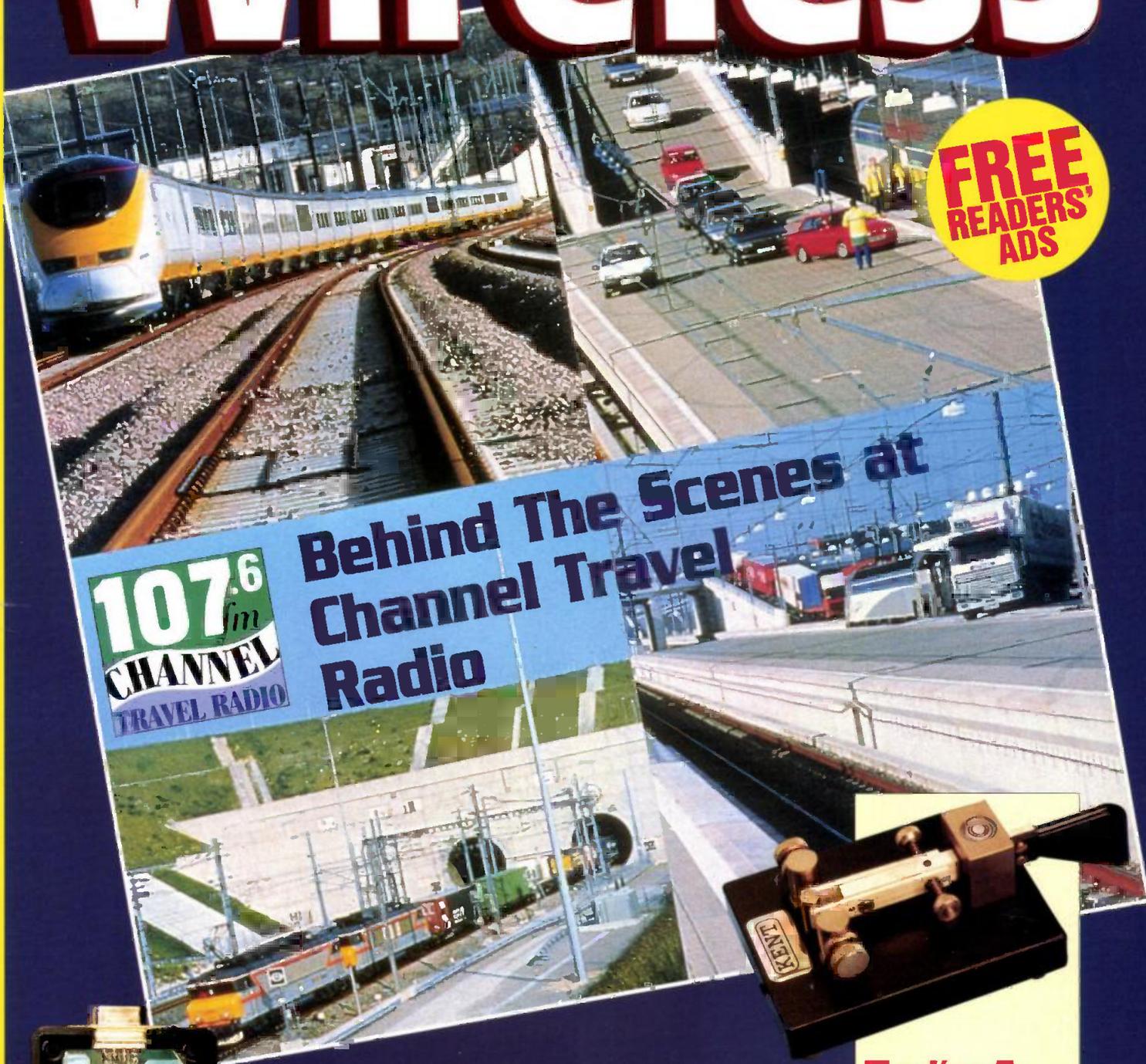


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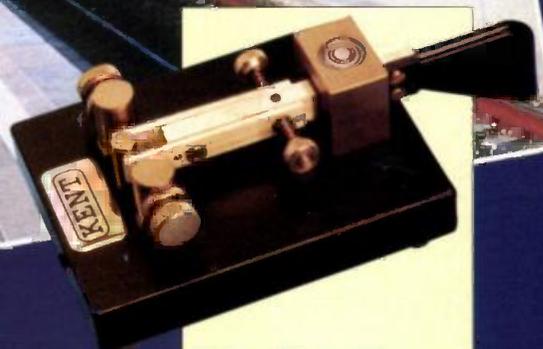
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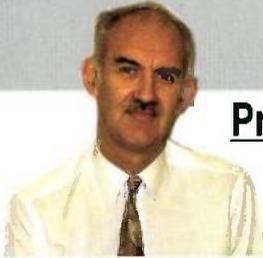
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- * Ultra sensitive
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- * 20 memories
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- * DTMF
- * Uses AA cells

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- * Wideband Rx
- * 20 memories
- * Keypad entry
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- * Uses AA cells

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- * CTCSS Encode, 1750Hz tone
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OFFER

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- * 2m 1.5W from ni-cad
- * 5W from ext. 12v supply
- * Rx 135 - 174MHz
- * 40 Memories
- * CTCSS built-in
- * 1750Hz tone
- * DTMF built-in
- * Battery saver
- * Programmable offset & steps
- * Ni-cads and charge included.

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A compact dual band handheld that is offered by us direct from factory. Why pay more?

W&S
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Latest Model!

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- * 1750Hz tone
- * 100 Memories
- * AM airband
- * Channel scope
- * Programmable steps
- * Extended receive
- * Full scanning
- * Ni-cads and charger

50W of Pure Performance Lowest UK Price

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Both rigs feature:

- * 3 Power levels - Wideband receive
- * 40 Memories plus call channel
- * 7 Programmable steps
- * Channel or frequency display
- * The best sensitivity in the business
- * 24 months warranty
- * Keypad mic and mounting kit

ADI AT-600D Dual Bander



W&S
£279

Alpha Numeric Display

- * 2m & 70cms tv.
- * 5W on 13.8V
- * Full duplex
- * 200 Memories
- * AM/FM Rx
- * Rx up to 990MHz
- * DTMF fitted
- * CTCSS fitted
- * 1750Hz tone
- * Batt. volt meter
- * Illuminated keypad
- * Battery saver
- * Ni-cad & charger

Wonder why other dual banders have dropped in price price? - Because ADI offers more for less!!

Delivery Mar.

Alinco DX-70T HF Rig

Latest "T" model back in stock
160-10m 100W (10W on 6M)

W&S
£669



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W&S
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30W
2m & 70cm

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HF RIGS We've got the DEAL PHONE! "BEST PRICE" ORDER LINE 0500 73 73 88

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Price Match

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- 430-440MHz
- 340mW output
- CTCSS
- 1750Hz tone
- 20 memories
- 6 Steps
- 3 x AA cells

PRICE DOWN

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Price Match

W&S £199

- 144 - 146MHz
- 108-174MHz Rx AM/FM
- 400 - 510MHz Rx
- 800 - 950MHz Rx
- 80 Memories
- Spectrum display
- 5W on 12v DC
- CTCSS + 1750Hz
- Ni-cads & charger

Includes FREE EJ-16U CTCSS unit

DR-430 70cm Mobile

PRICE DOWN

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- 430 - 440MHz
- 20 Memories
- 25W output
- 20 Memories
- CTCSS Encode
- Time out feature
- Wideband Rx
- Inc. Mic and kit

WATSON FC-128 Counter

1MHz - 2.8GHz

This new model has a wide frequency range and is powered by internal ni-cads. External BNC socket with aerial makes it very sensitive. Supplied with AC charger, it is very well built. Don't be fooled by the price!

W&S £79.95

WATSON Base Mic. WM-308

Built-in buffer amplifier provides matching. Modern rigs will power it direct from mic socket - otherwise use 2 x AA cells. Includes connecting cable for 8 pin rig sockets wired ready for Kenwood - Info provided for Yaesu & Kenwood changes.

W&S £59.95

WATSON WMN-1 Modem

See PW Review

W&S £69.95

WATSON

NEW

- Packet, AMTOR, CW
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- Transmit and receive
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Phone!!

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AVE £366!

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- CTCSS & 1750Hz tone

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W&S £Phone

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- SSB - CW - AM - FM
- Spectrum display
- Auto ATU
- Superb DSP built-in
- CW Memory keyer
- 100% duty cycle
- Keypad entry option
- DXers choice in the USA

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- 144 & 430MHz 50/35W
- Dual Rx on same band!
- 280 Memories
- Detachable front head
- CTCSS & 1750Hz Tone
- Large clear display

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Half the price of identical units of other brands!

An active antenna self-powered from your Garmin or Megellan GPS. Approx 45 x 40 x 15mm with magnetic base and 5m coax fitted BNC. You get S9 signals!

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The Best!

Plus FREE Case

- Position Indicator
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- Build your own map
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FT-840	£959	£695
FT-3000	£479	£359

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SAVE £140!

W&S £259

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- CTCSS & 1750Hz
- 31 memories
- Alphanumeric display
- US Mil. Spec.
- Mic. and hardware

KENWOOD HF RIGS

NEW TS-570

PRICE DOWN

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Save £130

W&S £349

PRICE DOWN

- 2m/70cms 5W (Ext 12v)
- 80 memories + Priority
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- Tough FET PA
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- DSP filter, fully programmable
- 16 Factory pre-sels
- Plugs directly into audio out
- Drives speaker or headset
- Requires 12v at approx 500mA

MFJ-1278DSPX Data Unit

£399



- Multi-mode
- Packet
- Amtor
- Pactor
- Colour SSTV
- 10 Modes total
- DSP filtering
- Tuning scope
- Simple to use
- Software

MFJ-948 HF ATU

Price Down!

£129



- 300 Watts PEP 150W CW
- 1.8 - 30MHz - with ease!
- Wire, coax or balanced line
- Balun included for best match
- 30 / 300W power meter - PEP / RMS
- Antenna selector, by-pass etc.

MFJ-447 Keyer

£79.95



- 2 - 65 WPM - suits all transceivers
- Adjustable tone, volume and weight
- Semi-auto, auto and lmbic
- 507 character memory
- Use AA cells or external 12v
- 162 x 127 x 38mm approx

MFJ-949 HF ATU

Price Down!

£149



- 160 to 10m 300W PEP 150W CW
- Wire, coax or balanced feed
- Built-in Dummy Load
- 30 / 300W power meter - PEP / RMS
- Antenna selector, by-pass etc.

MFJ-781 DSP Filter

NEW

£139



- Digital Audio Filter
- CW 50, 100, 200, 500Hz
- Amtor, fax, GTOR, PACTOR
- RTTY, SSTV, We-FAX

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- 144 - 148MHz 30 / 300W
- Forward & Reflected Power
- Reads field strength
- Easy to use - convenient size
- Low cost - efficient accessory

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- Amtor, fax, GTOR, PACTOR
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Your Auto ATU will now match any aerial when used with this.

Auto-Tuner Extender

Connect between auto tuner and transceiver - no more problems with G5RVs and all those difficult antennas - 160 to 10 metres

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- 1.8MHz - 170MHz
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 - Resonance
 - VSWR
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- Connect to aerial or coax and adjust it in seconds. Turns hours into minutes and ideas into antennas!

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NEW

£79.95



- 50MHz - 54MHz
- ATU and VSWR power meter
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- 100W CW/FM 200W SSB
- Tuner by-pass - SO-239 sockets
- Size 203 x 63 x 76cm

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Price Down!



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- 1 kW linear 9dB Gain
- Like a 5 element Monobander!
- Uses low cost 811A tubes
- Built-in rugged AC Supply
- Instant by-pass switch
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- Over rated variable capacitors
- Fan cooled for long life
- Very efficient - 600W output
- Easy to tune and connect
- Size 16" x 13.75" x 8"

**160 to 10M of DX-Getting Power
Perfectly matches all 100W rigs**

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MFJ-441 Keyer

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- 2 - 65 WPM - suits all transceivers
- Adjustable tone, volume and weight
- Semi-auto, auto and lmbic
- 37 character memory
- Use AA cells or external 12v
- 105 x 88 x 35mm approx

MFJ-969 HF+6m ATU

NEW

£179.95



- 1.8MHz - 50MHz 300W ATU
- "T" match with roller inductor
- Coax, balanced and wire
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- Internal 50 Ohm load - 3 way switch
- Size 268 x 242 x 95mm

MFJ-941E Atu

Price Down!

£109



- 160m to 10m ATU - 300W
- Wires, Coax and Balanced Feed
- Cross Needle VSWR & Power
- 3-Way antenna selector
- By-pass position - Dummy load socket
- Internal Balun - 30 or 300W position
- 260 x 180 x 70mm

MFJ-1118 Dis. Board

Price Down!

£69.95



- Complete 12V distribution system
- 5 Output terminals - RF by-passed
- Built-in 0 - 25V Volt meter
- Fused input and outputs
- Master switch and LED indicator
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- Heavy metal shielded case

MFJ-250X 1kW load

Price Down!

£34.95



- 1kW Dummy Load
- Oil cooled design
- SO-239 socket
- Ideal for linears
- 1MHz to 400MHz
- Oil not supplied

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NEW

£199.95



Fan Cooled

- 144 - 148MHz 100W Out FM & SSB
- Input 1W - 8W - ideal for handhelds
- GaAsFET switchable pre-amp
- RF sensing with 1 sec delay on SSB
- Supply - 13.8V at 15Amps approx

MFJ-260C 300W

£34.95



- Dummy Load
- 50 Ohm
- 300W
- OK to 450MHz
- Air cooled
- SO-239
- Totally enclosed
- Essential item

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Mirage 160W 2m Amp

NEW

£149.95



NEW

- 144 - 148MHz FM & SSB 160W out
- 40-50W input - ideal for modern FM rigs!
- GaAsFET switchable pre-amp + lo-high
- RF sensing - Adjustable SSB delay
- VSWR & temp. protected
- Supply - 13.8v at 25 Amps approx

MFJ-702 LPF Filter

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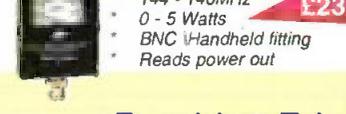


- Low pass filter 1.8MHz - 30MHz
- 200 W pep - 50dB down at 54MHz
- Loss less than 0.5dB
- SO-239 size 150 x 25 x 38cm approx

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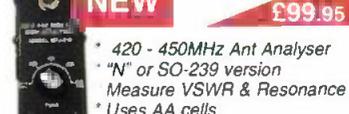


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Editor

Rob Mannion G3XFD
Technical Projects Sub-Editor
NG ("Tex") Swann G1TEX
Production/News
Donna Vincent G7TZB
Editorial Assistant
Zoë Crabb
Art Editor Steve Hunt
Page Layouts Jon Talbot & Paul Blachford

Advertisement Manager

Roger Hall G4TNT
PO Box 948
London SW6 2DS
☎ 0171-731 6222
Mobile (0585) 851385
FAX 0171-384 1031

Advert Sales and Production (Broadstone Office)

Chris Steadman MBIM (Sales)
Carol Trevanton (Production)
☎ (01202) 659920 - 9.30am - 5.30pm
FAX (01202) 659950

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CREDIT CARD ORDERS
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EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio

The dreaded 'flu bug struck the PW office just before the new year and well into 1997. And unfortunately I eventually joined the list of victims.

Going down with a 'bug' is inconvenient at the best of times. But despite having partial protection due to having taken advantage of an 'Anti-flu' inoculation...I succumbed just before I was due to start my club visits which was most inconvenient to say the least!

So, I'm taking the opportunity to send my public apologies via 'Keylines' to two clubs who had been patiently waiting for me to attend. The first club to be inconvenienced by the non-appearance of G3XFD were the **North Wales Radio Rally Club** in Colwyn Bay, North Wales. However, thanks to the sterling efforts of **John Worthington GW3COI** our 'resident' cartoonist and regular author, aided by another 'exile' living on the North Wales coast **Patrick Allely GW3KJW**, everyone rallied round to ensure the minimum of wasted journeys.

Fortunately, John and Pat got very busy and thankfully very few people found they'd made a wasted journey into Colwyn Bay. I was particularly pleased to hear that a large group travelling down from Anglesey were saved a lot of trouble!

The second club to be left 'high & dry' were the members of the **Launceston Club** in Cornwall. And hopefully they'll accept my public apology too!

Despite the 'flu bug' problems, I'm very pleased to say that I'm fully recovered now and back on course or my scheduled PW Club talks. The clubs who were inadvertently let down are now in the process of having new dates arranged and there won't be any other changes to the visits I've arranged to other clubs.

I'm hoping all is going to go well for the PW Club Visits plans for the rest of 1997. Despite this, I've heard in the last day or so (mid-February as I write this) that the 'flu bug struck at the North Wales end of 'the circuit' several



days after I was due to attend. So, on this occasion I can truly say "Not guilty m' Lud"....as you got the bug from someone else this time!

Stalwart Passes

To hear that an Amateur Radio 'Old Stalwart' has passed on is sad enough, but to hear the news belatedly doesn't make it any easier. Such was the case when the Editorial office was informed (in February) of the death in early January of **Jack Tweedy G3ZY**, for many years a well-liked and much respected Amateur Radio dealer based in Chesterfield, Derbyshire.

I had the great pleasure in having known Jack for over 30 years and since his retirement he always tried to attend the Leicester Show to chat to his old friends. He was a gently spoken man who always made you welcome in his shop which was within sight of the famous Chesterfield church with the crooked spire (he always denied the crooked spire was anything to do with his antenna erecting activities!).

Jack even made sure he had time to stop work for a short while when mobile ITV crews - who happened to be Radio Amateurs (G3XFD included of course!) made diversions to enjoy the friendly welcome and hospitality. People like Jack Tweedy make Amateur Radio what it is and he'll be missed by everyone, and my sympathies go to his close family and friends.

*Rob Mannion
G3XFD*

March 16: The Tiverton South West Amateur Radio Club are holding their Annual Mid Devon Rally at The Pannier Market, Tiverton, Devon. Only minutes from junction 27 M5, excellent free parking, refreshment facilities available throughout the day. Doors open at 10am, talk-in on S22. (01884) 257009.

March 23: The Bournemouth Radio Society will hold its 10th annual sale at the Kinson Community Centre, Pelhams, Kinson, Bournemouth, Dorset. Doors open from 10am until 4pm. Talk-in by RAYNET will be available on S22. As usual, there will be a mixture of radio and computer equipment on sale plus a Bring & Buy stall. More details can be obtained from **John G1HOK** on (01202) 535219 or mobile (0850) 240931. Those with Internet can contact jburtens@bournemouth.ac.uk or via packet as **G1HOK@GB7BNM** with 'BRS Sale' as the subject.

March 23: The Pontefract & District Amateur Radio Society are holding their 17th Components Fair & Spring Rally at the Carlton High School, 300 yds from Carlton Community Centre. Doors open at 11am (disabled visitors at 10.30am). There will be many traders on the ground floor and in the main building, admission by prize programme. **Colin Wilkinson G0NQE** on (01977) 677006.

April 6: The Launceston Amateur Radio Club are holding their Rally at Launceston College. There will be a Bring & Buy stand, many traders, RSGB Morse test on demand, refreshments, hot snacks from 7am. Doors open at 10.30am. Further info. from **Art G3XNE** on (01288) 354564.

April 13: The 16th Mobile Rally of the Lough Erne Amateur Radio Club will be held at the Killyhelvin Hotel, Enniskillen, Northern Ireland. Doors open at 12 noon. Tyrone Amateur Electronics, Icom, Yaesu, Waters & Stanton will be there as well as many other traders. **Keiran G17NET** on (01365) 348063 and (01365) 327133 (evenings).

April 19: SAMS '97 Computer & Electronics Show Rally will take place at Bingley Hall, Staffordshire Showground, Weston Road, Stafford (A518 Stafford-Uttoxeter Road),

signedpost from junction 14 on M6, bus shuttle from Stafford Railway Station. Doors open 10am to 4pm and admission is £2.50 for adults, children under 14, 50p, concessions. OAPS, RSGB members, student card, UB40. £1.50. Advance tickets £1.50 plus s.a.e. This is the 9th consecutive year for AMS at Bingley Hall. Last year's show saw just under 100 trade stands, covering the computing spectrum, including PC, Einstein, Amiga, AtariST and Atari8-bit, along with accessories, software, books, components and lots more. There will be lots of free parking, a licensed bar from 11am, refreshments, meals, cafeteria. More information from **Sharon Alward** on (01473) 741533 or FAX on (01473) 741361.

April 27: The BATC Rally '97 is being held at the Sports Connexion, Coventry. Doors open at 10am (9.30am for disabled visitors). Entrance is £1, 50p for OAPs and under 14s. There will be all the usual features of BATC rallies, over 200 trading tables, Bring & Buy, large outdoor flea market, specialist more television displays, ex broadcast vehicles, etc. GB6ATV talk-in on S22 and GB3CV (RB9). There are full refreshment facilities and a licensed bar. **Mike Wooding G6IQM** on (01788) 890365, FAX: (01788) 891883, E-mail: batc97@g6iqm.demon.co.uk

May 5: The Dartmoor Radio Rally are holding their rally at the Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. There is parking for 600 cars, access for disabled visitors, playground for children, trade stands, Bring & Buy, etc., refreshments. Doors open at 10.30am. Talk-in on S22. **Ron G7LLG** on (01822) 852586.

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

The Editorial staff of PW cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers.

If you have any queries about a particular event, please contact the organisers direct.
Editor

*Practical Wireless & SWM
in attendance

RADIO Directory

Compiled by Zoë Crabb

The Star Letter will receive a voucher worth £10 to spend on items from our Book or other services offered by Practical Wireless. All other letters will receive a £5 voucher.

RECEIVING YOU

Letters Received Via The 'Internet'

Many letters intended for 'Receiving You' now arrive via the 'Internet'. And although there's no problem in general with E-Mail, 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 don't forget to include your full postal address and call sign along with your E-Mail hieroglyphics! Editor

PW's Postbag. If your letter is published you'll win a prize.

Richard's Morse Problems

Dear Sir

The 'cri de couer' from Richard Pigg G4MHW (PW February 1997) forces me to sympathise with his problems and to say that he is not in an unusual situation. I have taught Morse for some 11 years, in evening classes and over the air and in addition as an examiner I have had the advantage of hearing of the problems expressed by the test candidates, which, if nothing else, does broaden ones experience!

As Richard G4MHW is no doubt aware, the learning of Morse is an intensely personal activity. It's therefore subject to personal variation in both the speed at which it is mastered and also the level which may be obtained. The concert pianist versus the ivory?

Morse tends to be learnt in a solitary manner, in ones own shack and hence any problems found become big problems. This is in contrast to those who have learnt in a class where the students soon find that others have had the same problems and, more importantly, overcome them.

The psychology of learning as applied to Morse is complex and worthy of a realistic research project (perhaps this may be forthcoming via the Morse '2000' project for Morse for the disabled).

The symptom of 'mental drop out' is common at all speed stages, whether it be 5 or 25w.p.m. I do not know its cause or how it may be deliberately overcome. But overcome it certainly is. I believe (I have no proof) that it is overcome when that particular speed has become

automatic, i.e. you don't have to think about what that sound meant. Additionally, I believe that the problem is compounded by the effort of 'trying' to reach whatever speed you have set for the target.

The effort of trying or concentrating seems to slow one down. In other words, if one stops trying or concentrating and let it come naturally, then in the fullness of time, the target will be reached, though it takes time to learn not to concentrate!

I am sure Richard, at some time, had the experience of taking Morse and suddenly realised he is quite detached from the task in hand and is watching his pen making marks on the paper and that they are making sense. In short, the receiving process has become automatic, at that speed, and once it has become automatic, you find time to read what you have just written and also to underline key words for composing your answer.

I broadcast, via GB2CW, an advanced Morse class where we go up to 25+w.p.m. and I can quote many members of the group who will tell you that they start saying they will 'never get anywhere above 15 or so words per minute' but who can, and do, reach 20+w.p.m.

At about this level, other factors start to come into the picture. Firstly, there can be a personal limit to which ones natural abilities limit you, and there is nothing you can do about that.

I suspect that those who trained service operators must have noted this natural limit in many individuals. I vividly remember a real old timer, of the G2+2 variety, sitting in the club shack carrying on a verbal

conversation and listening to, and understanding, not two, but three c.w. signals coming through from a badly tuned receiver. I wonder if we shall see this mixture of natural ability and exposure to the mode for very much longer?

Secondly, there is a limit as to how fast you can write. It is possible to speed up ones writing by writing small, two lines of text per line on the paper, and by using a smooth flowing ball-point pen, not a pencil or fibre tip, which have to be pressed into the paper and hence slow you down. One of the cheap transparent 'Bics' is ideal.

An individual whose daily job entails much writing will be able to cope with this more easily than one who rarely writes. Among those who reach a writing limit, there are those who can still read the c.w. and cope by making a note of the topic being sent.

While this is of limited value in plain language passages, it is obviously a most practical method for a c.w. QSO.

If one desires to increase their receiving speed, then I suggest a deliberate programme of attempting to work stations which are that little bit fast for you. Over a period of time, your RX speed will increase. The increase will possibly be slow, but undoubtedly occur.

It will, however, demand continuous exposure to the speed, i.e. practice as otherwise the speed will decay. One of my advanced Morse group members achieved the RNARS test level of 30w.p.m. about two years ago, but now admits, despite regular use of Morse, that his speed has decayed somewhat. This is in part due to the fact that he is quite happy to toddle along at about 20w.p.m. on transmit, which is his comfortable practical limit

on a straight key, while maintaining accurate Morse.

Remember P + P + P = P.
(Practice + Perseverance + Patience = Perfection!).

Incidentally, I'm somewhat worried about the 'BluTak' on the dot arm. Does this imply that he is using it to send slow Morse? If so, I can think of fewer worse methods as the dot speed is correct for only one speed setting.

I have never mastered the Vibroplex mode, but even so, can set my instrument to 5w.p.m. As a matter of fact, I wonder what is the 'designed minimum speed' for the Vibroplex, bearing in mind it was originally developed for high speed sending?

R. G. Wilson G4NZU
Nottingham

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This Month's Star Letter

Novice Home-Brew

Dear Sir

How many times have you looked at a project or a circuit diagram that has caught your eye, read the accompanying article and thought to yourself 'that looks as though it could be fun to build'? Then only to find that in the concluding part of the article, the following month, suggests that experienced constructors only should attempt it. No doubt we've all seen them.

I would be the first person to stand up and be counted as a Novice. But after seeing some PWs from 1984 showing the PW 'Marchwood' 30A p.s.u., I plucked up the courage to have a go at building it.

It has taken me at least three years to obtain everything required (yes it has cost me more than a commercial p.s.u. and no it didn't jump into life at the first flick of the switch). But with the help of my local club and other learned radio pals, the beast is fully operational.

My Marchwood p.s.u. is the size of a small microwave, has had a few modifications made to it - some things added, some things taken away - and should be fully capable of running my v.h.f./u.h.f. station.

The moral of all this is simple, if it catches your eye, don't be put off by the complexity, take your time and above all, don't show your XYL the shopping list!

N. Kerrison-Davey
Bristol

Editor's comment: Well done, long live home-brew and persistence!

Australian RAE

Dear Sir

Paul Collings, your correspondent in 'Receiving You' (The RAE On Demand, Feb '97), asked how the Australian licensing system compared to the system you have in the UK. I suspect I'm in a ideal position to answer Paul's question.

Until the late 1980s, our system was similar to that of the UK - two examinations per year, conducted by officials of the Radio Branch, which was originally a part of the Post Master General's Department. This was not only inconvenient to prospective amateurs, but expensive to administer as well. With the enormous distances a candidate could potentially need to travel to attend an examination site, it was clear that something had to be done.

These days, Australia's equivalent of the RSGB, the WIA (Wireless Institute of Australia) administers a volunteer examiner scheme on behalf of the Radio Branch's ultimate replacement, the Spectrum Management Agency, which sees exam invigilators (a minimum of three suitably qualified individuals) conduct examinations in which the questions have been set by the WIA Exam Service and vetted by the SMA.

The actual mix of questions from the approved Question Bank is left open to the WIA, but should ensure a suitable mix of subject as set in the syllabus.

There is obviously a great element of trust involved, but the presence of at least three authorised examiners at each examination would generally mean that there is little likelihood of any dishonest practices. Applications from the Exam Service are vetted carefully before being admitted as approved examination invigilators.

In any event, it is in the interests of us, the radio amateurs, to make sure that only properly qualified people have access to our precious bands. Most of the invigilators are themselves amateurs, and are generally nominated for this service by local Amateur Radio clubs, many of which offer theory and Morse code courses.

Officials of the WIA Exam Service are free to attend each and any exam event. But the bottom line is that an exam may be conducted at any place, at any time, and for as many or as few candidates as required by circumstances,

provided that sufficient examiners can be provided to effectively oversee the candidates.

The system has been in place for several years now. There is no indication whatever of any regular abuse of the system and both the government officials and the various amateur groups have been delighted with the new found flexibility and versatility of the system. It's also a lot cheaper to operate than the previous government run system, so candidates are paying substantially less than they otherwise might have.

As to whether the UK should consider such a system...well, you need to be cognisant of the stark differences between our two countries. Australia is a truly vast land, yet it has fewer than 20,000 amateurs.

The prospect of travelling 1000km to attend an exam would be completely ridiculous to Amateurs in the UK, but it was a very real situation for some people here. Add to that fact that the government wanted to streamline the system and substantially reduce its overheads by off loading the entire examinations procedure, and the scenario was ready for the birth of the Exam Service.

As both an authorised examiner and someone who works in the Amateur Radio scene, I think I could fairly say that the system has succeeded beyond the expectations of many critics. The air has not been filled with CB style operations. The service has covered its costs without charging huge amounts. In short, it seems to be a 'win-win' situation in this country. Whether a system of this type would succeed in the UK or not is now up to you to consider.

**Chris Edmondson VK3CE
Australia**

Editor's comment: Thank you for the information from Australia Chris. I'm sure that readers will find your up-date most interesting.

Incidentally, the PW office has received comments from readers on the subject of the RAE and the subject has aroused much interest from people involved in teaching the RAE, together with those studying for the examination. More letters on the subject will appear next month, including one from Roger Bone at City & Guilds, replying directly to Paul Collings' letter and the 'RAE On Demand' suggestions.

Free Blueprints

Dear Sir

Having read about the free blue prints in the old issues of PW many years ago, I agree with the writer of the letter in 'RY', Feb '97. It would be nice to obtain some of these as I have among my collection of PW the Volume 1, No. 1 issue, minus its free blue print 'The Long Range Express Three', also the PW 21st Birthday number minus its free blue print 'Coronet Four', the No.1 issue of course was September 24 1932 and the 21st Birthday issue was October 1953, so the blueprints are long gone.

Having been a reader and constructor since a lad (now 65), it would be nice to obtain these and maybe more blueprints to complete the collection. Incidentally, talking of construction, there was a one valve transceiver and a four valve DK91 DE91, etc., portable I built many years ago. The portable kept me company in my national service days on the long journey (train)

from the Midlands to Pembroke Dock and back.

There were no ferrite rod aerials then, so a wire aerial had to be used around the carriage or even out of the window on occasions!

**Ron Roberts
Staffordshire**

Ron Hartland - Silent Key

Dear Sir

I hope you can remember my dad, **Ron Hartland**, who sadly died in Hospital, December 10 1996. 74 years old. He always wrote to you, via the magazine, you always helped him out with his problems and questions.

Dad had many hobbies, starting of with Amateur Radio when he was very young, to fishing, cars, motorcycles, but then back to radio once again. Always wishing he had/could pass the necessary test to get himself a licence to transmit.

Even though he was elderly, he never gave up hope. Reading many books on the subject, buying various pieces and kits to help him achieve his goal

and loving every minute of it.

I think the last five or more years we, his family, had never seem him so happy, so determined, even changing a bedroom to a radio workshop.

Mainly, I'd like to thank all the members at the Malvern Radio Club for taking Dad on. Dave used to pick him up from our house and take him to the club every 1st Tuesday of the month and dad loved every damn minute of it.

Many thanks to everyone who helped, including everyone on PW. You all made a difference to a 70+ man, even though he was disabled, you encouraged him to believe, even to getting a letter of his printed in your magazine (which made his day).

Dad may not have passed that exam, but he has in our hearts. I hope you can print this letter in your magazine, mainly as a last goodbye to a great man whose love of radio made his life.

**Mandy Hartland
Worcestershire**

Editor's reply: Writing to your late father was a pleasure Mandy and I only wish I had the chance to meet him. However, the Malvern Club should take the 'main bow' as they've proved just how important clubs are. Well done Malvern!

Removing Enamel From Wire

Dear Sir

It was a delight to renew our acquaintance this year at the Leicester Show, to chat with you and the rest of the PW gain. If you recall, I was talking to you about the availability of the old PW Blueprints. Many thanks for your kind offer to look some out for me if I need copies sometime.

I have just read 'Receiving You' in my copy of PW for January 1997, two letters arrested my attention. Firstly I would like to add my 'penn'orth' of advice to John Noble regarding removing enamel from copper wires.

Although the hot meths flames works well, a far safer method, (which I learnt from industry), is to use very fine emery paper or glasspaper (sandpaper). Cut a strip of this material about 3 x 10cm and fold it centrally, across the shortest side, rough side in.

Holding the folded paper between finger and thumb of one hand, place the end of the enamelled wire between the folds and applying slight pressure, pull the wire. Repeat this operation several times, turning the wire after each pull, until bright clean copper shows.

**Duncan J. Walters
Notts**

Reader's letters intended for publication in 'Receiving You' must be original and not be duplicated. Letters are accepted on the understanding that they have only been submitted to Practical Wireless. Please ensure that your letter is clearly marked 'for publication in Receiving You' and that it has not been submitted to other magazines. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of Practical Wireless.



PN Junction?

Ian Poole G3YWX continues with his latest series and this time answers the question What Is A PN Junction?

One of the fundamental structures within semiconductor technology is the PN junction (see Fig. 1). It has the valuable property that electrons only flow in one direction across it and as a result it acts as a rectifier. This means that the PN junction is widely used both within integrated circuits and also as a discrete device for more conventional circuits.

In its basic form a PN junction is formed from a piece of silicon by making one end P type and the other end N type. This means that both ends have different characteristics.

One end has a surfeit of electrons whilst the other has a surfeit of holes. Where the two areas meet, the electrons fill the holes and there are no free holes or electrons.

No 'holes' means that there is no way for current to flow in this region. As the area where the two semiconductor types meet is depleted of charge carriers, i.e. there are no holes or electrons, it is called the depletion region.

Even though the depletion region is very thin, often only few thousandths of a millimetre, current cannot flow in the normal way. Different effects are noticed depending upon the way in which the voltage is applied to the junction.

If the voltage is applied such that the P type area becomes positive and the N type becomes negative, holes are attracted towards the negative voltage and are assisted to jump across the depletion layer. Similarly, electrons move towards the positive voltage and jump the depletion layer. Even though the holes and electrons are moving in opposite directions, they carry opposite charges and as a result they represent a current flow in the same direction.

If the voltage is applied to the PN junction in the opposite sense no current

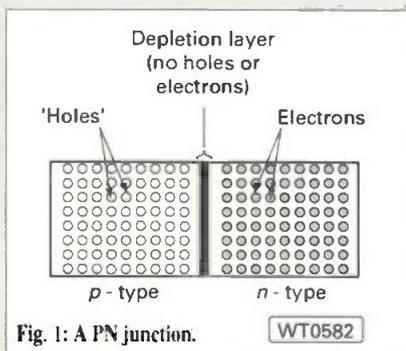


Fig. 1: A PN junction.

flows. The reason for this is that the holes are attracted towards the negative potential which is applied to the P type region.

Similarly the electrons are attracted towards the positive potential which is applied to the N type region. In other words the holes and electrons are attracted away from the junction itself and the depletion region increases in width. Accordingly no current flows.

Not Ideal

The PN junction is not an ideal rectifier having infinite resistance in the reverse direction and no resistance in the forward direction. Instead it has a characteristic like that shown in Fig. 3.

From the diagram you'll see that a small amount of current flows in the reverse direction. It has been exaggerated to show it on the diagram, and in normal circumstances it's very much smaller than the forward current.

Typically it may be a picoamps (pA) or microamps (μA) at the most. However, it's worse at higher temperatures and it's also found that germanium is not as good as silicon.

The reverse current results from what are called minority carriers. They are a very small number of electrons found in a P type region or holes in an N type region. Nowadays though, the manufacture of semiconductor materials is very much better and the number of minority carriers is much reduced as are the levels of reverse currents.

Forward Direction

In the forward direction it can be seen that very little current flows until a certain voltage has been reached. This represents the work that is required to enable the charge carriers to cross the depletion layer.

The voltage varies from one type of semiconductor to another. For germanium it is around 0.2 or 0.3V and for silicon it is about 0.6V.

In fact, it is possible to measure a voltage of about 0.6V across most small current diodes when they are forward biased. Power rectifier diodes normally have a larger voltage across them but this is partly due to the fact that there is some resistance in the silicon, and partly due to the fact that higher currents are flowing and they are operating further up the curve.

Widely Used

The PN junction is widely used as a rectifier in a number of applications, but it also has a number of other uses. I will be taking a look at some of these in the months to come before moving on to some other interesting devices.

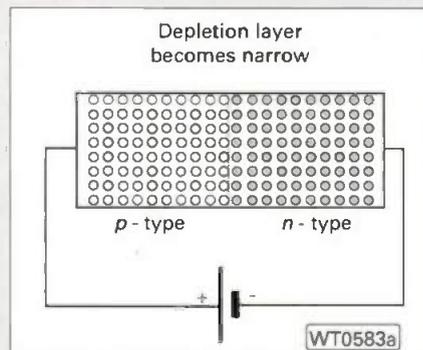


Fig. 2a: Forward bias.

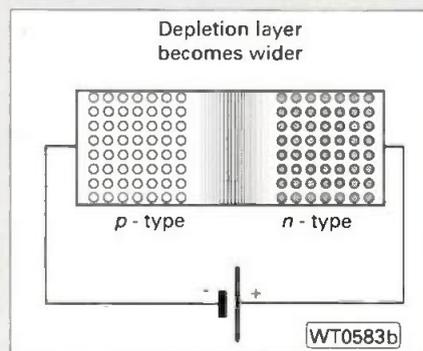


Fig. 2b: Reverse bias.

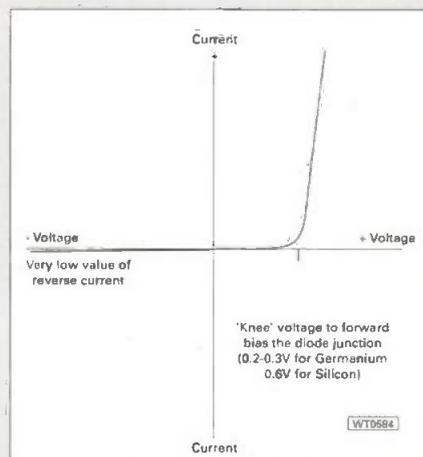


Fig. 3: Characteristics of a diode.

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Next Time

That's all for this month. Next time I will be taking a look at the point contact diode

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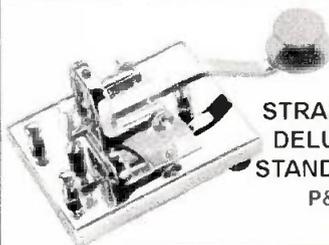
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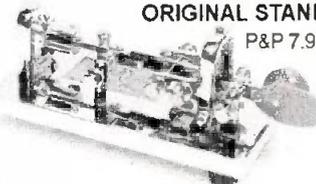
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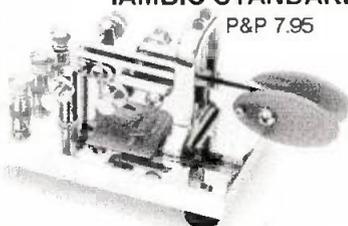


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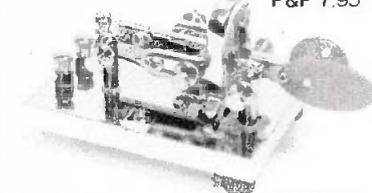
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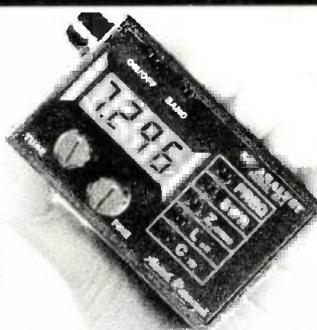
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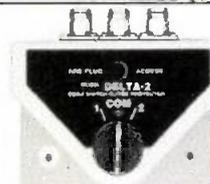
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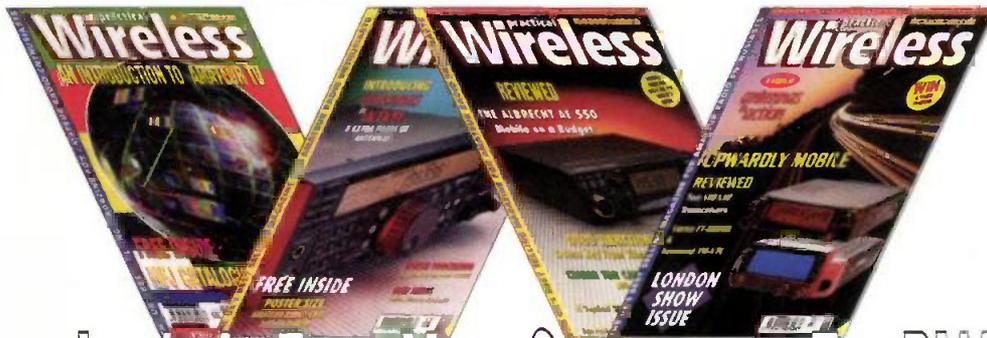
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FTDX 200 + FP 200.....	£150	KENWOOD TS-550SAT.....	£869	TRID TR-2300 + VB 2300.....	£70	YAESU FV-101Z.....	£69
GRUNDIG YB-500.....	£120	KENWOOD TS-450SAT.....	£850	TRIO TS-530SP.....	£379	YAESU SP-101.....	£50
GRUNDIG YB-650.....	£359	KENWOOD TS-780.....	£550	WELZ AC-38M ATU.....	£50	YAESU SP-102.....	£75
HEATHKIT HW-100/SB600.....	£150	KENWOOD TS-950SDX LINE.....	£1895	YAESU FC-901.....	£95	YUPITERU MVT-7000.....	£175
HEATHKIT SB-220 1kW LINEAR.....	£179	KW-103.....	£35	YAESU FC-901.....	£99	YUPITERU MVT-7100.....	£199
ICOM IC-740.....	£400	KW-204 TX.....	£79	YAESU FC-757AT.....	£140		

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NEWS 1997

Compiled by Donna Vincent G7TZB

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RSGB Install A New President

Ian Kyle G18AYZ, shortly to take up the callsign M10AYZ, was installed as the 63rd President of the RSGB at a Dinner and Ceremony held on Saturday 8 February at the Forte Posthouse, Dunmurry, Belfast.

During the Saturday afternoon, a Zonal Open Meeting of the Society, open to anyone with an interest in Amateur Radio or the Society from all parts of Ireland, was held. This was the first such meeting to be held in the province since 1980 and was attended by more than 100 radio enthusiasts, including the Presidents of the national societies for Eire, Germany, Belgium, Holland and France. The meeting covered a wide range of topics pertinent to amateur radio, and was kept in order by Terry Barnes G13USS - the most recent RSGB President to come from Northern Ireland.

The Society also announced that the new Executive Vice-President is John Greenwell G3AEZ. Paul Essery GW3KFE is the new Chairman of the Membership Liaison Committee, filling the vacancy left by Ian Kyle when he became President. David Butler G4ASR, who compiles *PW*'s 'VHF Report' column, resigned recently from the position of VHF Manager and has been replaced by Ian Cornes G4OUT, who is also continuing with his duties as VHF Awards Manager.

The 1997 RSGB President Ian Kyle G18AYZ (left) presenting Executive Vice President John Greenwell G3AEZ with his chain of office. (Photo by Stewart Mackay G14OCK).



To bring it in line with the Society's other committees, the Repeater Management Group has been renamed the Repeater Management Committee and Chris Goadby G8HVV is its new Chairman, replacing Geoff Dover G4AFJ, who was recently elected to RSGB Council.

Report by:
Dick Ganderton G8VFH

All Change For RAE

Further to reports made in *PW* last year of proposed changes to the Radio Amateurs Examination (RAE) the Radiocommunications Agency and the City & Guilds of London have recently announced plans to simplify the format.

Following a request from the Radio Society of Great Britain (RSGB) it has been agreed that from May 1998 the RAE will become a single paper exam consisting of 80 multiple choice questions costing £26 (Currently the exam is taken in two parts costing £19.40 per part). Candidates who have already passed one paper of the current RAE will be able to carry over their pass until May 1998 after which they will be required to resist the full new examination.

In addition to the changes to format of the RAE it has been agreed to reduce the one-off centre approval fee from £250 to £100 for centres running the exam. Examinations will continue to be held at approved examination centres throughout the UK in May and December every year.

It is hoped that the changes will encourage more people to take up Amateur Radio as a hobby in the future. For more information on examination centres and procedures you can contact the City & Guilds of London Institute, 1 Giltspur Street, London EC1B 1JP. Tel: 0171-294 2468.

Watson From Waters & Stanton

Waters & Stanton Electronics have added yet more new products to their comprehensive range. These latest additions are products from the



Watson stables.

The first of these is a low cost hand-held frequency counter in the shape of the Watson FC-128. This is a wide coverage counter covering between 1.8MHz and 2.8GHz with an l.c.d. showing bargraph signal, strength meter and a low battery level indicator. The FC-128 costs £79.95 and is supplied with Nicads, charger and telescopic antenna.

Secondly, there's the Watson GPS-150 compact receiving antenna



for use with GPS receivers. This compact antenna measures just 50 x 40mm and comes complete with 5m of miniature coaxial cable terminating in a BNC plug. The GPS-150 costs £39.95 and is described as ensuring optimum performance when using a GPS system when mobile.

To order either of the new Watson products contact Waters & Stanton Electronics at 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 204965.

Polarised Cushcraft

American manufacturer the Cushcraft Corporation have just introduced a linearly polarised directional Yagi antenna. The

PC18513N is designed for use between 1850 and 1990MHz, is housed in a weather resistant ultra-violet light (UV) stable polycarbonate radome and is said to provide a minimum of 13dBi gain with a nominal 32 x 32° half-power beamwidth.

The PC18513N measures just



3x26x1in and has a v.s.w.r. of 2.0:1 on 50Ω impedance. It comes supplied with 12in of coaxial cable and an N type connector and is designed for mast or pole mounting.

For additional information on the PC18513N contact the Cushcraft Corporation, PO Box 4680, Manchester, NH 03108 USA. Tel: (603)-627-7877, FAX: (603)-627-1764.

Datong Electronics

Datong Electronics Ltd. who have been involved in the Amateur Radio market for over 20 years have taken the decision to gradually phase out their range of Amateur Radio products due to ever increasing commercial pressures and therefore once an item becomes 'out of stock' it will now be discontinued. However, a final batch of Amateur Radio products will be produced by the Spring of this year.

The final batch of products, including stock already held will be made up of the following: AD270 Active Antenna, AD370 Active Antenna, D70 Morse Tutor, RFA Wide Band Amplifier, VH2 144MHz Converter and the VLF converter. All other products will be

Wind & Water Mills

The Denby Dale Amateur Radio Society will be running their Wind and Water mills event again this year. The event is run on behalf of the Society for the Protection of Ancient Buildings (SPAB) and will take place on Sunday 11 May 1997.

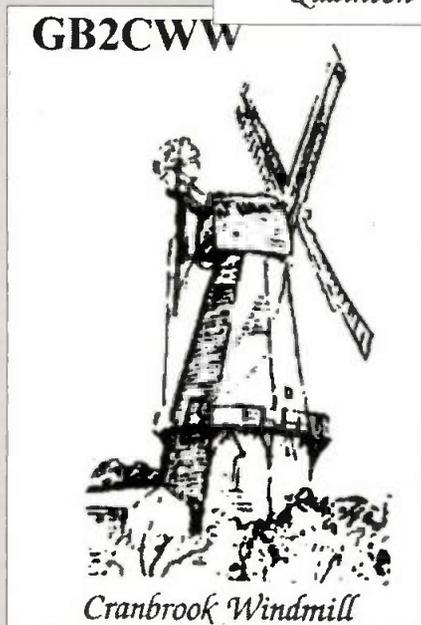
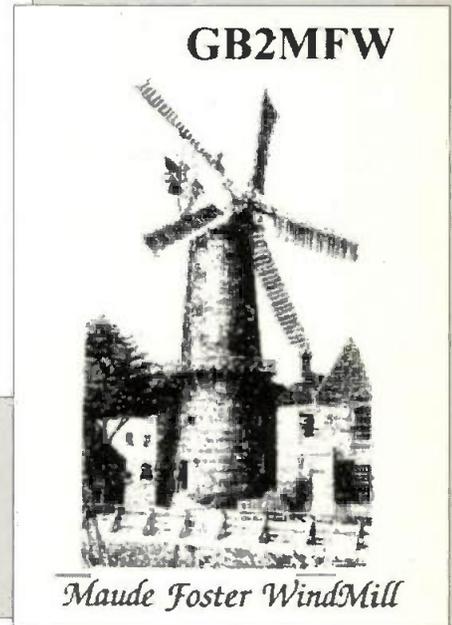
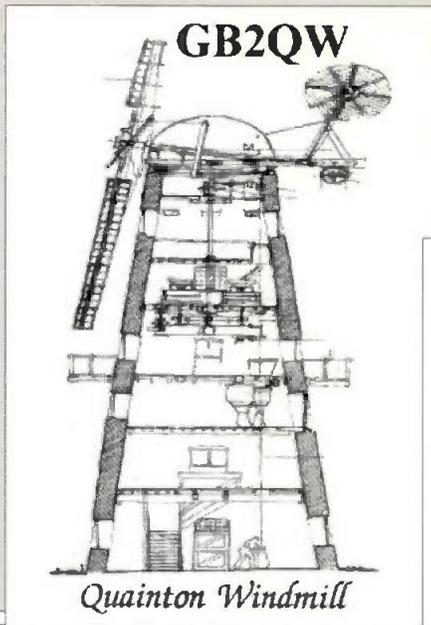
Last year 32 windmills and watermills were put 'on the air' by the event. This gave Denby Dale ARS the opportunity to promote SPAB, as well as bringing Amateur Radio to the general public who were visiting the mills.

The unusual event produced a tremendous response, with 3.5MHz almost grinding to halt with contacts being made as far afield as America and Russia. As a result of the success, supporters of a South African Windmill have expressed an interest in taking part this year! The mill enthusiasts also reported a successful day with an increased number of visitors being noted.

Special QSL cards were produced for each mill taking part showing a line drawing of the particular mill on one side and a potted history and contact information on the other. A certificate was also produced and given to those who contacted 10 mills or more.

The 1996 event was only made possible by the enormous amount of help received from radio clubs and individuals throughout the country. Denby Dale ARS are hoping to encourage more mills onto the airwaves this year, as well as widening the coverage by including people in Scotland, Ireland, Wales and the West country. Therefore they would like to hear from anyone who feels they could help with setting up or running a station.

If you think you could help or are interested in finding out more please contact Jasmine Marshall G4KFP, Secretary of the Denby Dale ARS on (01274) 869849 as soon as possible. Alternatively you can write to Jasmine at 'Hedgeways' B&B, 63 Highmoor Lane, Hartshead Moor, Cleckheaton BD19 6LW.



discontinued when the present stock is exhausted.

David Corney G4UPT Sales Engineer for Datong informed the Newsdesk that they will continue to repair and service units for as long as practical and for as long as it's possible to source spare parts. Once this becomes difficult they will supply customers with circuit diagrams so that they may undertake the repair themselves.

Datong would like to thank all their customers for their continued support over the years and would like to mention that they will continue to design and manufacture its range of counter surveillance receivers and radio direction finders.

Morse Test Party

As a result of the success of last

year's 10th Anniversary celebrations of the RSGB Morse Test Service it has been decided to make this an annual event. During the 1996 celebrations over 10 000 on-air contacts were made by Special event stations which were operated by Morse test examiners.

Morse testing teams will take to the 'key' over the weekend of 10 - 11th May when there will be at least 25 event stations active. All stations taking part will use the prefix GB0 followed by the RSGB county code suffix, e.g. the Isle of Wight team will use GBIOW. There will also be additional active stations from RSGB HQ (GB0RS), The Chief Morse Examiner GB0CW and Deputy Chief Morse Examiner GB0QSO.

Activity will be concentrated on the 3.5 and 7MHz bands and it's hoped newcomers will be

encouraged when each team spends time working QRS in the Novice c.w. section of the 80m band. An 11th Anniversary certificate will be available to anyone who makes contact with 10 of the Special Event stations. The cost of the certificate is £2 (cheque or P/O made out to RSGB), \$5 or 6 IRCs and is available, on receipt of log extracts, from Roy Clayton G4SSH, Chief Morse Examiner, 9 Green Island, Irton, Scarborough, North Yorkshire YO12 4RN.

Communication Gremlins

Unfortunately those naughty 'gremlins' who come out of hiding from time-to-time managed to get into Communication Technical Services Limited (CTS) advert on page 76 of last month's *Practical Wireless*. The address details in the advert featuring the Danmike DSP-NIR, which incidentally is available for £190 plus VAT, were lost due to their choice of yellow colouring.

The *PW* team would like to apologise to CTS Ltd. for any inconvenience caused by the gremlins and to prospective customers who were unable to contact CTS to enquire about the DSP-NIR. Communication Technical Services can be contacted at Unit 15, The Gatwick Metro Centre, Balcombe Road, Horley, Surrey RH6 9GA. Tel: (01293) 822602, FAX: (01293) 822612. so why not drop by or give them a call for more details on their range of products?

Zoë says:
"keep the News and
those Club
magazines coming!"

CLUB Spotlight

Compiled by Zoë Crabb

Host Of AGM

Gerard Dykes EI8HO, Secretary of the Donegal (Tir Conaill) ARS has recently written in with news that the society is to host the Irish Radio Transmitter Society AGM. This will be the society's 65th AGM and the second hosted by the club. There is also an Amateur Radio Computer & CB Rally at the same location in Jackson's Hotel, Ballyhofey, Co. Donegal, Ireland on the same day.

A dinner dance will take place on Saturday 26th April 1997 at a cost of £16. The Rally and AGM takes place on the Sunday 27th April 1997. More details from Gerard Dykes EI8HO, 30 St Benildus Avenue, Ballyshannon, Co. Donegal, Republic of Ireland

Special Event Station

The GPT Amateur Radio Club and the Rolls Royce Radio Club are putting on a Special Event Station GB2BST to coincide with the UK time change to British Summer Time over the weekend of 29/30 March 1997. The station will be set-up in the 10 acre grounds of Upton Hall. The HQ of the British Horological Institute (watches and clocks), between Southwell and Newark, approx. 20 miles NW of Nottingham. IO9NC, SK7354.

The clubs hope to operate all h.f. bands, except 'Top Band', 50, 144 and 430MHz, and possibly packet. The

Wakefield Update

Rae G4JMT has sent in an update from the Wakefield & District Amateur Radio Society, which meets on Tuesday evenings at the Community Centre, Ossett. She reports on a busy and varied year.

Among the visiting radio related speakers, Dr Peter Excell on the life of Sir Edward Appleton, Mike Bedford G4AEE, relating research and experiences in cave v.l.f. radio and Ray Snell describing his War Office Y Group work, were particularly noteworthy.

Of non-radio related events, the most unusual was a demonstration of mechanical musical instruments. A very successful first for the members was a Radio Controlled Treasure Hunt based on a idea by Cliff Sharpe G2HIF.

Dealing with coded clues and map references over the air was combined with traditional car treasure hunt skills. No one got completely lost and there's certainly a will to have another go this year. New too were the first effects of the Internet in the club's life.



In March and April, members will be the guests of West Yorkshire Police on three separate occasions! May the force be with them! They visit the control room in Bradford, the helicopter base and the driving school with its skid pan.

Recently the 6th Northern Cross Rally took place. As well as being an exciting day for all concerned, it also boosted club funds so that it can continue to provide the best facilities for the members.

Computing and audio visual facilities were added to the well equipped radio shack and comprehensive library last year.

An interesting family meeting took place at the last

rally, when three generations of radio amateurs came together, Gordon G0ISJ and his grandson Tristram 2E1ENC were on the W & DRS stand whilst Brian G0GNR, Gordon's son, was one of the



Before the 144MHz Trophy Contest (L to R) G0UJ, G4JMT, G7PNA, 2E1DML, 2E1DGD, G7JTH, Jamie, Sarah, G1YYE and baby.

Rochdale club members who ran the Bring & Buy stand.

If you would like more information on the Wakefield & District Radio Society, contact Rae on 0113-282 5519 or G4JMT @ GB7WRG or visit the club web site at URL: <http://www.waveg.demon.co.uk/wdrs/>



Three generations, (L to R) 2E1ENC, G0GNR, G0ISJ (see text).

station will be set-up on the Saturday morning and will be on air from 1200UTC on 29 March to as late as possible on Sunday evening, 30 March, on s.s.b., c.w. and f.m., hopefully all night, depending on available operators.

Previous events at this site have had over 700 contacts and the clubs hope to better that this time. All contacts will be sent a special QSL card

via the bureau and the clubs are especially interested to contact Horologists world-wide.

More details are available from Chris G4VFK on 0115-922 6321 (evenings).

Bracknell News

The Bracknell Amateur Radio Club was formed in 1970 and currently has 32 members. The club

provide a varied and interesting calendar of events for members and active participation in v.h.f./u.h.f. microwave contests.

The club possesses two call signs, G4BRA and G6BRA (no jokes please!) and regularly features in RSGB contest results listings.

The club meet on the second Wednesday of each month at Coopers Hill Youth and Community

Centre, Crowthorne Road North, Bracknell. Visitors are always welcome.

Further information on forthcoming events can be obtained from the Club Secretary, Steve Baugh G4AUC on (01344) 420577 or by E-mail at: baugh@compuserve.com

Yeovil Convention

The Yeovil Amateur

Radio Club will hold the 13th QRP Convention on 18 May 1997, at the Digby Hall, Hound Street, Sherborne, in the same larger venue as last year! Doors open at 9am. Let's hope that those who had difficulty finding the venue last year will know how to find the hall this time! When in doubt, take along your handie for the talk-in on 144MHz S22.

The convention will feature lectures by experts in their field, trade stands, junk stall, Bring & Buy, prize draws, plus the ubiquitous 'Constructors Challenge', and the same 'Top Class' refreshments that received such acclaim last year. Don't forget also the 'Fun Run' Contest on 3.5 and 7MHz on the week leading up to the convention.

Remember too, that the historic Abbey town of Sherborne offers a wide range of interest for the XYL. For further details, contact **Peter G3CQR**, who is QTHR, on (01935) 813054.

New Officers For Spalding

At Spalding & District Amateur Radio Society's recent AGM, the

following new officers were elected. Chairman: **Mick Pell G1APV**, (01775) 840521. Secretary: **John Flowers G0JLF**, (01775) 840445 (evenings and weekends only) and Treasurer: **Dennis Hoults G4OO**, (01775) 750383.

The club meets every Friday at 7.30pm for a natter/activity night at its clubroom, which is The Old Firestation, Double Street, Spalding. Refurbishment of the club facilities is currently taking place to improve antenna systems, equipment and workshop facilities available to club members.

Speakers, meetings and special events are planned for every third Friday of the month. New members and visitors are always welcome. Membership costs £7.50 per year.

The club will be holding Novice and RAE classes later in the year. Please contact one of the committee for further information.

Newquay's Group Photo

Maggie Reed G0KEM, Secretary of the Newquay & District Amateur

The Spotlight's On Again!

Yes, it's true, this is the 2nd year of the Spotlight Trophy, awarded to the Radio Club magazine of the year by *Practical Wireless* and Kenwood (UK). Last year, the Hoddesdon Club won, but who will have their club name engraved on the cup this year?

How did it all start I hear you ask? Well, **David Barlow G3PLE**, a retired Marketing professional and former member of the Birmingham Press Club, who now lives in Cornwall, wrote to **Rob Mannion G3XFD**, Editor of *PW*, and myself, suggesting a special trophy for the best radio club magazine or newsletter.

Both Rob and I thought David's idea was an excellent way of encouraging the often (hard-pressed) magazine and newsletter editors. **David Wilkins G5HY** of Kenwood (UK) thought so too! So, a new competition was borne!

So, let's see your magazine, whether it be weekly, fortnightly or monthly, glossy, duplicated A4, PC produced or whatever. They're all of interest and yours could win!

To enter your club magazine for the award, all you have to do is to send in two of your most recent club magazines and details of how they're published to the *PW* Editorial Offices. Most importantly, remember to mark your envelope 'Spotlight Club Magazine Competition'.

The panel of judges (as last year) are: **Dave Wilkins G5HY**, myself, (**Zoë Crabb**), **Jim Bacon G3YLA**, **David Barlow G3PLE** and last, but certainly not least, **Rob Mannion G3XFD**. We're all looking forward to receiving and reading your club magazines, and as we want to receive more than last year's ten entries, you'd best get busy, the spotlight's now on!

Zoë

P.S. Please note, the closing date for entries is Friday 25 July 1997.

Radio Society has recently written in enclosing a photo that was taken at Newquay's recent AGM. Members are (L to R) front row **Les G3WJO**, **Ted G3YJX**, **Mike G4WVD** (chairman), **John G3IGV**, 2nd row **Graham G7VPX**, **Gerry G0HEW**, **Maggie G0KEM**, **Colin G0UPZ**, **Mike G0JWX**, back row **John G7VER**, **Clyde G8XNH**, **Don G3JVN**

and **Roger G4OCO**. Meetings are held on alternate Fridays at Newquay. New members are always made welcome.

Further information can be obtained from **Maggie** on (01726) 882752 or via Packet BBS GB7NEQ.



Riding For The Disabled Association

'Club Spotlight' has recently had a letter from **Andrew Cunningham**, who is intending to hold a special event station. Here, in his own words, he explains all about it.

"I write to you as a class 'A' radio amateur to inform you and your readers of our intention to hold a special event station at the Riding for the Disabled Association Bannockburn Group here in Scotland. We hope to air the station callsign **GB2RDA** for a period of approximately one month from 6 June 1997.

The purpose of this station is to make people aware of the fantastic, dedicated work that's done daily by volunteer helpers in The Riding for the Disabled Association (RDA). The RDA centres can be found the length and breadth of the country (and I have no doubt that there are similar organisations in other countries doing equally good work).

One of the association's many aims is to allow the disabled person to feel, if only for a short while, that they can be 'on a par' with the ambulant person, and that they can do most of the things that the more fortunate take for granted. (I have had Spina Bifida from birth and am confined to a wheelchair for mobility).

So, I would like to bring to the attention of your readers that we will be QRV and calling for contacts on and around the above date. The station will be active on most amateur bands, h.f., l.f. and v.h.f., using predominately s.s.b., but also covering f.m. (v.h.f.) and some c.w.

There will be a special QSL card available for all contacts and we intend to run an award scheme. 1) **Basic Award**: Available to all participants who work the special event station on any four different

h.f./l.f. and/or v.h.f. bands. 2) **Advanced Award**: Available to all those participants who work the special event station on any six different h.f./l.f. and/or v.h.f. bands. 3) **SWL Award**: Available to all those participants who hear the special event station on any six different h.f./l.f. and/or v.h.f. bands.

The card and awards should be applied for no later than 31 December 1997 and will be available to any participants who apply either by writing or submitting a QSL card to either of the following at:

QSL Manager
Mr Andrew Cunningham GM0NWI
33 Broom Court
St. Ninians
Stirling
Scotland
FK7 7UN

Award Manager
Mr Ron Bloomfield MM0AOL
Torphin Princes Street
California
Nr. Falkirk
Scotland
FK1 2BX

As the RDA is a charity and depends solely on voluntary contributions, we would ask that participants include 2 Dollars or 2 Pounds sterling, to help towards the cost of printing and sending the cards & awards. We do hope that this special event station will be a success and make people more aware of these fantastic children, who must find life a struggle at times and their helpers too for their great efforts.

It may be that if successful, the station will become an annual event, who knows? With your help, I am sure we will soon be enjoying a 'pile-up' of interest for Riding for the Disabled Association!"

Amateur Radio Communications Ltd

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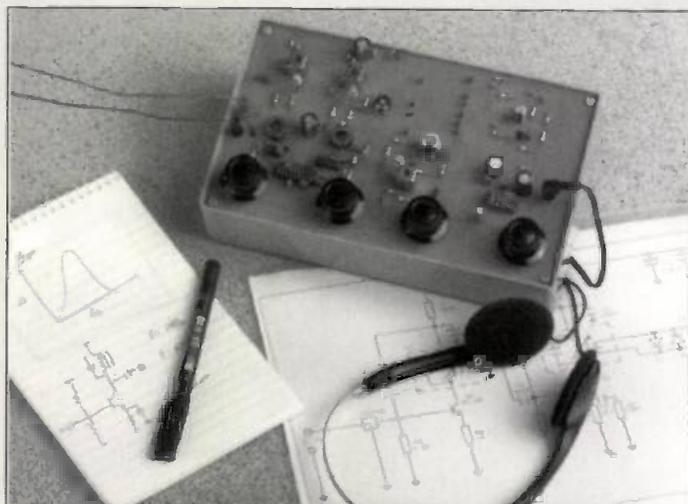


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The Chelcom CAHFV1 Vertical Antenna

By John Heys G3BDQ



Regular PW author John Heys G3BDQ breaks off from his 'Antenna Workshop' work to review a vertical antenna - something rather unusual for him!

My operating experience using vertical h.f. antennas is rather limited. Perhaps this is because I have always had the use of large gardens, which could accommodate effective wire antennas for all the h.f. bands. This means having spans of at least 50m.

A few years ago I put up a Hygain 18AVQ, which worked on all the non-WARC bands between 3.5 and 28MHz. More recently, another multi-band vertical tried was the GAP Challenger. This antenna is designed to radiate on 3.5, 7, 14, 21, 24, 28, 50 and 144MHz. It suffered considerable damage during a near hurricane and was only in use for a few months.

The Hygain and the GAP employed either traps or complicated stubs to achieve multi-band operation. Both antennas had narrow effective bandwidths and I only found them useful for rapid band changes without the need of an a.t.u.

Helically Wound Vertical

In the autumn of 1996, I was pleased to be offered for evaluation from Messrs. **Lowe Electronics** a Chelcom CAHFV1 helically wound vertical antenna. This antenna is designed to operate directly on 3.5MHz without using an a.t.u. and on six other h.f. bands when using a matcher.

The CAHFV1 has no traps or stubs and its helical winding makes it resonant as a quarter-wave on the 3.5MHz band. The performance on other h.f. bands is an added bonus.

The CAHFV1 arrived by carrier in an enormous cardboard tube a little over 3m long and this size is reflected in the cost of carriage! Unpacking revealed two white fibreglass sections each 2.74m in length.

In old style and American measurements, each was nine feet long. At the base of the thicker section (diameter 25.4mm) is a standard SO239 socket.

The other section is 19mm in diameter and is designed to have a thin stainless steel whip screwed into its top. The metal parts of the antenna are made from heavily chrome-plated brass.

The helical winding beneath the fibreglass provides a vertical antenna just 7m (23ft) long that will be resonant on the 3.5MHz band. The whip section can be trimmed to centre resonance on the desired part of the band.

Top Trimmed

I wished to use the CAHFV1 at the top or s.s.b. DX end of the band. So I trimmed the 1.22m whip down to 1.08m, which fortunately turned out to be just right. In the untrimmed state, the antenna will have a centre frequency of about 3.64MHz.

The antenna package includes all the necessary hardware such as mounting brackets, 'V bolts' and detailed installation instructions. The antenna must be mounted against a pole of at least 38mm diameter and positioned so that the coaxial socket is no more than 100mm above the ground.

The antenna can also of course be mounted in an elevated position.

However, in this case then some ground plane wires will be needed.

Easily Assembled

The antenna is easily assembled by using a few spanners or heavy pliers, no special tools being needed. Chelcom suggest that when used with a good earth system, no elevated radial wires are required.

With poor ground, Chelcom recommend using two or more $\lambda/4$ wave radials lying on the surface. Being a keen 'Top Band' DXer, I already have in place an effective



The CAHFV1 installed in G3BDQ's garden ready for testing.

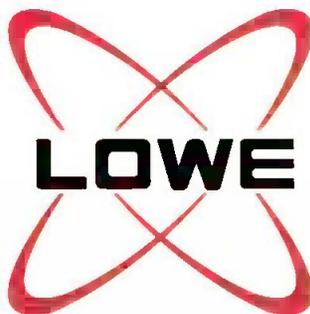
ground system, so I decided to position the CAHFV1 in my large rear garden.

The ground system or radials should be connected to the 'U' bolts at the antenna base. During the testing I used 45m of RG58U coaxial cable of which about 8m was buried to avoid any contact with my lawnmower!

I suggest that if you decide on getting a CAHFV-1, I recommend at least two people work together when putting up the antenna. I say this because it could prove difficult or even hazardous to attempt the work alone. Although not heavy, the 7m long antenna will sway in the lightest breeze and make the location and tightening of the 'U' bolts difficult.

Despite my precautionary warning, it's not that difficult. It took two of us more than an hour to erect the antenna and lay out the coaxial cable.

The photograph, Fig. 1, clearly shows the antenna base and the weather proofed coaxial connector. I used 'Elephant' tape which is excellent for keeping out moisture and does not seem to deteriorate when used out of doors.



The CAHFV1 in position surrounded by earthing rods is seen in the heading photograph. A month or so after the antenna was erected, two storms, with winds up to 130kph (80mph) were experienced. The CAHFV1 swayed rather alarmingly, but when the winds subsided, it remained undamaged and still vertical!

Coaxial Cable

When on the air many amateurs like to connect their antennas directly via coaxial cable to their transceivers or linear amplifiers. When not using an a.t.u. (matching unit) operating is certainly simplified, but unless the antenna is really broad-banded, the s.w.r. can rise considerably either side of the antenna resonant frequency.

Personally, I always employ an a.t.u. when the s.w.r. rises above 2:1. This is despite the fact that at this mismatch losses are really quite small and a listener would not detect a fall in signal strength.

After trimming the whip section of the CAHFV1, I discovered that it had an s.w.r. of unity on 3.8MHz. This rose to 1.8:1 at 3.7MHz and 3:1 at 3.6MHz. It was a disconcerting 4:1 at 3.5MHz on which frequency an a.t.u. would be mandatory.

The bandwidth of the antenna when the s.w.r. is 2:1 or better is about 180kHz. This is much better

than was experienced when using my previous verticals on '80'.

Table 1 shows the measured s.w.r. on six other bands. I did not attempt to use 7MHz, for on that band the antenna would be an electrical half-wave and certainly could not be end-fed with 50Ω coaxial cable.

Operation without an a.t.u. was possible on 10MHz between 14.2 and 14.3MHz, on 18.1MHz on 21MHz and over much of the 28MHz band. Chelcom suggest that an a.t.u. should be used when working on bands other than 3.5MHz and I took their advice when testing the antenna.

On Air Tests

For the on air tests I arranged that whenever I used the CAHFV1 I had

at least one other antenna available to switch in for comparison. On 3.5MHz it was compared with a 50m long end fed wire mounted at 12m above ground.

The reports received from DX s.s.b. stations

were very similar on both antennas and if anything, the Chelcom was less noisy on receive. It was a surprise that for contacts within the United Kingdom, the vertical was never more than one 'S' point down as compared with the wire antenna. And quite often the receive and transmit reports were equal to those on the 50m wire.

On the other h.f. bands, the Chelcom was sometimes as good as my other dedicated antennas. At those times it was 'filling in' the nulls in the radiation patterns of the other horizontal antennas.

Some signals 'in and out' were 2 or 3 S points down on the other antennas, but many DX contacts were achieved. If restricted to a limited garden area, the Chelcom CAHFV1 will allow operation on seven of our h.f. bands, but an a.t.u. will be needed.

Chelcom say that the antenna can handle power levels up to 1kW. I used output powers up to 400W with the antenna, the feeder and the antenna showing no signs of distress.

In a small garden as much wire as possible must be used for a ground system. Do not rely upon earth rods or you will be disappointed with results. Earthing rods do not work

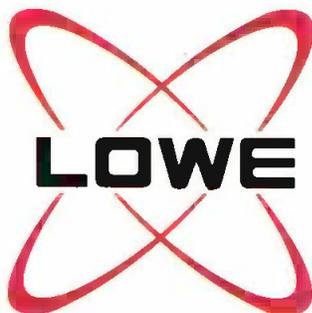


Fig. 1: Close-up view of the antenna's base and feed-point, suitably waterproofed.

properly as earth returns unless they are on a salt marsh! Earth resistance is very high when compared with copper wire.

Agreeably Surprised

I have been agreeably surprised by the performance of the antenna, but of course if it's possible to get up dipoles or long wires, they'll be more effective. Again, it's the old story of 'Horses for Courses'.

My thanks for the loan of the review antenna go to Lowe Electronics of Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800, FAX: (01629) 580020. The Chelcom CAHFV1 costs £119.95 plus £20 P&P.

PW

Table 1: Measured s.w.r.s using the CAHFV1 without an a.t.u.

Frequency MHz	SWR Measurement
3.500	4:1
3.600	3:1
3.7	1.8:1
3.8	1:1
10.1	2.2:1
14.000	2.5:1
14.200	2:1
14.300	1.8:1
18.1	1.2:1
21.000	1.5:1
21.200	1.5:1
21.300	1.5:1
24.900	2:1
28.000	1.7:1
28.500	1.2:1
29.000	1.8:1

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BBC Daventry.....

Potted History Of A Famous Station

By Keith Orchard G3TTC

Keith Orchard G3TTC provides a 'potted history' of the BBC Daventry transmitting station, for so many years a familiar name 'on the dial' and sight from the M1 Motorway in the English Midlands.

Heading photograph: Daventry BBC main building in 1991, the year before final closure.

Daventry's 'aerial farm' from the Weedon road, which was also visible from the M1 motorway.

Daventry is a name, like Hilversum (Holland), Motala (Sweden), Pittsburgh and Schenectady (USA), which was familiar to generations of listeners in the early days of domestic and international broadcasting. It has been one of the best heard and most listened to stations in the world, but on 28 March 1992, after 67 years of broadcasting, it fell silent.

Due to a reduction in the BBC's total transmission requirements, it was closed down. However, it still remains a base for a mobile maintenance team, which maintains domestic radio and television broadcasting station maintenance in the area.

Network Transmitters

By 1924, a network of nine 'main' and eleven 'relay' medium wave transmitters, each with its own studio, had been set-up across the country. However, there were problems in feeding all stations with a common programme from London, so the British Broadcasting Company made plans to build a long wave transmitter capable of covering a large part of the country, something not possible on medium wave.

Following successful long wave experiments at the Marconi works in Chelmsford, a search was made for a permanent site. This had to be fairly central in the country, to relay the



London programme on long wave.

Borough Hill on the outskirts of Daventry in Northamptonshire was chosen, being 200m above sea level (a.s.l.). It also had a flat top covering 20 hectares with good earthing qualities.

The site also had nearby electricity and water supplies and road and rail networks at hand. The site cost £2670 freehold, and as it was some distance from a road, a light railway was built to the top of the hill, using petrol-driven locomotives to transport the building materials.

Callsign 5XX

The station, using the callsign 5XX and a frequency of 187.5kHz was opened by the Postmaster General on 27 July 1925. With an output power of 25kW it was the most powerful in the world and the first to use long waves.

Originally, two 152m masts, each weighing 45 tonnes, spaced 244m apart supported a T aerial, while a number of buried zinc plates provided the earth system. The power supply of about 300kW was taken from the public mains supply without standby plant.

Reception reports soon confirmed that the range of the station was 300km for valve receivers, which at this time were becoming fairly common. Results showed that 85% percent of the population

could receive Daventry.

The opening of the station was a significant event for the BBC. This was because for the first time listeners were given the opportunity to receive an alternative programme if they were also within the range of a local medium wave station. Such was the birth of Daventry.

National & Regional

By now, some listeners had a choice of two programmes, the 'National' programme on long wave from Daventry 5XX and the local programme from their nearest 'Regional' medium wave station. But **Capt. P. P. Eckersley** (Chief Engineer) wanted everyone to have the choice.

Eckersley conceived the idea of the 'Regional Scheme', where a network of high power (50kW) medium wave transmitters would cover the country. They were to replace the existing low power transmitters.

A second building was erected at Daventry in 1926 and as no commercial 50kW m.w. transmitter was available, the BBC designed and built its own. It was estimated that it would cost £10,000 and that the running costs would be £3,000 per annum.

The prototype transmitter was built in under six months and was powered into a T aerial hung between two 100m masts for the first time on 5 May 1927, a remarkable achievement. It was known as 5GB.

The first alternative programme for



the Midlands started from this transmitter on 21 August 1927, operating on 610kHz with an output power of 30kW. During the testing of this transmitter, the BBC's first oscilloscope was used.

Distorting Radiation

When it was discovered that one of the long wave masts was distorting the radiation towards Birmingham, a new aerial had to be erected. Despite this, the new service was a success and the only complaints were overloading of local receivers!

There was a 25kW power restriction imposed by the Government on long wave transmissions from the Daventry site and in the early 1930s, thought was being given to the building of a new high power transmitter using the full 150kW permitted by the Lucerne Plan, but a new site would be required.

The new site was to be Droitwich in Worcestershire south of Birmingham, where the new National 200kHz transmitter was commissioned in October 1934. This was followed by the Regional m.w. transmitter in February 1935. (For further reading see

'Droitwich...Engraved On The Dial' PW January 1990. Editor).

Apart from a low power Air Met transmitter operating around 250kHz between 1935 and 1950, medium wave transmissions did not resume until 1950 when a Marconi experimental 'Ampliphase' transmitter was used to start the 'Third Programme' on 647kHz, later to be carried on two Marconi transmitters operated in parallel giving 162kW, housed in the original 5XX building.

The 'Third Programme' aerial was a 220m high mast radiator one and a half miles away at Dodford. It was fed by an open coaxial feeder comprising eight outer and four inner copper wires, resulting in a feeder loss of only 12kW.

The transmitters were completely air-cooled and were operated remotely from the main short wave building 150m away. This service ceased with the wavelength change in November 1978.

Short Wave Service

In May 1926, the Post Office granted permission to the BBC to set-up an experimental short wave transmitter at Daventry with a power not exceeding 20kW to service the Colonies.

Faced with shortages of money and manpower, priority was given to the experiments then taking place with high power m.w. transmitters.

Because of this, s.w. transmissions did not start until 19 December 1932, taking over from the 7kW Chelmsford experimental transmitter 5SW.

Mention should be made at this point of the pioneering work carried out by Radio Amateur **Gerald Marcuse G2NM**. Under the authority of the Postmaster General, he broadcast speech and music on a wavelength of 32m from 1 September 1927 with a power of 1kW from his home in Caterham, Surrey, and in doing so, proved that reliable world-wide broadcasting was possible.

New Concept

The design of a broadcasting station to give effective world-wide coverage was a new concept. Two Standard telephones and Cables Ltd. 15kW transmitters were installed to operate on eight wavelengths feeding 18 aerials, some directional and some omnidirectional.

The British Empire was divided into five zones, centres on Australia, India, West Africa and Canada. The programmes quickly gained a wide audience.

The early aerials were vertically polarised and supported by masts about 30m high but following experiments with different types, arrays of stacked horizontal dipoles were introduced, on taller masts. Two self-supporting steel masts were erected in 1934, so that various types of directional aerial could be tested.

Following the transfer of l.w. and m.w. transmissions to Droitwich in 1934, the two 152m masts used for the 5XX and 5GB aerials became available to support s.w. aerials. The old 5SW transmitter from Chelmsford was rebuilt and installed as Sender 3 in 1935, running 10kW, before being uprated to 20kW and then 60kW.

In the following year, construction of a new building commenced, in which Senders 4 and 5 (80kW ST&C) were commissioned prior to the Coronation of King George VI in May 1937, followed by Sender 6 (80kW Marconi SWB) and Sender 7 (80kW ST&C) in December 1940.

In 1937, the Postmaster General had announced that the BBC would commence foreign language transmissions. This led to an extension being added to house Senders 8, 9, 10 and 11 (all Marconi 100kW SWB18) which were commissioned in 1939/40.

Each 'sender' (the BBC always referred to the transmitters as 'senders')

had several low power stages. Any of these could be switched in to drive the higher power stages, which had a system of coils mounted on moveable trucks on a railway system, so that the coil truck corresponding to the desired waveband could be wheeled into the rear of the final amplifier.

Control Desk

Each transmitter had a control desk from which its various supplies - the extra high tension (e.h.t.) obtained from an evacuated steel tank rectifier containing mercury vapour, the remaining supplies from motor generator sets - could be controlled and monitored. A Technical Assistant was assigned to each transmitter and was responsible for its operation and monitoring its output on headphones.

As the number of transmitters increased, so did the number of aerials. Several additional stayed masts up to 100m high were erected to support them.

The aerials were fed by balanced 550Ω open wire feeders through an open air switching system. When a transmitter was not powered, a moveable connection could be transferred using a hook and eye arrangement, to connect it to a different aerial.

In 1944, new drive equipment was installed. This took the form of a number of v.f.o.s and crystal oscillators operating between 0.7 and 1.4MHz, which fed via frequency multiplier units to the transmitters. Frequent checks have to be made to ensure that the output frequencies were maintained within a few tens of Hertz.

Major Re-Engineering

In the early 1960s, a major re-engineering programme took place. Senders 1, 2, 4, 5, 6 and 7 were withdrawn in 1961/2 and four new Marconi 100kW BD253s installed. Designated Senders 12, 13, 14 and



All (almost!) gone, just one mast left in October 1992.

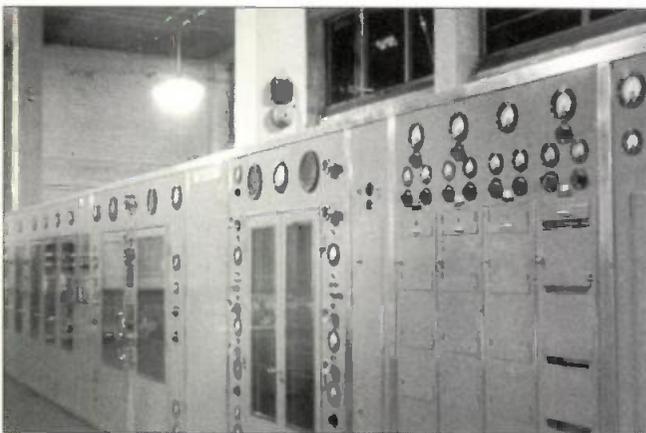




The original 1925 transmitter building (callsign 5XX) on the left, with the later transmitter building on the far right.

A temporary railway (far right) was used in the construction of Daventry, and a more permanent system - complete with 'points' - was used to move 'trucks' carrying the grid and anode tuned circuits.

Rather impressive! The r.f. stages of a 1939 Marconi SWB18 transmitter.



16, they were commissioned in 1962/3.

The new senders had r.f. channels, only one of which could be powered at a time. Between these was a modulator and power supply unit.

The unpowered r.f. channel could be set-up ready for a new frequency, and with a break of only two seconds, one transmission would cease and another start. Senders 12 to 16 were scrapped in October 1991.

A new control desk was installed in 1961. Remote control of filament and e.h.t. supplies was provided for the transmitters. A nearby automatic switching unit consisting of a pegboard, relays and uniselectors was programmed to switch any desired programme to any transmitter at 15 minute intervals throughout the day.

A lamp matrix on the control desk showed the selection. An audio monitor sequenced round all the incoming lines and transmitter outputs.

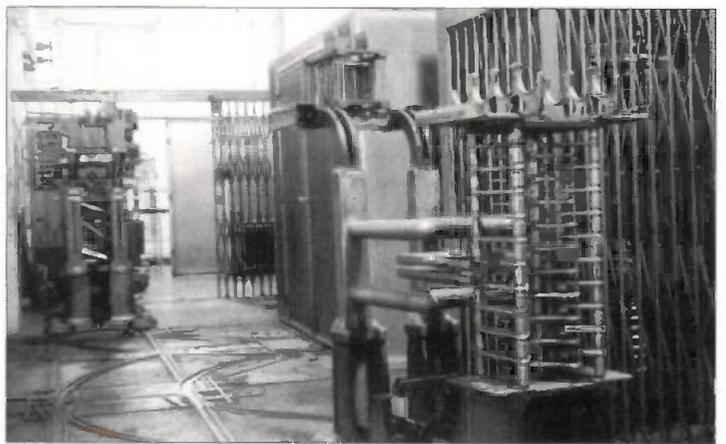
In the adjacent drive room, the first frequency synthesiser (by Rohde and Schwarz and containing 48 valves) made its appearance among the 1940s drive equipment.

New Transmitters

From 1964 to 1966, four new Marconi 250kW BD272 transmitters (Senders 18 to 21) entered service. In 1964, Sender 10, originally operated at 100kW was modified to generate a 20kW p.e.p. s.s.b. output for use as a point-to-point link to relay stations overseas.

Sender 10 was withdrawn in 1969 when two Marconi H1200 30kW single sideband transmitters (SSB1 and 2) were commissioned, with three rhombic aeriels. These transmitters were later converted for independent sideband operation, i.e. two sidebands carrying different programmes, SSB1 and 2 were withdrawn in 1985, when overseas relay stations received their programme feeds by satellite.

In 1965, a new feeder and feeder switching system with a characteristic impedance of 330Ω was brought into use. The switching was controlled remotely and replaced the original manual gantry system installed in 1937. The new system, using pneumatically operated r.f. switches, enabled any transmitter to be connected to any eight chosen aeriels.



More Synthesisers

Several more frequency synthesisers by Rohde and Schwarz and Marconi made their appearances after 1969. And when the (frequency) 'drive room' was abolished in 1972, each transmitter was equipped with its own synthesiser.

During 1982, vacuum circuit breakers were fitted to switch the e.h.t. power supplies of the transmitters. This was to reduce the wear and tear on the original oil-filled circuit breakers when switching the transmitters on and off.

A further modernisation programme began in 1985, when the pre-war Senders 8 to 11 were replaced by six Marconi 300kW B6126 self-tuning transmitters, Senders 22, 24 and 26 to 29. Senders 18 to 21 were dismantled and shipped to overseas stations and in their place a new control centre was installed, providing automatic selection of frequency, programme line, aerial and bearing.

Other Modes

Daventry transmitted in 'other modes' and radiated experimental

television pictures in 1928, using the Fultograph process. Later in 1935, early experiments with radar were conducted. One of the transmitters was operated in the 49 metre band and a receiver driving a cathode ray oscilloscope (then a new and expensive instrument) was set-up in an old van a few miles away.

The object of the experiment was to see if an aircraft flying through the radio beam would reflect the signal. An obsolete RAF Heyford bomber was 'borrowed' for the tests.

As it the lumbering aircraft flew at around 6000ft from Daventry to nearby Weedon, the spot on the oscilloscope wobbled due to interference between the direct and indirect (reflected) rays. This was a very encouraging start for Robert Watson-Watt's (later Sir Robert) team

and further development took place at Orfordness with the result that British radar was ready for the outbreak of the Second World War in September 1939.

Large Electricity Bill

In mid-1990, Daventry transmitted programmes in 37 languages to all parts of the world with a total air time of 1000 hours a week and a large electricity bill of £100 an hour. It had been the scene of many pioneering developments over the years and everyone was sad to see its closure in 1992.

Most of the BBC transmitter engineers have worked there at some time. But, like the Phoenix, Daventry is becoming a transmitting station once again, with a transmitter being installed for DAB (Digital Audio Broadcasting), the new v.h.f. digital radio service. You can't keep a good station off the air!

Finally, I'd like to thank the BBC for permission to publish this article.

PW



Watson WMM-1 Multimode

By Roger Cooke G3LDI

Roger Cooke G3LDI, PW's 'Packet Panorama' author takes a look at an interesting product aimed at the packet radio operator.

The Watson WMM-1 Multimode is another of the ever increasing stable of multi-mode modems that seem to be getting smaller and smaller. This one is in a black box, 100 x 50 x 20mm which hides a great deal of talent in its misleading anonymity!

On one end of the 'black box' there's a DB9 female connector to connect to the communications port of a PC compatible computer. This must be a '286 or better with at least one RS-232 port and a VGA video card.

Powered From Computer

Power is not needed as the Watson is actually powered by the computer itself. At the other end of the box there's a male DB9 connector for attaching the various signal wires to the radio.

The Watson Multimode's p.c.b. is of the double sided type and is quite neatly constructed using standard components. There's no surface mounted components to worry about! And the unit uses three integrated circuits (i.c.s) namely one TCM3105, one 74HC14N and a CD40538. There's also a 741.

Two pre-set potentiometers are provided on the p.c.b. One is used for setting the transmit audio level and the other for demodulator adjustment.

Looking At The Box

Looking at the box itself, there are four l.e.d.s on one side. The Data Carrier Detect (DCD) is green, the p.t.t. diode is yellow and packet 1200baud l.e.d. is red. The fourth l.e.d. is separated from the other three and is for FAX, c.w.,

RTTY, SSTV, AMTOR and h.f. packet (which is receive only, with no transmit capability).

On the other side of the unit there is a slide switch to select 1200baud packet or all-mode.

When all-mode is selected, the fourth l.e.d. illuminates.

The unit comes with a seven page instruction manual although no circuit is supplied and two disks. One disk has JVFX, used for FAX and SSTV and HAMCOMM, used for c.w., RTTY, AMTOR, NAVTEX and SYNOP. The other disk has a copy of the WINTNC program, used for packet.

Can Be Interfaced

The Watson WMM-1 unit can be interfaced to hand-held transceivers as well as normal radios. Explicit diagrams are provided by the manufacturers on how to wire the modem to both types of transceiver.

Full instructions are also given on the installation of the software, selection of Com port and IRQ and these instructions are accompanied by screen shots of the set-up procedure. So, I can assure you it's not easy to make a mistake!

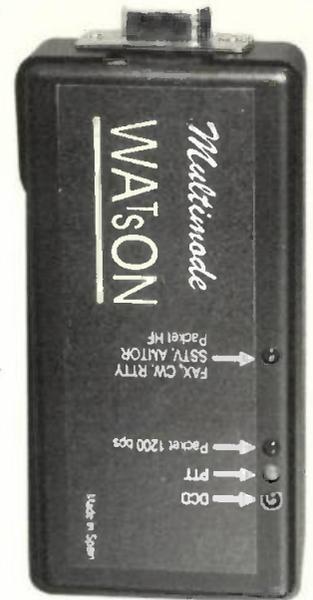
Ideal Introduction

Modems of this nature provide the beginner with an ideal introduction into the many facets of data communications. Using a unit like the Watson can be an economical way of trying out various modes without tying up too much capital.

The operator can then either stay with what they've bought, or then progress to a more sophisticated modem, which can provide many more refinements. Having done that, they can then afford to keep the unit as a back-up or spare, or even use it on another port.

The only disadvantage on this type of modem is that it has to be plugged into the Com port, which is on the back of the PC, normally out of reach and out of vision. However, once set-up, it does not have to be touched every day, unless the user wishes to change mode.

The only answer would be to build a connecting lead for the modem and have it in front of the computer. This would then solve the other problem, namely that there's no way of fixing the RS232 connector into the Com port as with a normal lead (it could work loose and fall out). But if you aren't too



sure about making a lead yourself they're available from computer shops.

Read & Operate!

As with all new pieces of equipment, no matter how simple, it always pays to read the manual first, read the instructions and then operate the new software off the air to become thoroughly familiar with all the commands. If you have used HAMCOMM and JVFX before, there should be no problem at all.

When I tried it out the modem worked first time and although I had limited time to put it through its paces, it seemed to work on all modes as predicted. I did manage to try it on RTTY and c.w. locally. Both worked fine, although as a keen c.w. operator myself, I'm never really happy with the 'mechanical sound' of computer generated c.w.

Computer Morse lacks personality, sounds stilted and is not a mode that I would recommend. I much prefer to hear human-sent c.w.!

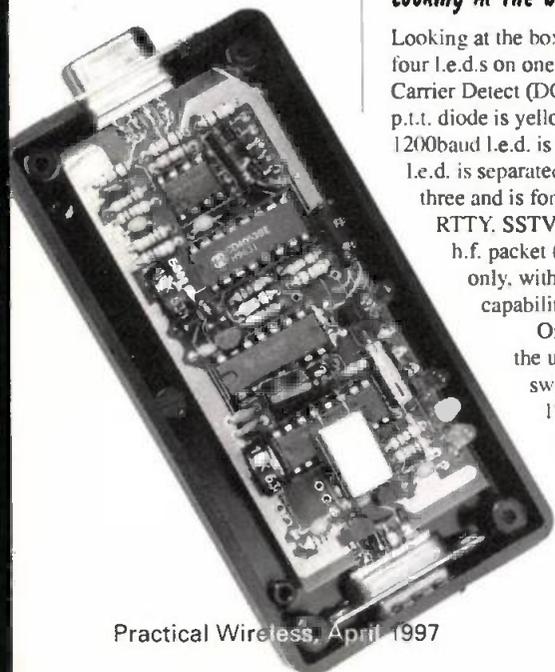
The software provides about a dozen or so 'brag' lines, which can be invoked from the keyboard and all the F keys can be pre-programmed to whatever is needed. The computer speaker can be used as a monitor if desired and all functions are menu-driven and should be set-up prior to operation.

It was an interesting experience trying the Watson. And I think this modem provides the new user with an ideal introduction into the fascinating world of data.

My thanks go to Waters & Stanton Electronics of 22 Main Road, Hockley, Essex SS5 4QS, Tel: (01702) 206835, FAX: (01702) 205843, for the loan of the review unit. The Watson WMM-1 Multimode is available for £69.95 plus £2 P&P.

PW

The WMM-1 hides a great deal of talent in its misleading anonymity!



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Feed-Point Resistance and Component Bridge

By Denis Payne G3KCR

Denis Payne G3KCR describes a useful low cost simple to build and operate, addition to the shack for the radio home-brew enthusiast.

This project started out as a feed-point resistance bridge for use with my MFJ-249 Antenna Analyser. But as an afterthought and careful construction, I realised it could also be used for measuring capacity and inductance over a useful range.

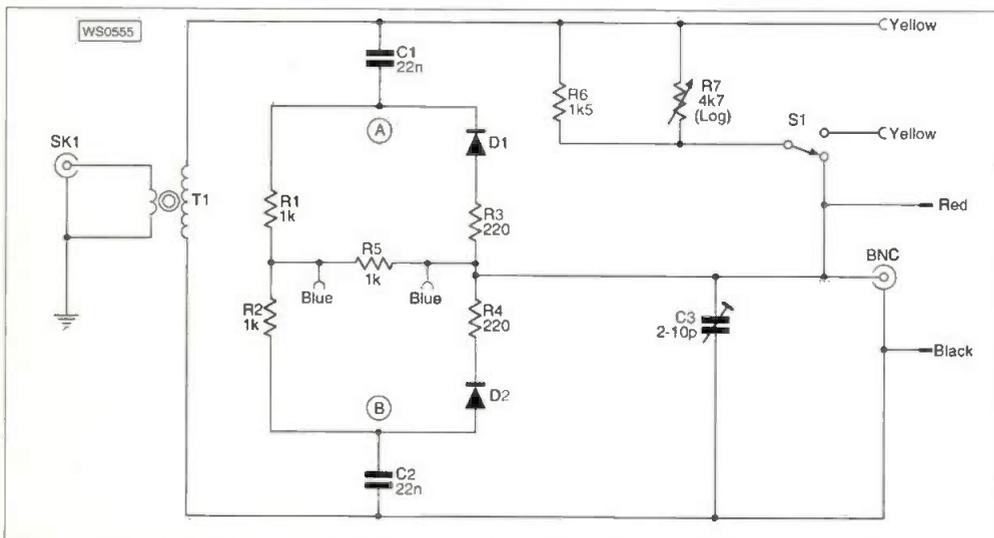
The circuit, shown in Fig. 1 is a basic bridge circuit, fed with an h.f. signal source of 2MHz, or to be more accurate 1.989MHz. This can come from an r.f. signal generator, antenna analyser or crystal oscillator shown in Fig. 2.

The reactance of an inductance is given as $X_L = 2\pi fL$, and for a capacitor, $X_C = 1/2\pi fC$, where:
 f = frequency in MHz
 L = Inductance in μH
 C = Capacity in μF
 and X_C and X_L are the reactances (impedance) in ohms.

The bridge circuit operates by balancing the value of R6/R7 resistance with the reactance (in Ohms) of a capacitor or inductor. When these values match, there will be zero d.c. volts across the bridge.

The signal is fed into a ferrite cored isolation transformer, T1, and connected to the bridge through capacitors C1 and C2. The bridge, built into a metal die-cast box for screening purposes, includes two diodes, D1/2, to rectify the signal applied to the blue sockets, and measured using a meter on a low d.c.

Fig. 1: The bridge circuit is very simple but effective.



millivolt range.

The two pairs of resistors, R1/2, and R3/4, are matched pairs, that can be matched using a digital multimeter. The actual values are not critical, but they should be equal. With no component connected to the measuring terminals, and the potentiometer, R7, connected, via S1 to the yellow sockets, the meter connected to the Blue sockets should read zero when the signal is applied.

Connecting a component, such as a capacitor, to the red and black terminals will cause an imbalance, and the meter will indicate this. By switching the potentiometer into circuit (connected to the red terminal) and adjusting it to balance the bridge, the meter can be brought back to read zero.

The value of the adjusted potentiometer will

now equal the reactance of the applied capacitor. By switching back to the Yellow sockets, and connecting the multimeter to the Yellow sockets, the value of the potentiometer can be read on the resistance scale.

The same principle can be used for measuring feed-point resistance and inductance. These will be described later.

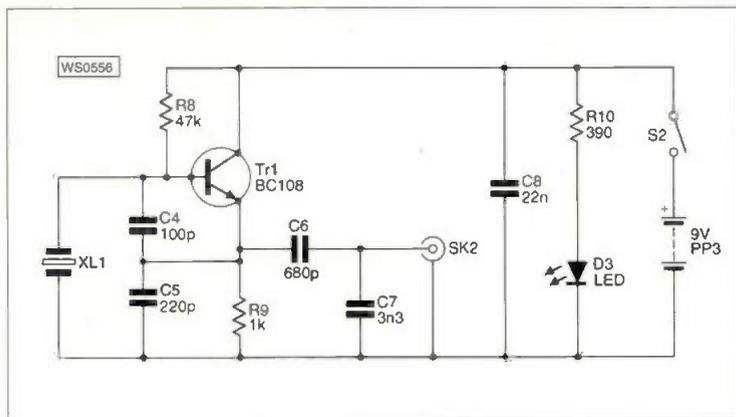
Limits and Accuracy

The upper limit for reactance is equal to the maximum value of R6/R7 combination, which is approximately 1000 Ω , and chosen for accurate measurements of feed-point impedance. The accuracy depends on the multimeter and the resolution of the potentiometer.

It's usually the odd capacitor or inductance that needs to be checked. Most enthusiasts can soon find the value of a resistor from the colour code.

Capacity measurements from 80 to 8000pF may be measured, but smaller capacities can be measured by substitution. Measure a capacitance within the above range, then add the small capacitor in parallel and measure the new value. The difference in values will be the value of the smaller capacitor.

Inductance measurements may be made on inductors in the range 2-80 μH . The accuracy of both capacity and inductance depends on the resolution of the potentiometer, but should be adequate for most applications.



It should be remembered that the ranges of capacity and inductance will vary with the frequency of the signal. These figures are based on a frequency of 2MHz, changing the frequency used will change the range of values that can be measured.

Feed-Point Resistance

When measuring the feed-point impedance, for the most accurate results, connect the bridge terminals directly to the antenna, **not** the transmitter end of the feeder. The frequency fed into the bridge will need to be at the design frequency of the antenna being measured (say in the frequency range 1.8 - 30MHz).

I use my MFJ Antenna Analyser as the signal source. Connect it directly to the antenna and tune for resonance. Switch off and connect the bridge unit between the antenna and the analyser. Switch the bridge potentiometer to red socket, then switch the analyser on. Adjust the potentiometer on the bridge for zero reading on the (blue sockets) meter.

Switch the analyser off, and the bridge to Yellow sockets. Next measure the resistance at the Yellow sockets using a multimeter on resistance. This will be the radiation resistance of the antenna at that frequency.

If you don't own an analyser, then use your transmitter on very low power as a signal source. I've shown a dummy load (10W) and attenuator in Fig. 3. This allows further reduction of the power to the bridge, and **must** be connected between the transmitter and the bridge.

Component values can be measured in a similar manner to above, but using a frequency of 2MHz, and connecting the component across the output terminals of the bridge. For components I'd recommend the use of a small crystal oscillator as shown in Fig. 2.

Construction

I chose to build my bridge into a die-cast box, and the main circuit is made on 0.1in pitch strip board. All drilling

is into the bottom and ends of the box, except for one hole for the 'P'-clip holding the transformer. The photograph, Fig 4, shows the layout of the bridge box.

The layout can be to your own design, depending on the method you choose, as can the choice of terminals and connectors. But it's essential that the circuit board layout is balanced, and be near the termination points to reduce internal capacity and inductance.

Ensure that the end terminals are spaced to avoid shorting with the 4 mm sockets inside the box. Fig. 5 shows a suitable layout inside the box. The bridge components are mounted on a piece of Veroboard, size 61 x 33 mm, with the copper strips parallel to the short side of the board. I'd recommend when using Veroboard, that you should file a bevel on the copper edges of the board to prevent shorting to nearby objects.

The transformer, T1, is wound using 0.71mm (22s.w.g.) enamelled copper wire. The primary is six turns, and the secondary is 24 turns. Leave enough length on the windings to reach the termination points.

Secure the windings to the core with tape or adhesive, and mount on the inside of the box using a clip. A large size solder tag should be between the clip and the box for the earth connection of the primary winding.

If the box is painted on the inside, the paint should be removed from around the holes for the input connector and the clip. The BNC socket on the measuring end of the circuit **must** be an insulated type. The connection to T1 is done after mounting the board in the box.

Using Fig. 5 as a guide, wire the components that are fitted to the box before sliding the board into position. Then connect the four wires from the board as shown. Keep all wires as short as practical. The last wire will be from T1, connected to the copper side of the board.

Testing The Bridge

After checking that all the wiring is

correct, to start testing the bridge, connect a 1.5V battery to the bridge at points A and B on the circuit. The upper (A) link being connected to positive. With the switch (S1) towards the yellow sockets, there should be zero voltage between the blue sockets. This should be measured on the d.c. millivolt range.

Any deviation from zero, which can be caused by slight differences in the diodes, can be corrected by adding large value resistors in parallel across R1 or R2. I made space at the top of the board to do this.

Disconnect the battery after balancing the circuit.

Before the lid is fitted, fit the small trimmer capacitor C3 inside the box between the Red and Black terminals. Apply a low power r.f. signal of 2MHz (from any source) to the input socket.

With no component connected to the measuring terminals, and S1 connected to the Blue sockets. The voltage at the Blue sockets should now be between 40 mV and 100 mV. Then switch towards the Yellow sockets, where there may be imbalance of one or two millivolts (at the Blue sockets). This is caused by stray capacity, and can be corrected by adjusting the small trimmer capacitor C3.

The next step is to connect a resistor across the measuring terminals. Any value between 180 to 560Ω. Switch S1 towards the Blue sockets, and connect your multimeter to them, set to the lowest d.c voltage range.

Adjust the potentiometer until you obtain a zero reading. Switch S1 towards the Yellow sockets, and check the resistance value between them. It should closely match the applied resistor.

The next step is to change the measured resistor for a small value capacitor, say 1nF, and repeat the process. This should give a reading of 80Ω. See the graph in Table 1 which should make it easier to find the values.

Don't forget that the components you are measuring may not be exact values, which could give you a slightly different value (in Ohms) than you expect. Try the same measurements with close tolerance components.



Fig. 2: A simple 2MHz oscillator is all that's needed if you only want a component bridge.

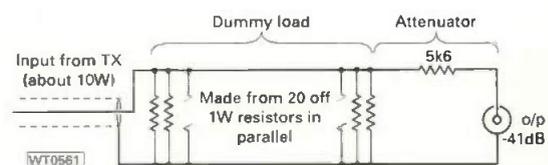


Fig. 3: Using a load and attenuator allows the station rig to be used as the bridge signal source (see text).

Feed Point Component and Resistance Bridge

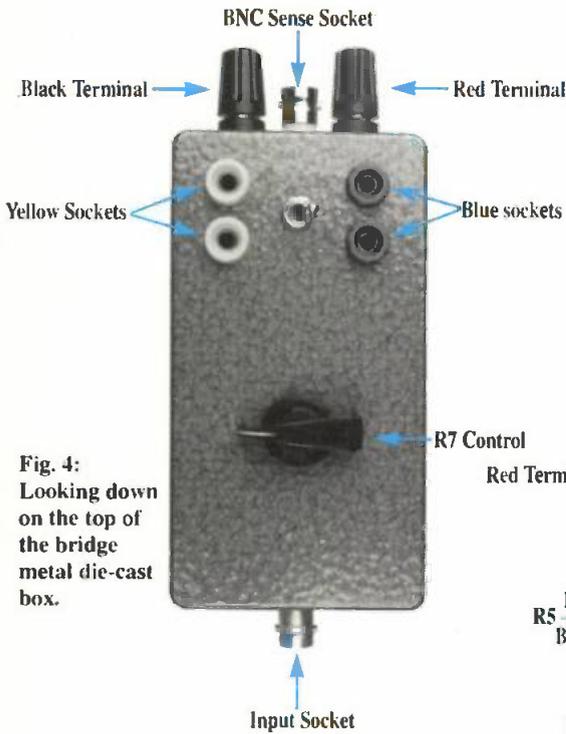


Fig. 4: Looking down on the top of the bridge metal die-cast box.



Fig. 6: This is the crystal oscillator box from outside.

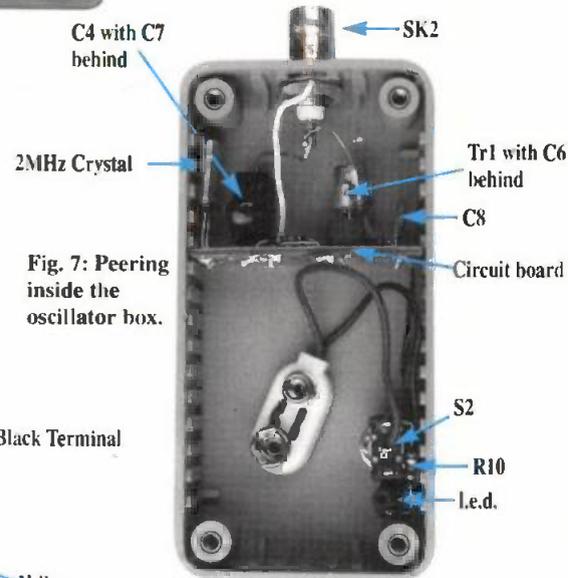


Fig. 7: Peering inside the oscillator box.

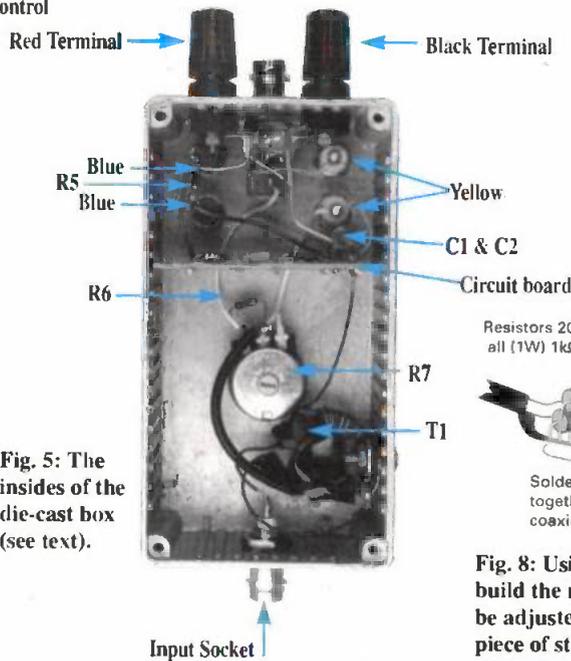


Fig. 5: The insides of the die-cast box (see text).

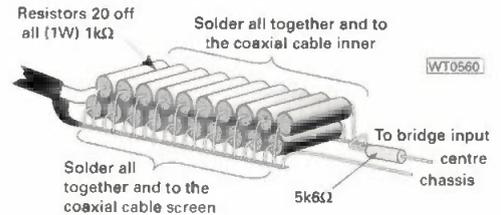


Fig. 8: Using 20 1kΩ resistors of 1W rating to build the matched load. The 5.6kΩ resistor may be adjusted in value (see text). (For clarity the piece of stripboard isn't shown).

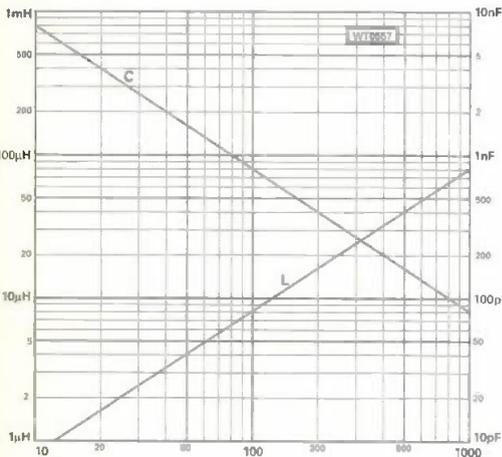
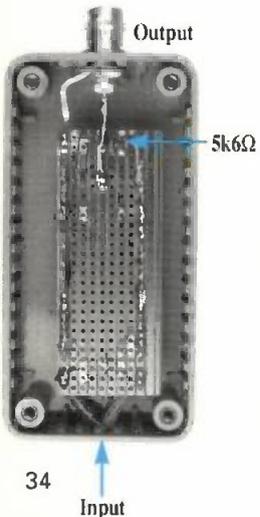


Table 1: When the bridge is fed from 2MHz, you may use this table for quickly finding inductor and capacitor values from their impedance.

Fig. 9: This is how the actual load and attenuator looks in its box.



Calibrated Scale

You may prefer a calibrated scale for quicker checking of components. This can be done by placing a plain label around the potentiometer. Calibration is then carried by setting the potentiometer value to known reactance values, and marking the label at the pointer tip.

I constructed the crystal oscillator on Veroboard as this is very simple way to construct. The board size is 46x20 mm. with the copper strips parallel with the long edge. I have included an I.e.d. indicator to remind you when it is on, and the layout is shown in Fig. 6 and Fig. 7.

The switch and I.e.d. are mounted to the side, to leave space for the battery. The heading picture shows the overall layout of the plastic box. The resistor R10 is connected to the longer lead of the I.e.d.

It's not possible to adjust the

oscillator frequency to 1.989MHz, to suit the graphs, but even at 2MHz the error is only 0.5%. The capacitor, C7, across the output socket is to clean up the signal and prevent harmonics giving false readings.

Dummy Load

To enable me to find feed-point impedances within various amateur bands, I had to build a dummy load and attenuator. This enabled me to use my transceiver, at 10 watts output, as a source for the bridge when measuring this resistance.

I used 20 (1W) 1kΩ resistors as a safety margin, and mounted them on stripboard of 71x28 mm size, with the copper strips parallel to the long edge of the board. The circuit is built into the same type of box as the oscillator.

The layout of Fig. 8 is shown without the piece of stripboard in the way. When the board is fitted in a suitable box, the layout is as shown in Fig. 9.

I found that during experiments, it only required a very small amount of r.f. to drive the bridge. The 5k6Ω

resistor should be adjusted to give about 50mV d.c. across the bridge when unbalanced.

Final Notes

As final notes, many of the features and components can be changed to suit your design, such as the connectors or range that you favour. Using a higher frequency may require a change of capacitor values in the oscillator circuit.

On my first model I used a 25-0-25mV meter mounted in a larger box. I changed this to a pair of sockets to more than halve the cost.

Planned for a minimum amount of drilling, and low cost, buying all the components for the bridge cost less than £17. The oscillator cost £10.50, and the dummy load £7. But I'm sure many of the parts can be found in your junk box.

Go on - bridge the gap in your test equipment!

PW



Practical Wireless has teamed up with the nationwide communication specialists Odyssey Corporation PLC to give away a free Ericsson mobile phone, with free connection to readers of the magazine.

The Ericsson GA 318 is one of the smallest and most reliable digital mobile phones on the market. Just 130 x 49 x 32.5 millimetres in size and a lightweight 248 grams, the GA 318 fits snugly into your pocket or in the palm of your hand.

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Each phone has a retail value of approximately £300, and comes with a 14 day trial period during which you can judge it for yourself. If you do not want to keep it, simply return the phone in perfect condition and its original packaging to Odyssey.

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 - 6.2 SIM cards issued by us will remain the property of Celnet
 - 6.3 You must inform us immediately if your SIM card is lost, stolen or damaged. We will issue a replacement card as soon as possible but we reserve the right to charge for doing so. You will be liable for all Charges incurred until we receive notice of the loss, theft or damage
 - 7. Payment of Charges
 - 7.1 You must pay for all charges invoiced to you within 15 days of the date of our invoice
 - 7.2 VAT at the applicable rate will be payable on all Charges
 - 7.3 We may charge interest at 4% per annum above the base rate for the time being of National Westminster Bank plc from the due date of payment until the date of actual payment
 - 8. Limit of Liability
 - 8.1 We do not exclude or limit our liability for death or personal injury arising from our negligence
 - 8.2 Subject to 8.1 above, our liability will not exceed £500 in respect of all claims arising in any one calendar year
 - 8.3 We will not be liable (whether in contract, tort or otherwise) for any loss of profit or for any indirect or consequential loss
 - 9. Term
 - 9.1 The initial period of this contract will be 12 months or such other period as may be agreed in writing. After expiry of the initial period, the contract will (subject to 10 and 11 below) continue until terminated by either of us giving not less than 90 days written notice
 - 10. Disconnection
 - 10.1 On termination of this contract under 11 below
 - 10.2 if our telecommunications licence is revoked or terminated for any reason
 - 10.3 if you are in breach of any of the terms of this contract which are capable of remedy within 14 days. If you remedy the breach within 14 days, we will reconnect you to the Network as soon as practicable and after you have paid the applicable reconnection fee
 - 10.4 If we have reasonable grounds to suspect that fraud or mis-use has occurred
 - 10.5 If we have reasonable grounds to suspect that You will not be able to pay your bill
 - 11. Termination
 - 11.1 The contract may be terminated by us with immediate effect if you commit any breach of your obligations under this agreement which cannot be remedied within 14 days or (in the case of a breach which is capable of remedy within 14 days) which is not so remedied; or (being an individual) you commit an act of bankruptcy or (being a corporation) a receiver or administrator is appointed over your assets or if you make any deed or arrangement with or composition with any of your creditors
 - 11.2 We reserve the right not to re-use or re-use the electronics serial number of your Cellphone until you have paid to us all outstanding Charges under this contract
 - 11.3 We will, if requested by you and upon payment of our applicable charge, release your mobile number(s) for re-use where the mobile number has not been re-allocated
 - 12. Emergency & Reverse Charge Calls
 - 12.1 No charge will be made to you in respect of calls for emergency services made available through the public telephone network
 - 12.2 We may temporarily suspend the Service during such period as we consider necessary to give priority on the Network to those dealing with an emergency
 - 12.3 You must not initiate reverse charge calls on the Network
 - 13. Restriction on Transfer
 - 13.1 This contract is personal to you and you must not assign it to any third party. We reserve the right to assign our rights and obligations under this contract to a third party on giving written notice to you
 - 14. Entire Agreement
 - 14.1 This document constitutes the entire agreement between you and us. It replaces the provisions of any previous agreement, warranty or representation made or given relating to the Service
 - 15. Modifications
 - 15.1 No modification to this contract will be valid unless confirmed in writing by one of our directors or our contract manager on our behalf
 - 16. Legal Construction
 - 16.1 This contract will be construed in accordance with the laws of England and the courts of England will have exclusive jurisdiction in relation to any matter arising out of it
 - 17. Force Majeure
 - 17.1 We will not be liable for any breach of this contract if caused by act of God, war, emergency, compliance with any statutory obligation, industrial disputes, fire, lightning, flood, exceptionally severe weather, acts or omissions of persons for whom we are not responsible or any other cause beyond our reasonable control
 - 18. Notices
 - 18.1 Any notice under this contract must be given in writing and delivered by hand or sent by prepaid post to the following address (or such other address as may be notified from time to time): to Us, Customer Service Department, Securicor Cellular Services Limited at the address shown on your invoice to you, the address specified overleaf. You must tell us if you change your address

Antenna Workshop

By Dick Pascoe G0BPS

This month Dick Pascoe G0BPS ponders the improbable and reviews 'invisible' antennas.

This is a tale that affects us all in these 'modern' times - the lack of space. We'd all love to have a 20m (or possibly even higher) tower, with a tri-bander or cubical quad stuck on top, in the garden but sadly, this is often not possible.

With space in most amateur's properties at a premium, we have to accept a compromise, even though the accepted compromise may differ. For the amateur who must accept a wire dipole compromise, a beam antenna may be the dream. But, for those with little space for any form of antenna, almost anything will be acceptable.

Recently a friend asked me about putting an antenna up in his garden for h.f. use, the answer was obvious of course. My immediate answer was of course - "put up a scaffold pole and the biggest doublet you can fit in". "Ahhhh..", he said, "but there is a covenant on the estate prohibiting antennas, even TV antennas have to go inside the attic".

The chances of fitting a doublet antenna for the '80m' (3.5MHz) band inside the small roof space of his bungalow was almost impossible. So, here was a fellow amateur with a problem.

I have 16 books on my shelves about antennas and feedlines, and any time I want to find out about a problem I dig into the books and inevitably find the answer in at least

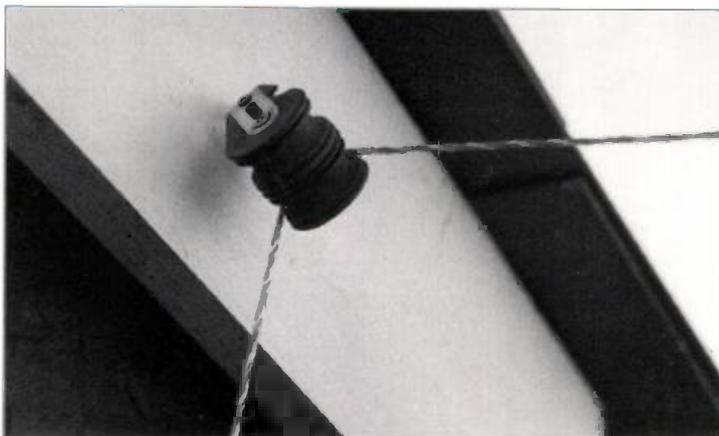


Fig. 1: An insulated 'pulley' for the washing line antenna. The electric fence (rope), forming the new washing line, has metal strands running through it.

one of them. The presentation of the information may differ slightly but the 'nitty gritty' will agree between all the books.

So, considering how to help my friend, some lateral thinking was called for. Out came the books and much to my surprise the only reference to hidden antennas - in any depth - was found in just one book, the *ARRL Antenna Handbook*

In the *ARRL Antenna Handbook* I found just one chapter on antennas for limited space which included a few 'invisible' antennas. In spite of this minimal amount of information, with my brain engaged I set out to try to cure his problems.

All of the ideas discussed here will work, but it must be remembered that insulated wire should always be used and any joint waterproofed thoroughly. It's also essential that the end of any wire should also be doubled back for a few inches and strongly insulated.

Everything mentioned here can be adapted to any location, if one version won't fit try to bend the legs, grow a larger fence or move the washing line. Yes... move the washing line.

The first obvious thing to do in this particular case was to use the XYL's washing line as the antenna. The existing line went from one side of the garden to the other. Moving the line to one end of the bungalow and running it down the full length of the garden gave a very long line that needed to be held up in the middle by a prop.

My friend's wife was happy with the longer drying line and he was happier because he had an antenna. We used electric fence wire which is

made up of polypropylene with some strands of wire running through the outside. It's easily strong enough to carry the washing and also when 'loaded' still radiates a fair signal. (See Fig. 1).

The end-fed type of antenna mentioned may cause other problems and should be fed against an effective r.f. ground. A counterpoise for each band used and tuned to resonance should be laid out at ground level or even buried inside a waterproof pipe.

There are two other considerations in relation to this antenna. Number one is that large damp sheets will alter the s.w.r. as they swing about in the wind. The second, and far more important, is that very high r.f. voltages can be present on this type of antenna. I would suggest keeping the XYL's insurance up-to-date and having a good alibi for yourself. Ed.

I'm sure the purists among you will complain that, using counterpoises or finding an effective r.f. earth, will create its own problems. But you must remember that any way of radiating r.f. signals is better than radiating none at all.

Shown in photographs Figs 2, 3 and 4 are a few ways to show how a wire can be hidden. In these cases I've used a thick red wire so that it can easily be seen by the camera.

For a practical application you would chose a thin wire of a colour that blends in well with the background. In these demonstrations I have used drawing pins to hold the wire in place, it would be better to use staples or nails of course.

A Step Up

Here's an idea for a step up in the

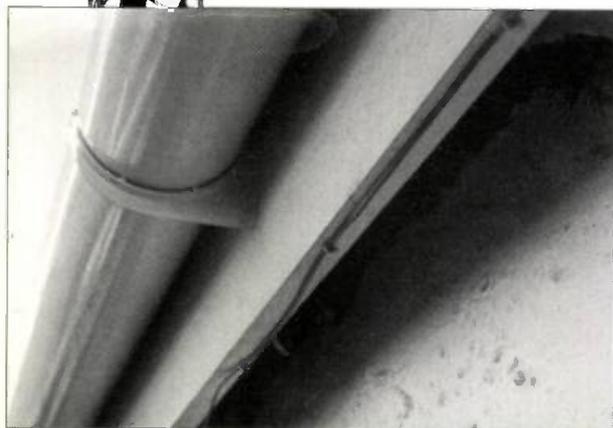


Fig. 2: The wire under the eaves would not be seen at all if it were fitted behind the fascia or behind the soffit board.



Fig. 3: Now if this was one of those green wires that are found in the bushes to control them, would you think it was an antenna?

right direction. Look at the photograph of Fig. 5. The ladder leaning up against the wall would never be seen as an antenna, but it will work if loaded against a counterpoise.

I've shown a close up of the foot of the ladder in Fig. 6. The outer of the coaxial cable connects to the radial and must be insulated from the ladder itself. This set-up can be used without anyone suspecting a thing.

How about a horizontal antenna from a longer ladder stored along a wall. You could have a clip to attach to the 'antenna' and be used. Even metal guttering or down pipes



Fig. 5: Stepping up the h.f. band. A metal ladder makes a good vertical antenna if loaded against a counterpoise.

could be loaded up although these are few and far between these days.

The wire hidden in the hedge, or along the fence does not have to be end-fed, if taken around the garden and brought back to the shack it would be a loop. A quick check of the resonant point of the loop will show which bands it works on and how much it will have to be loaded.

Any loading coil can be hidden inside the hedge at almost any point. As it would be outside in all weathers, it must be well insulated of course.

Another well known 'Antenna Workshop' amateur John Heys G3BDQ has done many experiments with low level antennas at a height of about a metre above ground. He has shown that it's not essential to have our antennas at great height.

Of course an antenna will work better if higher, but it's not essential. A wire run around the garden at just a metre above ground will radiate a signal. The signal may not be enormous or the best we require, but it will ensure some r.f. getting out.

On most properties, the vent pipe from the drains may run up one wall. How many neighbours would notice if another one appeared in a suitable place? It would have to appear with a suitable vertical antenna inside of course. *Leighton Smart GW0BLI wrote an article titled 'The Welsh QRP Club- Three Watts From A Drainpipe' in the April 1995 issue of PW on this basis.* Ed.

Even in a flat or apartment all is not lost. I well remember a cartoon in *Sprat* (the G-QRP club's magazine) of a ribbon antenna run around the room as a loop just below the ceiling. (it could go under the dado rail even). It looked very pretty too!

Any mobile antenna will work in the home too as long as they can see a ground plane or a counterpoise. The good old G-Whip when mounted on a metal balcony will radiate and use the metal of the balcony as the ground. Any other mobile antenna will radiate a signal indoors.

If difficulties are found creating an adequate ground plane, how about lots of cooking foil under the carpet? Or perhaps counterpoise wires run around the skirting boards. Have you tried metal window frames, or perhaps even a metal door frame?

I even know of one (American) amateur who used two shopping trolleys, 'nose-to-nose' as a doublet, yes it did work he told me and he had several contacts with it. (I was tempted to try this one for myself but couldn't



Fig. 6: Connections to the vertical antenna. The wire radial is connected to the outer of the coaxial cable and must be insulated from the antenna.

get the courage to ask my local store manager!).

Sensible Note

On a more sensible note even a mobile antenna on the back of a car can be used from indoors, just a connector fitted to a longer length of feeder.

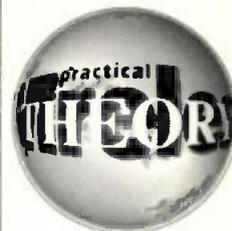
Take a walk around your garden, look carefully at the fences, the trees and bushes and find out just how many ways you could fit in an antenna. Look at any books you have and the thoughts shared by the other antenna workshop members. Some way will be found of getting that important antenna up somehow.

I have not gone into details of any specific antenna in this article for a good reason. We all know that what works well in your own location may not be so good at others. I'll leave it to you to decide which one to try first. Get experimenting! If you have other ideas for hidden antennas that you would like to share with the readers please let me have them via the Editor.

AW



Fig. 4: The wire on the fence was fitted on the face of a batten for the photograph. But it would be much less visible if a brown wire was fitted under, or above, the batten.



Warning: Bearing in mind high r.f. voltage in antennas, it's essential to ensure the safety of other people. So if you use any low mounted antenna system...please take care and make sure that you minimise any danger to yourself and others with appropriate warning notices.



The key to comfortable CW

MORSE KEYS

Rob Mannion G3XFD reports on his attempts to keep busy on 'the key'. Determined to carry on enjoying c.w. operating despite 'wear & tear' Rob's tried various alternatives to 'keep on the key' and shares his ideas to try and encourage others.

'Those readers who've met me know of course that I operate on the 'five digit' scale rather than the full 'decimal' quota. In other words, I've only got one arm (well one natural one anyway!).

Over the years, anyone working with me has come to realise that I 'just got on with the job' and made light of my loss. And in fact I used to show off what I could do with the immensely strong left arm, even to the extent of pulling a 30m outside broadcast type mobile antenna (normally towed by a Land Rover).

Now, after years of over-use, added together with the traumatic effects of my original accident, operating on c.w. has become very uncomfortable and even very painful at times. My 'chickens have come home to roost' and to carry on enjoying c.w. I've had to search for alternatives I'm sharing my experiences because I feel sure there are many others in the same boat.

In fact one of the reasons I think 'phone' is so popular nowadays is that it's apparently such an easy relaxed operational mode. On the other hand, operating on the key is seen as hard work rather than enjoyable. The idea of this feature is to share my attempts at improving the c.w. mode's image!

On The Air

If you have worked me on the air using c.w. I have no doubt that you'll remember that although I obviously enjoy a 'rag chew' in Morse, on many occasions I've had to cut the QSO short. This unfortunately is because of arthritic problems in my hand, wrist, elbow and shoulder (Perhaps I ought to be

scrapped really!).

So, in order to keep working 'on the key' I had to look for an alternative because I really **DO ENJOY** the 'Morse Mode'. Using c.w. I can get a QSO at virtually any time of day or night and in any language (with the International c.w. abbreviations and 'Q' code taking the place of a common language in many cases). There's another bonus in that I can operate at relatively low power reducing the risk of 'tripping' burglar alarms and other equipment with poor EMC parameters.

Up until recently my favourite hand key had been the well known Kent 'pump' style model. It had served me well over the years and is still an excellent key, but due to the wrist and arm problems I had to look at other ideas and that's how readers helped.

Rallied Round

I placed an advert in 'Bargain Basement' to try and locate as many different electronic keyers as I could because I thought that this would be the solution. It was, and the advert was very successful and readers rallied round.

Ken Sugg G8TTX sent me an interesting key, as did the members of the Bletchley Park Morse Centre, and Bill Collier G0TGU was particularly helpful. The various keys all helped but I found that the commonly available 'Iambic' type movement was just not suitable because it needed carefully co-ordinated work by the fingers...something I find difficult nowadays.

One of the earliest ideas I tried out was the MFJ-451 Morse keyboard (available from Waters & Stanton for £112 plus £5 P&P).

continued on p 40

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John Goodall G0SKR using the MFJ-451 Morse keyboard direct from his wheelchair. Rob G3XFD also found the keyboard easy-to-use but opted for a single paddle key to overcome operating problems (see text).

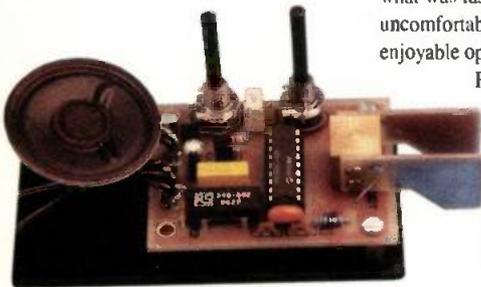
This has been reviewed in *PW* by our 'Morse Man' himself...John Goodall G0SKR.

John in his review (page 27 *PW* June 1994) obviously liked the keyboard and was photographed using it straight from his wheelchair so I thought it best to try one out a year or so ago. Incidentally, I taught John his Morse, now he's better than me and is a first class c.w. operator, so I listen to his opinion! (Isn't that the natural way of things?).

Personally speaking, I was extremely sceptical about using an MFJ-451 Morse keyboard. I'd tried one while I was at the Dayton HamVention, and the model I used at home had been brought back to the UK by a friend.

However, I must say that **IF** you're happy typing and **IF** you can bear to sit upright (just as though you're in front of a computer v.d.u. operating the keyboard) and have difficulty with c.w. - this must be the ultimate answer for you.

And in fact, bearing in mind just how many Radio Amateurs do sit a great deal in front of their computers...perhaps 'keyboard' c.w. might just be the answer! I had already seen a demonstration c.w. station that operates via a keyboard



The double 'touch' paddle electronic keyer - available in ready made form only - from R A Kent (Engineers) proved to be a possible solution for G3XFD (see text).

and monitor while I was in the USA...and at first it looked and felt rather odd to say the least.

The operator sat in front of the v.d.u., with the rig off to the left (he tended to operate with the receiver audio turned right down) and the decoded incoming c.w. being displayed on the screen. For all intents and purposes it could have been RTTY.

As I watched other operators working the keyboard & v.d.u. c.w. station, I noticed some of them (it was a demonstration station) kept the receiver's audio turned up so that they could hear it. When asked why the reply was the inevitable "Oh...the computer sometimes can't read the Morse correctly but I can"!

(Nice to know humans aren't - as yet - redundant in Amateur Radio!).

But, despite using the Morse keyboard successfully, I'm afraid that I felt as though I was missing something. True it generated good c.w. and the 'type ahead' buffer worked very well (ideal for the average 'hunt & peck' typist), but it really didn't feel like 'working c.w.' to me.

To be fair though, I've got to bear in mind that as a working journalist I already spend most of my day on a keyboard. Perhaps I'd think differently if I didn't pound the keys all day!

So, it was a case of looking for something that could give me good c.w. despite the vagueness of feeling (and fine control) in my hand. And it turned out to be far more difficult than I'd imagined.

Tried & Tested

Over the last year or so I've tried and tested many different types of electronic keyer and perhaps you may be surprised to hear that the type I found to be the least tiring to use was a single-paddle type.

I've found that the single-paddle type, carefully adjusted has proved very helpful indeed. It's transformed what was fast becoming an uncomfortable ordeal back into an enjoyable operating mode.

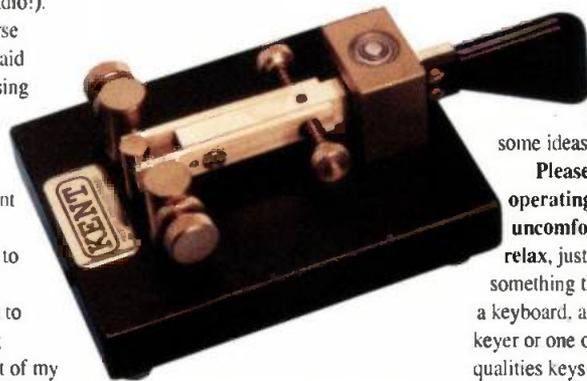
Following experiments with different commercially made electronic keyers (the types where you supply and use a key of your choice) I settled on a home-brew keyer using a Curtiss 'chip'. These 'one chip' devices are extremely versatile and

reasonably priced.

I'd always intended buying one when I was in the USA but after failing to find them on sale at the HamVention in Dayton...I bought mine (complete with i.c. holder and circuit details) from **Chris Rees G3TUX of The QRP Component Company** (price of the i.c. is £19.95).

The first 'key' I used with my Curtiss electronic keyer was an old Japanese semi-automatic 'Bug' that I had bought almost 30 years ago. And although I had never been able to get on very well with the auto-dots and mechanical 'dahs' the key had a reasonable paddle.

Once I had built the Curtiss i.c. into the old Japanese 'Bug' I found it worked very well indeed, with the



Rob's final choice was to use a **Kent single paddle key in conjunction with a home-brew 'one chip' electronic keyer using the Curtiss 8044 i.c.** One of the deciding factors for G3XFD was that the **Kent key's paddle extends very closely towards the operating bench, adding to his comfort when using the key** (see text).

strip of lead I'd added making a very good weight to keep it from sliding about on the operating desk. But I then found I had another problem in that the paddle was too high above the desk for my wrist to feel comfortable. So it was back to the drawing board and I started looking for a paddle which would suit me and my particular problem.

The Paddle

Eventually, I found the paddle to suit my requirements. It's not new (it's been available for a while now) but due to the shape of the paddle handle and that the finger grip almost reaches to the desk...it was just right.

The key of my choice? It was the **Kent Keys single-paddle model**, available as a kit for £46.50 or ready-built for £56.50 plus £3.50 P&P (It's very heavy!). It's not a 'fancy' design, is very simply but

beautifully made and extremely heavy and sits firmly on the operating desk! In operation the paddle key is delightful to use and adjust, while my wrist rests comfortably on the operating desk.

I also tried Bob Kent's combined **Jambic 'touch' paddle and keyer**. This is available in kit form only at £24 and was very pleased with the results. If I had slightly better quality of movement in my hand and wrist, I would have adopted this type of key. However, even though it didn't quite suit me...the variable speed 'touch keyer might suit someone else with difficulties like mine.

So, I've found the solution to my c.w. operating problem. And in doing so I hope I've given you some ideas.

Please don't be put off from operating c.w. because you get uncomfortable or you can't relax, just try and look for something that suits you. It may be a keyboard, an iambic electronic keyer or one of the many high qualities keys available on the market. Just persevere...I feel sure you'll find your key to success and I look forward to working you on the bands and hearing how you solved your own operating problems.

PW



Useful Addresses

Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843.

Kent Keys, contact R A Kent (Engineers), 243 Carr Lane, Tarleton, Preston, Lancashire PR4 6BY. Tel: (01772) 814998, FAX: (01772) 815437.

The QRP Component Company, Chris Rees G3TUX, PO Box 88, Haslemere, Surrey GU27 2RF. Tel: (01428) 661502, FAX: (01428) 661794.

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Channel Travel Radio

By Dick Pascoe GOBPS

Dick Pascoe GOBPS provides a 'behind the scenes' look at Channel Travel Radio, the specialist radio station that helps to keep Eurotravellers on the move.

During Rob Mannion G3XFD's last visit to Folkestone he told me that he had listened to the new Channel Travel Radio (CTR) station as he drove down the motorway to Folkestone. He found it so interesting that he asked me to do some investigating and to do a story on it.

There was also a coincidence in my being asked to write about Channel Travel Radio as when the Tunnel first opened I was serving as Chairman of the local Shepway District Council. I was there at the official opening of the tunnel and second in line behind the Lord Lieutenant of Kent to greet HM The Queen and President Mitterand of France when they came to open the tunnel. Like Rob, I have also travelled through the tunnel and listened to this radio station.

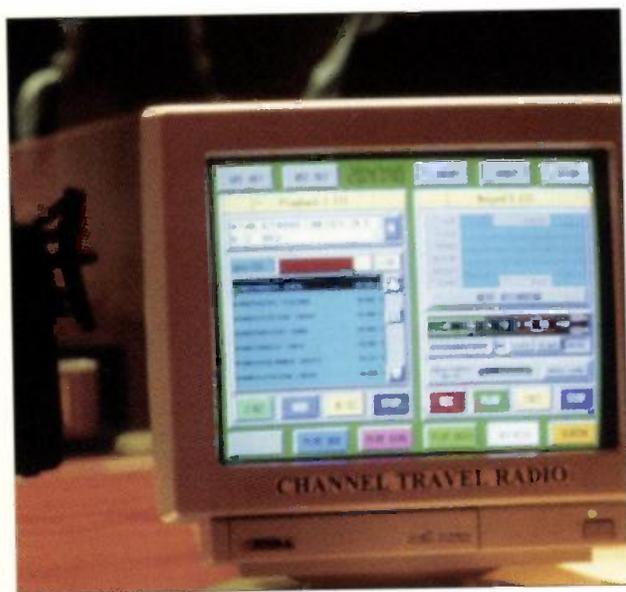
Information Service

The idea for an information service all started six years ago, when the construction of the tunnel was well under way and the need for an information service was first identified by Eurotunnel management. After long negotiations, experimental transmissions started in September of 1995.

Channel Travel Radio was

The touch screen computer system enables CTR presenters to call up news items, pieces of music, etc. by simply touching the screen with their finger.

(Photo by Polly Eltes for RSL)



eventually launched in May of 1996 after the experiments in providing information to the cross channel travelling public was found to be beneficial.

The current station is located within the control tower of the Eurotunnel site immediately behind and overlooking the busy control room. The presenter on duty has great views through this control room and out over the site where cars wait to get onto the next shuttle.

Security High

Security at the tunnel is high and I had to exchange my passport to gain a pass to enter the site. I was met and then escorted to the control centre by the programming co-ordinator **Michaëla Segol**, originally from Nice in the south of France.

Michaëla is one of the two bilingual presenters who give the news and other information in both English and French. Several presenters are used, both regular and a selection of qualified part timers.

Channel Travel Radio is a 24hour operation with a single presenter at the controls all the time. But long gone are the twin tape decks, the pile of records or compact discs and the mixing systems.

The whole output of this station is controlled by state-of-the-art

computer equipment operated by the presenter during the live program. The control of transmitted audio and the monitoring is still done by the control desk as shown in the photographs.

The American designed software is extremely sophisticated. This means that all the jingles, the music and many of the travel and weather reports are held on the computer hard drive and converted from digital to audio in a very fancy, commercial version of the sound card in your PC.

If you have ways of storing your voice and music on your home computer the CTR system does much the same. The touch sensitive screen reacts to the presenter's finger to call up pieces of music, news items and the required jingles.

Each item is timed to the second so that the presenter can see how many seconds he or she has before they give their live reports. It can be changed and updated at any time by either the presenter or the co-ordinator at her computer in the back office.

Service Provider

Channel Travel Radio is a news service and also an entertainment provider for the traveller that intending to cross the channel either by tunnel, ship, Seacat or hovercraft.

It currently has antennas beside the M20 motorway right up to the edges of Maidstone and towards Dover where potential travellers can dial up **107.6 FM** to receive CTR

One of the difficulties of this type of system is that the potential time that listeners will be tuned to this particular station is limited. Unlike, for example, Radio Four where listeners may stay tuned for several hours as they travel the country. On the motorway the listener for this station is usually tuned in for less than half an hour before they travel out of range or leave these shores.

With a potential ten million travellers crossing the channel, this year there is a huge advantage in getting information to them as early as possible. Channel Travel Radio also provides news of local accident spots, diversions and other road difficulties. It also provides news of road conditions on the French side with additional information on tourist routes, exchange rates and much more.

Travel Tips

Interesting features slotted in include details of life in France with useful travel tips for children. The news on European travel condition is broadcast direct from the studios of



AA Vodaphone Roadwatch whose reporters link up to CTR with their network of foreign offices. This ensures that a very accurate picture is relayed to travellers.

Although funded solely by Eurotunnel, part of CTR's licensing condition is that they have to give information on all the other local channel crossings with details on sea and weather conditions too.

Every broadcast, all day, every day is recorded and kept for a year in the vaults of the control centre in case

of problems. Back-up systems including a second computer with a back-up of the days' programs and everything else required to keep the station going, are in place in case of evacuation of the control building.

Channel Travel Radio, operated by Radio Services Limited (RSL) is a commercial station that currently only gives advertising about the services provided by Eurotunnel. At the time of my visit they had just accepted advertising from the Disney park at Paris and were considering other requests from major names for advertising air time.

You can even send in your requests to the radio station, many listeners do, but not usually for a piece of music so I was told. Many are just asking for a message to their family with good wishes for the trip.

On Duty Presenter

The presenter on duty during my visit was **Rommily Paradine** from Southend who has 15 years experience of working in local radio. She also spends time interviewing the famous as they travel, both for the station and national magazines.

Rommily told me in between broadcasts that she found some difficulty with the new technology. "Using sophisticated computers to

control the playing of almost all the broadcasts takes a lot of practice" she said.

I must say though that as I sat there listening for almost half an hour she made it seem very easy as she tapped the screen and the latest news items were broadcast automatically.

Further Transmitter

At the time of writing, the station was not yet complete. A further transmitter is needed to cover the

Dover area and a few more antennas raised. This should be completed by the end of this year.

It was also interesting to hear that the broadcasts heard by travellers whilst they are in the shuttle travelling under the sea are not those from Channel Travel Radio. This is a separate system run by another contractor.

During the time I was at the station I was impressed by the dedication of the staff, the quality of the broadcasts and although each item of regular comment about 'the next shuttle will leave at' was read from a written sheet it was also imprinted with the character of the presenter. The facts were still given but with a personality attached.

Technicalities

It may come as a surprise but Channel Travel Radio is a mono not stereo f.m. scheme. The system was designed, adapted and set-up by **National Transcommunications Limited (NTL)** of Winchester for CTR. The system engineer in charge of publicity, **Bruce Randle** recognised our Rob Mannion's name immediately (he used to work there in IBA days!).

The task given to NTL was to 'provide an f.m. transmission service over a section of the M20, to confine the signal to the road as much as possible and to avoid retuning'.

Apparently, there was a requirement to have single frequency operations in an area that required relay points to ensure coverage of the 40 miles of motorway between the tunnel site and Maidstone. Unlike our own repeater system they could not use an offset to achieve separation between the receive and the transmit antennas.

The antennas were selected for a specific frequency of course, in this case 107.6MHz. It will be obvious to most amateurs that even with their limited e.r.p. of 25W that some separation between the receive and the transmit antennas would be required.

In this case, the separation is usually about 200m, this varies according to each site and section of the road of course. The two antennas are also at 90° to each which gives about another 3dB of attenuation of the signal.

One thing that may seem strange to the casual observer on seeing the roadside installation is that slant polarisation was chosen for the antennas. Most amateurs use either horizontal or vertical, though I know of at least one amateur who uses his



Some of the Channel Travel Radio team, (l-r) David Lucas, Chairman RSL; Bobbie Prior, Presenter; Michaëla Segol, Program Co-ordinator; Richard Harding, Presenter and Lisa Kerr, Station Manager.

(Photo by Polly Eltes for RSL)



small beam antenna on 144MHz with slant polarisation.

The choice for slant polarisation is easily explained: Many modern vehicles have their radio antennas as part of the heating element in the back window whilst most of the older ones rely on more usual type of vertical car radio antenna. The two are of course of differing polarisation. By using slant polarisation NTL have the opportunity to provide a fair signal to both types of car antenna.

The choice of a log periodic antenna (as a wide band antenna) at first also seemed very strange. However, I was assured by the system engineer that when set-up for one specific frequency the front-to-back ratio of the antennas when set correctly is exceptionally good. The gain of the antenna is still very acceptable, no figures were quoted but with an e.r.p. of 25W and a separation of 200m between the receive and the transmit antennas I would have thought that the front-to-back ratio would have needed to be very good.

Successful First

The system used at CTR is the very first of its kind in the UK and it would appear to be very successful. The demand for similar systems is now bound to increase as more stations are required around the country.

As a Councillor I have also been involved with the planning applications that have gone through the local district council for the masts and antennas. We, as planners have to balance the needs of the community with the needs of the applicants and it was nice for me to see the results of our deliberations in this respect.

I wonder though, where Channel Travel Radio and other services such as these will be in 25 years time. Think back 25 years and of the technology then. Will the same leap forward in technology that we have seen over these past years continue, and will a second tunnel be built?

The current technology being used at the CTR station studio is 'state-of-the-art' without a doubt, but will the masts and the antennas still be required in the year 2025, who knows? I have a sneaking suspicion that we will all be tuning into satellite radio in the not too distant future even whilst driving the family car.

Time Listening

Because of my visit to the station I've spent some time listening to CTR and



Keep a look-out
These antennas are easily spotted alongside the motorway approaching the Channel Tunnel. (See text).

Right: A pair of 7-element log periodic antennas as used by CTR, note the unusual slant polarisation.

enjoyed their reports and reviews. It's obviously not for the local resident as much of the information is repeated over and over again, as it should be for the traveller. However, before travelling to Maidstone I now always check it out in case of problems on the motorway.

Next time you pass Maidstone on the way to the channel ports or the tunnel tune in and check it out. I think you will find this very local station of great interest.

My thanks go to Lisa Kerr, station manager of Channel Travel Radio, to Michaëla Segol for the morning she gave up to escort me around the station and to Bruce Randle of NTL for his advice and information on the technical aspects of the system. Without their help I would not have been able to present this article, which I hope has given you an insight into specialised broadcasting.

PW

Useful Addresses

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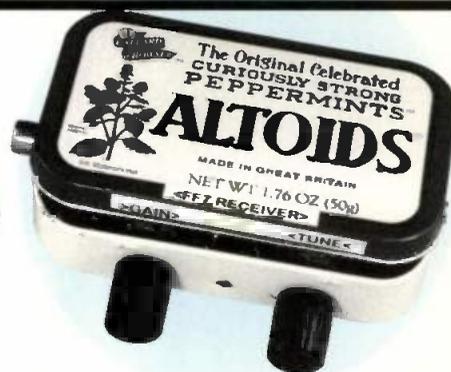
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Carrying on the Practical Way



The FF-7...a 'curious' little receiver that G3RJV describes in his column this month.

By Rev. George Dobbs G3RJV



This month the Rev. George Dobbs G3RJV describes the FF-7 receiver, a useful little companion to the FF-7 Transmitter

"My junk box is full of direct-conversion receivers loosely categorised as the good, the bad and the ugly. The bad designs I blame on someone else, but the good ones are none of my doing either. They are all ugly".
Rick Campbell KK7B. QST August 1992

In 'Carrying On' in October 1996, I described a small transmitter for 7MHz called the FF-7. I was spurred on by the fact that almost every QRP magazine or book seemed to contain a little transmitter built into a novel container. The FF-7 was so named because it fitted (with ease) into a Fisherman's Friend tin.

I know that several readers built it, because I received letters about the circuit and some letters about results on the air. It occurred to me that readers might like to follow it up with a similar little receiver. And I follow Rick Campbell's line: "It's direct conversion and it is ugly".

The design will shake no one's cage. It's based upon the familiar line-up of an NE602 oscillator/mixer followed by an LM386 audio amplifier.

You may recall the 'Sudden' receiver which appeared in *PW* some time ago. That receiver was roughly the result of when an NE602 and an LM386 are thrown into the air and fall down on a circuit board.

The FF-7 Receiver however, takes a slightly different direction. It's what happens the second time you throw the NE602 and the LM386 up in the air!

The Circuit

The circuit for the FF-7 Receiver is shown in Fig. 1. It's very simple so we will follow it through from nose-to-tail.

The signals from the antenna meet a linear potentiometer, R1, which acts as a basic radio frequency attenuator. (A useful thing to have on '40' metres.)

The attenuator is coupled via C1 to a single tuned stage for the band.

This is real compromise at work. Ideally I would have used a two or three stage bandpass filter for the input of a receiver on 7MHz.

But the FF-7 receiver is designed to be a simple, compact unit. As such the combination of the attenuator and the single stage copes surprisingly well with the heavy signal levels on the 7MHz band.

In fact, the attenuator is the only gain control in the whole receiver. At least this approach ensures that the receiver is operated in an effective way for such a circuit with the minimum amount of r.f. input and the maximum amount of gain later in the circuit.

Amateur's Work Horse

The NE602 has become the amateur radio constructor's work horse over the last few years. Because of this I actively seek receiver circuits that don't use this chip!

However, the NE602 is a useful little device with a balanced mixer and an oscillator all built into the small 8-pin DIL package. All the hard work of a simple receiver in one small package.

The oscillator section of the NE602 is located at pins 6 and 7. Turning the circuit 'on its side', experienced constructors will notice the Colpitts configuration is used for the oscillator. Capacitors C5 and C6 provide the capacitive feedback tap and C8 couples the oscillator to the tuned circuit around the inductor L2.

The FF-7 receiver is varicap tuned (or varactor diode to clever people) using a BB212 a.m. tuning diode. The BB212 is a double varactor diode and both anodes (outer leads) need to be grounded to give the full tuning range.

The arrangement as shown covers a little more than the European 7MHz band. Those requiring better bandspread of the tuning potentiometer, R4, could add a resistor either side of R4 to bring the required frequency swing into the potential dividing range of R4. (The values of these resistors will required

some measurement and experimentation).

Please take note of the varicap supply as shown in Fig. 1. Here you'll see that R4 picks up its voltage from the stabilised supply for the NE602.

Output Balanced

The output of the NE602 is again balanced using C12 and C13 to couple the resultant audio signal to the LM386 audio amplifier. The capacitor, C11, provides some rudimentary decoupling.

The audio amplifier, an LM386, is operated in the 'times 200' configuration by adding C16 between pins 1 and 8. The small value of output capacitor, C19, does away with the need for any filtering of the audio output.

Resistor R5 and capacitor C18 provide decoupling to the d.c. input to the LM386. In practice C18 is best mounted as close as possible to pin 6.

You'll also notice decoupling capacitors either side of the 78L06 three pin regulator. I think it's worth mounting C17 as close as possible to IC3.

The output from the receiver is really designed to drive a pair of 8Ω impedance headphones. Despite this, it will drive a small loudspeaker and I had good results from a very cheap pair of Walkman type phones rewired for a 3.5mm mono jack plug.

Stand Alone & Transceive

As shown in Fig. 1, the FF-7 is a stand-alone receiver but it's also possible to use it with the FF-7 transmitter in 'transceive mode'. This can be achieved by using the oscillator from the transmitter as the receiver local oscillator, where, a small capacitor replaces the tuning element of the NE602 oscillator (all the parts around pins 6 and 7).

Output is taken from T1 in the FF-7 transmitter to drive the receiver. This offers a simple form of transceiver capability but does have its drawbacks: for example there's no

Continued on p.50

Carrying on the Practical Way

Continued from page 49



offset circuit between transmit and receiver and the receiver will be on zero beat when tuned to the transmitter frequency.

Although it is possible to arrange frequency offset for the receiver, my feeling is that with such a simple arrangement, it's hardly worthwhile. Having independent tuning for the receiver can be very useful, if the operator remembers to keep checking the transmit frequency.

Altoids Tin

The FF-7 Receiver may be built in a Fisherman's Friend tin but I decided to throw caution to the wind and build it in an Altoids tin. (Altoids, if you don't already know, are the "original celebrated curiously strong peppermints" made in Great Britain but for some reason only commonly available in the USA).

Altoids are sold in sturdy tin measuring about 95 x 58 x 20mm. This oddly enough, is the same size as the Fisherman's Friend tin. In recent years those following the QRP activity in the United States cannot have failed to notice that an Altoids tin has become one of the favourite containers for little projects.

The layout of the receiver is as shown in the photograph Fig. 2. Like the FF-7 transmitter, the receiver is built 'ugly' style. The NE602 and the LM386 are mounted 'ugly bug' fashion, with their pins pointing upwards.

The pins, together with the inductor pins, controls and sockets,

provide anchor points for wiring the smaller components. All grounded connections are soldered directly to the bottom of the tin and the upturned leads provide further anchor and solder points for the circuit.

Very Liberating

In my opinion 'Ugly' construction is a very liberating way to build. My layout is what it is because that is how it worked. So, the picture provides only a guide to where to mount the parts.

To help you here are some useful rules of thumb: Remember to get the order of the i.c. pins right. Turning them pin-upwards can easily result in getting the pin numbers wrong. Sketch a pin layout on a piece of paper if that helps. Make the signal carrying routes as short as possible and mount decoupling capacitors close to pins on the device being decoupled.

I mounted the inductors on their side by soldering the cans to the bottom of the tin. They are mounted close to the front and back of the tin (oscillator to the front, input tuning to the back) so that a small hole can be drilled in the tin to facilitate adjustment of the cores.

It would just be possible to adjust the layout to get a PP3 battery into the tin. However, I opted to leave a small space in one corner of the tin with a view to adding a small transmitter into that space. (The famous 'Oner'



Inside view of the FF-7 receiver (in this version built into an 'Altoids' tin but a 'Fisherman's Friend' tin is the same physical size). George left the space for possible modifications or the inclusion of a small transmitter (see text).

transmitter would fit into that space if readers wished to convert the tin into a complete station.

How Did It Work?

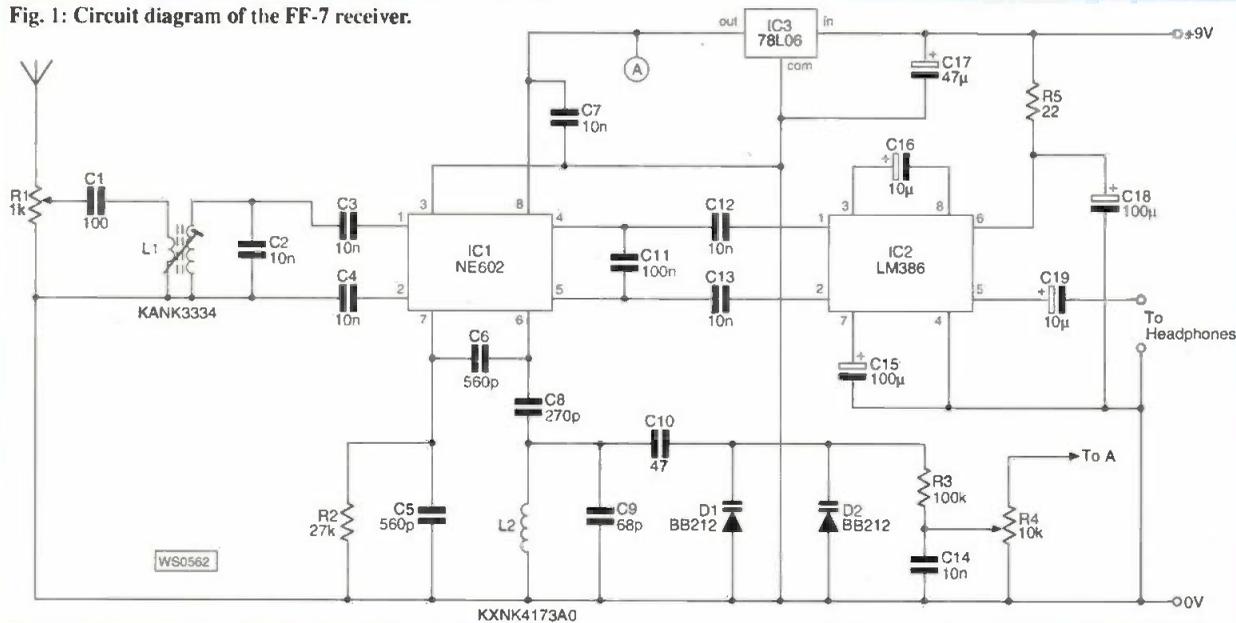
So, how did it work? And initially I admit I was doubtful about using only one tuned stage and the space for the possible added transmitter was partly left in case extra input tuning was required.

Despite my initial concerns the combination of the single tuned stage and the r.f. attenuator produced a workable receiver. It proved itself quite capable of receiving clean amateur signals on '40' in the evening.

The FF-7 Receiver could make a useful little stand-alone receiver for the beginner or for casual listening away from home. So there it is...all you have to do is to build your own!

PW

Fig. 1: Circuit diagram of the FF-7 receiver.



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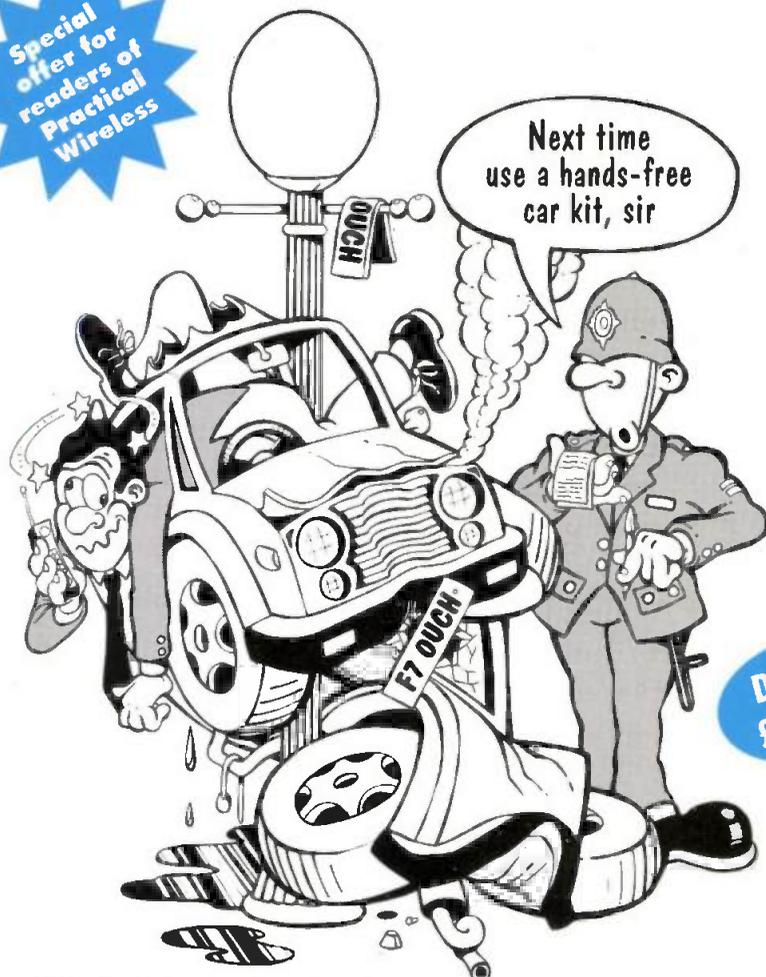
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FLEMING

The Father Of Electronics



By Stephen Poole

Stephen Poole takes us through the life of Sir Ambrose Fleming, one of the most important people in early wireless and electronics.

Had it not been for Fleming, modern radio would not be as we know it. It was Fleming who invented the diode valve, and he was also one of the first people to hold an amateur transmitting licence.

Born John Ambrose Fleming on the 28 November 1849, he was the oldest of seven children. His father was a minister at the Congregational Church in Lancaster, and from here they moved to Kentish Town, London.

Fleming went to University College School, and then University College itself, where he studied physics and mathematics for two years. Soon he was forced to leave to earn money so that he could study.

At first he worked for a ship building firm, but soon he left to become a clerk on the stock exchange. It was here that he was able to finish his studies as his job was easy, and found time to study in the evenings.

As a result, Fleming became a science master. He was not satisfied with this, so he decided to broaden his education and study chemistry at the Royal School of Mines.

In 1874 he was short of money again and had to return to work. He took up a position at Cheltenham college as a science master.

It was while Fleming was at Cheltenham that he decided to go to Cambridge to study under Maxwell, after reading his book on electricity and magnetism. In 1877 Fleming was at Cambridge studying the new theories of electricity.

University Demonstrator

Shortly after arriving at Cambridge Fleming became a demonstrator at the university. This was not for long as he was chosen to be professor of mathematics and physics at Nottingham University.

Even this appointment was short lived because of the 'pull' of London. So, Fleming decided to set-up as a consultant to companies including the Edison Telephone company.

At this time there were few people able to teach the new subject of electricity, so one of the professors at University College London asked

Fleming to give a series of lectures on the subject. These were a big success and soon Fleming was offered the position of the professor of electrical engineering at University College London (UCL).

Fleming enjoyed being at UCL for several reasons, firstly he was in London. There he was able to lecture and carry on with most of his research. His early research was mainly with different aspects of a.c. transformers, on which he wrote a book and presented papers to the Institution of Electrical Engineers.

Fleming looked not only at transformers, he also looked at ways of making more accurate electrical measurements. He and Crompton were able to develop instruments capable of taking readings to within 0.25%, a remarkable feat for those days.

Initial Discovery

Although Fleming invented the diode, it was Edison who made the initial important basic discovery. This was while he was working with electric light bulb filaments.

Edison noticed that when he evacuated the bulb and placed a second electrode in, the current would only flow one way. Edison demonstrated this to a few people, and it is entirely possible that Fleming was one of these on his visit to America.

Fleming did some research into this effect and presented a paper on it. Fleming had shown with his new discovery that it was possible to apply an alternating current to the heater and get a rectified signal on the anode, this now represented the next stage in the realisation of the diode valve. Soon Fleming became involved with some of the early experiments in wireless.

At the time, the coherer was used for detection of radio signals, but it was insensitive and unreliable. Using this background Fleming had the idea to detect radio waves using the diode.

It had already been proven by Fleming that it could detect frequencies up to 100Hz, but he had to see whether it could be used at higher radio frequencies. So Fleming immediately set his assistant to work

on the idea.

The idea worked, and one month later on 18 November 1904, Fleming was able to take out a patent for his invention. He named his discovery the 'Oscillation Valve', because of its valve-like rectification characteristics. The new 'valve' had a big impact on the newly developing world of wireless, because it was far more reliable and sensitive than the coherer.

Memorable Work

In 1899, while Fleming was still at University College London he was offered an advisory post to Marconi's wireless company. It was during this time that some of his most memorable work was done.

The notable work was particularly with Marconi's transatlantic tests of 1901. Fleming designed the transmitter for the site at Poldhu, it was unusual because it used two spark gaps in cascade powered by a 25kW alternator, which itself was driven by a 32 Horse power oil engine.

After a run of set backs the letter 'S' was finally sent across the Atlantic, the first time wireless had covered this distance. Even after this the transmitter needed further refinement.

Because of Fleming's general interest in wireless he became one of the first people to hold an Amateur transmitting license. This enabled him to both transmit from his home and at University College London.

In 1926 he was Knighted for his services to electric and electronic engineering. Then at the age of 77, he retired from his post at University College London and moved to Sidmouth in Devon.

Fleming still remained active by addressing meetings of the Television Society, as he had become interested in this field and supported John Logie Baird in his early experiments with TV systems. Sir Ambrose Fleming died on the 8 April 1945 at the age of 95, having been one of the most important people in early wireless and electronics.

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73 from Dave G4KQH, Technical Manager.



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'WIRELESS' ANTENNA



"Och aye Murdoch, they'rre just waiting for the laser beam to be switched on, they canna fly home without it on ye ken".

By John Cunningham GM3JCC

John Cunningham GM3JCC describes a 'magical' antenna that could solve your problems if however, you can shed some light on a few development difficulties!

I've been a licensed Radio Amateur since 1953 and during my retirement have turned my attention to an unusual use of the every day laser. It's certainly shed some light on my problems and it could do the same for you!

The ground space at my QTH is limited to the extent that no wire antenna of useful proportions can be erected. However, the solution to this dilemma has been overcome by using the beam of a low powered laser of no more than 2mW.

Laser System

The antenna system, Fig. 1, consists of a 2mW helium-neon laser system on a wavelength of 632.8nm (red light). There's also a stainless steel mirror (minimum dimension 20mm x 20mm) mounted on an insulated stand-off and any suitable antenna tuner.

The laser unit itself is mounted on the outside wall of the house at first floor level together with the stainless steel mirror. This plays an important part and acts as the beam deflector.

In operation the mirror should be within 50mm of the laser aperture but should not touch it. The mirror is connected to the output of the antenna tuner in the

shack by a short length of wire.

Although space for antennas is at a premium, I'm fortunate enough to have a church steeple about 330m distant from the shack. The steeple has a clock with an opaque glass dial which is used as the laser target.

Once I'd got the laser, the adjustment of the deflecting mirror was carried out with the use of binoculars during darkness when the red spot was clearly visible on the dial. The belfry bats didn't seem to mind the minute spot of light!

The system performs as an end-fed antenna with the glass dial forming the far end insulator. The maximum range using the 2mW laser is about 400m and the handling of the maximum licensed power presents no problems.

However, during tests I discovered that with laser powers of over 100mW small scorch marks appeared on the clock face. I could also see the resident bats becoming excited, and on checking with binoculars, I could see wisps of smoke from scorched fur.

I realised there was a possibility of danger (It's illegal to disturb bats) so I only operate on 2mW now. And in fact the bats (they can obviously see the red

laser) seem to appreciate the beam as they use it to 'home in' on the belfry in misty conditions and actually 'fly down' the beam, following the illuminated moisture droplets.

Annoying Hiccup

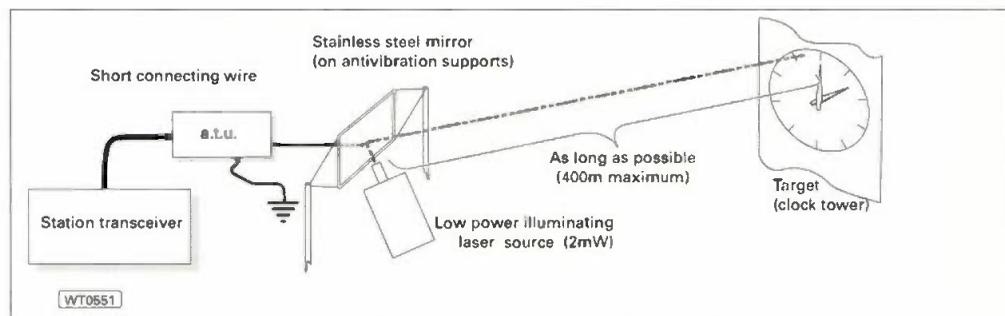
One slight annoying hiccup has occurred when using the clock dial as an insulator. Although the red spot had been located just outside the radius of the hour hand, the minute hand being of metal causes a short for about a minute every hour thereby causing the station to go QRT.

At the moment I'm experimenting with a method of scanning the laser beam ahead of the minute hand. Unfortunately, this idea is proving rather difficult because by advancing the beam, the bats's navigation is then 'thrown out'. So many bats have then collided with the clock face that the Minister has asked me not to move the beam.

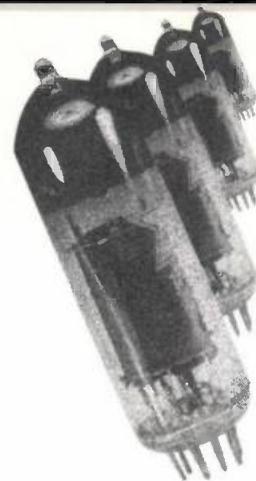
So, has anyone got any ideas how I can avoid the hourly break of transmission without disturbing the bats? I'd be very interested to hear from you, either by post or on 24kHz or thereabouts (pulse modulation only).

PW

Fig. 1: The basic laser 'wireless' antenna system used at GM3JCC's QTH. Maximum power output is 2mW to minimise danger to flying mammals (see text).



Valve & Vintage



By Charles Miller

It's Charles Miller's turn to look after PW's vintage 'wireless shop' this month. This time Charles continues the story of the John Scott-Taggart one of the most charismatic of the early radio designers whose name is still well known in the 1990s.



Welcome to the 'Valve & Vintage' 'history department' where I'm continuing the (very) interesting story of John Scott-Taggart.

In January 1927, Scott-Taggart announced that "everyone of ST Ltd's valves would be insured with Lloyds, against their going 'phut' (his term!) in the users' sets. STs say in their advertisement that they'll replace instantly any valve which does not give thoroughly satisfactory life. They can't treat you any more decently than that, can they?"

But just who was to be the arbiter of what was or was not a thoroughly satisfactory life was not stated! Although this was to some extent an academic question since the length of a guarantee is immaterial if there should happen to be no one around to honour it.

Three Types

So, what were the ST valves really like? Well, in fact there were three basic types of triode for h.f. amplification: detection/l.f. amplification and power output, each available with either 2, 4 or 6V filament.

Rather curiously, the same filament current was quoted for each voltage. This suggested that no strict parameter was applied regarding the amount of emission required and that extra lengths of filament wire were added as required to make up the voltage.

The prices ranged from 14/- to up to 22/6 (and it's pointless to convert these directly into decimal figures since the latter would give a totally false impression of what they represented in 1927 money!). A true value comparison is between about £35 and £60 in 1997 terms.

In fact, a person would have had to be in a very good job indeed in 1927

to be getting £5 a week. So, the more you look at the prices in early wireless magazines, the more you wonder how on earth anyone ever afforded anything!

Hard Saving

Hard saving and hire purchase were the answers, plus the fact that there were cheap valves available. These were both imported and made in Britain, and could be bought for about one third of ST Ltd. advertised prices.

But in spite of the advertising 'hype' there was a fundamental problem! It should have been obvious from the start that to achieve a sufficient volume of sales to make the business viable no one man could possibly sit down, test and clarify every valve that left the premises.

Even if you allow the rather low figure of five minutes per valve, only about a dozen per hour could be treated. (Let's say about 100 through a fairly long working day). A six day week could therefore see about 600 valves ready for delivery if, of course, the actual production was able to run at this rate, which seems unlikely for a small firm newly in business.

Allowing that it was in fact possible and that all deliveries were paid for promptly, the gross income per week would have been about £500, net, no more than about £100. This does not sound by any means sufficient to cover the cost of raw materials, electrical power, the rent on premises and the workers' wages, let alone paying off the cost of the plant and giving the boss a decent salary.

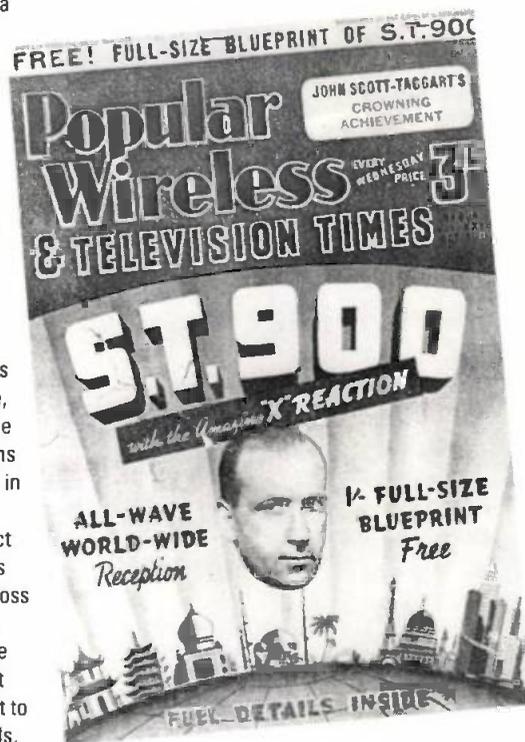
And, unless Scott-Taggart had done a special deal with Amalgamated Press, all that

advertising would not have been cheap. It continued for at least six months but by the end of 1927 had disappeared.

Little more was heard about ST valves. Their proprietor appears to have withdrawn for a while to lick his wounds.

Soon Returned

It was of course, impossible to keep Scott-Taggart down for any length of time and he soon returned. He was soon selling the product for which he was best equipped to sell - John Scott-Taggart!



Wireless Constructor let him loose with almost unlimited space to expound on the marvels of a new series of designs. These were for home-built sets under the names ST200, 300, 400 right up to 900.

There were very lucrative tie-ins

with component manufacturers who happily bought large amounts of advertising space to announce that their parts met ST's specifications and with his approval.

The valve-making fiasco could easily be forgotten by ST now that his name was close to becoming a household word. And this ultimate accolade was realised in 1932, when George Newnes set up a weekly radio magazine called *Practical Wireless*, under the editorship of a brilliant young man called F. J. Camm, in direct competition to Amalgamated's *Popular Wireless*.

Amalgamated needed a powerful weapon with which to fight back and the choice fell back on John Scott-Taggart. From that time on until its demise in 1939 *Popular Wireless* might just as well have been called the Scott-Taggart fan club magazine, so greatly did he dominate the contents.

Scott-Taggart orchestrated long 'build ups' for his latest ST design to create anticipation on

in a sports car to give practical demonstrations of its performance. These were often in locations carefully chosen for their alleged difficult reception conditions.

The numbers of stations logged at each were paraded like cricket scores, encouraging individual constructors to vie for top place. Scott-Taggart even persuaded a builder by the name of Shadbolt to give him workshop space literally under the shadow of the BBC's Brookmans Park aerial masts, where the ability of ST receivers to separate its transmissions from others on adjacent wavelengths was lauded as the ultimate in technical performance.

Never one to miss an opportunity, in 1936 ST bought some of Mr Shadbolt's workers into the workshop to be photographed with him (looking disturbingly like John Birt of the present day BBC) as he demonstrated one of his sets to their evident wonderment and delight.

remain as supreme examples of how to say very little at great length but which, thanks to the usual hyperbolically advertising, sold in vast numbers.

On the face of it, in 1937, the ST bandwagon seemed destined to roll along forever. As a marketing exercise for a writer and for the valve and component manufacturers it was and probably remains unrivalled, but in reality its days were numbered.

No amount of inspired verbiage about 'triple extractors' or 'X' reaction could forever disguise the fact that the sets were basically fairly primitive. They were in fact only t.r.f.s with



If you had met Scott-Taggart—

SUPPOSING a month ago you had been at your work as a designer to help a valve and you had met Scott-Taggart. If he had recommended a certain valve, or told you your present valve would have taken this advice. "Remember the last order," "When you get it," "I shall be happy to find it not short-weight and when I get satisfied it is not a cracked, give you a personally signed certificate to that effect," would you have accepted the offer?

You would ... certainly have analysed the explanation he has given to you and you would have seen the value in the matter. You would not have been told that the valve is the best, but a guide to over 2500 readers of *Practical Wireless* and the hundreds of articles of advice and apparatus. How the world has changed since that time—would you have put his recommendations and instructions to your own leader with confidence?

Finally you have accepted, he answers the question. John Scott-Taggart has recommended all the best valve constructions to produce the best results for you. It is impossible to carry them, and the designer naturally thinks every day in every shop that the ST valve would have been used continuously if the valve were not a separate construction under the name of Scott-Taggart.

You are asked to see a new valve. Let it be an ST valve which, as an electrical engineer, you know is the best and the most wonderful property of construction. To make up the construction of the valve and the best standard vacuum tube construction will be recommended for it. It is the best valve in the world.

S.T. Valves are made in Great Britain at any difficulty or when orders are sent we please to say so and send you a list.

S.T. Ltd., 2, Whitehouse Place, London, W.C.2

The high profile advertising for the Scott-Taggart valves continued for many months in the late 1920s. Full page version such as this - seem to be promoting Scott-Taggart himself rather than the product. The advertising must have been very expensive indeed and continued for at least six months before they disappeared and thereafter little was ever heard of the 'ST' valves.



This policy has produced the most excellent results. Those constructors who have previously rallied to the

PICK YOUR COUNTRY AND TUNE IT IN!

long-wave bands, becomes very much gets down to the slight changes in will make tremendous

With its 'X' reaction an no-gap waverange, there is not a country on the globe that does not come within the scope ST900. Never was the term 'World-wide reception' more truly upheld in either commercial or home-constructor design. (original caption taken from *Popular Wireless* Oct 30th 1937)

the part of the readership, then carried the actual construction over several issues. The introduction of mains powered versions enabled the process to be carried on for further weeks.

Practical Demonstrations

The designer would hump examples of the set around the length and breadth of the country

The instructions in the magazine for building ST sets were detailed in extreme. But just in case readers could not make them work, a network of helpers was set up so that anyone in difficulty, wherever they might be in Britain, could receive technical assistance.

In between all of the activities mentioned, ST also found time to write two books on radio. They

a few fancy extras that might have or might not have made a great deal of difference to the performance.

Never A Superhet

Scott-Taggart never published a design for a superhet, although he once claimed, improbably, to have built a one valve example. Neither did he incorporate short wave reception until 1937, and then only with the use of long out-moded separate plug-in coils.

The appearance of the finished sets was hardly inspiring. The last, the ST900 was (frankly speaking)

appallingly ugly and unlikely to appeal to the lady of the house who saw her friends with modern commercially built sets that were not only attractive, but also had in most cases far better performances.

Museum Pieces?

Unless ST sets were to become museum pieces in their own time,

something had to be done, and quickly. But in the event, the outbreak of the Second World War saved Amalgamated and Scott-Taggart from having to decide how to deal with the situation, ST went to the Air Ministry and a role in radar and *Popular Wireless* folded.

Meanwhile, under F. J. Camm's quieter but assured guidance, *Practical Wireless* had steadily grown in stature. Whatever the aspirations of the constructor, from a simple one-valver to a multi-valve, multi-band superhet, battery or mains operated, *PW* provided designs of great competence, capable of providing real satisfaction to their builders.

Quality will always tell in the end and by 1939 *PW* had become the unquestioned leader in popular radio constructional magazines.

Unfortunately, I've run out of space, and I'll have to wait to my next turn 'in the shop' before continuing. Then I'll have some more stories of the eccentrics in wireless and the screen grid revolution.



Cheerio from Charles, see you in July.

BITS & BYTES

Mike Richards G4WNC has news of a new book, takes a further look at DX4WIN logging program and much more.

With lots of readers having access to the Internet I thought it might be interesting to look at a new book from the publishers of the already famous *Passport to World Band Radio*. This brand new publication is called *Passport to Web Radio* and provides a very useful reference



for using your computer to listen to radio programmes from around the world.

Not only does *Passport to Web Radio* provide lots of information on how to listen-in, but it also provides a host of links to the best sites. The key to this new way of listening is the free distribution of the RealAudio software package by Progressive Networks of Seattle.

By utilising some neat compression techniques the RealAudio software program gives you the facility to download good quality audio signals from the Internet. If you've got a really quick modem (28.2k) or are lucky enough to have an ISDN connection you can also receive CD quality stereo sound!

If you're into sport in a big way, you'll find *Web Radio* a real boon as it contains a mass of sporting information. As you can probably imagine, this system has the potential to completely revolutionise broadcast band short wave listening.

If you already have Internet access full details can be found at <http://www.passport.com> You can also download the latest version of

RealAudio from <http://www.realaudio.com/products/player/download.html>

Passport to Web Radio is available for £14.99 plus £1 P&P (UK), £2 P&P (overseas) from the **PW Book Store**. To order please use the form in this issue or call the **Credit Card Hotline** on (01202) 659930.

DXing Using Windows

After last month's brief preview of the DX4Windows (DX4WIN) program, I've set aside some extra space this month to do the program justice. Rather than just a simple logging program, DX4WIN combines most of the features that a modern DX operator needs all built-in to one fully integrated package.

Included within DX4WIN are DX clusters, c.w. keyboard, label printing, rig control, external CD-ROM databases and lots more. If you already have a logging program in use you will be pleased to hear that DX4WIN includes a good range of import/export options that can handle lots of common logging systems.

In among the 29 systems on offer I noted the following popular programs were listed: Turbolog, Logwin, Logmaster, Logeqf, Logbook, Hyperlog, DXlog and DXbase. This means you have no excuses for not changing over to DX4WIN!

So, what do you need to run

DX4WIN on your system? The demands are not too great as you basically just require a PC that is capable of running Windows 3.1 or '95. That means an absolute minimum 386 processor, but a 486 is more practically the minimum for comfortable operation with Windows.

If you want to use the serial link to your rig and the c.w. keyboard you will also need to have a spare serial and parallel port. For this review, I ran the program on my trusty DAN 486DX33 with Windows 3.1. and it felt very quick.

Entering basic QSO information is done using through the main QSO window which can be configured according to the way in which you are currently operating. This main window has been very well thought out and includes automatic completion of a number of the fields.

As you type in the callsign, DX4WIN uses the prefix to determine the country, Zone, antenna bearing and range in miles or km. You can also set it to use the radio serial link to automatically complete the band and mode fields. Date and time are also completed automatically and you can even pre-set the sent and received RST numbers and add an automatically incrementing serial number!

The data from the main entry window is stored in the main QSO database and is then used by all the

other reporting systems to provide a host of sophisticated features. Although this window shows just a single QSO at a time, you can produce a log book type report that shows a more conventional style listing.

One of the incentives for DX work is to take part in one of the many award schemes that are operated by Amateur Radio Societies around the world. And DX4WIN makes this really easy as full support for all the popular systems is built-in to the program.

Each of the contests has its own set-up screen where you can configure all the important parameters such as bands and modes and award type. Once you have the parameters set, the program will automatically keep track of any QSOs that count toward the various awards.

To make life really easy DX4WIN includes a report generator that will provide not only the full award submission sheets, but will let you know how you're progressing towards your desired award. If you're really into DX, this is a real boon.

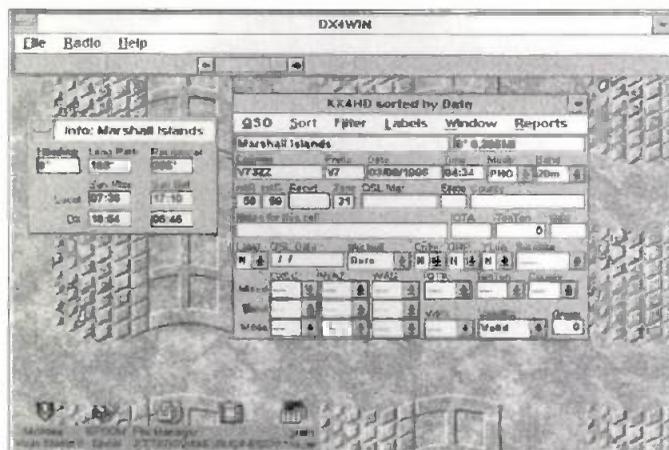
The hi-tech DXer will want all this and more, specifically access to the powerful DX Cluster system. This brilliant utilisation of Packet radio is fully supported by DX4WIN and is even supplemented by voice announcements!

Displayed spots are colour coded to show new country/new mode/new band. These spots can also be saved so that they are available next time the program is started.

If you've enabled the rig control link you can automatically tune your rig to the frequency of any spot you choose. There's lots of other packet cluster facilities that really go to make DX4WIN a really powerful spotting tool.

As you've probably gathered, I think this is one of the very best logging systems around. So, where can you find it?

If you have Internet access a good place to start is the Funet archives in Finland. The ftp address is:



The DX4WIN QSO screen.



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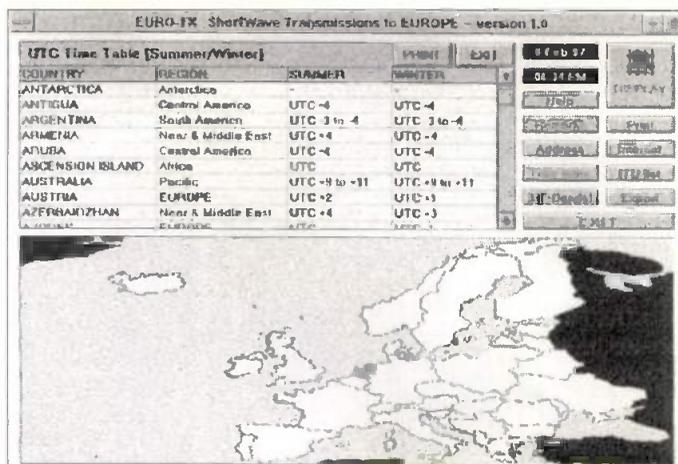
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The main screen from Euro-TX.

<ftp.funet.fi/pub/ham/hf-log/dx4w108d.exe> Without Internet access you will need to try one of the Amateur Radio shareware suppliers.

Euro-TX

Another great way to use your computer in radio is to spot those interesting broadcasting stations. Those of you with an interest in using weather FAX data to help with h.f. propagation will probably have come across Jan Nieuvenhuis and his popular WX-FAX station database program. This provides a very useful reference not only of where to find the stations but also details on the transmission schedule.

Jan has recently sent me a brand new program that applies similar techniques to a broadcast band database. The main difference, other than the stations themselves, is the use of a neat Windows interface. This provides access to a series of windows showing a range of broadcasting station data.

Other than just the obvious frequency information you can pull-up screens showing address, timetable, Internet address, ITU listings and band data. You also have the option to search and display station information according to a number of sort criteria namely;

country, language, station or time.

If you'd like a registered copy of version 1.0 all you have to do is send Jan 10 Dutch Guilders CASH or the cash equivalent. For this not only do you receive a registered copy but you get a very good deal on programme updates. The address to send to is: **Jan Nieuvenhuis, Vloedlyn 12, NL-1791 HH, Den Burg (Texel), The Netherlands.** My thanks to Jan for supplying the review copy.

Software Sources

Because amateur radio encourages experimentation, its no real surprise to find that there are always new software sources and programs being written specifically by amateurs for amateurs. The problem is how to get your hands on them!

By far and away the quickest method is using some form of remote download, but how? And although everyone tends to think of the Internet, there are other options available.

One of the earliest systems that's still available is the dial-up bulletin board system or BBS. This is basically a computer that runs

some special BBS software and is connected to a standard telephone line.

Other users just have to run a standard Terminal program on their computer along with a modem and phone line to get access to the BBS. Once you've connected to the BBS you can send and receive messages but, more importantly, download files that have been stored on the BBS.

Because of its ease of use the BBS system became a very popular method for distributing shareware and demo programs. Unfortunately, it also became a good way to distribute viruses, particularly if the system operator didn't regularly check uploaded programs.

There are still plenty of BBS systems around, but most users have migrated to the Internet. The Internet has proven so popular and powerful because it can be likened to a world-wide BBS system.

You still need your PC, modem and 'phone line, but one local call can connect you to computer archives all over the world. The other great attraction of using the Internet for software downloads is the increased sophistication of the Internet programs.

With many systems you can leave them to download information while you continue to 'surf' the 'Net. But what do you do if you don't have or want on-line access to download software?

The only real solution is to rely on shareware distributors to sell you disks containing the latest programs. If you want to get your hands on lots of software you would probably be well advised to consider on-line access, but if you're an occasional user, supply by disk is probably the best way to go.

A visit to any of the popular radio rallies will reveal a number of dealers with lots of software on offer. If you're not sure where to start I can thoroughly recommend the **Public Domain and Shareware Library** mentioned in my Reader's

Offers. They have been delivering a very good service for many years and can be relied on for good quality up-to-date software.

Fourier Analysis

Ever since I mentioned the SoundBlaster Fast Fourier Transform or SBFFT program an issue or two ago, I've received lots of E-mail from readers wanting to know more. Well the good news is the program's been upgraded and is now available in version 1.2.

The main changes to the SBFFT program are the increase to the range of video boards supported. This means it can now work properly with my SPEA unit!

Not only does SBFFT provide fascinating audio spectrum analysis, but it can be set to provide a host of

audio filters through your SoundBlaster card. The range available include band-pass, band-stop, low-pass and high-pass.

Another great feature is the ability to set the filter passbands using the mouse. That way you can look at the incoming signal and specifically carved out the offending part of the spectrum.

You can also switch the filters on and off with a single key press. This impressive range of features makes SBFFT a very powerful software package. To get your hands on a copy, ftp to: <ftp.funet.fi/pub/Simtel.msdos.hamradio/sbfft12.zip>

Special Offers

If you'd like a copy of Hamcomm/JVFAX, etc. I've arranged a very special offer with the Public Domain and Shareware Library (PDSL). They have put together a library set of all five disks for just £12, all inclusive.

Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by phone - you don't even have to write a letter. Please direct all orders and enquiries about this disk set to PDSL, **Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL**. Tel: (01892) 663298 and request library volume: **H008739abcde**.

Please note the software is only available as a set of five disks as follows:

IBM PC Software (1.44Mb disks): Disk A - JVFX 7.0, HAMCOMM 3.1 and WXFAX 3.2; Disk B - DSP Starter plus Texas device selection software; Disk C - NuMorse 1.3; Disk D - UltraPak 4.0 and Disk E - Mscan 1.3 and 2.0.



Hot Web Page

Whilst cruising around the Web (notching-up the phone bill) I recently came across Martin Lynch's home page. The can be found at

<http://www.martin-lynch.co.uk> and is very well laid out with good use of frames to provide quick and easy navigation around the site.

Not only does Martin's page offer loads of product data, but there are a few other goodies as well. Secreted in the download area is some control software for Kenwood rigs and a demo program of the WinRadio, the radio in a PC system.

Also in this section is Roger Barker's excellent WinPack 6.1 Packet radio program. Just to really tempt you to this site, Roger has just uploaded the version 6.2 upgrade for WinPack which at the time of writing is only available from this site.

That's all for this time, so cheerio until next month. In the meantime please keep your letter, hints and tips coming to me Mike Richards G4WNC at PO Box 1863, Ringwood, Hants BH24 3ZD or you can E-mail me at: mike.richards@diapipex.com Don't forget you can also visit my Web site at: <http://dialspace.dial.pipex.com/mike.richards/>

END

VHF REPORT

This month David Butler G4ASR reports on recent v.h.f. openings and some new UK distance records on the 10, 24 and 47GHz bands.

No real propagation surprises were evident on the air during January. The short lived yet productive Quadrantids meteor shower produced some DX contacts on the lower v.h.f. bands and there were five days of Sporadic-E (Sp-E) propagation on the 50MHz band.

A brief opening to Africa via trans-equatorial propagation (t.e.p.) was also observed on this band and there were three days when auroral events were evident on frequencies up to the 144MHz band. Most activity though was via tropospheric propagation with a number of periods during January when some very good DX could be worked on all frequencies right up to the microwave bands.

Meteor Shower

The Quadrantids meteor shower, encountered on Friday January 3, enabled a number of good DX contacts to be made on the 50 and 144MHz bands. On the 50MHz band it's very easy to make meteor scatter (m.s.) contacts (although in my opinion many operators on this band still don't have a clue how to do this correctly!).

According to the DX Cluster reports single-sideband (s.s.b.) contacts on the 50MHz band were being made with stations located in Germany, Italy, Austria, Norway, Denmark and Sweden. That's typically around 1000-1200km from central England.

Up on the 144MHz band, where the real DX is, some very good contacts were being made. Much activity on this band is made via high speed c.w. and amongst those being worked from the UK on this mode were EA6SA, EU6MS, HA7UL, SP20FW, SP4MPB, S57EA, TK5JJ and YU7EW.

At my QTH I only had time to make one c.w. schedule with OH3AWW (KP11) some 1918km away. The contact, ran at a speed of 2000 letters per minute (400w.p.m.) took 55 minutes to complete.

In all I received 14 bursts and 11 'pings' of signals, the longest burst lasting some 5 seconds and peaking to S3. Although c.w. is a very popular mode, many stations prefer to use s.s.b. when attempting m.s. contacts.

At the QTH of **G8XVJ** (I083) the stations of CT1DMK, F1CBW, I1JTG, I4YNO, OM3LQ were all heard operating on 144.200MHz, the m.s. calling frequency. A packet report from **Dick**

PA3FJY (JO32) indicates that conditions were best at his QTH between 0800-1500UTC with some very good bursts being received on s.s.b. between 1000-1400UTC. (The OH5IY m.s. software calculated signals would peak around 1200UTC).

Dick worked many stations on 144.200MHz including six Italian and five Spanish stations, HB9SNR and YU1VG. Interestingly, he also heard CT1FAK, EA1YV, EA2AGZ, EA3ACW, EB4GIA and 9H1CD on the 'normal' s.s.b. calling frequency of 144.300MHz.

By the way, the next large meteor shower that will be encountered are the April Lyrids. As its name suggests it will occur during April (19-24) with maximum activity being around 0400UTC on Tuesday April 22. More on this next month when I'll be devoting some of the column to this interesting DX propagation mode.

Sporadic-E

A number of Sp-E openings on the 50MHz band were observed on January 7, 13, 18, 19 and 20, the best of these being the event on January 20 when the maximum usable frequency (m.u.f.) reached 90MHz. From reports received the other openings were of very limited duration.

On January 7 between 1715-1740UTC the band was open to Estonia (ES) and Finland and on January 13 between 1700-1800UTC it opened up to Estonia again. On January 18 in a 20 minute opening commencing at 1710UTC stations in England reported a brief opening to Italy and Sicily. Propagation was generally in a southerly direction on January 19 when the band opened up between 1630-1830UTC to France, Portugal, Sardinia (ISO) and Spain.

Events on January 20 were considerably better with a number of openings occurring throughout the day. The first of these commenced around 1030UTC when stations located in central England found a path open to Scandinavia.

Later, from 1100UTC, stations in Scotland reported working into Estonia, Poland, Germany and Austria. This event, in which stations throughout England and Wales also participated continued through to about 1300UTC.

Around 1630UTC the band opened up again and, depending where you were located, continued through to at least 2030UTC. Among the stations being

worked during this early evening event were CT1EKF, ES1II, HB9AOF, HB0LL, LC3SAT, OE9MON, S01BSA, S59F and UA1WJ.

Fabio Arrighi IW1DFU (JN35) reports that the opening on January 20 was his first ever Sp-E opening he had experienced on the 50MHz band. Fabio uses an Icom IC-202 144MHz transceiver into a home-made transverter giving 10W output into an HB9CV antenna. Between 1819-1855UTC he worked the stations of G0NEI (I083), G7UYP (JO02), GD3AHV (I074), GM0EUA (I085) and MOADS (I093).

Andy Markham G8RZA (JO01) informs me that he is active on both the 50 and 144MHz bands. On this latter band he runs either a Yaesu FT-290 MkII or Icom IC-202 transceiver, a small 25W amplifier and a 5-element ZL special beam. On the 50MHz band he uses the IC-202 in conjunction with an RN Electronics Transverter and a 2-element HB9CV beam at 8m above ground. (Coincidentally the same set-up as IW1DFU!).

Andy remarks that conditions have not been particularly good with him on the 144MHz band but operation on the 50MHz band has been quite interesting. On January 17-18 he noticed (on the DX Cluster) some Sp-E activity on the 28MHz band.

On the following day, January 19 at 1830UTC, Andy found a weak Sp-E opening to Poland and managed to work SP6OUL (JO90). Other SP stations were heard at this time but were too weak to work.

However, on January 20 conditions were much better and between 1810-1835UTC Andy made s.s.b. contacts with IK2MKL, IK2QIL, IW2BZY (all in JN45), IK5AWM (JN64) and IW5BML (JN52). He was particularly pleased with these results as his HB9CV antenna was stuck to the north-east due to a faulty rotator and consequently all these contacts were made off the side of the beam. (In my opinion however it proves that small 'non-Yagi' antennas located fairly close to the ground exhibit an almost omni-directional characteristic!).

Trans-Equatorial

A short but interesting occurrence of trans-equatorial propagation (t.e.p.) was reported by **Geoff Brown GJ4ICD** (IN89). On January 9 he heard the Ascension Island beacon Z08VHF (II22) for about 5 minutes around 2030UTC.

The beacon, operating on 50.032MHz, runs 50W effective radiated power (e.r.p.) from a 5λ/8 wavelength vertical antenna. The distance between GJ-ZD8 is something in the order of 6500km.

Steve Gregory VK30T (QF12) has sent details from 'down-under' of his first t.e.p. opening this year from southern Australia. On January 15 he noticed strong Sp-E signals to stations in VK4, VK6 and VK8 up to 2000km away.

Some thirty minutes into the opening Steve started to hear video signals on 49.750MHz from the Vladivostok t.v. transmitter located 9100km from his QTH. Steve mentions that this is sometimes the precursor for an opening to Japan.

Sure enough 15 minutes later he heard the JA2IGY beacon (PM84) over a path length in excess of 8000km. A number of JA stations were heard at this time but signals were quite weak.

At 0400UTC a two-way c.w. contact was made with JA3JTG (PM75), signals peaking 559. It's important to recognise that the predominant propagation mode for this contact was t.e.p. from JA to the VK4 and/or VK8 areas plus a Sp-E link extension to the VK3 area of southern Australia. This is typical of the UK to Mediterranean (Sp-E path) plus t.e.p. link-up to southern Africa.

More details about the t.e.p. mode can be found in the December 1996 and January 1997 editions of 'VHF Report'. In them you'll note that any spring t.e.p. openings normally occur between February and April, peaking around the equinox on March 21.

Auroral

Openings on the 50 and 144MHz bands via auroral propagation were reported on January 10, 26 and 28. Don't worry, you didn't miss anything spectacular!

If it wasn't for beacon stations such as GB3LER on the 50MHz band and the Scandinavian units OY6VHF and SK4MPI on the 144MHz band then it's quite likely that most of these openings would have been missed. During the auroral opening on January 26 the station of **G4FVP** (I094) heard GM0EUA and GM40BD on the 50MHz band between 1920-1945UTC.

At the QTH of **GM7TKA** (I085) the OY6VHF beacon (144.885MHz) was heard peaking 41A at 1955UTC but nothing else was heard at this time. You'll have to wait a year or so before auroral conditions really start hotting-up. At this

Helplines

In the February edition I wondered if there were any Dutch readers of this column that could help Nigel Booth (a s.w.l. from Norwich) with QSL addresses of some Novice PDO stations he had recently heard on the 144MHz band. Well I'm very pleased to report that I've had replies from **Rob PDORZH** and **Tudor PDORMD** both offering to help with the request.

So Nigel, the address you wanted for **Tudor Mastwijk PDORMD** is **Markgraafaan 6, 3131 VM Vlaardingen, The Netherlands**. Both PDORMD and PDORZH mention they enjoy reading *PW* (and especially this column!). Tudor reports that he is active every Sunday at 2030UTC on 144.465MHz. Why don't you keep a look out for him?

stage of the solar cycle it is unlikely that any lengthy DX type openings will occur.

Tropo Openings

A number of stations have reported some good tropo openings occurring on January 10-14, 25 and 30-31. These periods of enhanced tropospheric propagation took place when high pressure weather systems were located over the UK and central Europe.

At the QTH of **Lee Adams G4RKY** (J001) the HB9HB beacon (144.865MHz) was heard peaking 579 during the evening of January 10. This was followed by an s.s.b. contact with HB9RDE (JN37) over a 600km path. Around this time other stations in eastern and central England were making contacts at similar distances into Germany and other parts of western Europe.

The enhanced propagation to DL, HB9, ON and PA on the 144MHz band existed for four days until finally petering out. Unusually, although most traffic was on an east-west path a Spanish station EB7BGM claims to have heard the station of G4FNL (IO90) at 2330UTC on January 13.

Propagation on the 430MHz band was very similar to that on lower frequencies although there was a good opening to parts of Scandinavia on January 14. At the QTH of **G3NVO** (IO91) s.s.b. contacts were made with OG3LAV (JO44), LA2PHA (JO38), OZ7AMG (JO65) and SM7FMX/7 (JO65).

Further north in locator IO93 the station of **G4AEQ** found OZ60L and SM7ECM (both in JO65). Propagation on the 1.3GHz band was also enhanced and some good inter-G contacts were made in the period.

During the evening of January 13 **John Bales G0HAT** (IO91) contacted **Tony Ault G3KTU** (IO90) via television (ATV) on the 1.3GHz band. Full colour pictures with 'P5' reports were exchanged over an obstructed path.

Microwave Bands

The period of enhanced propagation on January 13-14 enabled two UK distance records to be broken and one new world



It's QRV all bands from -50MHz to 5.7GHz - At DL0WH.

record to be created on microwave. On January 14 at 2335UTC **Bob Short G3GNR** (IO70) contacted SM6ESG (JO67) on the 10GHz band. The contact over the 1275km path has been confirmed by the RSGB Microwave Committee as being the new UK 10GHz tropo record. (Incidentally the 10GHz world record is 1991km set in 1994 between VK5NY and VK6KZ).

Meanwhile earlier in the day at 0935UTC a new UK distance record on the 24GHz band was established when **Petra Suckling G4KGC** (IO92) worked Arie Dogterom PA0EZ (JO22). The contact, established by tropospheric ducting, was over a path length of 391km. (Annoyingly the world record is only 5km more! It was set in 1993 between HB9MIN/P and DH6FAE/P).

After the contact, Petra then telephoned her husband **Charlie G3WDG** who immediately rushed home from work. Unusually the 24GHz band was still 'open' an hour later and G3WDG was very pleased to make a two-way QSO with PA0EZ over the same distance.

The masthead mounted equipment was then taken off the tower to make an attempt at creating a new world distance record. The 24GHz gear, consisting of a WDG009 module and DB6NT MkII

transverter running 400mW into a 250mm off-set dish antenna, was then set-up at a portable location some 425km away from the QTH of PA0EZ.

Although the 24GHz signals from G3WDG/P were heard by PA0EZ, unfortunately those from Arie were not. However, even though a two-way contact was not made it did establish a new one-way world record of 425km.

The previous one-way record incidentally was set in September 1996 between JROYGV and JA9TYK over a path length of 402km. And just in case you're wondering the North American 24GHz record, set in 1992 between KK6TG and WB7ABP, is a mere 256km!

Finally, a new UK distance record has been established on the 47GHz band. The contact took place on December 14 1996 when **Steve Davies G4KNZ/P** worked Roy Emery G3FYX/P over a 41km path.

The equipment used at G4KNZ/P was a Gunn diode cavity oscillator running 100mW into a 450mm diameter dish. A waveguide cross coupler attached to the Gunn source and a diode mixer was all that was required to make a very simplistic receiver.

At G3FYX/P similar equipment was

used but with a 250mm dish antenna. Indirectly I had a hand to play in the establishment of this contact.

A year ago I had discovered some surplus 4GHz parametric low noise amplifiers. A small part of the microwave electronics contained a 49GHz Gunn oscillator used as a 'pump' source for the parametric amplifier. Not only did these tune down to the 47GHz band but they also ran 100mW output. And that's real QRO at these frequencies!

As an added bonus the parametric amplifier also contained a cross coupler and a diode mount originally used to monitor the Gunn output power. True to form these were pressed into service for the 47GHz receiver!

All at *PW* send their congratulations to G3FYX, G3GNR, G3WDG, G4KGC, G4KNZ, PA0EZ and SM6ESG for achieving these outstanding results on the microwave bands.

Whilst on the microwave theme this year's **Microwave Round Table** meeting at the **Rutherford Appleton Laboratories, near Didcot, Oxfordshire**, has been rescheduled to **Sunday April 13**. If you're even the slightest bit interested in microwave operation or construction I thoroughly recommend that you attend. Contact me if you want further details about the programme or venue.

Contests

Now I'll turn to news of some RSGB contests coming up soon. On Sunday March 23 the 70MHz fixed station contest is being held between 0900-1300UTC.

Three 144MHz fixed station s.s.b. cumulative contests are being held on April 1, 9 and 17. These are all mid-week events and run between 1900-2100UTC.

On Sunday April 6 there's the 1.3/2.3GHz fixed station contest. It's held at the slightly strange time between 1700-2100UTC. Actually the idea is quite sensible and is intended to catch the lift in conditions when the sun sets, in this case at 1900UTC.

For the microwave operator there's a choice between attending the Microwave Round Table or entering the first 24GHz cumulative contest. Both are being held on Sunday April 13. Finally, on Sunday April 20 the 50MHz fixed station contest is being held between 0900-1300UTC.

Deadlines

That's it again for another month. Don't forget to send me your list of locator squares, counties and countries worked for the 1997 table. Forward any news, views, comments or photographs to reach me no later than **Saturday March 29**.

Send them to me at **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP**. You can also contact me via packet radio @ **GB7MAD**, the UK DX Cluster @ **GB7DXC** or E-mail via **davebu@mdlhr1.agw.bt.co.uk**. Alternatively you can telephone me on **(01873) 860679**.

END

HF FAR & WIDE

This month Leighton Smart GWOLBI has some heartening h.f. operating 'Novice News' and lots of other information from your log reports.

I'll start this month with some information from **Jon Whitton 2E0APL** of Wirral, Merseyside. He says that since receiving his new call sign in early December, he's been bashing away on the key on the 3.5MHz band.

John makes the point that the 'G' stations he's worked on '80' have been very helpful, as he says, "settled my nerves by sending slower"! Although I've been licensed since 1989 Jon, I remember only too well my jitters (or actually, near panic!) when I first got on the air, and it's reassuring to hear that there still are amateurs out there who will go out of their way to help newcomers to the hobby. Long may it continue, as it's always good to hear good reports about the friendliness and helpfulness of UK amateurs, eh?

Welcome to the h.f. bands, Jon. We hope to hear more about your low power DX activities soon!

DX News

Now some DX news and information culled from the pages of the RSGB's *DX Newsheet*. Firstly there's news of Enrique EA5AD who will be operational from Algeria until the end of the year as 7X0AD, using s.s.b. on all bands 1.8 to 28MHz. Your QSL should go to EA4URE.

Meanwhile, in Rwanda, Mark ON4WW is active again as 9X4WW and has been busy particularly on 1.8MHz between 2045 and 2130, as well as 0200UTC. And finally Bernhard DL2GAC will be active from the Solomon Islands for two months from February the 5th working as H44MS. Bernhard will try and be active for the CQ SSB 1.8MHz Contest. (QSL to home call).

Your Reports

Again, space is limited this time around so without further ado, I'll go straight into your reports, starting with 3.5MHz.

Exam time is over for **Eric Masters G0KRT** in Worcester Park, Surrey, and his logbook shows it! As usual, he's been pounding away with his QRP, and has listed contacts with DJ1ZB (Germany) at 2011, GU4YBW (Guernsey) at 0049, PA3ALX

(Netherlands) at 0958, OK1DMS (Czech Republic) and OZ/DL2HEB/P (Denmark) at 2208, all with a massive 5W of c.w.

Next comes the already-mentioned new licensee **Jon Whitton 2E0APL**. Jon, using an all home-made station lists DL1BDW (Germany) at 1945UTC on c.w. for his first contact with a mainland European station.

The 7MHz Band

The 7MHz band log from **Sean Gilbert G4UCJ** in Milton Keynes shows that this band has certainly been producing the DX. Sean has worked all c.w. here, with 4L50 (Georgia) at 2032, G4VXE/C6A (Bahamas) at 2323, FS/W2QM (French St. Martin) at 2337. There was also NP3A (Puerto Rico) at 2311, ZL2AGY (New Zealand) at 0842, and 4K0CW (Azerbaijan) at 0051UTC, all with around 50W.

On the 's.w.l. side', Sean's 'neighbour' **Charlie Blake M0A1J** is now using his new Alinco OX-70 rig as a receiver most of the time. His monthly receiving log indicated s.s.b. reception of V44NEF (Nevis) working DK2PS in Germany at 0752, LU9VET (Patagonia) working IK20FW in Italy at 0613, and ZL1AXD (New Zealand) in contact with HC1JAL at 0802UTC.

Also logged by Charlie were C08ZZ (Cuba) working IK5IKF at 0608, and VK9FL (Lord Howe Island) in contact with UX0UN at 0623UTC.

The Higher Bands

Well the higher bands are 'where it's at' for most of our reporters this month. **Ted Trowell G2HKU** on the Isle of Sheppey in Kent for instance, has been rather busy here, listing c.w. contacts at around 70W with ET3KV (Addis Ababa, Ethiopia), FY5YE (French Guyana), A71CW (Qatar), and UA9MA (Asiatic Russia) all at around 1100, while operating at 1600UTC gave Ted a long run of contacts with west coast American stations.

John Heys G3BDQ meanwhile has not had much time for the 'wireless' of late. But despite this he made a quick telephone call and provided a brief log of his contacts



Leighton GWOLBI's shack, pride of place taken by the KW2000B!

with VK0IR (Heard Island) on c.w. at 1450, and 1A0KM (The Knights of Malta) on s.s.b. at 1000UTC.

Our 'arch QRPer' **Eric G0KRT** lists just two contacts on 14MHz, with G3KKQ on 'short skip', and UA1TET (Russia) both at around 1500UTC.

It's back to sunny Milton Keynes now, where Sean G4UCJ has been having some good fortune. His 14MHz log includes c.w. contacts with VU2PAI (India) at 1345, XE3AJM (Mexico) at 1510, FS/W2QM (French St. Martin Island) at 1535, VK7CW (Tasmania) at 1316, 7Z500 (Saudi Arabia) at 1333, FG/F2HE (Guadeloupe Island) at 1418, and A71CW (Qatar) at 1348.

Once again, the key has been favoured at the station of **Carl GW0VSW**. Carl, using up to 90W lists contacts with PT2VE (Brazil) at 2020, 3V8BB (Tunisia) at 1245 (QSL via Box 2055 Tunis), KC4AAA (South Pole) at 2001 (QSL via NC6J), 8P9EM (Barbados) at 1718 QSL to G3VBL, and EA8/OH2BYS/P Canary Islands at 1909UTC.

On the 'transmit side' now from **Charlie M0A1J**, who has worked 4Z4TA (Jerusalem) at 1129, and Swedish Special Event station 8S0FRO at 1546. Finally he records YB1XUR (Indonesia) at 1445UTC.

The 18MHz Band

As space is limited this month, we'll take a brief look at the 18MHz band. It's a real favourite for some of our reporters!

Ted G2HKU for instance logged 9K2MU (Kuwait) at 1100, as well as V3JYK (Belize), HK7AAG (Colombia) and FY5YE (French Guyana) all on c.w. at around 1600. While John G3BDQ worked 701A (Yemen) on s.s.b. at 1500, and 3B8CF (Mauritius) on c.w. at 1400UTC.

During his operating 'stint' at Special Event Station GB60BBC ('despite having the 'flu') **Carl GW0VSW** hooked up with VE2BQB (Canada) at 1437. He then worked CN8NM (Rabat, Morocco) at 1258 (QSL via Box 242 Rabat), and 9K200 in Kuwait at 1316UTC, all on s.s.b.

Finally, we go to **Charlie M0A1J** who worked British 'ex-pat' Terry EA8BYR in the Canary Islands at 1025UTC using s.s.b. for a single report for this band.

Time To Go QRT

Well, that's all I have space for this month folks and it's time to go QRT! As usual, I appreciate your reports to the address below, by the 15th of the month.

Thanks to all reporters for your continuing support for the column. All the best DX for now, and cheerio!

Your reports please to me **Leighton Smart GWOLBI**, 33 Nant Gwyn, Trelewis, Mid-Glamorgan CF46 6DB Wales. Tel: (01443) 411459/(01443) 710749 or FAX: (01443) 710789.

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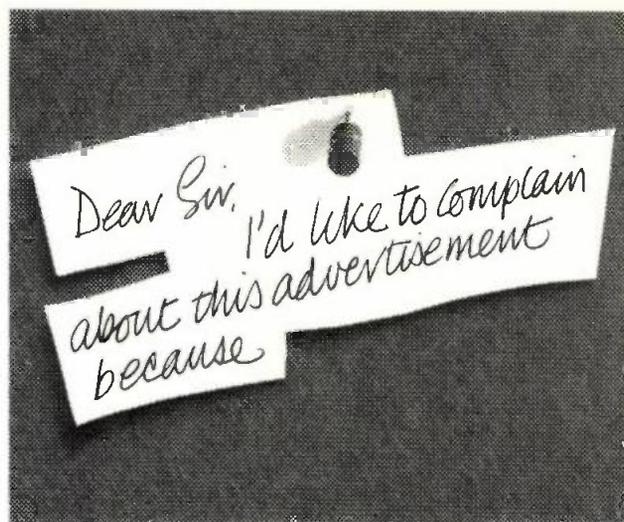
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ICOM IC4E £99
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HEATHKIT 2KW Linear £300
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KENWOOD SW 200 £75
KENWOOD AT230 £95
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ALINCO DJ-100 £99.00
ALINCO DJ-180 £150.00
ALINCO DJX-1 £225.00
AOR AR-7030 £650.00
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Traders' Table

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Icom IC-706 mint condition.....£750
Yaesu FT-900AT - boxed.....£950
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JRC JST-135HP deluxe + PSU
(opt. units incl.).....£TEL
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Yaesu FT-102 + FV-102DM & FC-102.....£799
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FP-757GX.....£TEL

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Yaesu FT-726R + 2/670/SAT.....£TEL
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Yaesu FT-290R Mk I plus accessories.....£225
2 x Navico AMR-1000S from.....£140
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ICOM IC-R71E boxed from.....£599
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Kenwood R-1000 boxed.....£TEL
Regency MX-7000.....£TEL
Yaesu FRG-9600.....£350
AR-2500.....£275
Drake R-8E.....£699
Lowe HF-225.....£375
Trio R-600.....£250

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Icom IC-M5.....£150
Kenpro KT-22.....£80
Alinco DJ-160.....£150
Kenwood TH-21.....£99

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ERA Microreader version 4.2 plus crystal
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Kenwood R-5000 c/w VC-20 VHF converter
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made!!.....£690.00

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manual.....£229.00
(NEW) Kenwood TH-22E 2M Handheld
£215.00
(NEW) Kenwood TH-42E 70cms Handheld
£239.00
Kenwood TH-79E 2M/70cms Handheld (mint
cond).....£299.00
(NEW) Icom IC-W21E 2M/70cms handheld
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Alinco DJ-F1 2M Handheld.....£159.00
Kenwood TH-28E 2M handheld c/w all
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(NEW) Alinco DJ-180 2M handheld.....£179.00
Alinco ALM-203E 2M handheld c/w mobile
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YAESU FT101ZD. VGC.....£395
TEN TEC ARGOSY 515. ATU+PSU
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VHF/UHF TRANCEIVERS

ICOM IC275H. 75W. 2Mtr. Base.....£895
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YAESU FT736. 70/144/50 Modules
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AZDEN PCS6000 2Mtr Tcvt +Airband
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ICOM IC228H. VHF Mobile Tcvt
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YAESU FT290 Mk2 c/w FL2050.....£395
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PX TS-50 Kenwood HF mobile.....£699
PX IC737 Icom HF 100W.....£1060
LX FTONE Yaesu HF 100W.....£675
LX FT890AT Yaesu HF 100W.....£1250
LX IC-706 Icom HF + 2/6m.....£779
AX FT767GX Yaesu HF 100W.....£1450
AX FT990 Yaesu HF 100W.....£1650
AX IC765 Icom HF 100W.....£1699
RX FT980 Yaesu HF 100W.....£625
RX FT101 Yaesu HF Valve.....£260
RX FT102 Yaesu HF Valve.....£325
RX FT747 Yaesu HF Mobile.....£450
RX FT107M Yaesu HF 100W.....£275
RX TS690 Kenwood HF/6m.....£1175
RX TS440 Kenwood HF 100W.....£750
RX IC726 Icom HF 100W.....£850
RX IC761 Icom HF 100W.....£995

VHF/UHF TRANSCEIVERS

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PX FT2700 Yaesu 2mtr/70cm.....£279
PX FT290R II Yaesu 2mtr port.....£375
PX FT221R Yaesu 2mtr m/node.....£295
PX FT2500M Yaesu 2mtr mobile.....£279
PX TS711E Kenwood 2mtr m/node.....£459
LX DJ580E Alinco 2mtr/70cm.....£245
LX TH21E Kenwood 2mtr port.....£100
AX FT790R Yaesu UHF port.....£310
AX TM-732E Kenwood 2mtr/70cm.....£525
RX DJ160 Alinco 2mtr/70cm.....£155
RX DJ560 Alinco 2mtr/70cm.....£335
RX FT76 Yaesu 70cm port.....£155
RX FT212RH Yaesu 2mtr FM.....£175

RECEIVERS

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PX R2000 Kenwood HF Gen. RX.....£375
PX FRG7700 Yaesu HF Gen. RX.....£295
PX AR8000 AOR Scanner.....£299
PX AR2800 AOR RX M/base.....£359
PX AR1500ex AOR Scanner.....£225
PX AR3030 AOR HF RX.....£475
PX HF150 Lowe HF Gen. RX.....£375
PX FRG100 Yaesu HF Gen. RX.....£449
PX MVT8000 Yupiteru Scanner.....£269
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RX AR1500 AOR H/H Scanner.....£165
RX ICF-7600 Sony Port. RX.....£120
RX NRD535 JRC HF Gen. RX.....£850
RX FRG8800 Yaesu HF Gen. RX.....£395

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LX = SMC Leeds 01132 - 350606
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FOCAL POINT

Graham Hankins G8EMX has details of the BATC rally, a round-up of news and events but starts off with some 'big' news.

The big news for UK Amateur Television is that another 1.3GHz ATV repeater, the first for over two years, has been granted approval to go into service. The repeater **GB3WV** is at a BBC transmitter site on Dartmoor.

In an excited phone call **Tony Reynolds G8CEQ** told me: "GB3WV brings improved 24cm ATV facilities into North Devon and Torbay. We have provided the repeater with three directional trough-reflector antennas which will be at a height of 30m".

So, why the two-year gap? **Graham Shirville G3VZV**, ATV repeater licence co-ordinator for the **British Amateur TV Club (BATC)**



An actual 1.3GHz ATV repeater in service. This very professional-looking hardware is GB3ZZ in Bristol, run by the Severnside ATV Group.

explains: "The actual licence application for GB3WV was submitted in June 1996 and cleared in December. This and other applications have been on hold because of interference problems with other band users".

So there are more repeaters to come on-air, Graham continued: "Two other applications - for **GB3AT**

(Southampton) and **GB3KT** (Kent) are still waiting, but I can see no reason for any further delay".

I gather that the **Kent Repeater Group** recently held one of its occasional 'At Home' days, when stations take along their latest projects to show off. There were test waveform generators, 10GHz systems, video mixers and of course the complete **GB3KT** project still waiting to be licenced. It seems that these meetings are the only way for most of the local ATVers to show off their ideas without a repeater.

Annual Rally

All of the UK ATV Groups have been invited to provide displays at the **British Amateur Television Club's** annual rally. The **BATC** will virtually 'take over' the **Sports Connexion** at **Ryton**, near **Coventry** on **Sunday April 27**.

You will be able to gaze at the mobile ATV studios, witness teams of members carrying just one ex-broadcast camera, wonder at the strides in development of 1.3 and 10GHz ATV transmitters and receivers.

The **BATC** stand will feature its quarterly magazine **CQ-TV** and other books, p.c.b.s for most ATV projects and, maybe, even special offers for new members joining at the show! For some 'hands on' ATV it's hoped that **Coventry TV repeater GB3RT** will be receivable from its new site near **Leamington Spa**.

Repeaters Not Needed

Amateur TV doesn't always need repeaters. **Mike Sanders G8LES** and **John Stockley G8MNY** established a simplex (direct station-to-station) video link on 1.3GHz (23cms) for the **Cookham Regatta** along a stretch of the **River Thames**. Amateur TV was needed because a tree-lined bank kept the commentator 'blind' for the first 100m, but thanks to the video links he had something to describe over the public address system!

John describes what was involved: "We set-up colour monitors and 24cm receivers on the announcer's table. Two flatplate receive antennas were fixed fairly

high, so that the transmitters could be anywhere up river.

"Mike used a large Hi-band Super-VHS camcorder feeding a 1W transmitter and long Yagi, positioned where there was a gap in the trees, so that he could see the start boat.

John concludes: "I went further down the course with cheaper c.c.d. cameras but still with only 1W of power. Needless to say over such a short path pictures were a clean, high quality P5. Next time, perhaps, the **Boat Race** itself"?

Simplex contacts are, of course, the only ATV mode available on 430MHz (70cm), which could enjoy fresh activity if experimental digital compression is permitted. This will be a substantial challenge for amateurs, so 70cm analogue still has many devotees; if there is a regular ATV 'Net' around 436MHz in your area, please tell me about it!

To The Netherlands

Now to the Netherlands where a 10GHz ATV repeater is being built, **Bernard PA3FZV** writes:

"Hello Graham. **Hans PA3ETK** and his ATV group are constructing a fully featured 3cm repeater right now. At the end of March a 3cm beacon will be operational beaming North with an angle of 200°.

"Operation will be 24 hour using the callsign **PA6ATV**. A few months later we hope to make the repeater fully operational".

Any reception reports of the beacon will be appreciated, either via the **QSL** bureau or packet to **PA3FZV @ P18WNO.#UTR.NLD.EU**."

Hans and his gang are well experienced with ATV, having previously put out 1.3 and 10GHz pictures from the 375m 'Gerbrandy' TV tower at **Ijsselstein** near **Utrecht**. Even working in freezing windswept conditions the team achieved 20W on 24cm and an amazing e.r.p. of 800W at 10GHz!

Kiwi Problems

My stalwart scribe from Kiwi country, **Michael Sheffield ZL1ABS**, reports some local problems: "The **ZL1BQ** repeater went low power during the stormy weather and

Amateur Television A to Z

Direct Current: or any 'steady' component of a vision signal. Must be preserved or 'restored' to produce an undistorted picture.

Equalising pulses: A form of synchronising pulse which are placed before and after each alternate odd and even field sync. pulse to ensure accurate timing.

Frame and Field: Often confused with each other. A **Field** is one top-to-bottom scan of 312.5 lines. Two fields complete one **Frame** or picture.

I'll continue with this next time.

power blackouts at the end of November".

Wasn't it supposed to be summer over there? "The problem was tracked to a loss of d.c. to the final amplifier due to a faulty fuse holder in the power supply. Opportunity was taken to fit the **Mk22 EPROM** to give new pages on the teletext video generator".

Mike comments: "Good show on the 'Intro to ATV' item in December, by the way!" Thanks **Michael**.

Most of the enquiries I received were about prices, so here is a very rough guide to 24cm. A good feeder will cost about £1 per metre; small antenna £20; receiver - a few pounds for a surplus satellite RX. or maybe £50 for a purpose-designed kit. Transmitter kits are available for £60.

So, within £200 could bring you onto 1.3GHz ATV. Nothing is for nothing, but that should be reasonably affordable.

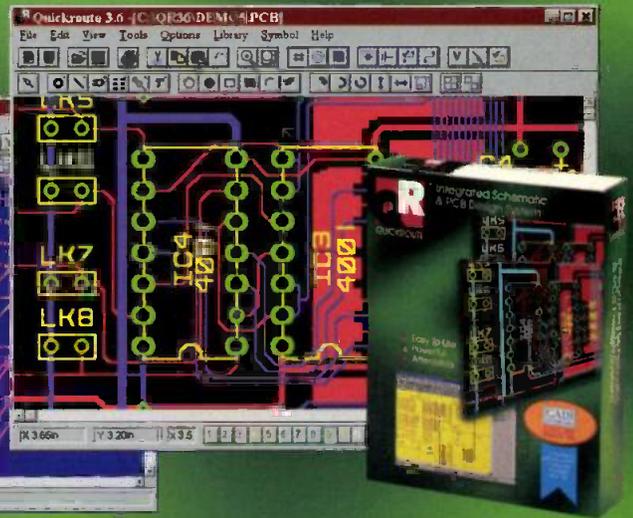
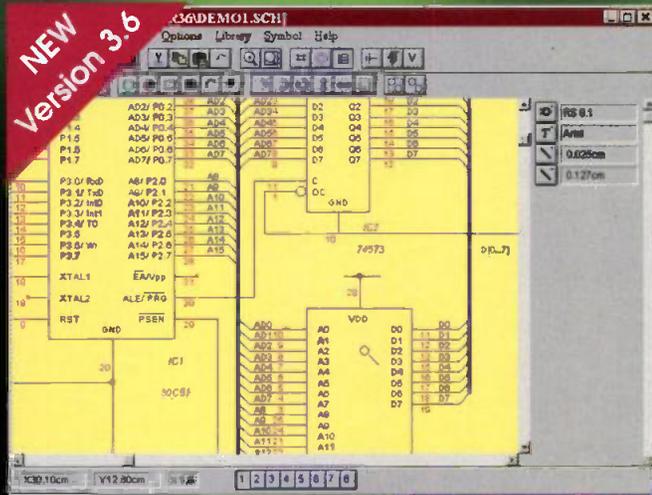
That's all for now, but I'll be very pleased to see anyone who calls at the **BATC** rally. **Cheerio** and **P5**, keep sending your ATV exploits and news to me, **Graham Hankins G8EMX**, 11 **Cottesbrook Road, Acocks Green, Birmingham B27 6LE** or via packet to **G8EMX @ GB7SOL.#29.GBR.EU**.

END



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NEW PLUG IN AUTOROUTER



SMARTRoute is a new 32-bit autorouter from Quickroute Systems rated in 'category A' by Electronics World (Nov 96). SMARTRoute plugs straight into Quickroute 3.6, automatically updating Quickroute's menus with new features and tools.

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SCENE USA

Ed Taylor NOED devotes the whole of this Scene USA to his interview with Rodney Stafford KB6ZV, President of the American Radio Relay League.

Rod KB6ZV President of the American Radio Relay League, shown in Fig. 1, could be considered the most important person in the Amateur Radio world, since the American Radio Relay League (ARRL) has a strong influence on other amateurs and radio societies globally. I began my interview with Rod by thanking him for his time, and asking how he got started in Amateur Radio.

Rod began: "As a youth, I had a friend whose father was a 'ham'. He was always talking to Australia, Japan, Europe and so on, it seemed a lot of fun.

"In fact, he wanted to be my 'Elmer,' and teach me about radio. This was in the late fifties and as a teenager I didn't have the patience for theory and Morse code!

"It was later, in my professional life as a lawyer, that I got interested again in radio. A client took me to lunch, and he had amateur equipment in his car.

"We discussed radio, and I found there were classes at a local club. I now had the perseverance to get my licence, but I'm sorry I waited all that time before getting on the air".

Membership

Rod then proceeded to tell me about the ARRL. Fig. 2 shows the headquarters, and its membership. "I'm not sure whether we or the Japanese society are the world's biggest. Anyway, we have about 175,000 members.

"Our society was founded in 1914, by Hiram Percy Maxim W1AW, shown in Fig. 3. The 'relay' part of the name came about because most activity then involved relaying messages. Equipment and propagation were unsuitable for long distances, and there was no real distinction between commercial and amateur traffic.

"The USA has around 700,000 licensees, so theoretically about 25% are ARRL members. However, because the licence term is ten years, and amateurs die or become inactive, we believe 45 to 50% of active amateurs are members".

More Members

Rod continued: "We would like to reach more licensed amateurs with the ARRL story. I believe other national societies also have this objective.

"We could all then speak to government agencies with maximum authority. It would also be possible to provide more services for the amateur radio community in general. This might mean more work for our volunteers, but we'd still like to have the extra members!

"New licensees can take a while to become familiar with the ARRL's activities, but once radio amateurs are exposed to what we do, and why we're doing it, they see the value in joining. It's sometimes hard to 'toot' your own horn, but we're doing a good job, and must make people aware of it".

Important Tasks

I then asked Rod what were the ARRL's most important tasks. Rod replied: "Our activities are in two broad groups. Those that directly serve the membership, and those that interact with the outside world.

"The membership services are the most apparent. We have a large variety of programmes, to mention a few there's *QST* (the monthly journal), ARRL publications, technical information, equipment insurance, QSL service, operating awards, volunteer counsel, volunteer examiners, Morse practice, bulletin sessions, ARRL contests, and so on.

"But equally important, perhaps not so visible, is our advocacy of amateur radio. The US government is aware of the benefits, and we have achieved many successes in protecting our bands. Day to day vigilance is essential, especially as parts of the spectrum are being auctioned to the highest bidders".

Older-Man's Hobby?

I asked Rod whether Amateur Radio in the USA was perceived as a hobby for middle-aged men? His reply was:

"We are concerned about the

high average age, although we've made some inroads into the problem. We've attracted a percentage of younger people, including women, particularly in local club membership. This is positive, and we're getting better at talking wives, girlfriends and daughters into amateur radio!

"Young people are interested in the Internet and computers now, although so are lots of amateurs, judging by the number of E-mail addresses I see. I wonder how much of a lasting effect there will be.

"This is a new phenomenon, a great way to communicate, and perhaps entertaining for a while. But I think there's still a magic in amateur radio which will last, getting on, calling, and not knowing who's coming back.

"Some younger hams are getting v.h.f. only licences and then dropping out. In the last few years a lower percentage have been upgrading, so we are considering a little restructuring.

"An ARRL working party is investigating how to interest more people in h.f. licences. We have to tell amateurs that additional privileges lead to greater interest. Yes, it's a technical hobby, but we should also stress the fun aspects of h.f. operating".

Licensing Views

Next I asked Rod for his views on the US licensing system.

"We are pleased with the volunteer method, where amateurs themselves test applicants. It's a great success, and there is very little fraud. It needs slight fine tuning, but basically it works well.

"Also on the licensing front, a recent success story has been the

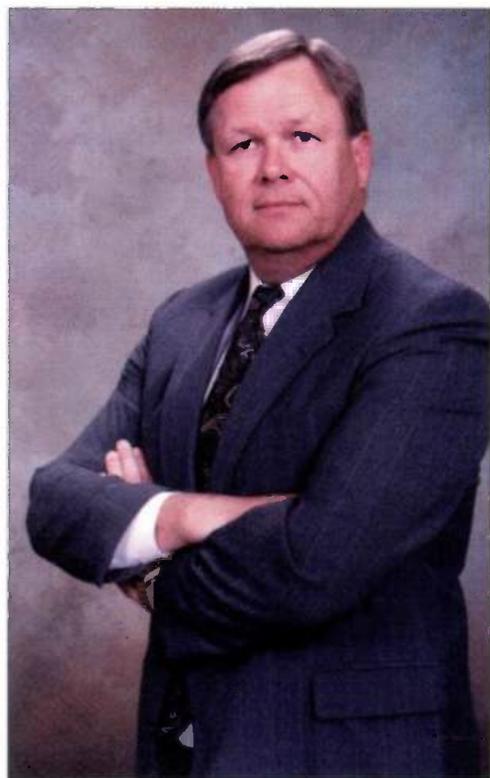


Fig. 1: Rod Stafford KB6ZV President of the American Radio Relay League.

'Vanity' system, where amateurs can choose their own call signs. It took twenty years, on and off, and was very hard to get the Federal Communications Commission (FCC), our regulatory body, to agree.

However, it's spurred a great deal of interest, and we're proud of the achievement. Definitely recommended to other countries!

"On the other hand, we haven't been quite so successful in cutting down bad behaviour on the air. The FCC is not enforcing the rules heavily, because they've had budget cuts and reduced personnel, which is 180° from the direction we want them to go.

"Perhaps we're aware of bad behaviour because there are more hams. Old timers used peer pressure, and we should keep doing the same. We might reluctantly have to accept that (like society itself) we have some members who are anti-social".

Low Profile

It's probably true to say that Radio Amateurs in Britain have a fairly low profile. Is the American situation the same?

"The ARRL stresses public service and emergency communications, which helps justify



Fig. 3: Hiram Percy Maxim W1AW founder and first President of the ARRL.

band usage. I get the impression there is not the same emphasis elsewhere, and that amateur radio is considered more of a technical pursuit than a contribution to society.

"I strongly suggest that other national radio societies get out front with their administrations, and make amateur radio more visible. Citizens, governments and administrations would then understand the benefits of amateur radio. They might then be less willing to reduce our capabilities by disposing of spectrum space, restricting amateur antennas, etc.

"In public service we generally stand head and shoulders above society. Every day there are stories of amateurs coming forward when needed. For example, earlier this year, hams in Northern California were manning shelters and handling logistical traffic, when public service and rescue agency communications were overburdened because of floods".

International Friendship

So, Rod what do you consider important from a global perspective? "International friendship is a unique aspect of our hobby. Amateurs talking to each other represent the best way of fostering friendship world-wide.

"Maybe we could solve the world's problems by doing this! I'd like better band conditions but we have to be patient. There's nothing like tuning the bands at the height of

the sunspot cycle and hearing hams from all over the place just chatting away!

"I'm very pleased with negotiations on the International Amateur Radio Permit (IARP). The participation of the US in the European system (CEPT) is also likely, and talks are progressing well.

"The FCC is currently seeking comments. Before the end of 1997, we'll know how far the USA will be involved - I hope completely. The outcome will be that amateurs in most countries will get an IARP or CEPT permit before they leave, then be able to operate almost anywhere with little formality. This should happen in the next 18 months to two years".

Amateur Attitude

The USA, like the UK, has amateur radio magazines which are not connected with the national society. What is the ARRL's attitude?

"I suppose it's competition in a sense, but I'm glad there are American magazines in a similar position to *PW*. They complement our own magazine, and keep the ARRL up to speed.

"There's plenty of room for other voices and independent magazines in the USA have not held back our membership numbers, perhaps the reverse".

Band Future

So with all this in mind what are Rod's thoughts on the future of our bands?

"For h.f., one of the goals of the International Amateur Radio Union, which we support, is harmonisation of the 40m (7MHz) band. I foresee a world-wide band of at least 300kHz fairly soon, perhaps resulting from the 1999 World Radio Communication Conference (WRC-99).

"It's helpful that broadcast technology is moving up in frequency from h.f. to v.h.f. and u.h.f. via satellite. It may take longer in emerging countries, but the

movement is there. The pressure for more h.f. broadcast space will decrease, so we could see new and expanded bands."

It's not all good news though, says Rod: "On v.h.f. and u.h.f. the pressure is great, and will not diminish. We'll have problems because commercial people want the frequencies and there's money to be made. Billions of Dollars have been generated for governments by licence revenue, and this will probably continue.

"We just can't afford to pay, and world-wide involvement will be needed. Amateurs must work together so that administrations don't reallocate our spectrum."

I asked Rod if new modes, digital speech, for example, would be used. "Definitely, and I hope we'll develop additional and different modes of communications, either based on existing technology, or by developing new systems. We need to become more efficient and save bandwidth, to accommodate the inevitable rise in our numbers".

Contribution To Society

Rod is keen to stress the public service aspect of amateur radio. So I asked can we also make a contribution technically?

"It used to be that many hams were experts, at the forefront of their technical fields. Then, we were the only ones involved, but what was a hobby has now developed into a real profession. Communications has moved on from being, sixty years ago, a small part of everyday life, into a full-time career now for a large number of people.

"Amateurs used to know best how to communicate, both technically and from a traffic-handling point of view. The government and industry now go to professionals for expertise, and of course, this has an impact on amateur radio. Despite that, lots of people in communications are amateurs themselves.

"There is so much money involved in the communications industry, and we have to leave it to larger companies to produce most innovations. Our contribution technically can be made in smaller ways such as with inventions, applications, and modes of communication. We still have a lot to give society, but in other areas".

The Morse Test

The Morse test requirement (for h.f. operation) is a hot topic in Britain. But, what about in the USA, and what is the ARRL's position, Rod?

"There is a lot of discussion. The ARRL has recently surveyed members, and about two thirds wanted the Morse code requirement to stay. If the majority want to keep it, I can't see its abolition. This is probably true anywhere that

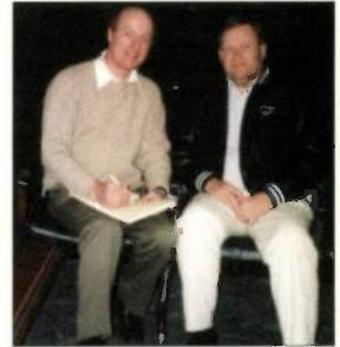


Fig. 4: Ed NOED and Rod KB6ZV discuss the future of Amateur Radio.

amateurs are involved in testing and licensing (as in the USA).

"On the other hand, in countries where the administration handles licensing exams, things may be different. Certainly, when the pendulum swings, and more amateurs want to delete the requirement rather than keep it, a new decision has to be made, 66% is not very far from 49%. I know the RSGB has found similar results in polling.

"Our feeling from international meetings is that some countries are willing to abandon this requirement. We'll find out at WRC-1999, but it's too early to forecast what might happen, and it's difficult to be more precise. We will probably reach a situation where each country maintains its own rules.

"If Morse testing is abolished, I think we would have to substitute it with something else. We might consider an additional exam, with perhaps a practical element (I like the sound of the UK Novice test)".

Many thanks Rod KB6ZV and of course to the ARRL. I really appreciate the openness in this informative conversation.

Vanity Callsign

In July's 'Scene USA' I will consider some of the ways the USA does things that the UK might import. I'll also explain the 'Vanity Callsign' program, which lets American hams choose their own callsigns.

You'll notice that I've taken advantage of the Vanity Callsign, and have become NOED1. Maybe the UK could adopt a similar scheme.

So, until next time, 73, and keep writing to me Ed Taylor NOED, PO Box 261304, Denver, Colorado 80226, USA, or E-mail me at 102662.2222@compuserve.com. The deadline for July is the middle of April.



Fig. 2: The ARRL's headquarters are in Newington, Connecticut.

END

BROADCAST

ROUND-UP

This month Peter Shore reports on lots of station activity and has news of new frequencies for the Voice of the Mediterranean.

As this edition of *PW* goes to press, the fate of **Radio Australia** hangs in the balance. A committee established to examine the future of the whole Australian Broadcasting Corporation (ABC) reported at the end of January.

The Mansfield Report contains a range of recommendations about the future of the ABC at a time when its budget is being severely reduced. The ideas proposed include the outsourcing of the production of most television programmes, with the exception of news which drew an immediate reaction from senior ABC executives who said that it was critical for ABC's future that the organisation continues to be a major TV producer.

The report was particularly critical of international broadcasting from Australia. It claimed that Radio Australia's audience was falling, and that there were no priorities applied by the ABC to its international radio service.

The Mansfield Report said that it is difficult to evaluate the effectiveness of funding of the Melbourne-based station. Furthermore it said that the ABC "cannot continue to maintain its domestic service and also provide an overseas broadcasting service within the funding allocated to it for 1997-98, put simply, maintenance of an overseas broadcasting service will be at the cost of domestic programming". Mansfield noted that



ABC has responsibility for the funding of the service, unlike other broadcasters like **BBC World Service** which receive direct government finance.

As this magazine went to press, the ABC Board of Management was due to meet to decide the fate of Radio Australia. Initial reports suggest that the station will be guaranteed a place on the airwaves until at least the end of June 1997. Its future beyond then is uncertain.

Watch this column for the latest news, and in the meantime tune to Radio Australia. English is on the air and audible in Europe at: 0000-0400UTC on 15.51; 0000-0500 on 17.75; 0100-0830 on 17.78; 0600-0800 on 15.53; 0800-1100 on 21.725; 1100-1300 on 11.66; 1430-1600 on 7.15, 9.85 and 11.66; 1500-2000 on 9.615; 1800-2100 on 7.33 and 2100-0000 on 11.855MHz.

Voice Of America

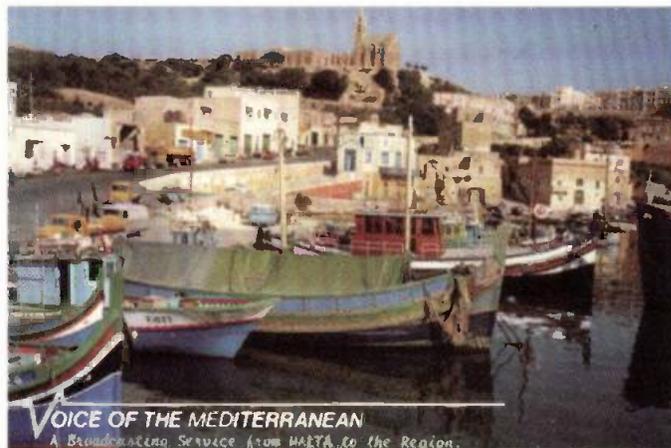
Last month I reported that **Voice of America (VoA) Europe**, the 'Music and More' service from the Voice of America, was given a reprieve. But time ran out on 24 January - if you have satellite equipment and tuned to Eutelsat II-F1 at 13° East and the audio subcarrier on **Deutsche Welle (DW)** television you'll have found that instead of the Washington-originated programme there are a variety of foreign language broadcasts from DW.

The Cologne-based station pulled the plug on the satellite service after VoA failed to agree terms with the companies interested in buying VoA Europe. The loss of the analogue subcarrier of VoA programmes resulted in a number of cable companies and local f.m. and a.m. rebroadcasters of VoA Europe across the continent feeding something entirely different to their audiences.

Dropped Frequencies

Radio France International (RFI) has dropped most of its short wave frequencies to western Europe. The station is no longer on the air on 6.175MHz with English at 1600UTC weekdays.

Instead, RFI comes on the air at 1500 on Saturday and at 1730 on Sundays. During the week it can be heard from 1700UTC. The channel seems to be diverting all its



resources to support its French language services: the station has pointed out that English is available 24 hours a day via the Internet.

Official Schedule

Reports have reached me that **WINB** has been heard once again between 2010 and 2155UTC on 11.74 MHz. The station's official schedule is: 0000-0600 on 11.95; 1600-1900 on 15.715; 1900-2200 on 11.74 and 2200-2400 on 11.95MHz.

Test Transmissions

The **Voice of the Mediterranean (VoM)** has been carrying out test transmissions on new frequencies. Its service to North America has been carried on 7.30 and 13.60MHz from 1600UTC, and the station has added a weekly Japanese-language broadcast. That service can be heard at 2300 on Sunday at 9.80, and then at 0200 and 0700 on 15.55MHz.

I have not been able to find out why the VoM, based in Malta, should want to broadcast in Japanese. Answers on a postcard, please?

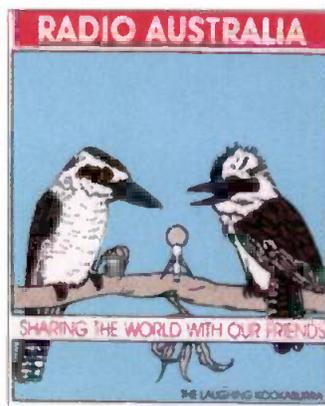
Band Sharing

Turkey played host to the High Frequency Co-ordination Conference in February. This is the twice-a-year meeting where all the major international short wave radio broadcasters meet to thrash out a workable sharing of the limited high frequency broadcast bands.

The success of the meeting can be judged from the lack of interference caused by one station to another on the bands after the frequency change at the end of March. Turkey's international broadcaster transmits in English at: 0400-0500 on 17.705 and 7.105; 1330-1430 on 9.63 and 9.445; 1930-2030 on 6.0 and 5.965 and 2300-0000 on 9.655, 9.56, 7.28 and 6.135MHz.

Extended Service

Radio Jordan has extended its English-language service, according to a report from **Radio Vlaanderen International**. The station is now on the air at 1100 through until 1730UTC on 11.69MHz, with news at various times of the day.



That's all for this month. I'll keep a close watch on the ever changing world of international broadcasting in the next four weeks, so make a date with this column for the latest news. And don't forget to let me have details of your interesting finds on the broadcast bands!

END

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ECC83	5.00	PL504	3.00	6BW6	4.00	12E1	10.00
ECC85	3.50	PL508	3.00	6BW7	3.00	13E1	E85.00
ECC88	6.00	PL509/519	7.50	6BZ6	3.00	57Z8	95.00
ECC808	15.00	PL802	4.00	6C4	2.00	805	45.00
ECF90	1.50	PY500A	3.00	6CB6A	3.00	807	6.00
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ECL86	3.50	QDV06-40A	12.00	6CW4	6.00	866A	20.00
ECL800	25.00	U19	8.00	6D05	17.50	872A	30.00
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Marconi CR100 short wave receiver, £35. Icom IC2025 2m (144MHz) s.s.b. transceiver, £85. Ex-army B44 MkIII three channel v.h.f., a.m. transceiver (valve) with half wave dipole, £20. Chris G4WFF, Bromsgrove. Tel: (01527) 836295.

Momentum data decoder MCL-1100 with latest synoptic upgrade, 9in monitor, a.c. power adapter, cables, manuals, under guarantee, new cost, £450, bargain, £325 o.n.o. As new condition. Tel: (01926) 854556.

MuTek SLNA290S2 pre-amp for Yaesu FT-290R2, unwanted project, complete with all original MuTek fitting instructions, east to fit, cost £44 new, will accept, £20 including P&P. James Flint, Surrey. Tel: (01342) 393534, answerphone if out.

Nearly one hundred valves to go, 50 types, also Clyné home built two manual organ and *Wireless Worlds* from 1946 to 1978, must pulp soon! Tel: Rutland (01572) 767235.

Normende Valved radiogram: Free to a good home if you live near the Winal peninsula! I have a Normende Model 5633C stereo radiogram in working order and complete with instructions and alignment details. Call Mr R. O. Woolham on 0151-608 6560.

Notebook computer, latest MITAC 4023 TFT screen '586 8Mb Windows '95 with software, Lowe Airmaster 3 ARCARs decoder AEA, FAXIII, FAX NAVTEX, RTTY, complete package, as new, £700. Tel: Oxford (01865) 749374.

Oscilloscope Tequipment type D43 double beam, in good working order, clean condition, £90 or nearest offer. Ken, Chester. Tel: (01244) 676167.

Packet controller Tiny 2 MkII, as new, boxed with all data, £75. Tom G6OEI, Derby. Tel: (01332) 767960.

QRP Mizuho hand-held for 14MHz, 2W s.s.b./c.w., speaker microphone, four crystals, etc., excellent condition and ideal for holiday use. G3YCC, Hull. Tel: (01482) 650410.

Racal h.f. manpack TX/RX Syncal 30, 1.6-30, all-mode, £350. Eddystone h.f. TX/RX s.s.b., £150. Signal airband, £100. KW107 a.t.u. super match, £150. Phillip, Leominster. Tel: (01568) 720378.

Racal RA17 in case, £150. KW77, £75. Eddystone 1830, £175. All excellent with manuals, also Aldis lamp in case, works, £30. Eddystone 960 wanted, also QRP linear for 3.5MHz. Tel: Powys (01686) 630255.

Robot 400 SSTV clone, £30. Icom IC-451E 430MHz transceiver, £375. Farnell B3020 p.s.u., heavy!, £75. 10GHz WG16 to SMA transition, £25. Collect or carriage extra. Bob G8VOI, Waterlooville, Hants. Tel: (01705) 250830 after 6pm please.

Scanner, hand-held PRO34, 200 memory, freq. range, 68-88, 108-136, 136-174, 380-572, 806-960MHz, a.m., f.m., £65. Adrian, Ludlow. Tel: (01584) 872618.

Sell/exchange 1 CWT/QST/CQ mags., 1930s-70s, want QST 1987 onwards, FT-220, info on Rhode and Schwartz noise generator, model SKTU, delivery Midlands and West possible. Mr Moore, Worcs. Tel: 0121-362 1050 answerphone.

Shack clearout! Magazines, power supplies, XT-PC, transformers, probes, units for breakdown, coaxial relays, W562, meters, hardware, nuts, bolts, connectors, etc., job lot to fill estate car, 'phone for list. Tel: N. Yorkshire (01947) 601567.

Sinclair 128K p.s.u., joystick & games, £30, good condition. Alex Munro on (01436) 821023.

Sony SW7600G, four months old, full short wave with s.s.b., c.w. and synchronous detection, highly rated by Passport to World Band Radio, unwanted gift, £110 for quick sale. Peter Jones, W. Sussex. Tel: (01903) 235682.

Ten Tec Argosy II 525D h.f. s.s.b./c.w. 5/50W solid state digital transceiver, mic., manual, c.w. and s.s.b. filters fitted + NB unit, £235. Matching mains p.s.u., £35. All good condition, no offers. Dave G4JXX, Tel: (01329) 220753.

Tokyo HT115 15m/21MHz s.s.b., c.w. transceiver, 20W, cost over £300, sell, £100. Daoging FL2 audio filter, cost £99.75, sell, £40. Sony Earth Orbiter receiver, 100kHz-30MHz + 88MHz-170MHz, s.s.b., c.w., a.m., £49. All v.g.c. Dave G4JXX, Hampshire. Tel: (01329) 220753.

Trio JR60 10 valve receiver, serviced, re-valved, g.w.o., £40. Tono terminal unit,

RTTY, c.w., etc., TX/RX, as new, £40. Tel: Surrey 0181-286 7577 anytime.

TS-130S, 500Hz, 1.8kHz filters, manuals, boxed, DFC230 external v.f.o., MC43S mic., PS30 p.s.u., good order, £500. 42 foot sectional mast, 2in diameter, 6 foot sections, guys, halyard, little used, £70. John, Stockport. Tel: 0161-477 6702.

Watson W30 2m/70cm (144/430MHz) vertical aerial, nearly new, £24. Gerry GM4NQT, Berwickshire. Tel: (01890) 818195.

Yaesu 9600 base scanner, 60 to 950MHz, boxed, manual, unmarked, c/w scan king antenna, £240 or swap for AOR800, MVT7100 or similar, must be excellent condition. Brian, Nottingham. Tel: 0115-975 3658.

Yaesu FRG-7, g.w.o. manual, circuit diagram, £85 plus carriage. A. Yallop, Beds. Tel: (01234) 720591.

Yaesu FR17700 antenna tuner, £35. MFJ16010 antenna tuner, £30. Daoging DC144/28 v.h.f. converter, £30. Nietszoh CX201 coaxial switch, £10. Kenwood HS4 headphones, £6. Howes AA2 active antenna unit, £8. Gerry GM4NQT, Berwickshire. Tel: (01890) 818195.

Yaesu FT-101E (no WARC), working okay on all bands, but would now benefit from service and re-alignment, hence only, £65, no offers, to include spare p.a. and driver valves, Brian, West Sussex. Tel: (01903) 762134 before 8pm any day.

Yaesu FT-101E, WARC bands, spare valves, G3LLL mags, g.w.o., £200, buyer collects. Keith G4TJE, Kent. Tel: 0181-859 7630 after 6pm.

Yaesu FT-290R 2m (144MHz) all-mode transceiver, good condition, recent new NiCads with speaker, mic., soft case, mobile mount, manual, £230. Jeff, Lancing. Tel: (01903) 750097 evenings.

Yaesu FT-707 h.f. transceiver, 3.5-30MHz including WARC bands, c.w. filter fitted, no CB mags, original box, excellent condition, £275. G4NVQ, Hastings. Tel: (01424) 420608.

Yaesu FT-747 h.f. transceiver with c.w. filter, recently overhauled by Lowes, £425. GW3C0I, Abersoch. Tel: (01758) 712675.

Yaesu FT-747GX h.f. TX/RX general coverage TX/RX, fitted f.m., boxed, £450. AOR1000 hand-held scanner, NiCads, charger, boxed with handbook, £150 o.n.o. Jim Graham, Dumfrieshire. Tel: (01576) 300869.

Yaesu FT-757GX, good condition, boxed with manual, MH-1B8 mic., £485 o.n.o. Eddie, Stoke-on-Trent. Tel: (01782) 868404.

Yaesu FT-790R MkI, as new condition, complete with box, manual and case, £240 for more info, 'phone Ian after 5.30pm on (01922) 30668.

Yaesu FT-990 a.c., Yaesu SP6, Yaesu MDIC and MFJ-949E de luxe Versa Tuner, all in immaculate condition, £1000 or near offer. Buyer must collect. Tel: Flints (01352) 780694.

Yaesu FT-ONE, 0-30MHz transceiver, manual, excellent condition, £500. 4 West Chapel Street, Tipton, W. Midlands DY4 8JB. Tel: 0121-522 2831.

Yaesu RG200 h.f. transceiver, c.w., s.s.b., ex. condition with a full set of valves, £200. P. Beech, N. Humberdale. Tel: (01964) 544452.

Yupiter MVT7000 in very good condition, two antennas, carry cover, still in original box, £160 or plus for Yaesu FRG-100 with cash adjustment, must be in mint condition. Tel: (01582) 661229.

Exchange

Amiga 500+, colour monitor, 2nd disc drive, mouse, joystick, various disks (three boxes), approx 20 boxed games (RPG), exchange for Trident 2400 or other

decent scanner or gen. cov. receiver. Tel: Worthing (01903) 260851.

Canon AE1 camera, power winder, 75-300, 70-210 + 50mm lenses, all like new, exchange for quality hand-held or base scanner, camera value, approx, £275. Paul, Tayside. Tel: (0378) 845119.

HRO with ten coil sets, near immaculate, full working for R1155, working or not, at least reasonable condition (i.e. restorable). Brian, Croydon. Tel: 0181-651 5345.

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Revco RS2000 scanner, a.m., f.m. 60-519MHz or Daoging D70 Morse tuner, will swap one or both for h.f. a.t.u. Kevin, Cornwall. Tel: (01736) 871785.

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A200 amplifier, two required, one low band one high band, 6-8W in 20W out. Wilf G4EQG, Walsall. Tel: (01922) 682689.

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Aerial, Hately EMDR or equivalent, ATU suitable for Icom 706. Magnetic loop, 2m, 14m. John, Derbyshire. Tel: (01283) 221870.

Altron 35ft wind-up mast, wall or post mount, good h/brew or similar slim line mast accepted, w.h.y.? Fair price paid. Dave G4TCX, Shropshire. Tel: (01746) 763790.

Amateur collector seeks early 1950s transistors (the components) such as GET1 and OC10 in any condition. Old data books and sheets also wanted. Write for detailed wants and prices. Andrew Wylie, 21 Brancaster Lane, Purley, Surrey CR8 1JH.

Antenna tuner to match Kenwood TS-440S transceiver. Tel: Cumbria (01539) 442240.

Bloh boards (mint or pan used) to assist construction by pensioner with failing near sight and shaky hand! Will collect London area. G31YQ, Ilford. Tel: 0181-514 8335.

BS-8 pan display/adaptor for Kenwood SM120 monitor scope. Kevin GHSNC, N. Ireland. Tel: (01504) 764112.

Circuit diagram for an IC-720A, must be complete diagram if possible, also wiring diagram wanted for an FT-77 (not circuit, but just wiring diagram), expenses repaid. A. Dykes, 149 Mayfield Road, Chaddesden, Derby DE21 6FZ. Tel: (01332) 370623.

Circuit diagram for FDK multi 700EX, circuit diagram for an IC-720A, must be complete diagram if possible, also wiring diagram wanted for an FT-77 (not circuit, but just wiring diagram), expenses repaid. A. Dykes, 149 Mayfield Road, Chaddesden, Derby DE21 6FZ. Tel: (01332) 370623.

Circuit diagrams for any HAC receivers + circuit for 90V h.t. power supply for one valve receiver, will pay all costs. Aled Lewis, Henllys, New Chapel, Boncath, Pembro SA37 0EH. Tel: (01239) 841692.

Circuit or any information on Elizabethen Pathfinder model no NR52FI,

your price paid. Jim, Belfast. Tel: (01232) 283789.

Heathkit SB101 h.f. transceiver, also Tokyo HT120 mobile 20W c.w./s.s.b. rig, Dick GM4PPT, Scotland. Tel: (01292) 570517.

I have a Philips add-on unit ref. 1005, which is in addition to Philips 1003 radio, any information for the Philips 1003 would be helpful. Pete, E. Devon. Tel: (01884) 255842.

I wish to build a battery portable a.m., f.m. l.w. band radio receiver, has anybody got a suitable circuit incorporating modern radio i.e.s. with parts list, dial cord tuning. Dean Gale, 206A Ramsey Road, Si lvers, Huntingdon. Cambs PE17 6QZ.

Icom R70 h.f. receiver or general coverage receiver with equivalent spec., must work on 12V. Tel: Emsworth (01243) 376538.

Info about Jan 7077 microwave valve or projects using it, first ten replies enclosing s.a.e. will receive two of them free, they must surely have a use. Dave Jones, 50 New Dock Street, Llanelli, Dyfed SA15 2HB. E-mail: daivngood@aol.com

Kenwood AT-130 a.t.u. Chris G6HIQ, QTHR. Tel: Somerset (01963) 240449.

Kenwood AT250 antenna tuner for TS680S h.f. vertical all band antenna, i.e. Chelcom, Hygan, Diamond, Cushcraft, Peter, Brighton. Tel: (01273) 779532.

Manual for Zenith Supersport SX lap-top computer, loan or purchase. Chris G6HIQ, QTHR. Tel: Somerset (01963) 240449.

Mobile mount for Icom IC-290H to replace mount stolen from car. John, Gloucester. Tel: (01452) 527209.

Need manual (or copy) for Heathkit DX40U transmitter. Jim Berry WA3IAT, 2512-16th Street, Cuyahoga Falls, Ohio 44223-2048, USA.

Original microphone to suit 2m (144MHz) transceiver TR-7930 Trio. Name price? Tel: Scotland (01542) 841043.

RF signal generator, 100kHz to 150MHz, all letters answered, also old domestic radios, valves, etc., can collect, pay cash. Mr J. Creasey, 4 Low Farm Drive, Folkingham, Sleaford, Lincs NG34 0SP.

Sony CRF160 short wave radio. Sony CRF320, Panasonic DR48, Grundig Satellit 2400, Grundig Satellit 1000, Grundig Satellit 1400, Grundig Satellit 400, any of these radios would do, reasonable price. Hugh McCallion, No 8 Strathard Close, Coleraine, Co Londonderry, N. Ireland BT51 3ES. Tel: (01265) 43793.

SSB attachment for Grundig Satellit 2000. D. M. Jones, 81 Newport Road, Hanslope, Bucks MK1 9NA.

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Write ups from magazines, etc. on the AR77 (not service info.), also circuit for Vortexion 30/50 valve amp and circuit for advance B4A5 signal generator. Brian on 0181-651 5345.

Yaesu SCI station console, made some time ago for FT-780R and FT-480R, any plans, photos or advertising material, costs refunded. Ken 2E1CRE, QTHR. Tel: (01438) 316418.

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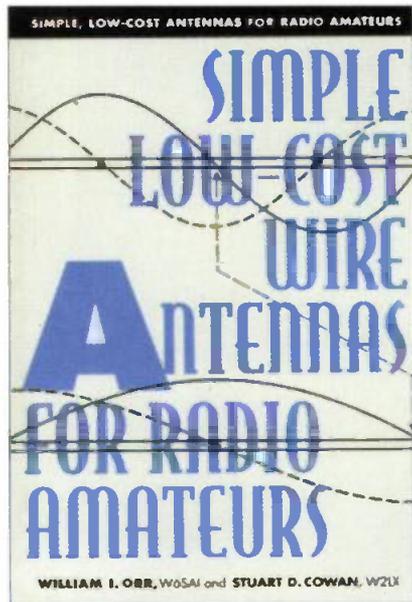


prof

Antennas, Theory & Much More!

William Orr W6SAI and Stuart Cowan W2LX are well known for their Amateur Radio books. All the books produced by this redoubtable pair are good reading, informative and very helpful. So, with that in mind the *PW* team have selected a few of the interesting titles published by W6SAI and W2LX to 'profile' here.

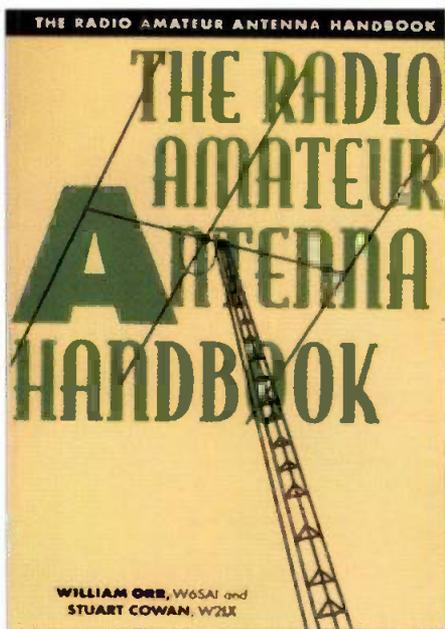
Editor



than just wire antennas as it also acts as a very effective introduction to antennas, theory and propagation. It's very readable, extremely useful and should prove particularly effective for anyone just starting off on h.f. as it's complete with many basic (and very well known) antenna designs. It comes **Highly Recommended** at only £8.50.

Vertical Antennas

This title, written in 'workshop notebook' style will prove to be very useful to anyone contemplating using, designing or experimenting with vertical antennas. Very well illustrated with good explanations, it takes the mystery out of 'verticals' and emphasises the 'practical' aspect. **Recommended.** To add *VERTICAL ANTENNAS TO* your collection will cost you just £8.50.

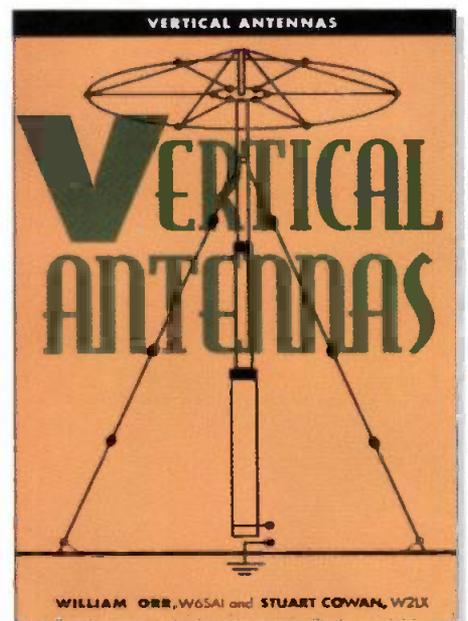


particular book is - as the title suggests - is packed with information.

Topics include: a 'truth table' aimed at unmasking false antenna claims, showing antenna gains and how to compare them., how to judge your radio location, best DX antenna height, s.w.r. use and misuse, coaxial cable use and misuse and so on. The book covers h.f. and v.h.f. antennas and should prove very useful to the many *PW* readers who are fascinated in antenna work.

Highly recommended.

The *Amateur Antenna Handbook* costs £8.50.



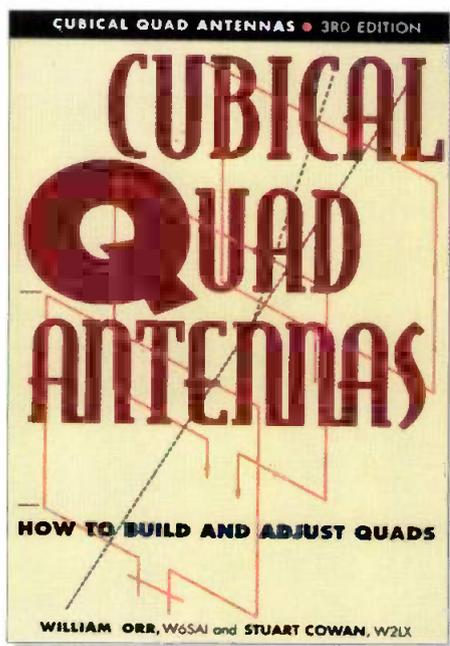
The Amateur Antenna Handbook

You can forget that W6SAI and W2LX's books are specifically aimed at the American Radio Amateur because everything they examine, try and suggest is just as applicable here in the UK. And this

Simple Lost Cost Wire Antennas For Radio Amateurs

Although this book does cover what the title suggest...it covers far more

TO ORDER ANY OF THE TITLES MENTIONED ON THESE TWO PAGES PLEASE USE THE ORDER FORM IN THIS ISSUE OR



Cubical Quad Antennas - How To Build & Adjust Quads

If you're keen to have a go at building a cubical-quad antenna - this book is for you. And although it's a small publication, it's probably the best book available on the subject.

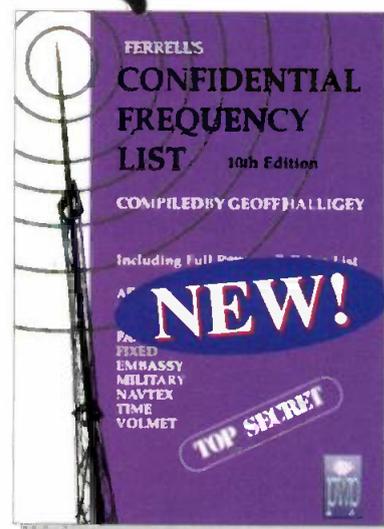
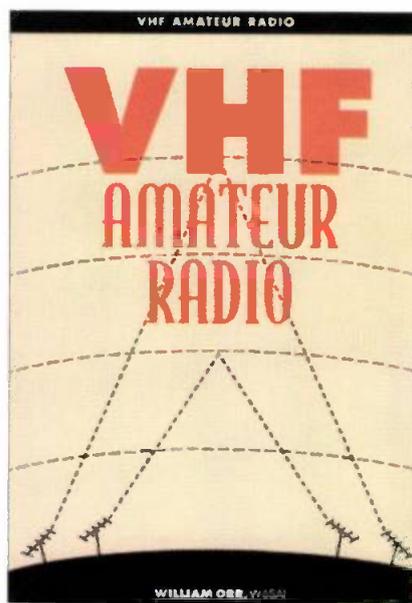
The cubical-quad antenna has many advantages for the h.f. operator and this book could help you discover them yourself the *PW* team are often asked for advice on the subject of cubical-quads and this is the title we always suggest.

Recommended. A copy of *Cubical Quad Antennas* costs £8.50.

VHF Amateur Radio

This title provides a very readable, clearly illustrated and informative introduction to v.h.f. Amateur Radio operations. Although American in origin (there are band allocation differences and some different techniques used in the USA) the sections on propagation, antennas, modes and equipment (including a helpful section on wiring up those awkward plugs and sockets) are of truly universal interest and very helpful indeed.

Antennas and techniques are well covered and there's also a section on v.h.f. cubical-quad antennas. *VHF Amateur Radio* comes **Highly Recommended** at £8.50.



Ferrell's Confidential Frequency List - 10th Edition

(Published by PW Publishing)

This popular, well read, frequency list compiled by Geoff Halligey continues to go from strength to strength and is now in its 10th Edition. This 'Top Secret' confidential listing covers 1.6 - 30MHz and its spirally bound A5 format makes for easy reading and reference.

Included within its 350plus pages are frequencies covering all modes, utility services and for the first time NAVTEX. Also featured is the reverse frequency list showing every known frequency against each callsign, who's using what frequency and mode.

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RCA TRANSMITTING TUBES (Original Publisher Radio Corporation of America) Re-published by Antique Electronic Supply (Arizona).....	318 pages. \$9.95

Well, it's time again for me to collate another booklist and this month I've added several new titles in among the old favourites. Why not take a look at the five special 'Orr & Cowan' titles we've chosen to profile this time? - They are of particular good value.
Bye for now, 73, Michael

NEXT MONTH

practical Wireless

SPECIAL FEATURE!

Brian Dance looks at Lasers and their applications.

REVIEWED!

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