do the necessary logging! One-handed operation will be made much easier with the use of a Bob Heil headset (kindly supplied by **Waters & Stanton**). In practice, I've found this type of headset-microphone to be essential as it enables me to log and operate at the same time!

Great Fun!

I'm sure that operating the GB75PW SE station will prove to be hard work, exhausting and great fun! And to be honest - although I've had the pleasure of sitting down and operating SE stations set up by other people - I had no real idea of just what was involved in preparing one myself!

As a result I have much admiration for SE organisers and hope that our own station will be just as successful as those I hear and work on the bands myself! I hope to see long lists of *PW* readers' callsigns in the logbook and I'm sure we'll have a very successful year! •

An Active Pre-selector

Carrying on the Practical Way

Rev. George Dobbs G3RJV
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This month, the Rev. George Dobbs G3RJV describes his latest project - an active pre-selector. It's simple to make and can really help a simple receiver's performance – after you've read the 'appropriate quotation!

"Then as the years went on and my listening became more deliberate, I would climb up on an arm of our big sofa to get my ear closer to the wireless speaker."
Seamus Heaney

Long ago and far away (the 'long ago' was probably 40 years and the 'far away' probably Lincolnshire), I owned a Codar PR-30 Pre-selector. As I recall, its case and styling were very much of the period. I've also heard that the products made by the **Codar Radio Company** of Sussex in the 1960s and early 1970s are much sought after by vintage radio enthusiasts.

Codar's most popular product - the AT5 top band a.m. and c.w. transmitter can still be found in active service in many Amateur stations. These days I often look back with regret on the now sought after items of equipment I disposed of in the past. One day, I must sort out my collection of Denco plug-in coils to auction on eBay!

The Pre-Selector

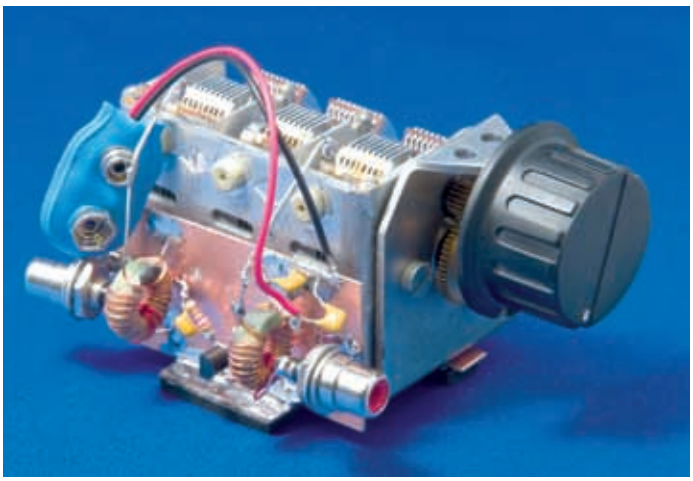
The Codar PR-30 Pre-selector covered 1.5 to 30MHz and was made for use with the Codar CR-70A but I used it with a range of h.f. receivers. It used an EF183 frame grid valve as a tuned r.f. amplifier and provided up to 20dB of front-end gain.

The unit required high tension (h.t.) and heater supplies from external source, usually the receiver that it was used with. The PR-30 was an 'active' pre-selector, meaning that it not only provided tuning but also amplification of the incoming signals. **Note:** Many pre-selectors are 'passive' in that they simply offer extra stages of tuning before the input tuned circuit (or circuits) of a receiver without adding amplification.

The pre-selector should not be confused with an antenna tuning unit (a.t.u.), the purpose of which is to match the impedance of the antenna to the input impedance of a receiver. A pre-selector (as the name implies) pre-selects the signals required by the listener.

The tuned circuits in the pre-selector allow only a very small portion of the r.f. spectrum to reach the receiver and attenuate other (unwanted) frequencies. Reducing the out-of-band signals increases the signal-to-noise ratio and reduces undesired effects such as cross modulation and broadcast signal breakthrough.

Pre-selectors work better at lower radio frequencies and are thus beloved by medium wave DXers. So, unlike Seamus Heaney (this month's quotation), they don't have to climb nearer to the radio speaker!



This month, George G3RJV harks back to the 1960s and 1970s when many of us were using active pre-selectors to help our rather basic receivers.

Follow On

This month's column is something of a follow-on from my topic of last month, which looked at a few simple receiver building blocks. The idea for the column came when I was looking at ideas for receiver input tuning and stumbled across an old circuit from the late **Doug DeMaw W1FB**, for a pre-selector.

Long-time readers of this column will know that I'm a fan of the work of W1FB and had the privilege of staying with him a couple of times at his home in Michigan, USA before he died. Doug's pre-selector circuit was for the 50MHz band using a grounded gate f.e.t. amplifier. He appeared to favour the grounded gate arrangement for r.f. amplifiers and described many examples in his published work. *The W1FB Design Notebook* also extols the virtues of the method. Using the circuit outlined in that book, I re-worked the tuned circuits to include the major h.f. Amateur bands. The result is shown in **Fig. 1**.

The diagram, in Fig. 1, shows an MPF102 f.e.t. used as a tuned r.f. amplifier in the configuration known as 'grounded gate' or 'common gate' as the gate of the f.e.t. is connected to 'ground'. This type of amplifier is known for good stability, depending (partly) on keeping the gate lead as short as possible. The expected gain is in the order of 10 to 15dB. The small value resistor in series with the drain lead acts as a parasitic oscillation suppressor. (Some

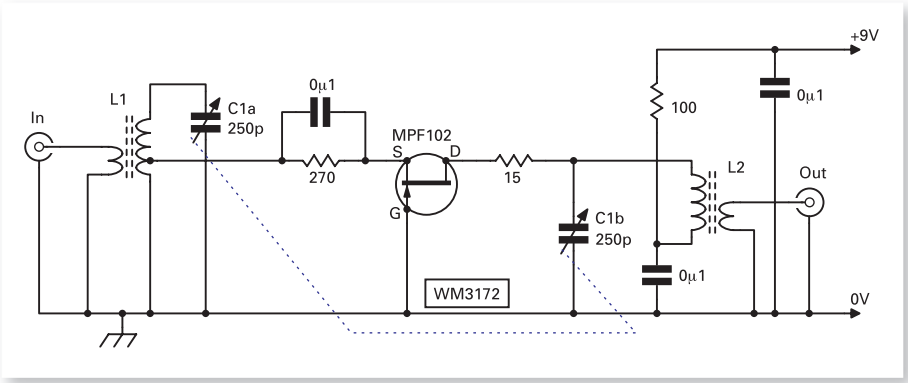


Fig. 1: Circuit of the modern version pre-selector.

designers use a ferrite bead in place of a resistor).

The amplifier has a tuned input and output using a two-ganged variable capacitor. Values for the inductors, L1 and 2, were calculated to tune from just below 7 to over 30MHz with a twin gang 250pF variable capacitor. Readers could experiment with these windings to suit an available capacitor.

The usual input impedance of a grounded gate f.e.t. amplifier is approximately 200Ω. Therefore, L1 is tapped about a quarter of the total turns above ground to feed the f.e.t. Each winding, L1 and 2, also have a small link winding to provide a low input and output impedance to match the antenna input and receiver input.

Please note that I have built the amplifier on a single ground plane. Ideally the circuitry around L1 and C1a should be grounded to the nearest point on the ground-plane and the circuitry around L2 and C1b. The f.e.t. gate lead is grounded directly with a short a lead as possible. The amplifier and tuned circuits are best housed in a screened metal box. Having said that, I did not keep to my own recommendations! The variable capacitor I use was a three-gang type so I used the outer two gangs, which gave me some extra isolation between the input and output.

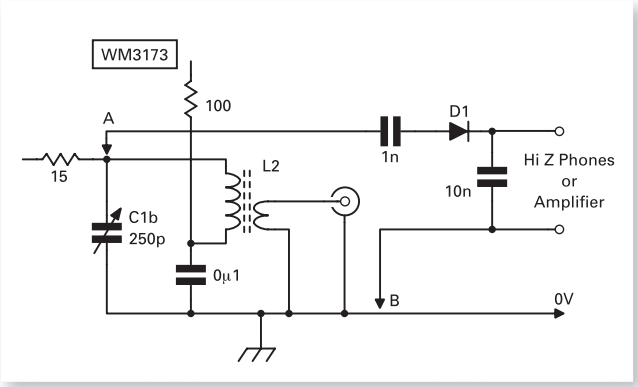


Fig. 2: A 'quick' version crystal set, taking advantage of the pre-selector circuitry.

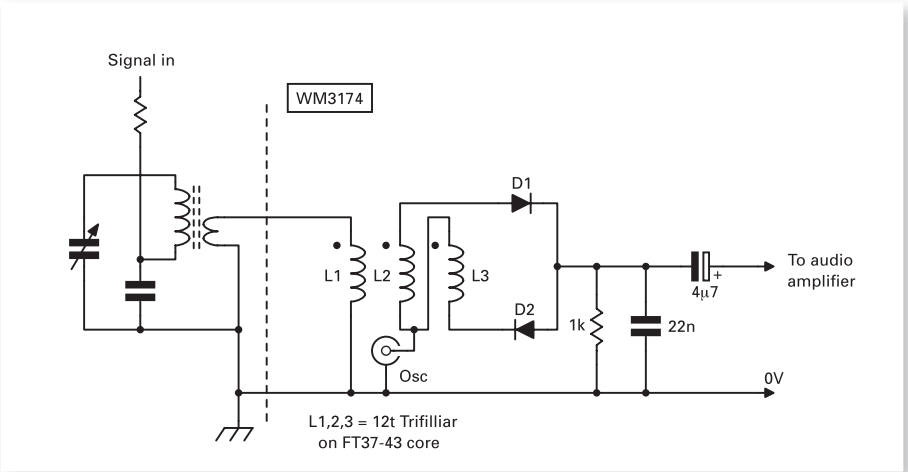


Fig. 3: An extremely basic direct conversion (DC) receiver – but it does work!

Reduction Drive

The capacitor has a built-in reduction drive which is very useful to find the tuning peak - especially at higher frequencies. I decided to 'bread board' the circuit by building it 'ugly' style on a piece of printed circuit board (p.c.b.) material. The input and output are by way of phono sockets directly grounded to the copper foil of the board, which is mounted on the base of the variable capacitor.

The two inductors, L1 and 2 are mounted symmetrically behind the phono sockets. Both L1 and 2 tuned windings are made up of 23 turns wound to occupy about three quarters of the core circumference. The tapping point on L1 is 5 turns from the ground end and both L1 and L2 have link windings of four turns wound over the main winding. Making L1 and L2 as similar as possible aids the tracking of both tuned circuits.

My usual method is to prepare on the main windings and cover the windings with a layer of bee's wax to hold the turns in place. Bee's wax can easily be melted with the soldering iron tip. The wax quickly burns off leaving the tip ready for fresh solder. The four turn link windings probably ought to be wound over the ground end of L1 and 2 but I wound mine over the centre of the main windings. This is easier and the four turns nestle into the bee's wax on the original windings.

The completed Fig. 1 circuit functioned well, even without being mounted in a screened box! I tried it ahead of several little receivers including an ancient prototype 'Sudden' receiver on 7 MHz. The peak was quite sharp and the added gain and extra tuning stages were useful. The results were somewhat better at the lower end of the frequency range, the tuning being very sharp at higher frequencies.

Individual constructors might like to work out other inductor values for the lower frequency Amateur bands or even for medium wave DXing. For example: 60 turns on a T50-2 core would give an inductance of 17.6µH. This, in conjunction with a two-gang 500pF variable capacitor, would give a frequency range of some 1.7 to 12MHz, which could suit those who want to use the circuit on the lower frequencies.

Simple Add Ons

Having built the pre-selector, I thought I'd try it with a couple of simple add-on circuit ideas. The first is shown in **Fig. 2**. With the addition of two capacitors and a single diode, we have a short wave crystal radio! The diode, D1, should ideally be a germanium diode.

Using the circuit in Fig. 2 and feeding it into my bench audio amplifier, I picked up quite a range of short wave broadcast stations. Having two tuned circuits made the crystal receiver quite selective, although it will only pick up the strongest signals on the short wave broadcast bands.

Note that the crystal detector is connected to a high impedance point on the pre-selector. The junction of C1b and L2 is the obvious place. Since the f.e.t. derives its supply through the main winding of L2, the detector circuit requires d.c. isolation from the pre-selector. A 1nF capacitor appears to be about right for coupling the crystal detector to the pre-selector. This circuit is hardly a top of the range short wave receiver but is a bit of fun for next to nothing!

On the workbench I had a board left over from my tests of the projects in last month's column. So, it was a simple job to add a passive mixer to the output of the pre-selector. The board was a version that had the mixer without any audio amplification, so I simply fed the output, via a 4.7µF capacitor, to the bench audio amplifier, with the circuit shown in **Fig. 3**. Using my signal generator as a 7MHz local oscillator, the set-up produced quite viable 40 metre direct conversion (DC) receiver. Again, it's something for almost nothing! The pre-selector will certainly remain on my shelf as a useful addition to my project armoury! ●

Loudspeaker cone repair

Fig. 1: One hole that Ian inadvertently created earlier, when working on the chassis of a radio.

Fig. 2: The hole of Fig. 1, after a repair as suggested.

Modern loudspeakers are very reliable unless grossly misused. However, occasionally accidents do happen and when they do, it's usually the cone that gets damaged. If a replacement is unavailable, a repair is often successful, especially when carried out on inexpensive speakers of domestic equipment and particularly with vintage radios

Expensive hi-fi loudspeakers, on the other hand, once damaged are unlikely ever to be the same again, but the approach I'm about to describe may be worth a try even with these. A surprisingly large amount of damage can occur before the quality becomes noticeably degraded. The following simple technique will often prove effective. Don't try to repair a damaged cone with sticky tape or self-adhesive labels. These materials just won't stick well for long.

To do the job properly, both sides of the cone need to be accessible, so if necessary, remove the loudspeaker from the equipment it's mounted in. Place the torn edges so that they align a neatly as possible. Then mix a little Copydex style glue 50/50 with water and using a cheap small paintbrush, dab it all over the damaged and adjacent areas from the front of the cone.

Affected Area

Without allowing the glue to dry, place a piece of soft tissue paper (toilet paper for example) over the affected area. Press it down gently on to the glue. If the other side of the damaged area is accessible, dab the glue mixture over this too and cover with another piece of tissue, so that the tears are sandwiched between two layers.

Such a repair will be particularly effective if a small section of the cone is actually missing. Gently dab the area again on both sides with the glue solution to soak all layers and leave to dry. Although the layers of tissue paper will start to wrinkle, once dried they all shrink back, holding the torn edges together but still allowing the area to remain flexible.

The photographs show the loudspeaker of an old Ekco U122 radio repaired in this way. Unfortunately, on this model, removing the speaker to allow work on the chassis only provides enough slack in the speaker leads for them to pull it back against the control spindles! The hole that I created is shown in **Fig. 1**.

The damage is probably not bad enough to cause any noticeable difference in sound quality. Nevertheless, if left alone, the fragile cone from a set of this age is likely to start tearing further. The finished repair is shown in **Fig. 2**. Although it looks as if the affected area might be a bit stiff, in reality this is not the case and the whole area remains supple.

Another difficulty that may also arise on older moving coil loudspeakers is that of a loose 'spider', the old name given for the arrangement holding the cone and its moving coil centrally around the magnet. The illustration, **Fig. 3**, shows this and other areas where problems may be encountered.

The loudspeakers occasionally found with this damage, have circular, corrugated spiders made of stiffened cloth. This is glued onto the outer metal surface of the magnet structure and can become unstuck. This causes a buzzing noise, although the cone looks and is perfectly intact.

Spider Repair

To repair the spider, lift the loose edge up with a thin screwdriver and sparingly smear some good multi-purpose glue under it before pressing it firmly back into place. Other problems with loudspeakers are more difficult to rectify. An open circuit or uncentred speech coil for example would generally be unrepairable, although an apparent open circuit can sometimes be traced to a bad joint where the flexible braid is soldered to the speaker tags.

Modern loudspeakers have fixed centering so there's little that can be done to rectify this problem. Very old speakers, however, have a spider adjustment, allowing the mountings to be slackened for re-centering.

Although you may consider it hardly worth the effort to carry out any loudspeaker repairs these days (and up to a point this is probably true) replacement speakers are not difficult to come by. Occasionally repair is the only option if the speaker has an odd shape or unusual impedance or another characteristic, which is difficult to substitute. ●

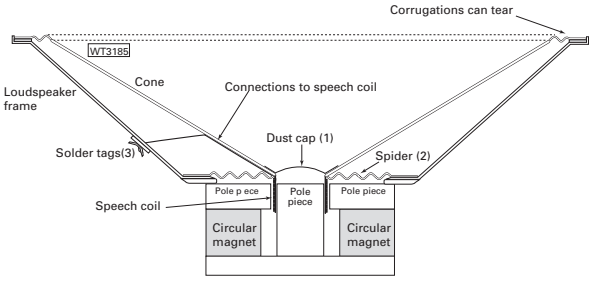


Fig. 3: The simplified cross-section of a typical loudspeaker, typical problems are: (1) A loose edge to the dust cap allows grit to enter, binding the voice coil in the throat of the magnet. (2) A torn or loose spider may also allow dust and grit to enter. (3) A broken wire attaching the voice coils to the solder tags mounted on an insulated board on the frame of the speaker.

Ian Liston-Smith had a problem with a loudspeaker but instead of replacing it, he found that it was repairable. Read on as he tells you how.

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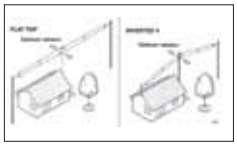

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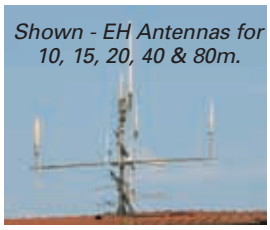

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In Top-band-speak, 'alligators' are 'all mouth' and have 'no ears'. It's a term thought to have originated in America.

When I moved to my present suburban terraced house in Oxford in 2000, I hadn't operated on-air since the late 1960s and gave no thought to the Amateur Radio potential of the site. But what pitched me back into activity was the loan of an old h.f transceiver and a curiosity to see how the bands sounded. However, the new QTH was not exactly ideal, with a garden 20 x 6m surrounded by (r.f. noise generating) houses in a densely populated area.

Then the bug bit, I had to get onto 1.8MHz from this location. I wasn't then aware of the high level of radio frequency interference (r.f.i.) that bedevils today's would-be 'Topbander' in suburban locations like mine. When I first tried listening using a simple wire antenna, all I heard was broadband noise, with the occasional very strong station breaking through.

The band noise comes from a number of different local sources, such as harmonics of the ubiquitous and often poorly suppressed switch-mode power supplies, computer monitors, plasma TVs and so on.

One day, I noticed a sudden drastic increase in noise level, which I eventually traced to one faulty and very noisy switch-mode power supply in my own house. Needless to say, it was immediately replaced! But there's not much that can be done about the multiplicity of failing or poorly specified equipment in surrounding properties. Problems with r.f. interference are worse on this band than any other, with the exception of 136kHz!

Some Research

I embarked on some research and experiments to see if matters could be improved. My sources were the Internet and useful publications (see references). For DX top band operation on 1.8MHz, the gurus generally deem separate receiving antennas to be necessary. This is because vertically-polarised transmit antennas pick-up much local noise in reception.

Many of the 'big' 1.8MHz stations seemed to have some very effective Beverage receiving antennas. But these require a lot of space - a typical Beverage can extend some 260m or more. Such large antennas were clearly out of the question for my limited space. However, there was a viable alternative in the 'small' loop antenna designs.

Besides being small enough to fit in my garden, a really useful feature of a loop antenna is the existence of one or more deep nulls in the reception pattern at low elevations, **Fig. 1**. The idea is to use the directional nulls in the loop's pattern to attenuate local interference whilst having little effect on the wanted signal arriving at higher elevations. By rotating the loop, the nulls can be oriented in the direction of a local noise source and reduce it by some tens of dB, so giving an overall improvement in signal-to-noise ratio on the DX.

The loop described here is resonant in the 1.8-2MHz band. Incidentally, an additional advantage of having a tuned antenna is that strong out-of-band signals are attenuated before entering the receiver where undesirable intermodulation products could be generated.

Extensive Tests

After extensive tests, the most effective loop design that I've found (not to mention cheap!) is one made using some spare coaxial cable, **Fig. 2**. The antenna is electrically balanced and symmetric about its vertical axis. There is a braid-break in the coaxial outer conductor at the top and a simple matching circuit at the bottom feed-point. It is important to realise that this loop is not a purely 'magnetic' antenna - the coaxial cable outer conductor is not an electrostatic shield but forms an integral part of the antenna.

The loop works best when sited far away from local houses. This means putting it at the end of my garden where it feeds some 40m of RG58 coaxial cable running to the shack in the attic. Despite having only passive components at the feed-point, losses are minimal and the signal levels I get at the receiver are in

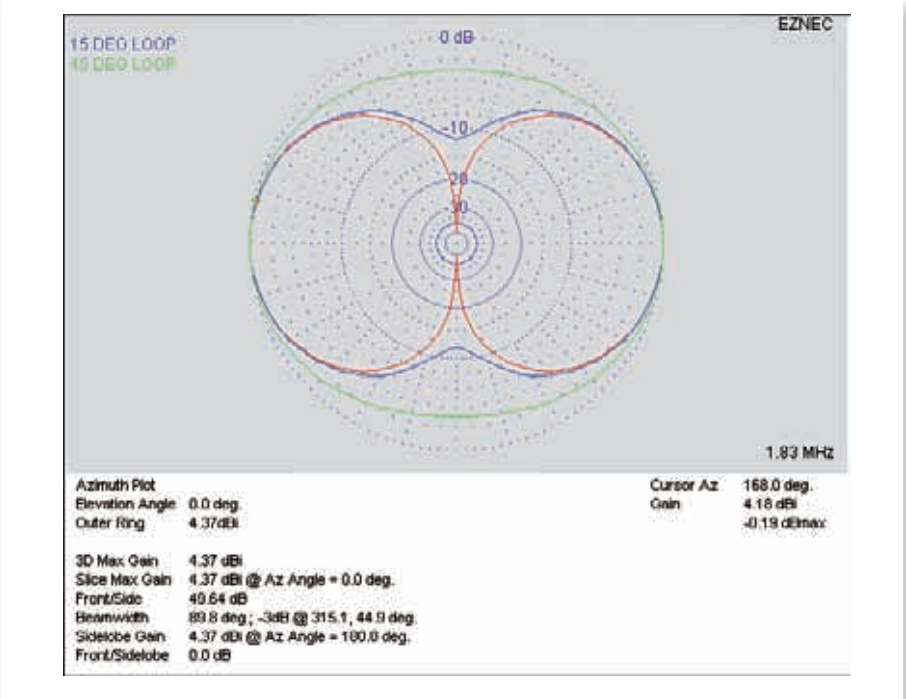

Fig 1: Azimuthal plots of the loop polar diagram seen from above with the plane of the loop lying along the horizontal axis and with the scale marked in decibels (EZNEC model). The red curve is for 0° elevation – note the two sharp nulls aligned with the central axis of the loop. The blue curve is for 15° elevation and the green curve is for 45° elevation. Note: the response becomes more omni directional for higher elevation angles.

general high enough for me not to need any additional pre-amplification.

The loop is a resonator. A parallel tuned circuit is formed by connecting the inductance of the loop (i.e. the two ends of the inner coaxial conductor) to the tuning capacitor C1, which can be varied to resonate the loop to any desired part of the band. I chose the c.w. end of the band. The bandwidth of the loop is about 50kHz, so the loop also covers the s.s.b. DX section (1.840-1.850MHz). In fact the loop also works well from 1.9-2MHz, although with reduced output.

Setting Up

To set up the antenna, I used an MFJ antenna analyser but peaking the noise on receive (at the required frequency) will do just as well. One side of the resonant circuit at C1 feeds a one-to-one isolation transformer (T1) via a matching capacitor C2. Naturally, there is some interaction between C1 and C2 but in practice it's easy to find settings that give both the required resonance frequency and a v.s.w.r of 1:1 in the 50Ω feedline.

You may ask, why is transformer T1 needed? The answer is that it's really a balun, matching the unbalanced coaxial feedline to the balanced antenna. If T1 is omitted the antenna will still work but (being unbalanced) there is a risk that the run of coaxial cable to the shack could pick up noise on its sheath. This noise will find its way into the receiver, degrading performance. I have tested loops with and without T1 fitted and believe that it makes a positive difference at my site.

How does the loop work? The loop diameter D is only 2m, which is very much smaller than 160m wavelength. Any interfering r.f. noise propagating towards the loop directly along either of the central axis directions, induce opposite and almost equal currents in the conductors on the left and right hand sides. These currents almost completely cancel resulting in no output.

For waves coming from any other direction, signal current cancellation doesn't happen and the loop is capable of good reception. There are, therefore, two narrow nulls aligned along the loop's axis. To reduce local noise, it is simply a matter of rotating the loop 'face-on' to the offending source. The higher angle waves arriving from the required DX stations suffer less signal cancelling and are much less attenuated. In fact, for higher elevation signals, the loop is almost omnidirectional. (Fig. 1).

Loop Construction

My loop has evolved from earlier designs (see refs). I do not intend to give a blow-by-blow account of the loop's construction as there are many ways to make one and I suspect that anyone contemplating making one will probably have their own ideas. However, a discussion of the critical aspects of the design, types of materials used and method of support may be useful. So, I give the main constructional steps of a circular loop that has been in service reliably at my QTH for several years (**Fig. 3**). These appear in rough order of assembly.

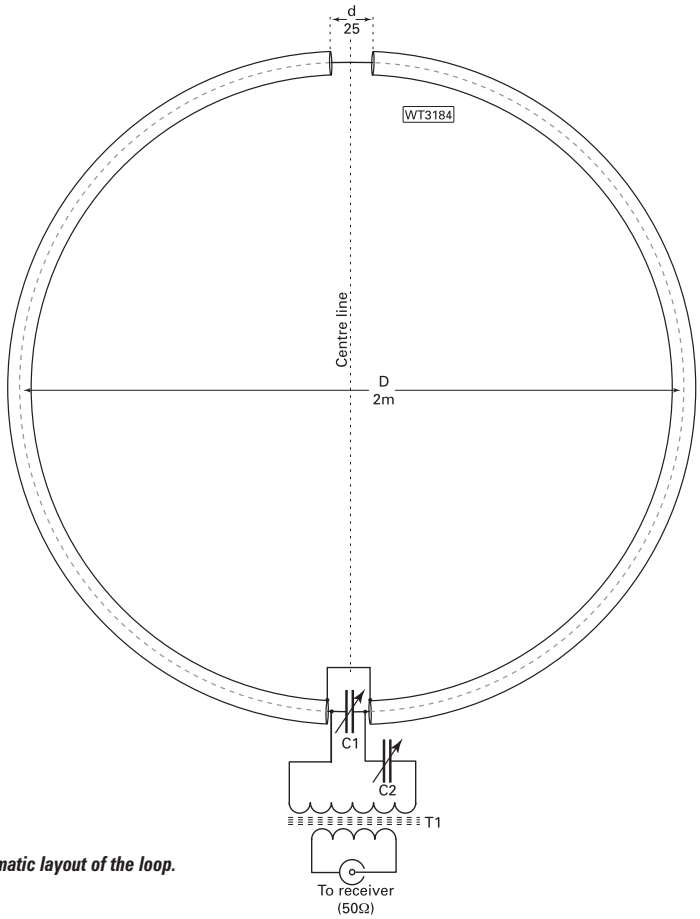

Fig 2: Diagrammatic layout of the loop.

Loop Element

The diameter, D, of the loop is two metres, which translates to a length of coaxial cable of roughly 6.3m (just over 20 feet). The exact loop diameter is not very critical but the geometry is. The element should be supported in such a way to keep it lying in as flat a plane as possible and with equal lengths between the left and right-hand sides measured from the two free ends at the base up to the centre of the braid break at the top. The length of the braid break, d, should be 25mm. Take care not to sever the inner conductor when removing the braid.

Self-amalgamating tape was used to weatherproof the joint. Carefully mark out the equal lengths of the element either side of the break. The coaxial I used was RG92, which has a lower capacitance per unit length (30pF per metre) than RG58, although there is no reason why the latter should not work in a loop of this size.

The Support Structure

In the antenna of Fig. 3, I used a circular support structure made from lengths of standard (and cheap) 22mm diameter pvc electrical conduit, together with some matching adaptors (joiners, a 'tee' piece, clamps and a box entry adaptor). The marked out cable element should be fed into the main pvc tube before attempting to form it into a circle.

The tubes were then joined and sealed from the weather using pvc 'pipe cement'. Be careful – this cement bonds very quickly indeed! The 'circularity' of the final structure was ensured by attaching the antenna tube to a single vertical piece of 50x25mm timber, using pvc screw-on clamp fittings.

Matching & Tuning

The two cable ends at the base pass through the pvc 'tee' adaptor, through a short length of pvc tube and enter an alloy box containing the tuning and matching components (C1, C2) via an entry adaptor. The removable box lid gives access for adjustment. The variable capacitors were 200pF 'Varicon' a.m. tuner types, mounted on a small piece of copper-clad board.

Note: Some fixed silver mica capacitors from the junk box were used to 'pad out' these variable capacitors to give optimum values, found by trial and error. At the base of the box is a BNC socket for the feedline and the box was grounded to the (joined)

ends of the two outer sheaths of the two ends of the coaxial element.

The Transformer

A separate 1:1 transformer/balun (see **Fig. 4**), in a pvc box, was added as an afterthought. With this arrangement, the sheath of the feedline is isolated from the ground of the tuning and matching box yielding good performance.

Transformer T1 uses a type 43 material 'binocular' shaped ferrite core with: six turns of 22s.w.g. enamelled copper wire (primary) and six turns overwound (secondary). One complete pass of a wire through the core counts as one turn. With hindsight, I would recommend mounting all components in a single pvc box as suggested by Fig. 2.

Further Improvements?

The loop, as described, works well when it is sited far (e.g. more than one wavelength) from any other resonant metallic structures. However, if it is unavoidably positioned closer than this, near a resonant transmitting antenna (in my case a quarter wave inverted L) there's interaction between the two antennas that can couple noise into the loop and degrade its performance. Fortunately, it's possible to 'detune' the transmitting antenna during periods of reception and regain the full hearing performance of an isolated loop.

Detuning is done by placing a relay (operated from the shack) in series with the feed point of the transmitting antenna. The relay contacts are closed during transmit and open during receive.

In the receive state, the resonant frequency of the transmitting antenna effectively doubles, and it can no longer resonantly couple noise into the loop. In practice I can obtain a noise reduction of up to two 'S' points (12dB) - a huge difference!

Can the loop be improved (for example by making it bigger)? After all, the r.f. signal power coupled from the loop to the receiver is proportional to the loop's enclosed area. A bigger loop will certainly sound 'louder' at the receiver but it won't necessarily provide a greater signal-to-noise ratio.

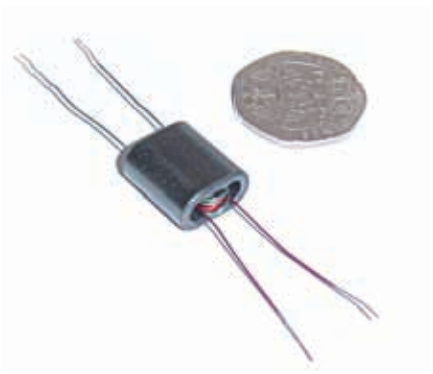

Fig. 4: The one-to-one transformer T1 ready for installation at the antenna. The binocular core is of type 43 material (AL =2900) and part BN-43-202 (Fair rite part No. 28430000202).

Fig 3: The author with the completed 1.8MHz receiving loop in its final setting with its low-profile camouflage colour scheme!

Loop Larger

As the loop is made larger, the inductance increases and so does the capacitance between the inner and outer conductors. The resonant frequency falls and C1 needs to be reduced to compensate and maintain the desired resonance.

Eventually, when the loop reaches a critical size, the loop self-resonates at the desired frequency and C1 has reached its minimum value. Beyond this critical size it will not be possible to resonate the loop at the desired frequency. Use of a lower capacitance cable can however, recover the situation to some extent.

In practice, the described size is both convenient and gives very good results with the base of the loop about 300mm above ground (Fig. 3). Initially, I set my loop up on a rotator but quickly found that there was only one position that gave the best results. This position corresponded to the nulls pointing to the two nearest houses - mine and the one directly opposite. So, finally the loop has been set up in a permanent location. Over three years of operation, I have certainly heard (and worked) much 160m DX with this system. Although it is not a Beverage antenna, it is a lot cheaper than buying up acres of prime real estate in suburbia! ●

References:

A rich on-line resource of valuable information relating to antennas and so on is to be found at: **www.w8ji.com/**

ON4UN's *Low-band DX-ing* Fourth edition with CD-ROM, 2005, ARRL publications (ISBN: 0-87259-914-0)

DX-ing on the Edge: The thrill of 160m by Jeff Briggs, K1ZM. First edition, second printing, 1997-1998, ARRL publications (ISBN: 0-87259-635-4)

Valve & Vintage

For his first 2007 session in the vintage 'shop' this month, Phil Cadman G4CJP looks at battery operated valve protection circuits and fuses plus interesting news from readers who've built replicas of Second World War valved transceivers.

Hello and welcome to my first session in the Valve and Vintage 'shop' for this year. I trust you all had a good Christmas and New Year, and that everyone enjoyed a thoroughly 'vintage' time!

A short while ago, I received a letter from a good friend of mine, **Wyn Mainwaring GW8AWT**. Among the diverse topics Wyn covered in his letter, was the one time availability of 10mA fuses. They certainly did exist but I'm not sure whether they can still be obtained today. While talking about miniature battery valves, Wyn remarked that even such a low rated fuse might not wholly protect a 25mA filament from momentary contact with the high tension (h.t.) rail.

When experimenting with battery powered valved sets, the application of 90V across a 1.4V 25mA filament never has a happy outcome! Because of this danger, perhaps a modern 'electronic' fuse replacement could be the answer?

In fact, all that's needed is a two terminal current limiter placed in series with the h.t. positive terminal, the basic design of which is shown in **Fig. 1**. With suitable choice of components, this circuit is more than adequate for, let's say, supplying a constant current to charge NiCd (Nicad) batteries.

The minimum voltage across the circuit is set so that it's sufficient to keep the circuit delivering a constant current. At the same time the maximum voltage across the transistor is never allowed to be high enough to cause over-voltage or dissipation problems.

However, when protecting valve filaments the requirements are different. Many battery powered valved sets consume around 10mA at 90V and any protection circuit needs to drop as little voltage as possible while passing up to 10mA.

Yet, if the h.t. supply is short-circuited, the protection circuit needs to limit the current to 25mA or less, while at the same withstanding a potential difference (p.d.) of 90V or more. The circuit shown in Fig. 1 is not capable - as it stands - of operating successfully at these extremes, as a single transistor simply hasn't got sufficient gain.

Darlington Pair

The obvious solution is to use a Darlington pair transistor but an even better option is to use a Darlington triple, as shown in **Fig. 2**. In this circuit you'll notice that the single *npn* transistor of Fig. 1 has been replaced by a specific arrangement of two *npn* transistors and a *pnp* transistor. This arrangement gives the lowest saturated collector-emitter voltage of any combination of three transistors*. It's certainly much lower than the usual emitter-to-base, emitter-to-base Darlington connection of three transistors.

I tried the Fig. 2 circuit with two 1N4148 diodes and a 39Ω emitter resistor but the performance wasn't as good as the circuit shown. Note that the current limit is set by the 68Ω resistor (Re), while sufficient base current must be supplied by the 100kΩ resistor (Rb) even when the voltage across the circuit is only a couple of volts. In fact the value of 100kΩ is a compromise between providing sufficient base current under normal conditions, while not passing excessive current when the resistor has 90V or more across it.

***Note:** There is, of course, a complementary *pnp* version of this circuit, which shares the same useful characteristic.

Circuit Worked

Despite my initial pessimism, the circuit did work acceptably well, as can be seen from the graph shown in **Fig. 3**. The (very) gentle knee in the characteristic is entirely due to the forward biased diodes diverting some of the intended base current directly to the negative terminal. Incidentally, they're supposed to behave like a stack of 0.7V zener diodes but clearly they don't!

To quote some actual figures: at a current of 7.5mA the circuit drops 1.36V, at 10mA the figure rises to a fairly reasonable 2.15V, but at 12mA the voltage drop is becoming a little high at 4V. Beyond 12mA the voltage drop increases rapidly until the circuit is directly across the (96V) test supply, when 20.3mA flows. Of course, there'll be some variation in these figures depending on the actual components used and it does seems Re is a bit on the high side. When I use this circuit for real, I shall try a 56Ω resistor for Re.

Remember, under short-circuit conditions, all three transistors will have (almost) the full h.t. supply across them. This means that transistors with a Vceo of 200V or more to provide a reasonable safety margin. Additionally, the lower *npn* transistor (the one fed by the *pnp* transistor) has to dissipate around 2W under short-circuit conditions. Please note that the MJE340 will need a small heat sink

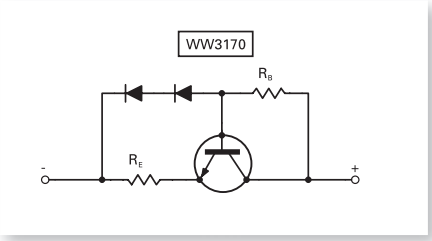

Fig. 1: A basic, two terminal current limiting circuit.

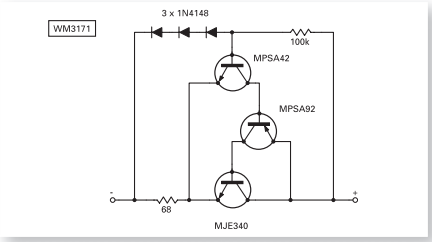

Fig. 2: The Darlington triple has advantages over the more commonly used Darlington pair circuits.

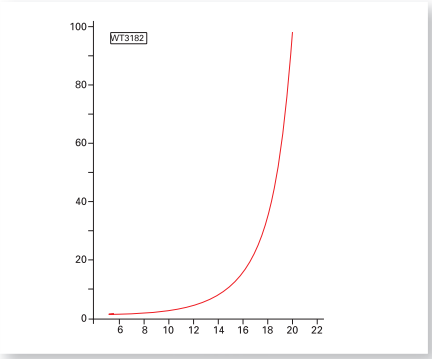

Fig. 3: Phil G4JCP prepared this graph, which shows the results plotted from his own experiments.

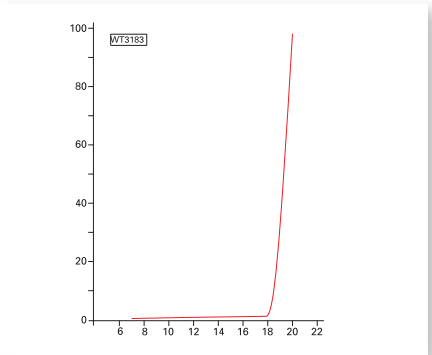

Fig. 4: Second graph demonstrating G4JCP's further protection circuit developments.

Fig. 5: The Rev. Adrian Heath G4GDR's replica Paraset project.

Phil Cadman G4CJP
21 Scotts Green Close,
Scotts Green,
Dudley,
West Midlands DY1 2DX
E-mail: phil@g4cjp.freeserve.co.uk

if it is to survive more than a few seconds at this power level. The transistors I used were from my junk box but they're all readily available and quite inexpensive. Any similar transistors you happen to have lying around will work equally well.

Before I cleared the kitchen table of various test meters and PP3 batteries, out of curiosity I replaced the three 1N4148 diodes with a single LM3851.2 micro power voltage reference diode. This necessitated changing Re back to 39Ω, just as it was when I tried only two diodes. Initially, things looked good. The circuit dropped less than 1.2V at a current of 10mA. Better still, the voltage drop only increased to 1.5V at 17mA.

At this point I thought the results were too good to be true and I feared that the circuit might not actually be working. But by 18mA the voltage had begun to rise somewhat faster and at 19mA the voltage across the circuit had soared to 34V.

Finally, I measured the short-circuit current with 93V across the circuit (the PP3s were flagging a little) at a shade under 20mA! As you can see from the graph shown in **Fig. 4**, the performance of this circuit is quite impressive. Indeed, the slight slope of the curve that's visible between 19mA and 20mA, is predominantly due to the increase in current through the 100kΩ resistor, which bypasses the Darlington triple.

I'm surprised that this circuit - and others like it - hasn't been widely promoted as a means of protecting delicate valve filaments. (Perhaps I haven't been looking in the right places?). Even when built with new components, it shouldn't cost much more than a couple of pounds. And it's only got to save one valve to pay for itself. I know I'll be following my own advice (for a change). Thank you Wyn, for giving me the idea!

Under Running Heaters

In the September 2006 V&V column, you may remember that I asked if anybody had personal experience of under-running valve heaters/filaments, and whether or not such operation appreciably affect a valve's useful life. I've now received another reply, this time from **Chris Atkins G8AFA**. He tells me that in 1967, he built a 432MHz converter using a 416B gold-plated, low noise planar triode.

The author of the design suggested that to maximise the lifespan of the valve, the heater should be run at 5.3 to 5.5V, rather than the specified 6.3V. Chris was happy to follow that advice as the 416B cost him a whopping £10 - quite a sum in 1967! Still, the valve gave excellent service for over six years and thousands of hours operation, so Chris was eventually well satisfied with his purchase. Thanks for passing on your experiences Chris.

It does seem, therefore, that under running heaters does extend valve life, just as long as the valve is not delivering appreciable power. That said, Chris did mention one exception: very occasionally it may be prudent to slightly reduce the heater/filament voltage of a power valve that's operating at v.h.f. or u.h.f. However, this is only to compensate for the 'back heating' of the cathode that can occur at these frequencies, when the valve is operated under certain conditions of voltage, current and loading.

Paraset Club

I never cease to be amazed at what Radio Amateurs get up to - and how little I know about it! An example of this was revealed in a letter I received last autumn from the **Rev. Adrian Heath G4GDR**. Adrian, who lives near Swindon, is the *Newsletter* Editor and a co-founder member of the **Paraset Club**.

The Paraset was a Second World War clandestine transceiver used by the Resistance movements in Norway, Belgium and France. I was vaguely aware that the Paraset existed but I didn't appreciate the popularity of this little transceiver amongst constructors. And just to prove the point, only days after receiving Adrian's letter, I overheard a local Amateur - **Don Bayliss G4FJJ** - talking about the replica Paraset he was building!

Briefly (bearing in mind this is really **Ben Nock G4BXD's** V&V specialty), the Paraset comprises a single valve (6V6) crystal oscillator transmitter, and a two valve (2 x 6SK7) regenerative receiver. Covering a frequency range, which includes the 3.5 and 7MHz Amateur bands, the Paraset's transmit power is about 4W. Despite the simplicity of the receiver, the set puts in a good performance - even in today's crowded bands. Adrian has built his replica Paraset - shown in **Fig. 5** - using components from the early 1940s, so that it's as close as possible to the original. To date, the set has produced contacts with much of Western Europe, as well as contacts within the UK.

Anyone interested in joining the Paraset Club are invited to contact the Rev. Adrian Heath G4GDR, at **227 Windrush, Highworth, Swindon, Wiltshire, SN6 7EB**. An s.a.e. would be appreciated. Incidentally, just the other day, G4FJJ announced that his replica Paraset was (finally) working. Congratulations, Don!

It's time for me to shut the 'shop' now. Remember, please send your comments and letters to me at: **21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**. Best wishes to you all.
Phil G4JCP. ●

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

VHF DXer

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This month, David Butler G4ASR has reports of Auroral and tropo openings on the v.h.f. bands and also takes a look back at events during the 1980s.

Although we are at Solar Minimum the Sun was quite active during December and as a consequence a number of auroral (Au) backscatter and Auroral-Es (Au-Es) forward-scatter openings were reported on the 50, 70 and 144MHz bands. Sporadic-E (Sp-E) openings were also reported on the 50MHz band on December 9, 10, 27 and 28 to Italy (I), Sicily (IT9), Poland (SP) and Slovenia (S5).

Auroral backscatter openings were reported by stations in Scotland on December 6, 7, 8, 9, 10, 12, 14, 15, 20 and 22. The station of **David Gillies MM0AMW** (Argyll IO75) was very active during these events and mentions hearing the GB3LER (Shetland Islands) 50.064MHz, OY6BEC (Faroe Islands) 50.035MHz and TF3SIX (Iceland) 50.057MHz beacon stations. Using a 7-element Yagi, as shown in the photograph, **Fig. 1**, he also made some QSOs with stations in Norway, Sweden and Scotland.

Auroral-Es forward-scatter events occurred on the 50MHz band on December 7, 12, 14, 15 and 22. Unlike auroral signals, those via Au-Es exhibit a pure note without any distortion. David MM0AMW reports hearing the beacon stations of JW7SIX (Svalbard) 50.048MHz, JX7SIX (Jan Mayen) 50.079MHz and OH9SIX (Finland) 50.067MHz during some of these events. There was a very good Au-Es opening at his QTH on December 14 with the Icelandic beacon being heard at 599 for some considerable time.

At 2344UTC, the station of K1TOL (USA FN44) was worked on c.w. over a path of 4642km. After this QSO was completed the beacon station of K0KP (EN36) was heard over a 5785km path peaking 539 on 50.073MHz. A few minutes later, David heard the Canadian beacon VE4VHF (EN19) peaking 549 over a distance of 5767km. The best DX of the evening though was hearing the beacon VE4ARM (EN09) at 2359UTC on 50.018MHz. Signals were peaking 539 over the 5871km path. This is a very long distance for Au-Es propagation.

Long-Distance Tropo on 144MHz

An extensive period of tropospheric propagation occurred during the Christmas holiday period between December 21- 27 with contacts up to 2000km being made on the 144MHz and 430MHz bands. Some of the tropo DX reported being worked on the 144MHz band included the stations of EA2TO/P (Spain), ES3RF (Estonia), HB9RDE (Switzerland), IV3GBO (Italy), LA5UF (Norway), LX1JA (Luxembourg), OE2LCM (Austria), OK1AF (Czech Republic), OZ9ZZ (Denmark), SM7GVF (Sweden), SP4BY (Poland) and YL7GDF (Latvia).

Fig. 1: The 28 and 50MHz Antennas at the QTH of David Gillie MM0AMW.

Reg Woolley G8VHI (Northamptonshire IO92) reports working the station of OH1ND (Finland KP00) on the 430MHz band and wonders if this is the first time that OH has been worked on this band from the UK? (I think not but maybe someone could tell me.) Reg made the 1700km s.s.b. contact at 0028UTC on December 22 with signals peaking 51, just above the noise level.

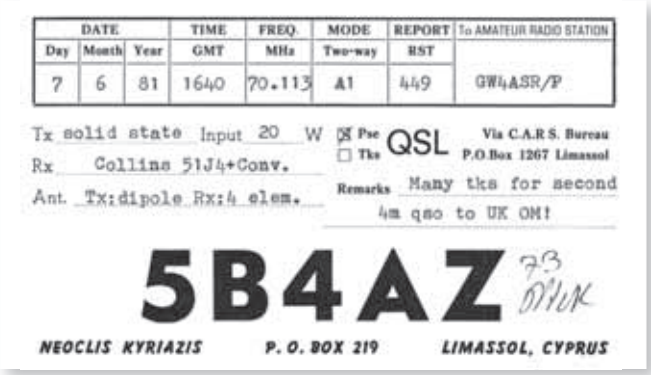
Every year, 144 and 430MHz operators in the UK have the opportunity to make DX contacts via tropospheric propagation to stations around 3000km away. But you can only accomplish this when the marine path to the Azores and the Canary Islands opens up and the good news is that it does this regularly every year throughout the summer and early autumn.

Last year, was no exception and I have received reports that this 3000km path was open for 12-days during 2006. The openings occurred on July 6, 12, 17, 22 and 23, August 12 and 31, September 3, 4, 5, 6 and 9. Ideally, you need to be situated in the southwest or west of the UK with a clear path towards the Canary Islands. However. there have been numerous occasions where propagation has encroached considerably further inland, to East Anglia and northwest Scotland for example. There is now a fair bit of activity from the various Canary Islands with the following stations being worked during 2006; EA8BPX, EA8BUH, EA8CQW, EA8TJ, EB8AYA, EB8BTV, EB8CDX, EB8CME and EA8/DL7AJA (all in IL18), EA8BEX (IL27), EA8AVI and EA8AYY (IL28).

The station of **Tim Fern G4LOH** (Cornwall IO70) is located in an optimum spot to work stations in Azores (CU), Canary Islands (EA8), Portugal (CT), Spain (EA) and possibly Cape Verde Islands (D4). Tim mentions that on July 23 there was a good Atlantic opening from his QTH on the 144MHz band. The first tropo contact of the day was at 0848UTC with the station of EA8BEX. He was peaking 55 on 144.300MHz, the s.s.b. calling frequency.

After that QSO, Tim moved up to 144.350MHz and made further s.s.b. contacts with EB8AYA, EA8BUH and EA8AVI. At 1130UTC the marine duct had intensified and further contacts were made with EA8AVI and EA8BUH, both with 59+ signals. Propagation remained in for much of the day with the final s.s.b. contacts being made between 1925-2015UTC with the stations of EA8BPX, EA8BUH, EB8BTV and EA8/DL7AJA. And don't forget that from his QTH in Cornwall these contacts are over paths in excess of 2700km!

Charles Coughlan EI5FK, County Cork



DATE			TIME	FREQ.	MODE	REPORT	To AMATEUR RADIO STATION
Day	Month	Year	GMT	MHz	Two-way	RST	
7	6	81	1640	70.113	A1	449	GW4ASR/P

Tx solid state Input 20 W ☒ Pse ☐ Tks QSL Via C.A.R.S. Bureau P.O.Box 1267 Limassol

Rx Collins 51J4+Conv.

Ant. Tx:dipole Rx:4 elem.

Remarks Many tks for second 4m qso to UK OM!

5B4AZ 73 DAVE

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Fig. 2: The QSL card from the 3475km distance record on 70MHz between GW4ASR/P and 5B4AZ.

(IO51) reports that at 1600UTC on September 4. he contacted the 144MHz station of EB8CME who was running just 10W output. The Spanish beacon EA1VHF was peaking 529 at that time but increased in strength as the opening progressed. One hour later, the station of EB8CDX was worked on s.s.b. followed by QSOs with EA8AYY, EA8BPX, EA8BEX, EA8BUH and EA8AVI. Charles mentions that it has been a long time since he worked so many EA8-stations in one night.

Although these long-distance contacts from EI and G are remarkable, even further distances have been achieved from these islands. In 2005, while travelling on a fishing boat close to the African coast off Mauritania, the station of **Alex RW1ZC/MM** managed to make a number of c.w. and s.s.b. contacts into England (G4LOH) and Ireland (EI5FK) breaking the IARU Region 1 long distance record in 144MHz tropospheric radio propagation.

The first contact came during the morning of August 7 2005 when Tim G4LOH (Cornwall IO70) worked several EA8 stations and then managed two QSOs with RW1ZC/MM. The distance of 3493km set a new 144MHz DX record in IARU Region 1 (Europe, Africa and parts of Asia). But this wasn't the end of the story.

On August 15 2005, the station of Charles EI5FK (Ireland IO51) also worked RW1ZC/MM in four separate QSOs. Meanwhile, Alex who was running 100W into a 9-element Yagi had changed position to locator square IK18 extending the IARU Region 1 tropo record to an amazing 3751km.

144MHz Transatlantic Beacon

Brian Justin WA1ZMS/4 passes on the news that he has recently installed a transatlantic beacon on the 144MHz band from a very nice mountain location near his home in Virginia, USA. The beacon is located on Apple Orchard Mountain (FM07) at 1400m above sea level. Using the callsign **WA1ZMS**, it's running 1.4kW e.r.p. from a pair of Directive Systems DPM144-5LVA Yagis beaming towards Europe. It transmits an identifier in slow speed c.w. followed by a 30-second steady tone.

Brian has locked the beacon frequency utilising a surplus HP Z3801 GPS disciplined oscillator. The end result is that you can count on it to be exactly 144.285000MHz. If you hear it please let me know!

Deadlines

That's it for this month. If you have any news, reports or anything of interest regarding the 75 year anniversary of *Practical Wireless* please send me the information to the address given at the head of the column before the last Saturday of each month.

73, David G4ASR

75 Years Celebration - The 1980s

Every month during 2007 I'm celebrating the 75 years of *Practical Wireless* by looking at notable achievements and this time around I'm looking at the period between 1980-1989.

On **June 7 1981**, a UK distance record of 3475km was established on the 70MHz band. As seen in the photograph, **Fig. 2**, it was achieved by the stations of **GW4ASR/P** (Powys IO82) and 5**B4AZ** (Cyprus) on 70.113MHz. Surprisingly, this 25-year old UK record has still not been bettered.

On **January 28 1983**, special permits were issued to 40 UK stations allowing access to the 50-54MHz band for propagation experiments. The power was limited and operation was restricted to outside of UK television broadcasting hours. On **February 1 1986**, the 50MHz band was opened up to all UK Class A licensees and the power level was limited to 100W e.r.p. In 1986, the only other European countries with access to the 50MHz band were Norway (LA) and Portugal (CT).

Probably the most significant auroral backscatter opening for at least 50-years occurred during the evening of **March 13 1989**. The first authenticated 50MHz transatlantic contact via Auroral-Es (Au-Es) was recorded during the opening with the station of **David Newman G4GLT** contacting KA1MFA (USA FN41) for a two-way c.w. contact.

Dave also heard the Canadian stations of VE1BPY and VE1YX. At my QTH (Herefordshire IO81) a total of 186 c.w. QSOs were made on the 144MHz band during the evenings of March 13-14. Activity, especially using Morse code, was much higher on 144MHz than it is nowadays.

My station, G4ASR, worked 74 locator squares and 18 countries that included 12 x HG (Hungary), 6x I (Italy), 27 x OK (Czechoslovakia), 17 x SP (Poland) and 10 x YU (Yugoslavia). Best DX of the opening were the Ukrainian stations of RB5PA (KO21) at 1920km and UK5KY (KO31) at 2029km.

Szigy Iulius YO2IS (Romania KN05PS) made the first G-YO contact on the 430MHz band by working the station of **Simon Freeman G3LQR** (Suffolk JO01). This was followed by c.w. contacts with G3XDY (JO02) and G4RGK (IO91).

More interesting news came from **Keith Naylor G4FUF** (Kent JO01) of a one-way contact with HG2RD (Hungary JN87WB) on the 1296MHz band. Keith received a report of 55A from the Hungarian but could not make a two-way QSO as HG2RD was only running 2W. The Doppler shift on 23cm was running at around 12kHz. This auroral opening really was the event of the decade.

During the late 1980s when wideband frequency modulation (w.b.f.m.) equipment was very popular on the 10GHz (3cm) band, **Mike Walters G3JVL** was experimenting with a narrowband filter system leading to the development of what has become known as the 'JVL rig'. At the heart of the 10GHz receiver was a three-stage, narrow bandwidth, waveguide filter that reduced image signals to negligible proportions. On transmit the desired 10368MHz c.w. or s.s.b. signal was passed through another three-stage, iris-coupled filter to produce up to 1mW at the antenna port.

The JVL rig was therefore a complete 10GHz transceiver. As a receiver it could certainly hold its own since, as a result of the excellent image rejection noise figures of 6 to 7dB were possible with just a diode mixer and all this without a GaAsFET preamplifier in sight! This little rig enabled many UK microwavers to taste 10GHz narrowband for the very first time. However, unless you had a travelling wave tube (t.w.t.) amplifier the 500 microwatt to one milliwatt of r.f. output did not achieve results significantly better than the wideband f.m. rigs of the day.

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

HF Highlights

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Carl GW0VSW says band conditions are on the up once again and so there's lots to report on this month.

As the bands appear to be improving once again, it's no surprise that there will be a good number of DXpeditions and holiday operations together with special events running on the h.f. bands throughout the year. I'm sure many of you will be keeping a good look out for many of them as they often provide not only a colourful QSL card to add to your collection but can often confirm a new country or island for a particular band or mode. If you do receive one of these and you think readers would be interested in seeing it then please scan a copy (no originals please) and E-mail a copy to me and I will try to include the best of them in the column.

DX News

On to this month's DX news and to Nepal where **Stig Lindblom LA7JO**, Regional Telecoms Officer for the UNICEF Regional Office for South Asia (ROSA), continues to be very active from Kathmandu as 9N7JO. He has been worked on 3.5, 7, 10 and 24MHz c.w. as well as 14, 18 and 21MHz using PSK.

A few reports indicate that Stig will be active from Nepal 'on and off' at various periods during 2007 where activities are expected to include s.s.b./c.w. and RTTY on 1.8 to 24MHz. You can QSL direct to **Stig Lindblom, Jum Changphimai, 147/1 Moo 3, Tambon Boot, Ban Ta Bong, Phimai, TH-30110 Nakhon Ratchashima, Thailand**.

The **French EUCW Society** and the **Union Francaise des Telegraphistes** (UFT) will be active during the '4th Antarctic Activity Week' (AAW) as **TM5TAF** from the 12 to 25th February. The WAP reference issued for this is WAP-79. Activity will be on all h.f. bands using c.w. only and you can QSL via either direct to **Norbert Laurent F6AXX, 72 chemin de Bellevue, F83500 La Seyne sur Mer, France** or by the French REF Bureau.

In Ireland there will be two special calls active to celebrate the centenary of World Scouting in 2007 and the 100th anniversary in 2008 of Scouting in Ireland. Look for the following special event stations to be on the air during the year, **EI100S** (Echo India One Hundred Sierra) and **EI100SI** (Echo India One hundred Sierra India). Any Scout Groups wishing to use these callsigns should contact **Sean O'Suilleabhain EI3IP, 14 The Crescent, Inse Bay, Laytown, Drogheda, County Louth, Ireland** or by E-mail to **jota@scouts.ie**

Photo of the South Pole taken by Mike Gloistein GM0HCQ, Radio Officer onboard the Royal Research Ship James Clark Ross.

John Thompson K3MD, will be active as **KP2/K3MD** from 13 to 20th February in the US Virgin Islands where his activity will include the ARRL DX CW Contest on the 17 and 18th February. John will be operating portable from the north shore of St. John's for a few days before the contest using a vertical and 100W. The QSL route is via **John W Thompson, RR 1 Box 431, Reichley Road, Winifield PA 17889, USA.**

Finally, there's a small reminder that Neil Schwanitz WD8CRT is active once again as **V73NS** on the Marshall Islands, Kwajalein Atoll on Roi-Namur island OC-028 for at least the two years. He will operate mostly c.w. on all h.f. bands and you can QSL via the Bureau or direct **to Box 8341, APO, AP 96557, USA**. Any cards required for his 2003 to 2005 operations are good via the same address.

Your Reports

I begin your reports with 1.8MHz where **Leighton Smart GW0LBI** in Trelewis, Mid-Glamorgan used his Yaesu FT-100 with 100W c.w. to a 67m (220ft) long wire antenna once again to find c.w. stations 5A7A (Libya) cracking a massive pile-up with just his second call! CT3/DL5XX (Madeira Island) AF-014, 4O3B (Montenegro), OY9JD (Faroe Islands) EU-018, EA8W (Canary Islands) AF-004, W3BGN (U.S.A.) Steve in Pipersville, Pennsylvania, TA3D (Turkey), SV3RG (Greece), C4M (Cyprus) AS-004, RK3FWA (Kaliningrad), RA6AX (European Russia), EA6IB (Balearic Islands) EU-004, EU2RZ (Belarus), UX3HX (Ukraine), CN2WW (Morocco), OH0K (Aland Island) EU-002 and TK/HA0HW (Corsica) EU-014 between 2000 and 0100UTC.

Leighton said "I've been busy here radio-wise, adding more counterpoises to the earth system for Top Band and it appears to have made a big difference. I am now working more consistent DX on the band although conditions have also vastly improved now winter is here. I am also using a paddle key after 17 years of using a straight up-and-downer and it is taking some getting used to". Judging by the log and previous reports from Leighton those counterpoises have do seem to have increased the number of countries worked on this band.

The 3.5MHz Band

In Wombourne, Staffordshire **John Yarnell M1AUN** sent in an E-mail saying "After reading John Heys G3BDQ article on Having fun with a slinky in a previous *PW,* my thoughts were to try a 3.5MHz version based on John's dimensions. I soldered together two 'helix' slinkys and stretched them out to approximately 5.5m (18ft) in length and then fastened the top coil of the slinky to the top of a 6.4m (21ft) fibre glass pole, which I bought very cheaply from eBay. The inner of my RG213 coaxial cable was soldered to the bottom of the stretched out slinky while the outer was fixed to my station's earth system. The fibre glass pole was then attached to the side of my shed with some pipe clamps made for me at work."

John continues: "At first the s.w.r. was quite high and the tuner on my Yaesu FT-1000MP would not give me any kind of match at all. However, received signals were a few 'S' points higher that my commercially made antenna so, this was a good positive start! Once again, I followed John's instructions and linked 10 coils together and this made a real difference. The Yaesu now tuned the antenna within two seconds and was usable from 3.620 to 3.750MHz.

Eager to try the new antenna out I tuned to 3.711MHz and made my first contact with Peter EA5TQ (Spain) at 1124 who had a nice 5/8 signal. This was also the report I received from him. As you can imagine

I was well impressed with the results as QSOs then followed with stations ON4JI (Belgium) 2245 and SQ4CTK (Poland) at 2355UTC. The slinky is now part of my permanent antenna system and I am looking forward to making many more contacts with it. I would like to take this opportunity to thank G3BDQ for his great article."

Note: John has not tried the antenna on any other bands as yet but plans to do so over the coming months and has promised to let us know how he does with it.

Using s.s.b. again, **Panos Dadis SV1GRN** in Athens, Greece has repaired his Hustler vertical antenna now and used it to work AA1BU (USA) Joseph in Holliston, Massachusetts at 0535, 5A7A (Libya) 0706 and a little later in the evening HG1956R (Hungary) at 2204UTC

The 7 & 14MHz Bands

Moving to 7MHz, Panos found 5A7A again at 0801, 5B4AHY (Cyprus) AS-004 at 1817, 8Q7DV (Maldives) AS-013 at 1931 and 7X2EB (Algeria) at 2227UTC.

In East Finchley, North London Martin Addison 2E0MCA used a Yaesu FT-840 and 10W s.s.b. to a folded half-size G5RV antenna and lists s.s.b. QSOs with F6ARU (France) 0739, GD3YUM on the Isle of Man EU-116 at 1237 and LX6T (Luxembourg) at 1420UTC.

On 14MHz, Martin found IH9/IV3SKB (Italy) on Pantilleria Island EAF-018 at 0808, EH7FEW (Spain) 0843, HA503DMF ((Hungary) a special call celebrating the 1956 uprising at 0914, OE3RHS (Austria) 0920, S52OW (Slovenia) 1006, EA6AZ (Balearic Islands) EU-004 at 1121, RV3DMX (European Russia) 1257, UN7MMM (Kazakhstan) 1307, DK0HB (Germany) 1320 and LZ1900K (Bulgaria) at 1358UTC, (this was a special call celebrating 1900 years since Pautalia, now called Kyustendil, was proclaimed a city).

The next report is from the log of **Martyn Medcalf M3VAM** in Chelmsford, Essex who worked s.s.b. stations EW8MW (Belarus) 0738, S58AL (Slovenia) 0822, T93M (Bosnia-Herzegovina) 0826, CT6A (Portugal) 0859, RN3QO (European Russia) 1022, 7S2E (Sweden) 1034, IG9R (Italy) 1149, CN2ZR (Morocco) 1247, SO9Q (Poland) 1318, ZA/UT7DW (Albania) 1356 and HB0/HB9AON (Liechtenstein)at 1356UTC using an Icom IC-746 at 10W to a long wire antenna with SGC-237 auto tuner.

In Seckington, Staffordshire, **Geoffrey Powell M1EDF** used his Yaesu FT-840 and 100W into a dipole for all his h.f. activities but took things a little easier this month. He keeps in touch with Mike Gloistein GM0HCQ onboard the *RSS James Clark Ross* (mentioned in a previous column) on a regular basis. Mike sent Geoff a great picture from the South Pole, which I have included for you all to see. The scene certainly betters the one I have outside my window of the wind and rain we are having as I put the column together!

In Scotland, **Colin Topping GM6HGW** was operating /P once again from Troon where was working s.s.b. QRP running an SGC-2020 and 10W to a Watson mobile whip antenna. Colin was surprised just how well the set up worked as HG1956R (Hungary) 1340, W9FFA (USA) William in Terre Haute, Indiana, USA at 1347 for a 55 report, LY2PX (Lithuania) 1402 and WW2QQ in Kevin in Calonia, New Jersey at 1410UTC all made his log before the cold finally beat Colin forcing him to close down early!

Gary McKelvie G7USC in Guildon, Surrey has been running PSK31 again using his TGM MQ26 beam and Yaesu FT-857D at 40W. UA1ZMX (European Russia) 0817, LX1DA (Luxembourg) 0950, HA6ICP (Hungary) 1407, LA5ZK (Norway) 1410, HB9CTH (Switzerland) 1419, OE3OIL (Austria) 1647, LX2HF (Bulgaria) 1819, UN7TW (Kazakhstan) 1850, UR5WS (Ukraine) 1904, K2YM (Kuwait) 1935, DL0ODX (Germany) 2043, OM3TG (Slovak Republic) 2120 and EA1EWC (Spain) 2150UTC all made his log.

There were a few contacts here for Panos SV1GN as 9K2CQ (Kuwait) 0511, 5A7A again at 1156 and 5V7SE (Togo) were all worked using s.s.b.

Finally, for 14MHz **Keith Winward 2E0JKD** in Middlesbrough used s.s.b to find OH6IU (Finland) 1138 and YT1BB (Serbia) at 1306 while c.w. found UA3WY (European Russia) 0750, HA508LTQ (Hungary) 0815, S51KM (Slovenia) 0827, UR5TG (Ukraine) 0940 and DJ8RX (Germany) at 1145UTC using a Yaesu FT-920 and 40W to a Cobwebb antenna.

The 18 & 21MHz Bands

On now to **Jim Pedley GM7TUD** in Dumfries, Scotland who found conditions "In reasonable shape for most of the time. The 5A7A caused a bit of interest on several bands and they were surprisingly easy to work. As usual what pile-ups I found got out of hand with the usual stations calling but **not** listening and the usual deliberate interference from a minority of 'so called' HAM operators!" Despite this, 18MHz s.s.b. contacts using a Kenwood TS-450S, TGM MQ4 beam and 100W included 5A7A at 0938, J79CO (Dominica) NA-101 at 1314, 3XM6JR (Guinea) 1409 and TX6A (Mayotte) at 1523UTC.

In Newtonabbey, County Antrim, Northern Ireland, **Peter Lowrie MI5JYK** used just 3.5W and s.s.b. on 21MHz to work CN8K (Morocco) 1036, SP8IMG (Poland) 1043, OE2S (Austria) 1046, EU1PA (Belarus) 1047, EA3FYZ (Spain) 1053, YO6OSC (Romania) 1112, CT3/HA5PP ((Madeira Island) 1115, CU2/OH1VR (Azores) EU-003 at 1135, VO1HE (Canada) 1141, ES5TV (Estonia) 1155, LY2W (Lithuania), OH2RA (Finland) 1240, V26B (Antigua) NA-100 at 1245, DM2SR (Germany) 1300, 4X/AA4V (Israel) 1406, Z36W (Macedonia) and 6W1RY (Senegal) at 1728UTC. All the contacts were made using a Yaesu FT-817 and a quarter-wave vertical cut for the band and as the antenna was resonant no a.t.u. was required.

Back to Chelmsford again where Martyn M3VAM logged J48RT (Greece) 0856, ZA/UT7DW (Albania) 1356, S50R (Slovenia) 1412 and LB8IB (Norway) at 1955UTC with just 10 watts s.s.b.

The 24 & 28MHz Bands

On 24MHz there was just one contact for Jim GM7TUD and that was 5A7A at 1000. This was followed by 28MHz QSOs with HV5PUL (Vatican City) 1132, 5A7A again at 1106 and 1159 using c.w., VK9AA (Norlfolk Island) OC-005 at 1114 using c.w. and a s.s.b. contact with JX9NOA (Jan Mayen) EU-022 at 2024UTC.

Signing Off

Well that's about it for another month as once again I have run out of space. There is just enough room for me to thank all our reporters for their logs and **Tedd Mirgliotta KB8NW** editor of the *OPDX Bulletin* for all the DX information. I wish you all good DX filled month.

73, Carl GW0VSW

75 Years Celebrations

History of h.f. operating during the 1980s

The 1980s saw the launch of one piece of equipment many of us take for granted now. On 12 August 1981, IBM released the first personal computer, the famous model IBM 5151. Around the same time, development of the first Terminal Node Controller or TNC (also known as the VADCG board) took place by the Vancouver Amateur Digital Communication Group (VADCG). This enabled a computer and any radio to talk to another computer. Packet radio soon followed.

Peter Martinez G3PLX developed 'Amateur Teleprinting Over Radio' or AMTOR (SITOR-B) in 1982, the first h.f. digital mode using an error-free protocol. Throughout the 1980s its distinctive 'Chirp Chirp', sent at 100bauds, would become familiar on the h.f. bands until it was superseded by the faster and more reliable modes we know today. In 1985, Bill Gates and Microsoft launched the first version of Windows and the rest as they say is history!

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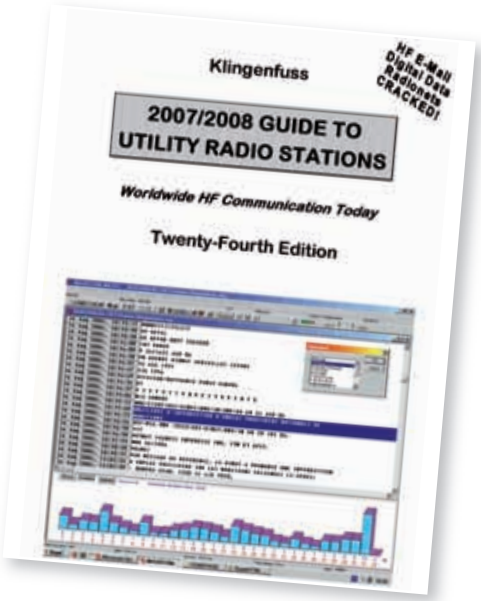
Klingenfuss 2007/2008 Guide to Utility Stations



£33.00

The *Klingenfuss Guide to Utility Stations* has remained a best seller for the past 25 years which is testament to this excellent reference publication. With 9,510 frequencies monitored during 2006 this is the most comprehensive independent reference available to the utility listener. Each of the listings details the station callsign, name, ITU country symbol, modulation type, return frequency or time of reception. This is all vital data that can save the enthusiast hours of investigation.

The main frequency coverage is 3 to 30MHz but that is supplemented by coverage of 1.6 to 3MHz and the interesting 0kHz to 150kHz VLF segment.

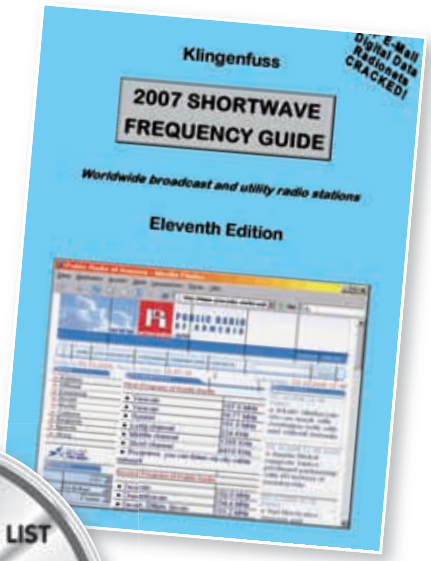
The ever popular country index is included, which covers 250 countries with 1600 stations! There is also full global coverage of NAVTEX activity across all three frequencies, 424kHz, 490kHz and 518kHz. Also included are full aero and maritime frequency allocations complete with fold-out charts.

in stock NOW

revised *Shortwave Frequency Guide (11th Edition)* is a valuable reference document. It's about as up-to-date as you can get and was compiled with a deadline in November 2006! There is a huge amount of information in the guide with some 8,985 broadcast frequencies along with full schedules for those stations. This is supplemented with an alphabetical list of all broadcast stations.

The guide also features a full utility station listing of 9,510 frequencies, so providing a very useful combination of broadcast and utility information in a single volume.

The list of frequencies included in the guide is the same as the 2007 Super Frequency List, which provides a very useful on-line reference that you can have running whilst you are listening. The search facilities on the new disk are excellent and it's very easy to navigate to the information you need.



£27.00

Klingenfuss Short Wave Frequency Guide & 2007 Super Frequency List

For those with a more general interest in short wave listening the newly

£20.00

To order please use the form on page 77 or call 0870 224 7830

Introduction

Selecting the articles to appear in this 'spotlight' view of notable items we've published is a truly fascinating job, as **Rob Mannion G3XFD** explains!

Amstrad PCW8256
The article featuring the Amstrad PCW8256 computer, written by former Editor of *PW* and friend, **Geoff Arnold G3GSR** 21 years ago (1986) begged to be included in these special pages because the Amstrad was to become very much part of the editorial offices!

When I joined *PW,* the Amstrads were being replaced by the superb Apple Macintosh computers. However, it's obvious that PW Publishing Ltd. was significantly impressed with the PCW to buy some. The pioneering machine showed what could be done with computers in our specialised work. We certainly couldn't publish magazines without computers nowadays!

Kit Constructions - It's Easy!
Kit Construction – It's Easy, was written by **Elaine Richards G4LFM**, who is now Editor of *RadioUser* magazine. Elaine's article was written at a time when kits were becoming popular again.

I regard kit building as an essential way of encouraging enthusiasts to build their own equipment. It's one of the reasons I encourage all authors to offer kits and bits' to go with their constructional articles.

The G8VFH Review
Even though he did his best to remain anonymous when writing the review on the Standard C7088 u.h.f. transceiver, **Dick Ganderton G8VFH**, the former Editor of *Short Wave Magazine* gives himself away in the photograph!

Dick told me he always enjoyed 70cm, regarding it as the 'Gentleman's band'. The rig he reviewed became very popular although its memory provision seems very low compared to modern rigs!

Microstrip & Marconi Elettra
I found the microstrip system to be very helpful when living in north western Scotland. Several of the small community remote antenna systems I installed suffered with adjacent channel interference. Using the microstrip system to connect u.h.f. Band IV/V quarter-wave stub filters was very effective and economical.

Finally, I've included the historic 'diary story' featuring Marconi's' assistant at Clifden radio station because I visited the site in November 2006 with the help of **John Corless EI7IQ** (who pushed, pulled and cajoled me over the extremely rough countryside – thanks John!).

Even though it was my second visit to Clifden, the beauty of the remote scenery overawed me. After recovering from the cold I could only admire the determination Marconi had to even consider building it there in the first place!

Rob Mannion G3XFD

1980 – 1989

Kit Construction – It's Easy
December 1986
A noise bridge is a very important piece of test equipment for the Radio Amateur, this month, **Elaine Richards G4LFM** looks at the noise bridge kit from Cambridge Kits.

Calling the *Elettra*
December 1986
A diary for 1920 was recently discovered among family papers, it belonged to a young man living in the West of Ireland and **E. M. Fairburn** recounts the story from the (written in note form) diary.

Microstrip
August 1986
A Marconi quarter-wave grounded antenna can be thought of as an half-wave dipole whose bottom half is formed by the reflection of the top half in the 'ground mirror'.
In the same way, a microstrip transmission line can be considered as a two-wire line, in which one of the wires is represented by the image of the other wire in the ground plane. **S. J. Davies G4KNZ** gives some practical pointers for home construction.

Looking Back
1980-1989
Snippets from the *Practical Wireless* archives.

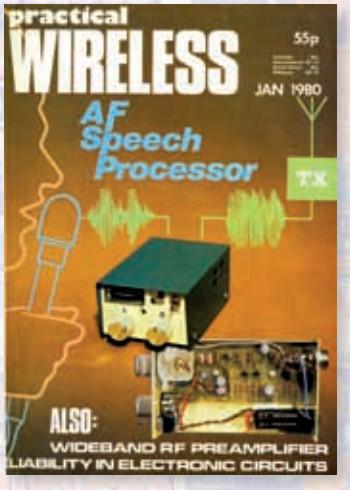
Special Product Report
August 1980
The C7800 70cm UHF FM Transceiver
Dick Ganderton G8VFH Editor of *The Short Wave Magazine* (now retired) 'road tests' the C7800 in his famous Maxi' car.

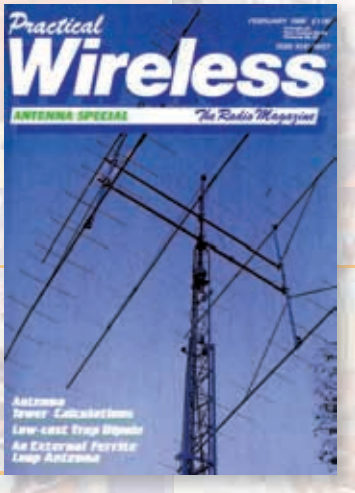
Amstrad PCW8256
Personal Computer Word Processor
February 1986
Geoff Arnold G3GSR provides an insight to what was to become an avalanche of computerised developments within publishing.

News 1980
More memories from the 1980s.

Practically Yours

75 years of Heritage & History





Coming up during 2007

- January Issue: 2000 - 2006
- February Issue: 1990 - 1999
- **March Issue: 1980 - 1989**
- April Issue: 1970 - 1979
- May Issue: 1960 - 1969
- June Issue: 1950 - 1959
- July Issue: 1940 - 1949
- August Issue: 1930 - 1939
- September Issue: *PW* Launch in1932
- October Issue: Pre-*PW* Radio Days
- November Issue: Pre-*PW* Radio Days
- December Issue: Pre-*PW* Radio Days

Every month during this eventful year we take a look back at a decade of radio reading in this special 16-page supplement

Kit Construction

Editorial note: *Elaine Richards G4LFM wrote this article, which was first published in the December 1986 issue of PW. Elaine was on the editorial staff of PW, eventually becoming Editor of RadioUser magazine in 2006.* ***Rob G3XFD***

The kit was received well packaged and in good condition and a check of the components list showed that all items were present. The p.c.b. was of good quality glass fibre and the resistors were all 5% and the capacitors were of good quality. The toroidal transformer was supplied ready wound, a boon to those who hate winding toroids!

One novel feature of this kit is the front panel, an adhesive backed paper panel is provided, this is stuck down on the panel and takes care of the calibration!

Construction

No particular problems were encountered during construction of the p.c.b. All the holes were correctly spaced and of the right size, enabling all the components to fit neatly.

We did encounter one rather unfortunate problem with the potentiometer. The item supplied was marked up as 100Ω lin, which was as per the components list. But some nasty little gremlin had put a log track in ours, which meant that the calibration was totally wrong on completion! Still, it was nothing that couldn't be sorted out with a bit of theory and imagination.

When the time arrived to box the project we found that all items were supplied, i.e. box, screws, nuts, spacers and a knob. The instruction sheet also contained a template. By using this template you could be sure that the adjustment potentiometer and the sockets, etc., all aligned with the supplied front panel markings.

One thing I would recommend you do is that, after marking the holes, the components should be presented up to check the spacings – following the old saying 'measure twice, drill once'.

Having drilled the box the next step was to mount the p.c.b. with a single counter-sunk screw. The front panel markings were then applied. Care is required here as the adhesive backing is a contact adhesive and the markings cannot be slid into the correct position.

The next stage is to finish mounting the p.c.b. and fit the sockets and switch. A small amount of wiring then completes the project.

Testing

The noise bridge can be powered by an internal PP3 battery (not supplied) or by an external power source connected to the miniature jack socket on the side of the box. The current consumption of the review kit was 4.5mA, this is rather less than the 15mA quoted in the instructions but is dependent on the Zener current.

A noise bridge is a very important piece of test equipment for the Radio Amateur, this month Elaine Richards G4LFM looks at the noise bridge kit from Cambridge Kits.

Alignment

Alignment was the next task. It involved setting the Zener current for optimum noise output. This is achieved bv setting vour receiver to the highest frequency of interest, and then adjusting the pre-set potentiometer for maximum noise output.

Thanks to the ready printed front panel any further calibration is unnecessary. The scale's accuracy can then be confirmed by connecting a 50Ω dummy load to the antenna socket and then checking that the null is at 50Ω.

The first practical use of the bridge was to help find the optimum settings for an antenna tuning unit (a.t.u.). To achieve this, the transceiver output was connected to the receiver socket and the a.t.u. to the antenna socket. The antenna was then connected to the a.t.u. in the normal way.

To optimise the a.t.u. settings the pointer on the bridge is set to 50Ω and the a.t.u. controls are adjusted for a null in the noise as received by the transceiver. The null was found to be very sharp and well defined, the review bridge showed a noise reduction from S9+20dB to an inaudible level.

Having adjusted the a.t.u., the transceiver was reconnected directly to the a.t.u. and power applied. The match obtained was excellent and the s.w.r. was below measurement levels.

A word of warning here, when using the bridge to set up an a.t.u., care must be taken not to apply any r.f. power to the bridge as although fuse protection is provided within the bridge, damage may still occur.

The bridge was tested on all the Amateur bands from 'Top Band' to 144MHz. Operation was satisfactory with accurate results obtainable up to about 50MHz, above this frequency an indication is given but the null was rather too broad for accurate measurements.

There are a multitude of other uses for an r.f. bridge, ranging from adjusting resonant lines to setting up receiver front-ends. The test equipment section of any Amateur Radio handbook will usually describe the methods in detail.

Circuit Description

The circuit is fairly conventional and uses a reverse biased Zener diode as the noise source and the noise spectrum (and amplitude) can be optimised by adjusting the Zener current. The resultant noise is couple to a three-stage common-emitter amplifier, which boosts the noise level to about 1V p-p.

The output of the noise generator is coupled to a Wheatstone Bridge comprising the potentiometer P1 as two of the legs, resistor R1 as the third leg and the device connected to the antenna socket as the fourth leg.

The receiver socket is coupled to the centre point of the bridge by a toroidal transformer. When a receiver is connected to the receiver socket it's used as a narrow-band null detector. As transceivers are likely to be connected to the receiver socket, the fuse protection has been provided to give limited protection against r.f. power being inadvertently applied.

Summary

Despite the potentiometer problem with the review sample, I think that the kit is very good value for money and is an essential tool for the h.f. a ntenna experimenter.

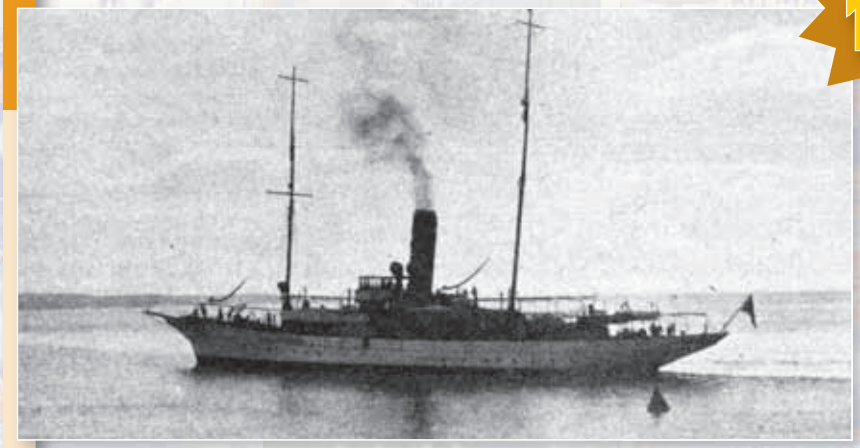
The noise bridge kit is available for £24.20 from **Cambridge Kits, 45 (PK) Old School Lane, Milton, Cambridge.**

Calling the *Elettra*


Feature
Calling the Elettra

Dec 1986

Editorial note: *This article first appeared in December 1986.*



Steam-yacht Elettra in Mount's Bay, Cornwall.

Ireland, January 6 1920. James and I set off early for Connemara. We wanted to see place where Alcock and Brown finished their Atlantic crossing last June. But region bigger and wilder than expected – got lost. Asked help at remote cottage. Woman there said she knew nothing about any Vickers-Vimy but there was a Marconi station four miles beyond Tully Cross so why didn't we go there instead?

Travelling the sandy road she'd directed us along, we saw only desolate bog land on each side and the Atlantic Ocean before us. Then suddenly a cluster of low buildings. We pulled up. They were made of timber and roofed with iron sheets. Only one had a stove-pipe but no smoke from it. We thought entire place deserted.

Walked about, opened doors (nothing locked). Looked inside. Saw no one. Puzzled by equipment in huts.

Tried last door, hut with stove-pipe. Unlocked like others. Stood on threshold, peering into gloom. Same as other sheds, had coils of wire suspended from roof and what appeared large alarm clocks lying on backs all around wall-benches. Only then noticed human figure.

Sitting with back to us. Had half circular band on head and big black covers over ears.

We coughed but he didn't turn. Then we stamped feet. Vibration through wooden floor must have reached him because he swung around. Snatched equipment from head and leapt from stool, very startled.

Asked us, in American accent, "What do your want?" Seemed frightened but trying to hide it. Maybe thinking us Irish gun-men. The times are dangerous.

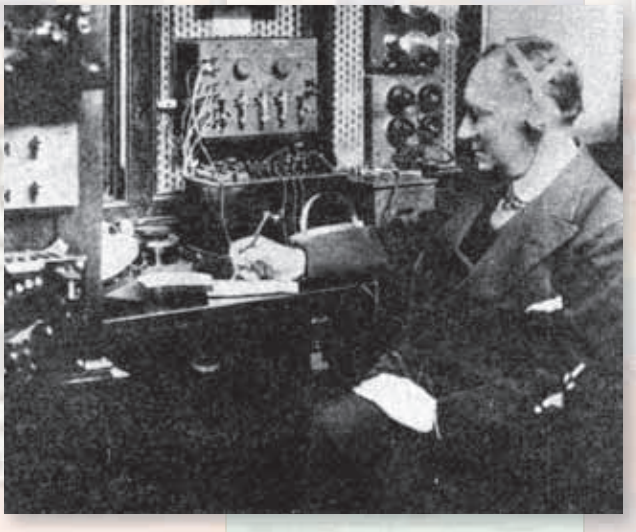
We apologised, explained our intrusion. He laughed, invited us in. Said, "Sure glad to meet you gentlemen. Haven't seen a human being in six weeks." Then told us he was a scientist employed by the Marconi Company. His job to try to make contact with the yacht *Elettra* anchored off Newfoundland, straight line westward from this part of Ireland.

He let us try his head-pieces. We heard nothing except crackling sound like bacon frying.

Then showed us what he called 'a wireless receiving set'. He was making it in his spare time, he said. It was about the size of a one-pound jam-jar and all wrapped in a criss-cross of copper wire. When we asked what it was for, he said, "the time is coming when folk will put on a pair of headphones like these in their own homes, anywhere, and be able to listen to a concert of music in New York".

James and I think the poor fellow has gone crazy from living like a hermit!

Photos courtesy The Marconi Company Limited.



Marconi on board his yacht Elettra.

A diary for 1920 was recently discovered among family papers, it belonged to a young man living in the West of Ireland and E.M. Fairburn recounts the story from the (written in note form) diary.

KYOKUTO

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KDK FM2016E 2m FM DIGITAL SYNTHESIZED TRANSCEIVER

The KDK FM-2016E is a 12V DC two metre FM transceiver for mobile and base station use. It has been compactly designed with emphasis on maintenance and ease of use by using the latest CMOS IC digital PLL circuitry. Rx 144·000–148·995MHz and Tx 144·000–145·995MHz. Direct readout of operating frequencies by large size LEDs.

The most commonly used, 100kHz and 10kHz, switches are mounted coaxially. These will not go below the 0 or above 9 position facilitating frequency changing by feel only, for "eyes-on-the-road" motoring and use by those with impaired sight.

An electronic memory using CMOS RAMs (Randon access memory ICs drawing only 25nA!) allows any four of the 1,000 channels to be written-in (stored) at a flick of a switch. An auto-charging back up NiCad battery maintains the RAMs contents after disconnection from the power.

The plus 600kHz and minus 600kHz positions of the mode switch provide for normal repeater operation. In position 1T–2R the set Tx's on the frequency in memory channel 1 and Rx's on memory channel 2 (likewise the 3T–4R position). This provides for non-standard shifts, and is also convenient for use in conjunction with up-converters.

The memory may be scanned in the "closed" mode, (the scanner will stop at the first channel in use) or in the 'open' mode, (stopping at the first empty channel). Scan-hold allows transmission immediately the scanner stops.

Dual-gate MOS-FETs are used for the RF and mixer to provide superior inter-modulation characteristics with high sensitivity. Performance is held constant across the wide frequency range covered, by automatic electronic tuning.

A monolithic crystal in the first IF and a commercial quality 15-pole ceramic filter in the 2nd IF provides extremely sharp selectivity. The 2nd IF is built with discrete components to keep stray coupling to a minimum and a ceramic discriminator has been adopted for excellent temperature stability and long-term alignment.

The RIT (Receiver incremental tuning) and centre zero meter for contacts with off-frequency or drifting stations.

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Microstrip

Editorial comment: *This article - originally published in the August 1986 issue - demonstrates an interesting technique. It was to prove very useful to me in Scotland! (See the 'Practically Yours' introduction this month).* ***Rob G3XFD***

Microstrip is the name given to a transmission line consisting of a flat conductor spaced above a ground plane by an insulating material, as illustrated in **Fig. 1**. It can easily be made by etching one side of double-sided p.c.b. and is widely used at u.h.f. and above.

For example, the 50Ω tracks between stages on a converter or transverter p.c.b. at these frequencies are microstrip. The most common dielectrics used, often referred to as substrates, are glass fibre and *ptfe* or combinations of these.

Electric Field

The electric field present around a microstrip is illustrated in **Fig. 2**. This shows that the field is not confined to the dielectric, but rather part of the wave travels in the dielectric and part in the air.

This means that the effective dielectric constant is lower than that of the substrate. This effective constant partly determines the impedance and is a function of both the dielectric constant of the insulator and the ratio of the conductor width to dielectric thickness (w/h). So it's obvious that any expression for the impedance of microstrip is not going to be simple.

Impedance

There are numerous approximations and one most useful for Amateur Radio applications is the following, which is valid for the ratio w/h between 0.5 and 5, for any dielectric constant:

$$Z_0 = \frac{57}{\sqrt{(e+0.47)}} \times \log_e \frac{(13.5)}{(w/h)}$$

Where:

Z_0 is the characteristic impedance

h is the dielectric height

e is the dielectric constant

w is the conductor width

The equation will normally give results within 5%. The thickness of the strip conductor is ignored, since it has negligible effect if thin.

Accurate plots of the characteristic impedance, against w/h for various dielectrics are shown in **Fig. 3**. For standard glass fibre, dielectric constant 4, thickness 1.6mm (1/16in), then 50Ω track should be 3.3mm wide. (The equation shown give 3.4mm).

Velocity Factor

The velocity of propagation of the waves is reduced by the dielectric and microstrip has a velocity factor, similar to coaxial cable. As with the impedances, expressions for this are complicated, because part of the wave travels in air. The velocity factor plotted against w/h for various dielectrics is shown in **Fig. 4**.

Practical Materials

In order to confine most of the energy to the dielectric (to minimise the amount of stray radiation), a high dielectric constant should be chosen. Professionally, such materials as alumina with its dielectric constant of 9.7 are used. However, these high dielectric constants mean that the wavelength is much shorter and the line widths also become very narrow. Very high accuracy is therefore necessary in defining the line widths, making a very smooth surface necessary on the substrate.

These materials are not very suitable for Amateur Radio use and lower dielectric materials will have to be used. Standard glass fibre epoxy p.c.b. is the cheapest, and has a dielectric constant of around 4. Above 1GHz, however, it's too lossy for many applications (a better alternative is *ptfe*).

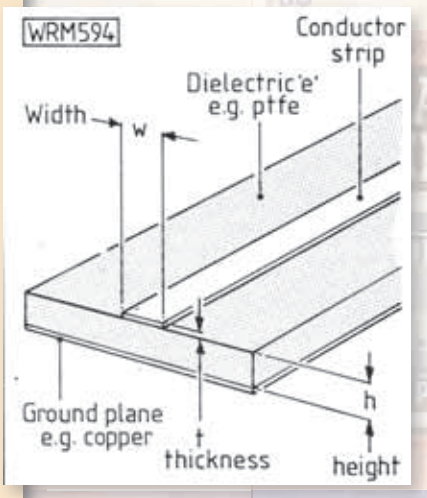


Fig. 1: The microstrip.

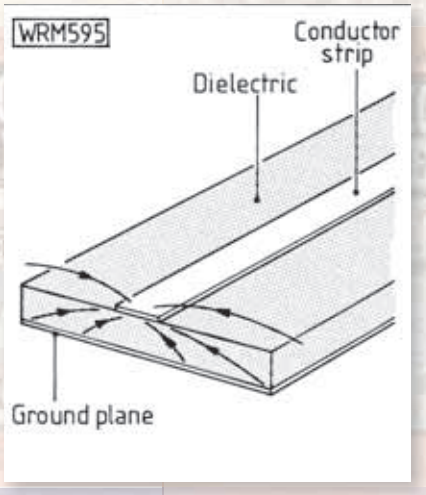


Fig. 2: The electric field around microstrip.

A Marconi quarter-wave grounded antenna can be thought of as a half-wave dipole whose bottom half is formed by the reflection of the top half in the 'ground mirror'. In the same way, a microstrip transmission line can be considered as a two-wire line, in which one of the wires is represented by the image of the other wire in the ground plane. S.J. Davies G4KNZ gives some practical pointers for home construction.

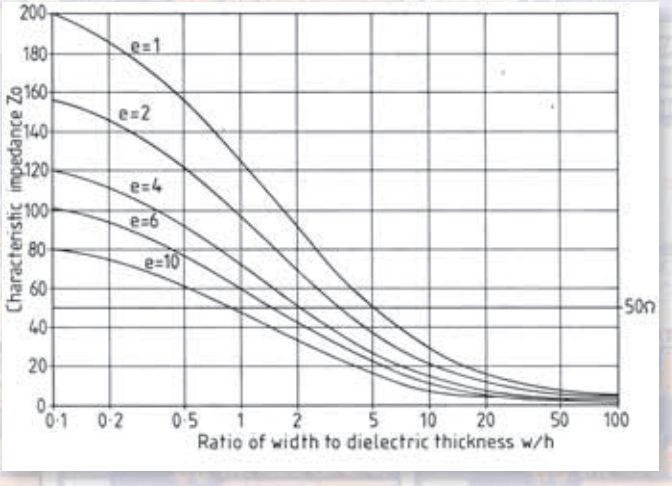


Fig. 3.

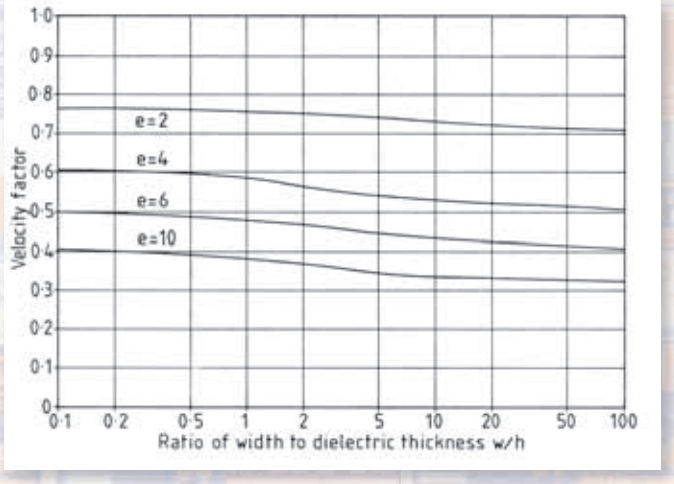


Fig. 4.

Rather than pure *ptfe* (dielectric constant 2.1), a combination consisting mostly of *ptfe* with a little glass fibre strengthening is used, and this has a dielectric constant of about 2.3. **Note:** When using these materials please be aware that there will be significant radiation from the lines.

Prototype Construction

Prototype p.c.b.s using microstrip can be made quite easily using a soldering iron and some double-sided glass fibre epoxy or *ptfe* board, provided the lines are not too thin. First mark out the lines on one side of the p.c.b. When you are satisfied with the layout, make a cut round each piece of line using a sharp knife with a steel rule to guide it. This is illustrated in **Fig. 5**.

Next, remove the unwanted copper as follows. Hold a hot soldering iron on a piece to be removed, at one corner and apply just enough solder to the iron tip to make sure that a good thermal contact is made between the bit and the copper. Then lift up a corner of the unwanted copper using the knife.

The heat will weaken the bond between the copper cladding and the dielectric and the copper can now be peeled away. Gradually move the soldering iron along as it is peeled off, as shown in **Fig. 6**.

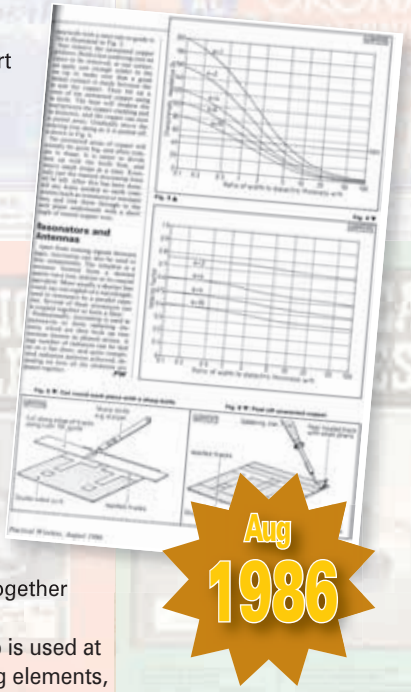
The unwanted areas of copper will normally be quite big and often complex in shape. **Tip:** It's easier to divide the unwanted areas up with the knife first, then removing small strips at a time. Eventually just the wanted microstrip lines will be left. After this has been done, drill any holes needed to earth components (such as trimmers) or resonant lines and link them through to the earth plane underneath with a short length of tinned copper wire.

Resonators & Antennas

Apart from routing signals between stages, microstrip can also be used to form components. The simplest is a resonator formed from a shorted quarter wave line, similar to its coaxial equivalent.

More often, a shorter line is used (let's say one-eighth of a wavelength) and this is tuned to resonance by a parallel capacitor. Several of these resonators can be coupled together to form a filter.

Professionally, microstrip is used at microwaves to form radiating elements, which are then built up into antennas known as 'phased arrays'. A large number of radiators can be laid out on a flat sheet, and quite complicated radiation patterns achieved, depending on how all the elements are phased together.



Aug 1986

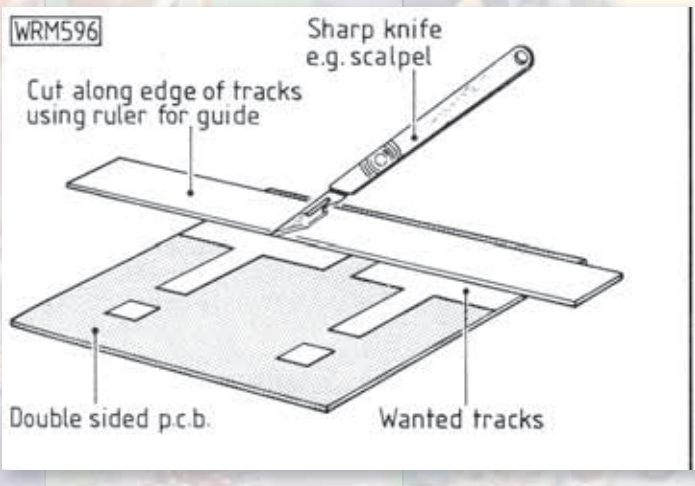


Fig. 5: Cut round each piece with a sharp knife.

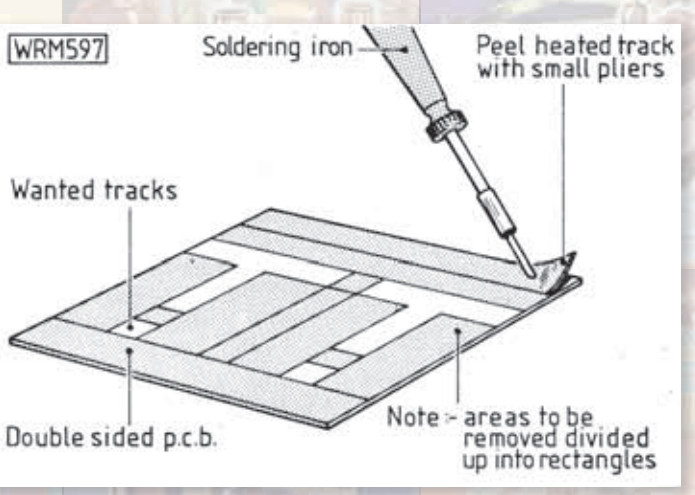


Fig. 6: Peel off unwanted copper.

News, Views and Memories from 1980-1989

May 1982

PW "Tardis"

As several radio and electronics magazines have been holding forth lately about how much test equipment they have, we thought it was about time we showed you the *Practical Wireless* test facility, recently totally re-equipped.

The photograph shows the interior of our new screened room (nicknamed the *PW* "Tardis" by some of our colleagues), which houses a comprehensive range of test equipment from Marconi Instruments Ltd.:Spectrum Analyser TF2370/TK2373, covering from 30Hz to 1.2GHz, Signal Generators 2017 and 2019, each covering to over 1GHz with very low noise. Both generators can be amplitude or frequency modulated and between them offer a wide range of sweep and memory facilities. Frequency Meter 2435, featuring 8-digit readout to 2GHz. Modulation Meter TF2337A. Two-tone Audio Generator TF2005R. Audio Power Meter TF2893A. High-Z f.e.t. Mulitmeter TF2337A. Several of these instruments can be computer controlled, giving us the opportunity to automate some tests in the future.

From other manufacturers come a Bird Thru-Line r.f. Power Meter; Shackman oscilloscope/analyser camera; two-channel chart recorder, plus all the usual power supplies, dummy loads, etc.

The investment of well over £30 thousand in these new facilities will help us to give readers an even better service, both in constructional projects and our equipment reviews. Certainly no other UK radio /electronics hobby magazine has more comprehensive or up-to-date test laboratory devoted to its exclusive use.

Jan 1981

Bye Bye 405

The Home Secretary, in a written reply in the House of Commons earlier this year, made a statement about the closure of 405-line television services and the further extension of the 625-line service.

His statement began: "The 405-line v.h.f. television services of the BBC and IBA transmit BBC-1 and ITV in black and white only and are now substantially duplicated by the 625-line u.h.f. services, which transmit BBC-1, BBC-2 and ITV in colour, and which will in due course transmit the fourth channel service. Phase II of the current u.h.f. engineering programme for extending the 625-line services to communities with populations of 500 or more (over 90% of the population) should be completed by about1984.

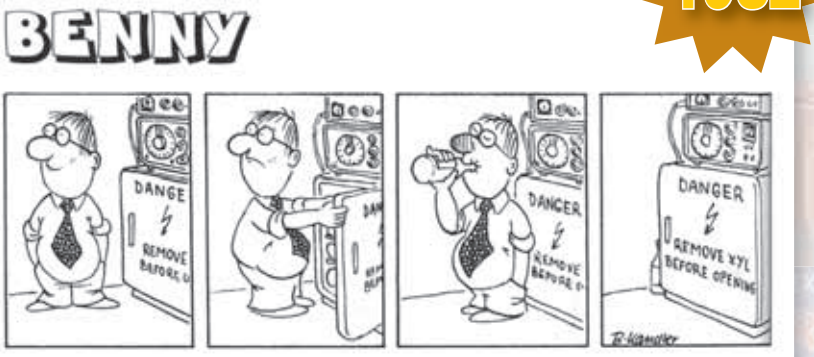
" The need to close the 405-line services in the early 1980s was recognised by the Pilkington Committee and the Annan Committee on the Future of Broadcasting. The manufacture of sets capable of receiving the 405-line services ceased some years ago and the transmitting equipment is rapidly nearing the end of its useful life. Substantial capital expenditure would be required to extend its life beyond the next few years and such expenditure on a duplicate and obsolescent service would not be justified.

" I have, therefore, agreed with the broadcasting authorities on a timetable for the closure of the 405-line services. Closure will begin in 1982 and will be phased over a period of about 4 years."

The BBC and the IBA are co-operating closely in the implementation of these engineering programmes in order to minimise any inconvenience to the public. As far as possible they plan to close down their 405-line services in Bands I and III at the same time in particular areas, although this will not be possible everywhere since the BBC have 110 transmitters on 405-lines while the IBA have 47.

Stations to be closed earlier in the programme will be those in areas where there is good coverage for the 625-line services. The last stations to be closed will be some of the high-power mains stations in areas where 625-line coverage is less complete.

Oct 1982



A selection of what was happening between 1980-1989 in the Amateur Radio hobby – how much do you remember?

June 1981

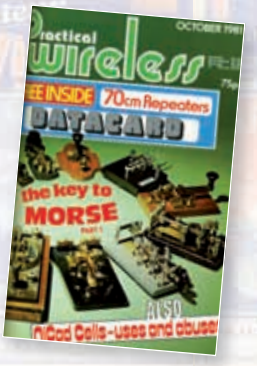
Moved by Popular Demand

The Amateur Radio Retailers Association (ARRA) National Amateur Radio Exhibition, which has traditionally been held in Leicester is now so popular with the public that the hall in which it has been held has proved to be too small to cope with the many thousands of people who visit the show.

This year, the ARRA have decided to move the entire exhibition to a new venue and they have chosen Donington Park, Castle Donington, which was the home of pre-war motor racing and now houses the Donington collection of historic racing cars.

The show this year, will open between 10am and 6pm on the 29, 30th and 31st October and admission is £1 for adults and 50p for children, which includes admission to the Motor Museum. Parking is plentiful and free and Donington Park is just off Junction 24 of the M1 motorway.

Oct 1981



GB3SC Takeover

One beautiful sunny, July day in Bournemouth witnessed the metaphorical takeover of **GB3SC** by a happy band of mobile Amateurs from GB3WR land. Following a morning of virtual constant activity on SC, a rendezvous was arranged with some *PW* people at a local hostelry, and SC returned to regular users and visitors.

As the photograph shows a very pleasant lunch hour was enjoyed by all, nattering about Amateur Radio. The characters are, from left to right, **Jim G8ZSP, Elaine G4LFM, Brian G8ZVK, John G8MCP, Norman G8YBT, Kevin G4FNI, Gary G8WVR, Nick G4IQX, Paul G8XTZ** and **G8ZPW**.

Licence Fees

April 1988

The DTI have just announced that the licence fee for Amateur Radio, both A and B licences, will stay the same at £12. Beacon and repeater licences will also stay at £12 for each station. Citizen's Band radio licences are £12 too. Out of the 47 different standard types of licences, 25 have changes, so Amateur Radio has been lucky to be amongst the 22 that have remained the same.

If you would like to know more about licence charges for all kinds of licences then you will need to buy a copy of The Wireless Telegraphy (Licence Charges) (Amendment) Regulations 1988, available from the HMSO.

Congratulations

What do you give the Amateur Radio couple who've everything – including each other? When Brenda and Bernie of Amateur Radio Exchange added a marriage certificate to their other qualifications (the happy day was 16 December 1984) even the wedding cake entered into the spirit – featuring a pair of Icom hand-helds in place of the conventional 3-tiered ediface.

The happy couple, now officially Mr and Mrs Godfrey, will still be **Brenda G4VXL** and **Bernie G4AOG** to their many customers and friends. We at *Practical Wireless* would like to send our congratulations to Brenda and Bernie and wish them every happiness for the future.

New Marine Channels

July 1981

The DTI has assigned additional v.h.f. radio frequencies for use by marinas, yacht clubs and pleasure craft to reduce congestion on the existing communications channels in coastal waters.

The boom in yachting has resulted in the current 158.85MHz frequency, called Channel M, becoming over-used. The frequency 161.425MHz, provisionally called Channel M2, has been made available to yacht clubs whose need is mainly for a simplex channel on which to pass messages, for instance to a group of yachts in a race.

Marinas, which often need to be contacted by foreign vessels, may apply for a transmitting frequency of 161.625MHz and a receiving frequency of 157.025MHz, which are together known as Channel 80. This is in the international band available to the UK and foreign yachtsmen. The new channels will require a licence or, in the case of current Channel M licences, an amendment will be needed.

April 1985

The FT-712RH

Jan 1988

This rig arrived fresh from Japan when it accompanied two Japanese gentlemen who visited the Leicester show to see SMC. It has the serial number of 00001- so you can see it was quite new! They brought the 430MHz version to the show but apparently the 144MHz version (the FT-212RH) will be available later.

It's a small rig, approximately the size of an IC-28E but it has this huge heatsink on the back of the set. That's needed, too, as the rig has an output of 45W. It has all the usual features plus some very unusual ones too. There is an in-built voice memory and that's not a speech synthesiser. This stores your voice in up to four of its memory channels. There are four sampling rates, the slowest of which provides three minutes of recording times – eat your heart out CQ loops!

The recording facility can also be used to record incoming signals too. Anyone with a d.t.m.f. mic can call your 'selcal' number and leave a message of up to three minutes in their own voice on your rig – just like an answering machine.

April 1986

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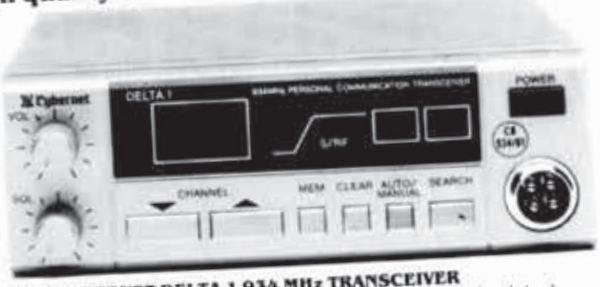

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Feature

The C7800 70cm UHF FM Transceiver

Nowadays in PW we clearly identify all our authors and this is especially important whenever equipment evaluation is featured. In this 1980 article, although he's not named, the author is ***Dick Ganderton G8VFH*** *(now retired), who became Editor of The Short Wave Magazine and is photographed 'road testing' the C7800 in his famous 'Maxi' car.* ***Rob G3XFD***

The 1980 text:

Seventy centimetres seems to have had an upsurge of interest in recent months, particularly in areas where there is a good repeater with a wide coverage. The Standard C7800 u.h.f. transceiver was therefore looked at with great interest.

The initial impressions of the rig are ones of a Rolls-Royce class of equipment – well built and designed with a solid look with excellent styling. Nothing looks cheap and nasty and all the external parts were well finished and fitted neatly together. The rear panel is black anodised aluminium casting, which acts as the heat sink for the output transistors as well as carrying various sockets and the antenna input SO239 u.h.f. socket.

As with most transceivers intended for mobile use, as well as base station use, the C7800 can be slid into a special mounting rack, which allows it to be adjusted in the car. A chromed bar is also provided to act as a front tilt leg to angle the rig when used in the shack.

Appearance

The front panel is particularly pleasing in appearance and is not unduly cluttered with controls. A large 'smoked' window covers the green digital frequency display as well as the various indicator l.e.d.s and the very useful l.e.d. power and signal strength meter. The keyboard under the display window is the main means of driving the rig. This keyboard controls the microprocessor and gives access to the five memories, scanning modes and an 'instant' SU20 calling channel selection.

The actual frequency selection can be performed in two ways. A large round knob on the front panel allows the frequency to be changed up or down in either 25kHz or 50kHz steps. The step size is selected on the rear panel.

The hand-held microphone also carries a rocker switch, which allows the frequency to be changed up or down remotely. Operating this switch gives an initial shift of one step followed a short while later by a continuous shift of frequency until the switch is released. The frequency selected is shown on the display with the first two digits removed.

The volume control also doubles as the push-on-push-off button control for the repeater access tone generator. Concentric inner switch levers are fitted to the squelch and volume controls and control the repeater shifting and the transmitter output power. The front panel is sloped to allow easy use of the controls and this also gives the rig its stylish lines.

Dick Ganderton G8VFH says, "The initial impressions of the rig are ones of a Rolls Royce class of equipment – well built with a solid look with excellent styling. "

Inside the C7800 lives up to its outer appearance. The main printed circuit boards (p.c.b.s) are well made and all internal components are fitted neatly giving the set a professional look and obviously contributing to its potential reliability and stability.

Access to the works is by the simple removal of the top and bottom panels and can be accomplished in a matter of seconds. The instruction manual gives very complete step-by-step instructions for obtaining access to any part of the set as well as full alignment instructions.

In Use

The rig was given a very thorough air-test over a period of some four months, both mobile and fixed and after a few preliminary problems gave a very good account of itself.

At the start of the tests the C7800 was used as a mobile rig fitted into the reviewer's Maxi. The power take-off was from the feed provided for a car radio and so is switched off when the ignition key is removed. The antenna used was a collinear from the SMC range of gutter mounted mobile antennas with the mount on the driver's side at the rear of the gutter.

The first few days were very disappointing with dismal failure every time an attempt was made to access the nearest repeater shown in the RSGB handbooks. A few enquiries locally brought to light the fact that the local Wimborne repeater did not exist except in the repeater books!

Hope rose and attempts were then made to access the next repeater, GB3SD at Weymouth some 30 to 40 miles away. The repeater could be heard very strongly but all attempts to access it failed. By now it was becoming apparent that there was something amiss with either the rig or the operator.

Success was eventually achieved through GB3CB while in the Birmingham area but shortly afterwards (while working GB3LT at Luton) the reports on the audio quality from the Standard were not very complimentary. It would seem that the rig was transmitting way off frequency. This was confirmed when GB3SD was at last accessed and quite by chance a regular user of SD (**G8TGE**) who also runs a C7800 was listening and was able to pinpoint the trouble.

The C7800 has a phase locked loop system to set the frequency and when the repeater mode is selected another crystal is brought into use for transmit only, to give the required 1.6MHz shift. It seems that the crystals were inserted by the importers but by an oversight, they were not trimmed to give exactly the required 1.6MHz shift. This put the rig outside the pass-band of 'SD when deviated and the repeater failed to recognise the input.

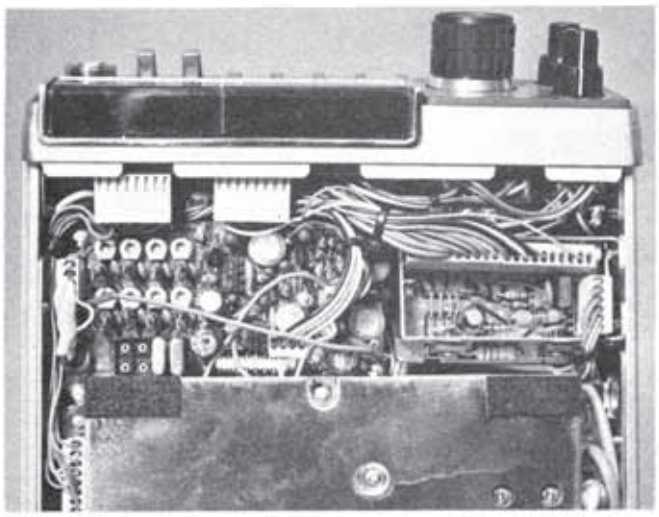
Adjustment proved very simple once the correct trimmer capacitor had been located. Here the instruction manual proved both very helpful and at the same time devious. The location of the trimmers was clearly shown but they were all incorrectly labelled. G8TGE had been through this exercise and was able to pinpoint the correct trimmer.

Five minutes later, the Standard was set up correctly! Since then reports from the many contacts made through SD have been very complimentary on the quality of both signal and audio from the C7800.

Microprocessor

The microprocessor control of the C7800 seems to be very effective once the controls have been mastered. The main keyboard has eight push-buttons controlling the scanning, memories, selection of the MHz band and SU20 calling channel selection. There are five memories each of which can be accessed from the keyboard or scanned at two speeds for either busy or vacant situation.

Setting up the memories is straightforward. After selecting one of the memories, the frequency desired to be entered is set up using the frequency selection knob or the microphone rocker switch. When the display indicates the desired frequency the **MEMORY ENTER** button is pushed and the frequency shown on the display is stored in the memory.



The p.l.l. crystals can be seen on the left with the two sets of trimmer capacitors immediately above them. It was necessary to trim the p.l.l. crystal to net the rig onto frequency for repeater operation. One of the crystals gives a 7·6MHz downshift for Continental operation

The C7800 fits neatly under the dash of the reviewer's Maxi

A simple memory back-up supply is fitted to retain the memory when the main power switch is turned off. However, the back-up is only operative as long as the rig is still connected to a 12V d.c. supply.

If the supply is removed the memories are erased and the rig must be re-programmed the next time the rig is switched on. This is a nuisance but can be overcome by connecting a separate small 9V battery to the accessory socket on the rear heat sink. (A remote keyboard can also be connected through this socket if desired).

Pushing the **CALL** button selects SU20 as the simplex calling channel. This can only be overridden by pushing the cancel button, which then restores the frequency to that selected before the CALL button was pushed.

Unfortunately, there's no reverse repeater facility. This is surprising since there is a spare button on the keyboard. These could have been used simply to provide instant selection of the repeater input frequency, using the appropriate crystal in the phase lock loop system (PLL) system.

It's possible; of course, to use one of the memories to store the repeater input frequency as long as you don't object to losing one of the memory channels.

All the controls fall easily to hand with the exception of the **Tone** button for repeater access. This is the control farthest away from the driver in a right-hand car and in some models the only suitable mounting position could give a long arm stretch to press the button. Fortunately, this only needs to be done to bring the repeater up initially so this is only a minor criticism.

The display is clear and easily read in all conditions while the repeater mode is indicated by white light emitting diodes (l.e.d.s) alongside the frequency display. For certain conditions the transmitter is automatically locked out and this is indicated by a red l.e.d.

The power and signal strength meter is a multicolour l.e.d. type of display and is most effective when operating mobile. It's much simpler to notice that two red l.e.d.s are lit rather than try to read a continuously wavering meter needle, and this is a form of indicator that must surely catch on for transceivers.

The hand-held microphone was comfortable to use but it proved very easy to accidentally operate the frequency change rocker, thus losing the channel being worked.

The transmitter and receiver seem to be very well matched in terms of performance. When the repeater comes in on receive at above about S5 then the transmitter will put a good signal into the repeater. When the S-meter indicates say S1, then the repeater is not accessible.

Towards the end of the tests, a 5A 13.8V stabilised power supply was constructed along with a scaled down version of the 12-element ZL Special beam antenna described in *Out of Thin Air*. These were used to run the Standard as a fixed station working into SD over a distance of some 40 miles. The results have been outstanding with the reports of the Standard's signal showing it to be performing exceptionally well. The r.f. power output was measured at 13W on high power and 900mW on the low power setting.

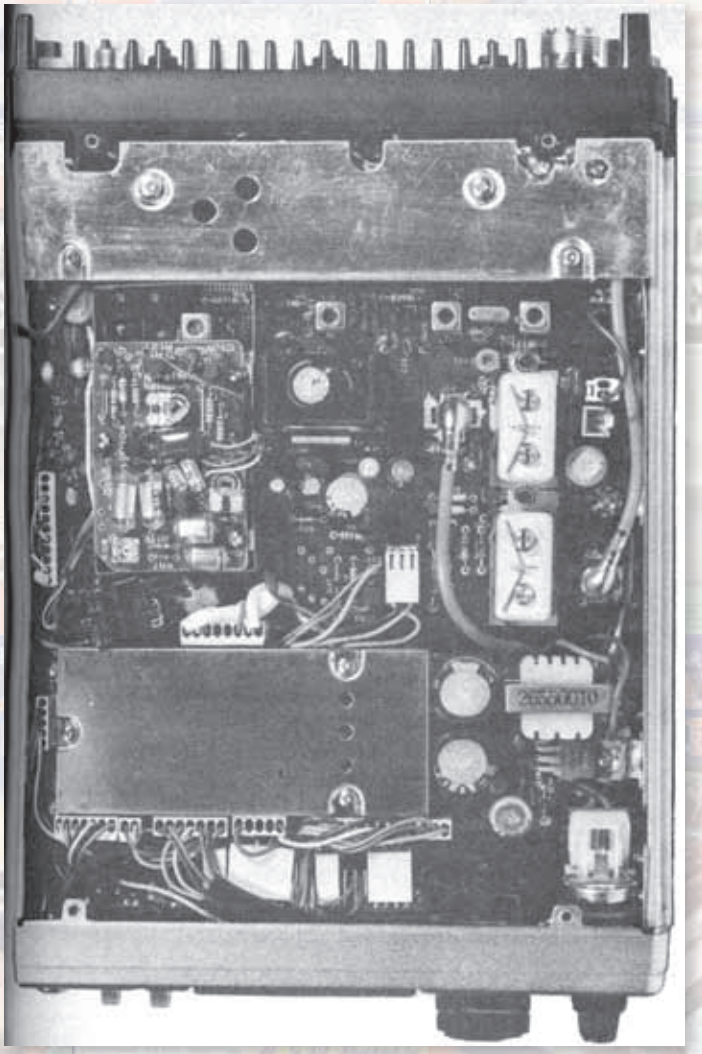
On test the Standard C7800 transceiver performed really well and was a pleasure to operate. As a fixed station it is compact and all controls fall easily to hand and even on high power it does not require too large a power supply. As a mobile unit it is very good, offering to the Amateur enthusiast a versatile 70 centimetre rig at a reasonable cost.

Thanks must go the regular users of GB3SD for the reports on the signals from the Standard as well as four months of interesting and well-ordered QSOs over quite incredible distances.

Price

The Standard C7800 costs £275 inc. VAT.

The Standard C7800 was loaned by Lee Electronics, 400 Edgware Road, London W2. Tel: (01732) 5521 and we would like to thank them for their co-operation.



Amstrad PCW8256

Editorial introduction: *The following article, written by the Editor of PW Geoff Arnold G3GSR in the February 1986 issue, provides an insight to what was to become an avalanche of computerised developments within publishing. It started (on PW) with PCWs and continues with Apple Macintosh computers!* ***Rob G3XFD***

Whatever is word processing anyway? This is the question some of you may be asking. Well, in answering I think you should consider it as a sophisticated electronic typewriter, which instead of reproducing your typing character-by-character or line-by-line directly onto the paper, stores it in memory and displays it on a monitor screen while you correct spelling mistakes, re-arrange sentences and paragraphs until you are entirely happy with it. Only then do you print it out on paper.

The main attraction for the home-computer user is probably that even a one-finger typist can produce an immaculate letter with a little practice!

Now, what's so special about this new Amstrad machine? Well, there are usually two approaches to word-processing. One is the dedicated word-processor, which is a microcomputer designed to do that job, and that job only, with clearly labelled keys for such things as DELETE, INSERT, CUT, PASTE, COPY, etc., but you can't use it as a computer.

The other approach is the general-purpose microcomputer, which can be used for word processing with the appropriate software. However, this has the disadvantage that the various editing keys are marked with cryptic codes, or at best some sort of overlay label is provided. The PCW8256, on the other hand, has all the usual word processing function keys and by loading the appropriate software can also be used as a general-purpose microcomputer.

The PCW8256 comprises computer (Z80A processor and 256KB of RAM, of which about 112K is configured as RAM-disk, giving greatly increased speed of memory access), 14in green-screen monitor (90 columns x 32 lines display), integral 3in floppy disk drive (2 x 180K formatted), keyboard (82 keys) and dot-matrix printer at 20 characters per second (c.p.s.). In near-letter-quality or NLQ mode, 90 c.p.s. In draft mode, with tractor feed and automatic single-sheet feed).The cost of this outfit is kept down by the use of custom-designed large scale integration (l.s.i.) chips for printer and keyboard control, and concentrating all the electronics apart from the keyboard controller in the monitor unit and powered from a single power supply. (More about that later).

Software supplied includes Loco-Script word processing, featuring pull-down menus and a selection of type pitches and faces. An attraction for radio and electronics work is the inclusion of super-scripts and sub-scripts together with all the commonly used Greek characters.

The CP/M+ (CP/M3.0) operating system gives access to a host of standard software such as spreadsheets, databases, etc. A second disk carries Locomotive Software's Mallard BASIC and Digital Research DR Logo.

Optional extras available are an RS232 Serial and Centreonics Parallel interface, which plugs onto an edge connector on the back of the monitor, and a second floppy disk drive (720kB formatted capacity), which fits in place of the label plate below drive A on the monitor front panel.

My Impressions

Such was the demand for evaluation models that we could only borrow a PCW8256 for one week. There was something wrong with the BASIC/DR Logo disk so I was unable to check those features within the time available.

Two thick instruction books are provided, one for BASIC and the other for LocoScript, CP/M and DR Logo. The LocoScript instructions lead the w.p. beginner gently through a series of exercises to demonstrate the various editing features available. But they do sometimes tend to stop short of telling you how to go on to apply that knowledge to real-life document.

In a machine so obviously aimed by its price at the newcomer to w.p., the instructions should be at the most elementary level. As it is, you have to discover some things by trial and error.

After a first session with the exercises, I went on to write and edit a real article using the more elementary w.p. features. All went well and I had just decided the article was in a state to be save on disk when there was 'splat' as one of the display cathode ray tube (c.r.t.) safety spark-gaps flashed over.

The monitor screen went momentarily dark and the whole system reset itself to the switch-on state. Where was my article? You've guessed it – totally lost! After that, the system behaved itself for the rest of the week but this is obviously a disadvantage of having a single power supply driving the monitor, computer, keyboard and printer.

The display quality on the monitor is better than a TV, but not as good as a 'pukka' monitor. I found it pleasant to use for some fairly extended operating periods. There's one odd thing about the monitor – the case looks as if it's meant to tilt and swivel on its base but in fact it doesn't.

The ribbon cable connection to the printer was a bit on the short side. If you put the printer on the left of the monitor you couldn't get at the paper-feed knob and if you put it on the right it was pushing against the DIN connector for the keyboard. About 50mm longer would do the trick. The printer quality in either draft or NLQ mode was very acceptable.

A peep at the monitor innards showed them to be very clean in design and well assembled. Tests for radiated radio frequency interference (r.f.i.) produced less happy results. There was some general hash over the h.f. bands close-in to the computer but quite vicious harmonics of the 4MHz central processor (CPU) clock extending well into the v.h.f. bands and could be detected on a 144MHz hand-held at ranges of up to 5m. However, they were clean signals though, affecting a very narrow bandwidth.

Price

The Amstrad PCW8256 is available at around £460 or less, including VAT, a very attractive package for the price. Our thanks for the loan of the review machine go to **Amstrad Consumer Electronics Plc, Brentwood House, 169 Kings Road, Brentwood, Essex CM14 4EF. Tel: (0277) 228888.**

It is reckoned that more microcomputers are used in industry and commerce for word processing than for any other single application.Surprisingly in many ways, many home computers are also beginning to be used for word processing. Amstrad, never slow to spot a trend, have capitalised on this with the PCW8256, which we review this month.

News 1980

June 1980

Club News

Steve Boler G8VEF, is now the secretary of the Derwent Valley Amateur Radio Society which meets on the first Monday of the month in Chatsworth Hall, which is part of the Matlock college of Further Education. All newcomers are welcome.

Steve can be contacted on: **Chesterfield (0264) 39204 (home) or Matlock (0629) 2430/2817 (work).**

The North Devon Radio Club meets twice a month, on the second Wednesday of the month at 1945 hours, the venue is Pilton Community College, Chaddiford Lane, Barnstable. At 1930 hours on the fourth Wednesday of the month the venue changes to Bideford School and Community College, Abbotsham Road, Bideford. Further details from: **The Secretary, H. G. Hughes G4CG, "Crinnis", High Wall, Sticklepath, Barnstable EX3 12DP.**

The Lagan Valley Amateur Radio Society GI4GTY, meet on the second Monday of every month and always includes a film or an interesting talk. Meetings are held at the Scout Hall, Dromore and visitors or prospective new members are always welcome. Furthe details from: **The Secretary, R. McClurg, 4 Alfred Terrace, Dollingstown, Craigavon, Co.Armagh, Northern Ireland. Tel: Lurgan (0762) 23173.**

CB News

As recently reported in the national press, the Greater London Council and the Society of Motor Manufacturers have added their support to the campaign to legalise Citizens' Band Radio.

We have received letters from two groups supporting the campaign. First, the Harrow and Wembley Citizens' Band Group, whose members come from all over NW London. The group is strictly a non-user group and was started in September 1979, by two people who saw the need for local groups to assist in promoting the national campaign to legalise CB.

The group meet at 1930hours on the first and third Monday of the month at the Queens Arms, High Street, Wealdstone, Middlesex. All interested parties are welcome. Further details from: **The Membership Secretary, Bill Ridgeway, 7 Sandringham Crescent, Harrow HA2 9BW. Tel: 01-422 7570.**

Second, a group who produce a monthly magazine/newsletter called *Bandstand* whose readers include, Councillors Theo Yard, Chairman of the recently formed Steering Committee and Richard Town, Technical Adviser to the All Party Group of MPs, and Patrick Wall MP, the Chairman of that group, also about 400 other people up and down the country.

An annual subscription to *Bandstand* costs £3.60 (12 editions) or 3 IRCs for overseas readers. Anyone writing to *Bandstand* will be sent some "Bumper Stickers" so long as an s.a.e. Is enclosed. Further details from: **The editor, Mike Evans, BM Bandstand, London WC1V 6XX.**

Jan 1980

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TEL: 01403 785600. FAX: 01403 785656.

Repairs

REPAIRS TO ALL AMATEUR AND VINTAGE Rx/Tx Cost effective service. Phone or call in for details. Medway Aerials, Rear of 14 Luton Road, Chatham, Kent ME4 5AA.
Tel: 01634 845073.

Aerials

GAREX ELECTRONICS VHF/UHF accessories and aerials, PMR equipment and spares. www.garex.co.uk
Tel: 0771 4198 374 PO Box 52, Exeter EX4 5FD.

For sale

Qtz x-tals 455kHz to 150MHz Std 10.106, 10.245, 10.7, 11.155MHz £1.00/unit. Callg 3.56, 7.030, 21.06, 28.06 £1.00/unit. 1.4MHz fltrs £14.00. 10.7MHz 10kHz fltrs £3.25 P&P £1.00 + VAT. IQ Electo 0208 391 0545. vincent@jakomin.fsnet.co.uk

Wanted

OLD HALF INCH FERRITE RODS Must be half inch in diameter and be six inches long or more. Tel: Peter Tankard 0114 2316321.

QSL Cards

FULL COLOUR QSL CARDS for all your QSL needs. Shirts and caps with callsigns and also ham cartoons by GW3COI. For free samples contact Chris M0DOL. E-mail: qslers@aol.com P.O. Box 184 Northampton NN3 9JH.

Classified Advertisment Dept.
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW

ORDER FORM FOR CLASSIFIED ADS

PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7820, Fax: 0870 224 7850.

Please insert this advertisement in the ..... **issue of *Practical Wireless*** (if you do not specify an issue we will insert it in the next available issue of *PW*) for ..... insertion/s. I enclose Cheque/P.O. for £.....(42p per word, 12 minimum, please add 17.5% VAT to total).

Name: .....

Address:.....

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Telephone No.:.....

Box Number @ 70p: Tick if appropriate ☐

Category heading: .....

Please photocopy this form or write on a separate sheet if you prefer

Bargain Basement

SEND YOUR ADVERT TO:-
***PRACTICAL WIRELESS*, BARGAIN BASEMENT, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW**

For your advert in Bargain Basement please remember to include your dated, coloured corner flash from this page along with your entry.

YOUR ATTENTION PLEASE!

Bargain Basement rules - £4 per advert

Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of **30 words**, plus **12 words f**or your contact details on the form provided and send -it together with the dated corner flash and your **payment of £4** (**subscribers** can place their advert **free of charge** as long as they provide their **subs number and corner flash**), cheques should be made payable to **PW Publishing Ltd.**, credit card payments also accepted.

Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert to **peter@pwpublishing.ltd.uk** (If you don't want to include your credit card details on your E-mail, just 'phone us on **0870 224 7820**.

Please help us to help you by preparing your advert carefully. Any advert which contains **??** marks indicates that the advertiseing dept. could not read/interpret the wording. **Please avoid FAXing your advert - it could delay publication.**

Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors and no correspondence will be entered into on any decision taken by the Editor on any of these conditions.**

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

FOR SALE

AT-11MP ATU W25m PSU, MFJ-462B decoder, FRG-9600 receiver, UBC-280XLT scanner, SG-237 ATU, SG-230 ATU. All excellent condition, including manuals and boxed,except SG-237/230. Sensible offers pleas. Tel: Howard G7ESM QTHR 07932 584504 (Mersyside).
E-mail: g7esm@tesco.net

AV-640 6-band vertical. As new, not built at new QTH, £250 o.v.n.o. Tel: 01669 680215 (Northumberland).

DRAKE R4C AND T4XC perfect condition with all inrad filters and PSU, £550. Rare Drake LF converter for R4C, £25. T4XC ND PSU, £200. R4C for spares, £50. FL8, £10. Tel: Colin 01634 250427 (Kent).

EDDYSTONE 640 Rx, good working order and condition, £80. Buyer collects. Tel: G3HKD 01603 405611 (Norwich).

EIGHT ASSORTED MAINS transformers, £50. Heavy, therefore must collect. Tel: G3AIO QTHR 01892 822836 for details. (Kent).

ELECTRONIC MORSE KEYER KIT as published in *Practical Wireless*. 4-35wpm practice or transmit, with auto switch-off. Excellent keyer yet simplicity itself to make. Full details provided, only £16. E-mail: chick@chickene.freeserve.co.uk

ICOM IC-275H 144/5 10-100 Watts multi-mode, £375 o.n.o. Watson WS-2090H linear amplifier. 1-5 Watts input, 80 Watts output. New, unused, £85. All plus postage or buyer collects.
Tel: Derek GW0CSR 01286 674455 (Gwynedd).

JAY-JAY DECADE BOXES zero to 99kOhm and 10pF to 1μF, £15 each. Also, Narda DC 18GHz variable attenuator zero to 60dB N-types. Offers around £20. Tel: Phil 01529 307301 (Lincolnshire).

KENWOOD R-2000 communication receiver, all modes. SSB, CW, AM, FM. Excellent condition original hardback book, £200 o.n.o. Plus carriage. Collection can be arranged.
Tel: 0114 274 6138 (Sheffield).

KENWOOD R-Z1 SCANNER VHF/UHF airband, wideband, no gaps. Fits car dash, DIN size. Also, brackets for normal mount, £140 including post. Manual included.
Tel: Allen 01458 447019 any time. (Somerset).

KENWOOD TH-5000 RECEIVER hardly used. Two antennas, £250. Tel: 0207 233 2213 or 0775 252 8532 (London).

KENWOOD TRIO R-2000 communications receiver. 0-30MHz unmarked with box, manual, like new, only £140 includes post. Realistic PRO-2022 200 channel programmable, direct entry UHF/FM/AM scanner, desktop. Receive air, marine, etc., £90 + P&P. Tel: Frank 01608 663745 (Warwickshire).

KENWOOD TS-570D £400. MFJ-949E tuner, £70. Tel: 0161 688 9680 (Manchester).

MFJ-464 KEYER READER (CW) Plus MFJ keyboard. VGC, £75 o.n.o. Heathkit SB-300 Rx working. Offers. MFJ 464 boxed. Tel: 0777 649 5381 after 6pm, please. (Dorset).

MFJ-1270B TNC 2 packet. Boxed, manual. Good condition, £50 plus postage.
Tel: Adrian 01584 872618 (Ludlow).

MOSELY TA-33 HF three element tri-band antenna or exchange for multi-band vertical. Buyer to collect. House move to smaller garden forces sale.
Tel: 01933 624933 after 6pm (Northants).

TRIO TH-26E (VHF H/H), £49. Also, TH-46E (UHF H/H), £49. Trio TR-3200 (UHF) portable, £45. All above complete, boxed, plus carriage. Radiophile magazines in mint condition. Offers. Tel; John G8BXO 01769 573385 (North Devon).

YAESU FT-290R1 2m all-mode transceiver. Working but frequency display faulty (2 digits black), £40 o.n.o. Tel: Daniel M0ERA 01883 713387 or 07813 985230 (Oxted, Surrey).

YAESU FT-757GX HF transceiver. 100W SSB and FM. Rx full coverage from 0.5 to 30MHz. Good condition with mic, lead and manual, £250 plus postage. Tel: Adrian 01584 872618 (Ludlow).

YAESU FT-7800E used three times. Still in box. 2m/70cm 50W, £175 o.n.o
Tel: Peter G6HQ 0151 336 2276 (Wirral).

YUPITERU 7100 mint. Eddystone EC-10, Heathkit valve voltmeter. Behringer 862 mixer. Tiger 100W AM transmitter VFO. First sensible offer secures. Buyer collects. 01234 711538 or G2CYN QTHR. (Bucks).

YUPITERU MVT-9000EU £200. Drake R-8E plus VHF converter for 108-174MHz, £450.
JRC NRD-535, £450. Te;: 01604 846439.

Please mention Practical Wireless *when replying to advertisments*

WANTED

CIRCUIT DIAGRAM for Acorn one valve S.W. Receiver using Denco coils. Published in Practical Wireless or Short Wave Magazine 8 years ago. All costs paid. Tel: Ron 01905 355381 after 6pm (Worcester).

KW-107 SUPERMATCH ATU metal cases, 16 inches wide x 9 deep x 8 high approx or W.H.Y. Tel: Dennis QTRH G4IAD 01942 817556 (Bolton). E-mail: cropton@btinternet.com

OLD HALF INCH FERRITE RODS must be half inch in diameter and be six inches long or more. Will pay very good money for the rods. Tel: Peter Tankard 0114 2316321 between 9am and 10pm (Sheffield).

TO COMPLETE THE REBUILD of a Marconi CR-100. I am looking for the nameplate fixed on top right hand corner of front panel. Can anyone help, please? Tel: John G3EGC 01204 301502 (Bolton).
E-mail: jvhradio@tiscali.co.uk

WANTED IF THE PRICE IS RIGHT Icom IC-703 plus, HF + 50MHz transceiver. Many thanks for last months 17 offers but you were all too close to brand new price, try again! Tel: 01986 896658. Write: M3MEMB 85 Hillside Road West, Bungay, Suffolk NR35 1RH. E-mail: wendy-michael@wmevans.wanadoo.co.uk

WANTED PLEASE for nostalgic project Heath 6-pin coils. Tel: Peter 01205 871410 (Boston).

WODEN OR SIMILAR modulation transformer. Must be centre tapped for push/pull output. Tel: Brian G4KGU 0161 973 6888 (Cheshire).

bargain basement order form

Please insert this advertisement in the next available issue of *Practical Wireless*.

❑ **For Sale** ❑ **Wanted** ❑ **Exchange**

PLEASE NOTE: as a security measure, you must include your house number and postcode.

Name.....

Address .....

.....

..... Post code .....

Telephone Number .....

CARD NUMBER

Signature..... Security number
last three digits on the back of the card

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

Start date of card ..... Expiry date of card.....

My Subs Number is.....(or mailer label) .....

please write in block capitals

	(30)		

CONTACT DETAILS FOR ADVERT.

Please only write in the contact details you wish to be published with your advert, ie. do you want your name & address, or just your telephone number?

Your advert, you decide! PLEASE - No FAXed Ads!

			(12)

B.B. Mar '07

Trader's Table

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

Disclaimer

Advertisements from traders for equipment that is illegal to possess, use or which cannot be licensed in the U.K, will not be accepted. While the publishers will give whatever assistance they can to readers or buyers having complaints, under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.

SHORTWAVE SHOP LTD

01202 490099

TRANCEIVERS

ICOM IC736 HF/6.....£550
ICOM IC703.....£350
ICOM IC703.....£350
YAESU FT2800.....£129
YAESU FT847.....£695
YAESU FT897.....£495
KENWOOD THG71 2/70 HANDY.....£80
YAESU 747 HF.....£295
NAVICO AMR1000 145MHZ.....£50
TRIO TW4000A DUAL BAND.....£85
AKD 2001.....£60
KENWOOD TR751E MULTIMODE.....£235
KENWOOD TS50 HF.....£295
ICOM IC208 2/70.....£155
YAESU FT290R.....£125
YAESU FT690R.....£125
KENWOOD TMG707.....£155
KENWOOD TS120S.....£195
YAESU VX5R.....£125
ICOM IC718.....£350

RECEIVERS

BEARCAT 278 BASE.....£95
COMMTEL.....£60
KENWOOD R5000.....£395
SONY SW11.....£20
BEARCAT 278 BASE EX DEM.....£139
SANGEAN AT818.....£ 85
ROBERTS 9914.....£ 60
AOR 5000.....£890
SONY SW07.....£169
TEN TEC RX350 HF WITH SPKR.....£520
ICOM 8500.....£595
AOR EM8200 MEMORY.....£35
GRUNDIG SATALIT INTERNATIONAL.....£295
GRE PSR282.....£65
NRD/JRC 535.....£420
REALISTIC DX395.....£125
AOR 8600.....£150
YAESU FRG100.....£245

ACCESSORIES

NISSIE BASE MIC YAESU/KENWOOD.....£55
ICOM SM6 BASE MIC.....£49
TOKYO HL50B AMP.....£180
ERA MULTIREADER.....£45
DIAWA 144MHZ AMP.....£30
DIAWA CAN 1001 HF AUTO ATU.....£125
MFJ 948 ATU.....£55
GLOBAL AT200 ATU.....£49
GLOBAL AT1000 ATU.....£60
RN ELECTRONICS TRANSVERTER.....£55
KENWOOD R2000 REMOTE CONTROL.....£145
TONO MR1300E.....£60
MFJ 722 OPTIMIZER UNIT.....£25
KPC-2 TNC.....£85
PACCOMM TINY-2.....£85
FRV 7700.....£20

For latest list please see www.shortwave.co.uk

NEVADA

023-9231 3090

Icom T8IA Quad Band 2/6/70/23cms FM Handheld.....£225
Yaesu FT736R 2/6/70cms Base Transceiver.....£599
Alinco DJX3 All Mode Scanning Receiver.....£75
AOR AR8000 Wideband Handheld Scanning Receiver.....£99
Bearcat 220XLT 200 Channel Handheld Scanning Receiver.....£79
Bearcat 3300XLT Scanning Receiver.....£135
Bearcat UBC120XLT 100m Handheld Scanning Receiver.....£79
Bearcat UBC860XLT Scanner.....£99
Icom R10 All Mode Scanning Receiver.....£179
Uniden UBC180XLT Handheld Scanning Receiver.....£109
Yupiteru MVT3300 Wideband Scanning Receiver.....£99
Yupiteru MVT7100 All Mode Scanning Receiver.....£149
AOR 7030+ Receiver c/w NB, Filter Board & Remote Control..£699
Grundig Satellit 800 HF & Airband Portable Radio.....£299
Grundig YB500 Receiver.....£89
Icom PCR1000 Computer Receiver. 1-1300Mhz All Mode.....£249
JRC NRD535 HF Receiver 0-30Mhz All Mode.....£599
Roberts R861 Portable All Mode Worldband Radio.....£129.95
Sony SW100E Compact Worldband Receiver.....£99.95
Yaesu VR5000 Wideband Receiver.....£399
Eton E1 Shortwave Receiver.....£325
Icom 7000 HF/VHF/UHF Mobile with DSP / new display.....£825
Icom 7400 100w HF/2/6m Base Transceiver with DSP/ATU.....£999
Kenwood TS850S 100w HF Base Transceiver.....£699
Kenwood TS870 HF Transceiver.....£899
Yaesu FRG100 HF Receiver.....£299
Yaesu FT847 HF/VHF/UHF 100W Base Station Transceiver.....£799
Yaesu FT920 100w HF & 6M Transceiver including filters.....£795
Commtel Base 40 Channel Base CB Transceiver.....£89
Midland 98+ Mobile CB Transceiver.....£69
Zetagi M27 Antenna Matcher.....£20
Bencher Keyer Bencher Paddle Keyer.....£59.95
Icom AT160 Coaxial Auto ATU.....£179
Icom AT180 Auto Tuner to suit Icom 706/7000.....£225
Kenwood PS30m 20amp Power Supply.....£110
MFJ 784 DSP Filter.....£129
MFJ 784B Digital Noise Filter.....£149.95
MFJ 9406 6m SSB Transceiver c/w microphone & manual.....£139
MMT144/28 10watt Transverter.....£89
Morse Key Morse Key.....£15
Pakratt 232 Data Terminal & Leads.....£99.95
Palstar PS04 2-4 Amp Power Supply.....£14
Ten Tec ATU 2KW High Power Antenna Tuner Coaster.....£169
TenTec229 2Kw Antenna Tuner.....£199.95
Tokyo HL160V 100w Amplifier.....£159
TW232DX Ham International Base Mic.....£25
Uniross Charger and Batteries.....£12
VCI PM30 2Kw Power Meter.....£69.95
Yaesu FC30 Automatic Tuner to suit FT897.....£199
Yaesu FRV7700 Band Converter.....£30
Yaesu MH35A2B Speaker/Mic for older models.....£19
Zetagi 700 Meter.....£59.95
Zetagi B300P Linear Amplifier.....£89
Zetagi DL61 Dummy Load.....£39.95

Check our web site for latest items available. E&OE. Prices quoted are in pouds sterling and exclude carriage

WATERS & STANTON

01702 206835

ICOM IC-82 H2M, 70CM ALL MODE BASE TRANSCEIVER 45/40W 12V.....£549
AOR AP-3000 100KHZ-2036MHZ ALL MODE RECEIVER 400CH. 12V + PSU.....£449
KANTRONICS KAM PLUS MULTIMODE DUAL PORT DATA CONTROLLER + PACTOR.....£149
GRE PSR-282 65-512MHZ (WITH GAPS) AM,FM HAND HELD RECEIVER 200CH.....£69
ALINCO DJ-190T 2M FM H/HELD TRANSCEIVER + CTCSS.....£99
ADI AT-400 70CM FM H/HELD WITH BATTERY BOX 420-465MHZ RX.....£69
KANTRONICS KAM PLUS MULTIMODE DUAL PORT DATA CONTROLLER + PACTOR.....£149
GRE PSR-282 65-512MHZ (WITH GAPS) AM,FM HAND HELD RECEIVER 200CH.....£69
KANTRONICS KAM MULTIMODE DATA TNC.....£99
AMERITRON ALS-600XCE 10- 60M SOLID STATE 600W AMPLIFIER WITH 80W IN.....£949
YAESU FT-5200 2M,70CM FM MOBILE TRANSCEIVER 50W,25W.....£149
AKD 2001 2M FM MOB LE TRANSCEIVER CHANNELISED 25W.....£69.00
OPTOELECTRONICS MODEL 40 "SCOUT" 10MHZ-1.4GHZ FREQUENCY COUNTER + REACTIVE TUNE & 400CH.....£199
COX SWR-7RM 7MHZ HF PWR/SWR METER 60W WITH ANTENNA MATCHER.....£39
PALSTAR KH-6 6M FM H HELD WITH CTCSS, NICD, CHARGER, DC LEAD.....£75
SHARMAN PS-205 13.8V 20A REGULATED PSU 25A SURGE NO METERS.....£59
SONY ICF-SW07 MINI RECE VER + FM STEREO, SSB & "ONE TOUCH" TUNING.....£ 69
ICOM PS-85 13.8V 20A (MAX) MATCH NG PSU.....£179
SEC 1212 13.8V SWITCH MODE REGULATED 12A (MAX) PSU.....£45
ICOM IC-737A HF BASE TRANSCEIVER WITH GEN.COV.RX, AUTO ATU 100W 12V.....£649
ALINCO DJ-496E 70CM FM H/HELD TRANSCEIVER WITH CTCSS, DTMF KEYPAD, NIMH & CHARGER.....£99
ALINCO DJ-496E 70CM FM H/HELD TRANSCEIVER WITH CTCSS, DTMF KEYPAD, NIMH & CHARGER.....£99
MIRAGE RC-1 LINEAR REMOTE CONTROL UNIT FOR POWER, MODE & PREAMP WITH 25' OF CABLE.....£29
KANTRONICS KAM-98 MULTIMODE DIGITAL DATA CONTROLLER WITH PACTOR, GTOR, AMTEXT & NMEA-0183 GPS.....£279
ICOM IC-82 H2M, 70CM ALL MODE BASE TRANSCEIVER 45/40W 12V.....£649
AMERITRON AL-811XCE 10- 60M 600W LINEAR VALVE AMPLIFIER WITH 100W MAX INPUT.....£499
UNIDEN UBC-278CLT 25-174,406-512,806-956MHZ AM,FM,WFM + MW DESK/MOBILE RECEIVER 100CH. 10V + PSU.....£99
ICOM IC-T3H 2M FM TRANSCEIVER WITH CTCSS AND DTMF KEYPAD.....£69
SONY ICFSW07 MINI RECE VER + FM STEREO, SSB & "ONE TOUCH" TUNING.....£ 69
TOKYO HX-240 HF TRANSVERTER 3.5-28MHZ WITH 2M IF 40W.....£139
ICOM IC-2100H 2M FM MOB LE TRANSCEIVER 55W 113CH. + CTCSS.....£149
UNIDEN UBC-3300XLT 25-1300MHZ (WITH GAPS) AM, FM, WFM 1000CH. ALPHA-TAG + TRUNKTRACKERI, CTCSS.....£129
SGC PORTAPAK PORTABLE QRP TRANSCEIVER SSB, CW 25W 10 X D CELLS OR 12V.....£599
MFJ MFJ-461 PAGER SIZE MORSE CODE READER + LCD DISPLAY.....£59
ALINCO DJ-X7 100KHZ-1300MHZ AM, FM, WFM HAND HELD RECEIVER 1000CH + 8.33KHZ STEP.....£79
ALINCO DJ-491T 70CM FM H/HELD TRANSCEIVER 40CH. + DTMF KEYPAD & CTCSS.....£115
MAYCOM AR- 08 08-180MHZ AM,FM 99CH. M NI RECEIVER 2 X AA OR 3V DC.....£49
UNIDEN UBC-69XLT 66-512MHZ (WITH GAPS) FM RECEIVER 80CH. 4 X AA OR 12V DC.....£59
UNIDEN UBC-105XLT 25-960MHZ (WITH GAPS) AM,FM RECE VER + 8.33MHZ STEP 00CH. 4 X AA OR 9V DC.....£4900
MFJ MFJ-484C GRANDMASTER CW MEMORY KEYER + 4 RANDOM ACCESS MEMORIES.....£89
YAESU VX-150 2M FM MIL. SPEC. 5W HAND HELD TRANSCEIVER + FULL CTCSS & DTMF KEYPAD.....£79
ICOM IC-R2 0495-1309MHZ AM,FM & WFM HAND HELD RECEIVER 450CH.....£79
SSE PSU- 01 DESK STAND WITH 2 X 12V DC OUTPUTS 240V AC.....£29
ICOM IC-PCR1000 500KHZ-1300MHZ ALL MODE PC CONTROLLED RECEIVER 12V + PSU.....£199
ICOM AT-180 HF + 6M AUTOMATIC ATU, 500HM.....£249
YAESU FRG-100 0.5-30MHZ AM,SSB,CW + FM OPTION COMMUNICATIONS RECEIVER 2V WITH PSU.....£29900
YAESU FRG-100 0.5-30MHZ AM,SSB,CW COMMUNICATIONS RECEIVER 12V WITH PSU.....£279
ICOM IC-R2 0495-1309MHZ AM,FM & WFM HAND HELD RECEIVER 450CH.....£79
ICOM IC-R2 0495-1309MHZ AM,FM & WFM HAND HELD RECEIVER 450CH.....£79
M. MODULES MML144/30-LS 2M 1-3W IN, 30W OUT LINEAR WITH PREAMP.....£69
SWS WLA-25 25W CB POWER AMPLIFIER.....£10
M. MODULES MML144/30-LS 2M 1-3W IN, 30W OUT LINEAR WITH PREAMP.....£69
MATSUI MR-4099 PORTABLE WORLD BAND RECEIVER WITH FM STEREO AND SSB.....£59
UNIDEN UBC-3300XLT 25-1300MHZ (WITH GAPS) AM, FM, WFM 1000CH. ALPHA-TAG + TRUNKTRACKERI, CTCSS.....£129
ICOM IC-703 HF& 6M ALL MODE QRP MOBILE TRANSCEIVER + AUTO ATU, GEN.COV. 10W 12V.....£339
ICOM IC-R72E 100KHZ-30MHZ AM, CW,SSB BASE COMMUNICATIONS RECE VER MAINS OR 12V.....£299
KENWOOD TR-751E 2M ALL MODE MOBILE/BASE TRANSCEIVER 25W.....£199
ICOM IC-R75E 30KHZ-60MHZ ALL MODE COMMUNICATIONS RECEIVER 12V WITH PSU.....£399
MIDLAND ALAN 42 MULTI 40CH 4W CEPT CB HAN HELD TRANSCEIVER WITH BATTERY BOX, AC CHARGER & DC POWER LEAD.....£69
UNIDEN UBC-278CLT 25-174,406-512,806-956MHZ AM,FM,WFM + MW DESK/MOBILE RECEIVER 00CH. 10V + PSU.....£99
ICOM IC-R7000 25MHZ-2GHZ ALL MODE BASE COMMUNICATIONS RECEIVER 99CH. MA NS.....£349
UNIDEN UBC-92XLT 25-960MHZ (WITH GAPS) AM,FM HAND HELD RECE VER WITH "CLOSE CALL" 200CH.....£6900
RADIO SHACK PRO-97 25-1300MHZ (WITH GAPS) AM,FM HAND HELD RECE VER + "SIGNAL STALKER" 000CH. ALPHA & PC INPUT.....£7500
YUPITERU MVT-7000 200KHZ-1300MHZ AM,FM,WFM HAND HELD RECEIVER 200CH.....£5900
YAESU FT-290R II 2M ALL MODE PORTABLE TRANSCEIVER 2.5W 12V OR 9 X C CELLS.....£19900
YAESU FL-2025 2M CLIP-ON 25W LINEAR (FOR FT-290R II).....£5900
AOR AR-2002 25-550,800-1300MHZ AM,FM,WFM RECE VER 20CH. 12V + PSU.....£14900
ALINCO DX-70TH HF/6M ALL MODE MOB LE/BASE TRANSCEIVER WITH GEN.COV. 12V.....£39900
REALISTIC PRO-43 68-998MHZ (WITH GAPS) AM,FM HAND HELD RECEIVER 200CH.....£6900
ICOM IC-703 HF& 6M ALL MODE QRP MOBILE TRANSCEIVER + AUTO ATU, GEN.COV. 10W 12V.....£23900
ICOM IC-756PRO HF + 6M ALL MODE TRANSCEIVER WITH ATU, DSP & GEN.COV. 12V + UT-102 VIOCE SYNTHESIZER.....£99900
AOR SDU-5600 COLOUR SPECTRUM DISPLAY UNIT FOR RECEIVERS + PC CONTROL.....£64900
LDG AT-7000 1.8-54MHZ AUTOMATIC 4-800 OHM ATU FOR ICOM IC-7000 00W.....£59900
YAESU FT-920 AF HF/6M ALL MODE BASE TRANSCEIVER + AUTO ATU, GEN.COV, FM OPTION & AM FILTER 00W 12V.....£79900
OPTOELECTRONICS DIGITAL SCOUT 60MHZ-2.6GHZ DIGITAL FREQUENCY COUNTER + FIELD STRENGTH, REACTIVE TUNING & 1000 MEMOR ES.....£25900
MFJ MFJ-94 E 1.8-30MHZ 300W ATU WITH DUMMY LOAD.....£5900
AOR AR-5000A + 310KHZ-3GHZ ALL MODE COMMUNICATIONS RECEIVER WITH TXCO, SYNC AM, AFC & NB 2000CH. 12V + PSU.....£1,19900
AOR AS-5000 3 WAY ANTENNA SELECTOR FOR AR-5000 RECEIVERS.....£6500
UNIDEN UBC-3300XLT 25-1300MHZ (WITH GAPS) AM, FM, WFM 1000CH. ALPHA-TAG + TRUNKTRACKERI, CTCSS.....£12900

Rob's chance to air his views!

Topical Talk

This month, Rob G3XFD discusses a letter with encouraging information from Angus Annan MM1CCR the RSGB President, and feedback from *PW* readers Paul G4KHU and Keith G4UKW.

The Radio Society of Great Britain
Lambda House
Cranborne Road
Potters Bar
Hertfordshire EN6 3JE
2nd January 2007

From the President of the RSGB to the Editor *Practical Wireless*

Dear Rob
In recent published correspondence in *PW* there are references to the 'not protected' status of the Amateur Radio Service and the need for vigorous action to protect the hobby.

Readers may like to know that under the UK implementation of the new EU EMC Directive, 2004/108/EC this position may be changing. The preamble to the new Directive states that "member states are responsible for ensuring that radio communication, including radio broadcasting and the amateur radio service, operating in accordance with International Telecommunications Union (ITU) radio regulations, electrical supply networks and telecommunications networks, as well as equipment connected thereto, are protected against electromagnetic disturbance."

The inclusion of the Amateur Radio Service in the wording of the preamble to the EU EMC Directive is the result of lobbying by the International Amateur Radio Union (IARU), strongly supported by the RSGB. Subsequently the new UK draft EMC Regulations were put out to consultation by the DTI and the RSGB responded pressing the case for inclusion of this protection in the UK implementation of the Directive.

The RSGB EMC leaflet 09 explains the current position on protection against inbound interference and in view of the importance of EMC matters the RSGB EMC website is open to all Radio Amateurs. See **www.rsgb.org.uk/emc/emchelp.php**

The RSGB EMC Committee has extensive experience of the EMC problems arising from plasma screens and other domestic television installations and an EMC Advisor is in touch with the member correspondent who raised the issue through your columns.

Angus Annan MM1CCR
President
RSGB

I'm always pleased when it appears there's good news on the way for the Amateur Radio hobby and this month, I'm delighted to publish the E-mailed letter (above) from **Angus Annan MM1CCR**, the RSGB President. It's obvious from his letter that the IARU and the RSGB have been working hard on our behalf.

I hope that the pressure that the various Amateur Radio organisations are applying will succeed in helping to relieve us of some of the pressing EMC problems mentioned in *PW* recently! Thank you for the letter Angus!

Somerton & Rugby Stations

The letter from **Paul Hawkins GKHU**, this month, provided a fascinating insight to the work of radio stations that have long since disappeared from maps in the UK, soon to be joined by Rugby. In the letter, Paul describes his experiences at several sites and – I shall be writing to him on the subject – I feel that many Radio Amateurs would be interested to know some more of his important work.

Paul's letter also reminded me that we are very likely to lose the historic Rugby transmitter masts before the end of the year. The current owners - British Telecom - are certain to have the remaining masts demolished as soon as possible following the transfer of the 16kHz time signal transmissions to the new Anthorn transmitter operated by VT Communications in Cumbria during April.

When other redundant masts were demolished in 2004 BT had the job done with minimum publicity. However, even though I think the station should be commemorated in some way, I hope that - considering the historic importance of the site - BT will at least keep everyone informed of what's happening to our heritage. It mustn't be forgotten that this mighty commercial company literally had this historic site fall into its lap following privatisation. I know the company is conscious of its duties regarding communications history but I feel it now has a special duty to help us remember what Rugby has done over the years.

Droitwich & Data

Much is owed to **Keith Wevill G4UKW** for the time he spent in gathering information on the Droitwich 198kHz data transmissions. Our readers often put themselves out on behalf of *PW* and our readers. In my opinion such co-operation reflects the goodwill of Amateurs and Amateur Radio very effectively indeed. Thanks again Keith!

Rob Mannion G3XFD/EI5IW

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