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IC-910 VHF/UHF Transceiver - Coming Soon The new IC-910 from Icom will shortly be available. 100W on 2m and 75W on 70cms, plus the option of 1.2GHz. Well placed to take advantage of satellite operation, you can simultaneously operate 2 bands at once.

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Output: Terminal post
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Fully weatherproof
Size: 292 x 242 x 43mm

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Output: High Voltage terminal
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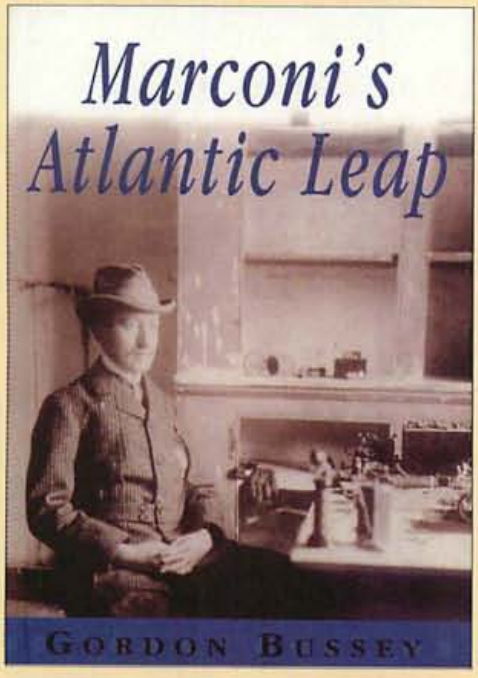

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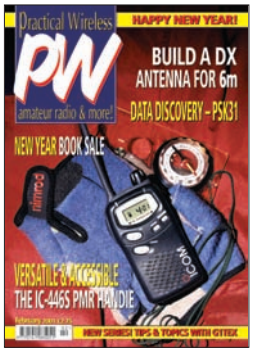
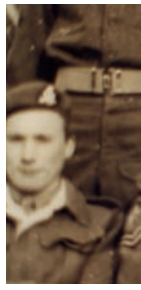


Cover Subject.
The Icom IC-446S PMR licence-free transceiver can be used in everyday applications such as walking, cycling and shopping to name a few. For an insight into how easy the transceivers are to use and how accessible they are to all ages of operator read the review on pages 16, 17 and 18 of this issue.

Photograph by: **Tex Swann G1TEX**

Design by: **John Kitching**

February features



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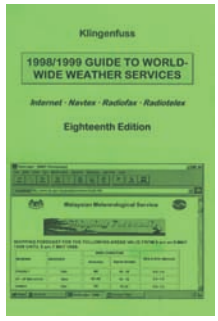
February regulars



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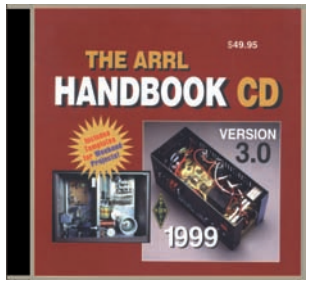

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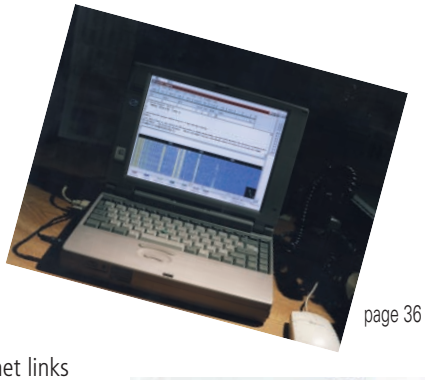

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rob mannion's keylines

Welcome to 'Keylines'! Each month Rob G3XFD introduces topics of interest and comments on current news.

Despite the fact that this copy of *PW* is the February 2001 issue - I'm actually writing this edition of 'Keylines' just before Christmas 2000! Because of this I'm looking forward to the holiday which the season brings - refreshing us all for the next busy year which leads me onto Club Visits , etc!

My first visit of the year is to the **Telford & District ARS** in Shropshire on Wednesday 10 January. This visit was rescheduled following yet another breakdown on my very unreliable (but relatively new) VW Sharan car last year. So this time, I'm looking forward to meeting everyone in Telford.

February is a clear month for me as I'm scheduled to go into 'Dry Dock' for treatment for my arthritis for the first half of the month. Regular visits to hospital for treatment will now be in order for me every six months or so and the treatment will allow me to carry on - with the full support of everyone on the team - serving you in the best way I can.

As a result of my health problems, in future I'm planning to reduce the number of visits to clubs from two (sometimes three) a month to one. This reduction in visits will help me a great deal by requiring less driving which will in turn bring other obvious benefits! However, although I'll only be scheduling a maximum of one club visit a month in future - I'm hoping to be attending those events where I can meet more readers.

'Get out & Get Under' could be the tune playing here as Barry Maxwell and Karen Scott from the Radio Communications Agency - looking rather worried as G3XFD checks his unreliable VW Sharan - seem to be asking the question "What's fallen off this time Rob"! But despite the problems with his car, the Editor hopes to be travelling throughout 2001 visiting clubs and shows to meet readers.

The first large event which I'm hoping to attend is a new one for the calendar: The North Derbyshire based **South Normanton & District Amateur Radio Club**'s 'Junction 28 QRP Convention' which is due to take place on Saturday 17 March. Situated just off the M1 it should be a marvellous day.

Tex Swann G1TEX, our Technical Projects Sub-Editor will be accompanying me on the trip, and on the way up to the north on Friday 16 March we'll be paying an evening's visit to the **Nunsfield House Amateur Radio Group**, Alvaston in South Derbyshire. This club has been very patient indeed waiting for a visit and both Tex and I are looking forward to the trip and we'll travel on up to the northern part of Derbyshire after the talk. See you there hopefully!

Competition Certificates

Everyone who entered the Millenium 144MHz QRP Contest in June 2000 will be receiving a special commemorative certificate eventually! The contest was generously sponsored by **Chris Rees G3TUX** of The QRP Component Company and was well supported and competitors have been very patient - sorry for the delay folks!

Chris G3TUX, our Art Department and the *PW* team want to ensure we provide a really good certificate. To do this we need get the best quality material to print the certificates on. This has been more difficult than I anticipated, but you can be sure that when they do arrive...they'll be something to be proud of. Thanks for your patience!

Maritime Mobile Operation

Every now and again I receive update photographs from Irish Ferries showing how the work on the new MV *Ulysses* is progressing but I'm afraid I have no firm news on the proposed Maritime Mobile Operation. (**John Corless EI7IQ**, Vice President of the IRTS and I are still actively working on the project).

Members of the Irish Radio Transmitters' Society together with Radio Amateurs from Wales and England are still hoping as I write this editorial, that we shall be able to take advantage of the proposed (unique) jointly organised Maritime Mobile DXpedition. **However, the problem seems to be convincing senior officials that such an Amateur Radio exercise could provide any benefit!**

Personally I feel that a /MM operation on board the *Ulysses* would draw attention to the new ferry (the largest roll-on roll-off ferry in the world), Amateur Radio in Ireland and the UK and the natural friendship that exists between EI and G stations. Amateur Radio has a tremendous future ahead, particularly in promoting good international relations. With this in mind I feel rather frustrated because if such an event was suggested in the USA it would be accepted with alacrity because Amateur Radio has a much higher profile than it does in Europe!

So, we've got to do something to actively encourage Irish Ferries - and any other similar attraction/event which could attract an accompanying Amateur Radio operation to provide additional publicity or interest. We already know our hobby can spread the news around the world...so let's show other people just what our hobby is about and what they're missing if they 'leave port' without us on board!

Rob G3XFD

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Components For *PW* Projects

In general all components used in constructing *PW* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article. The printed circuit boards for *PW* projects are available from the *PW* PCB Service, **Kanga Products, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115 - 967 0918. Fax: 0870 - 056 8608.**

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of *PW*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *PW* are £2.50 each and photocopies are £2.50 per article.

Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

A complete review listing for *PW*/*SWM* is also available from the Editorial Offices for £1 inc P&P.

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Technical Help

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

amateur radio waves

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.

Make your own 'waves' by writing into *PW* with your comments, ideas, opinions and general 'feedback'.

Using Bees Wax

Dear Sir

I note that the Editor revisits the art of coil-winding in the December 2000 issue of 'Radio Basics'. Rob G3XFD mentions sealing them in wax and describe the process as 'smelly'. I can assure everyone that if bees' wax is used, this is the only bit of electronics that you can do in the kitchen and have your wife come in and declare "Mmm... what is that LOVELY smell?"! Much better than the paraffin wax used in modern candles!

Whilst I get my bees' wax from a bee-keeper husband of a colleague of mine, I discovered the other day that blocks of it can be purchased at very modest price in our High Street hardware store from the 'polishes' section.

I keep mine in an old tobacco tin (now, they **are** hard to find!) and either melt the lot over a low gas flame and dip small components, or scrape off 'ribbons' with a penknife blade, apply them to the windings, and then heat gently. Bees' wax can also be heated with a soldering iron tip (no, it doesn't burn or foul the tip), and any spills or excess are easily melted and wiped up with an absorbent paper towel.

You may be interested to know that I have just had an article published in the US Crystal Set Society Newsletter' describing my home-brew plug-in coil formers for the 'Radio Basics' 'Tinny Dipper' dip-meter project (using a different style of coil formers than that published) employing the above wax technology.

Philip Miller Tate
Kingston upon Thames

Editor's reply: I've got a plentiful supply of old bees' wax covered capacitors. However, Philip's suggestion is very useful and I managed to buy a 250gm block at a hardware store for £2. I wonder how many bees were involved and how long it took them to produce that much wax. Busy bees aren't they?

What A Rude Man!

Dear Sir

It is not often that I am driven to writing a letter in response to the comments other people make in a magazine but in the case of Mr B.C.N Ward I have to make an exception ('Amateur Radio Waves' December 2000).

I have no problem with Mr Ward's comments on the quality of *PW* or the fact that he counted pictures of the editor **five** times in one edition of the magazine (Yawn). As a paying subscriber to the magazine he is entitled to his opinion though **I have to say that I do not share it.** However, I must object to the somewhat sad, childish and, in many ways, rather ignorant comments he makes about other readers of *PW*.

Mr Ward seems so sure that his view of the quality of *PW* is right, that the many people who readily praise the magazine are in some way either of lower intelligence than himself or are easily pleased. His somewhat pathetic attempt at a joke where he appears to call the licensed Radio Amateur a "...sad and lonely individual who calls CQ into a microphone to collect call-signs..." is rather unfunny and inaccurate to say the least.

If Mr Ward is truly a short wave listener as he professes then he will know that the 'cardigans' (As he calls them) calling CQ into a microphone, do it to communicate and learn about other people from other cultures. They are by and large, interested in other human beings and what their lives are like. They may or may not, be interested in building the equipment to do this but each and every one of them have a passion to bridge the ether with their thoughts and words and to listen to those of other people.

It would appear that Mr Ward does not share the same passion. While he seems keen to share his thoughts and words with other people it would appear that he is almost incapable of listening and learning about the more important aspects of life, those of friendships and tolerance.

As for Mr Ward's comments of how sad and lonely a Radio 'ham' is. I have many friends all over the world who's help and encouragement over the years I believe has made me a better person, I hope that in some small way that I might have put something back into those friendships by helping some of those people

If a 'cardigan' is a sad and lonely individual who sits by a radio set screaming CQ, CQ, CQ into a microphone in order to learn about other people and develop friendships then I am guilty and immensely proud of my 'cardigan' status. But let me ask you this: Who is sadder, someone who tries to make a friendship or someone who doesn't know how to? (If the cap fits Mr Ward).

Best Regards and thanks to all the *PW* team for what I consider to be an excellent magazine.

David Pearson G4UFS
Milton Keynes
Buckinghamshire

Rather Abrasive

Dear Sir

I wonder if B.C.N Ward of Manchester ('Radio Waves' December 2000) has ever written anything more technical than a rather abrasive whinging letter. I suspect not. If he had he would know better.

He does have a point though; there are errors in the pieces in *Practical Wireless*. **But of course there are! There are in all other publications as well.**

From my own experience I doubt if it is possible to publish anything of any length without errors of some sort existing. (I don't mean errors of fact of course. There is no excuse for those). I am employed as a part-time lecturer at a local technical college, and as part of that job I need to produce course materials and student assignments.

In my case the courses are (or have been) for the C & G 2240 core units, and several of the options, and computer science courses for both the C & G 7261 series and Open College units. Over the years I have produced hundreds of pages of material that have had very favourable reactions from both students and other tutors. And there have been occasional errors sprinkled throughout!

Now I enjoy producing the material, and I take pride in doing it properly, but no matter how much checking is done some errors do get through. Naturally the last are not spotted until twenty copies have been printed. In just a very few cases silly little things have not come to light until later editions several years after the originals were produced.

Two things are important: Never failing to be angry at oneself for making the errors, and the other is correcting them. I suspect that you (the Editorial team) probably exercise the former, and all readers should be grateful that in *Practical Wireless* the latter usually happens as well. So keep up the good work *PW* Team. After all *Practical Wireless* is now the only newsagent accessible practical radio magazine left, and without it the radio world would be much poorer.

There are simple ways in which readers can prevent the errors that do get through from having an undesired effect: One is to not just accept someone else's work passively. Engage the brain, analyse what is read, and learn by doing so.

After all, with some other less than honest magazines, there was no choice. Finally, never even get the parts for a project until at least two issues of 'errors and updates' have appeared.

Tony Jacques
Stretford
Manchester

Editor's comment: Thank you Tony, and on behalf of the *PW* team I thank everyone who wrote in supporting the Editorial stance and approach. We cannot possibly print them all. Thank you also for the suggestions - on overcoming mistakes, etc., which were included in letters. Without your support it would be very difficult.

Licensed Amateur?

Dear Sir

I felt I had to reply to B.C.N. Ward's letter in the December 2000 issue of *Practical Wireless*. Is he a licensed Radio Amateur? (***See below)** I would think not because he would be aware that calling CQ CQ CQ is not just for collecting callsigns!

The only time this would be the reason is during contests and even then, people will sometimes stop for a chat. At different times, does not realise that it is to make contact with others?

These people share a common interest in a very interesting hobby. At least we have got better things to do than sit and look through a magazine to see how many mistakes have been made! (If calling CQ

makes us 'cardigans', does looking for mistakes in a magazine make you a 'tank top'?).

I wonder if this is the attitude that is putting people off becoming Radio Amateurs? As to the magazine, I have only been buying it for a year, ever since I started on my NRAE/RAE course in October 1999, I find it very helpful and it gave me the chance to take part in my first ever contest, that being the 144MHz QRP contest in June last year.

Last by no means least, it was great to meet Rob G3XFD the Editor and Tex G1TEX at Longleat last June. It was my first rally as a licensed operator. Keep up the good work and best regards.

Dawn Bennett 2E1HVA
Radstock
Bath

Editorial Comment: It was good to meet you too Dawn - carry on enjoying the hobby and let's hope Longleat's grounds have dried out before next June after all the rain we've had!

***Editorial note: The letter writer B. C. N. Ward does not hold an Amateur Radio Licence.**

Something For All

Dear Sir

I wish to distance myself from the views expressed by B.C.N. Ward. *Practical Wireless* is an excellent magazine and I look forward to each issue. There is something for all tastes.

As for you travelling around the country I know from talking to Club members that your visits, lectures and presence has been a huge success. **And anything that promotes friendship and co-operation between Britain and Ireland can only be good**.

Many thanks for your editorship of *PW* Rob!

George Armstrong G0LIU
Cockermouth
Cumbria

Editor's comment: With the help of everyone on the *PW* Team - I'm delighted to serve you George!

Too Many Mistakes?

Dear Sir

Reference the letter with the heading 'Too Many Mistakes' from B.C.N. Ward in the December 2000 *PW* issue, it made me so furious I was almost foaming at the mouth! I could not have disagreed more with his comments, as I feel absolutely sure that your magazine has improved tremendously over the years, and continues to do so.

I should know, as I have been a reader since the number one issue. As a schoolboy I built my own breadboard receivers from the articles in *PW*... all had two volt valves supplied with current from an accumulator.

Practical Wireless has always done its best with its many varied articles to satisfy both the short wave listener as well as the radio transmitting amateur, and home constructors, and is doing so today as in those days long past and now we have beautiful colour printing. As for mistakes, the important thing is that these are corrected, as they are, generally in the next issue wherever possible. The editor's photo - well he makes a good model!

Douglas Byrne G3KPO
Ryde
Isle of Wight

Editor's comment: A reader from No. 1 Douglas? It's a privilege to know you are still enjoying *PW* after so many years. I wonder how many other readers 'From The No. 1 Club' there are?

From this issue of *PW* correspondence on this matter is now closed.

Volunteer - Ready & Willing!

Dear Sir

In 1975, aged 15, I became the owner of an old Yaesu rig. Homework was forgotten as G4ETX chatted on 3.5MHz. At college I obtained the Higher National Certificate in Electrical power as the maths appeared easier than required for electronics! The Radio Amateurs Exam was the first and most useful qualification I have taken.

For a decade I worked for the British Government installing and maintaining mobile and fixed h.f through to u.h.f. radio systems. I serviced old radio equipment including Pye sets. Maintenance was relatively easy. Changing frequency meant changing crystals and trying not to become over confident by cracking the ferrite dust cores during alignment! Chargers and power supplies were readily fixed. Repairs to lightning damaged equipment was optimistic! Modern replacement sets are smaller and neater than old sets and cloning is a delight compared to changing crystals!

I am a practical man, looking for either volunteer or paid work abroad, not necessarily in radio. Work I could do includes wiring a school, hospital or clinic, installing solar cells or windmills to provide power and lighting in one of the developing countries. I can also wordprocess and do administrative work.

The mosquito net, anti malaria and water purification kit are packed - but I have nowhere to go! A church in Milton keynes has purchased part of an island in Lake Victoria, Uganda, but until they can provide power, will not require a 'sparkie' for the orphanage. Meanwhile my preparation continues, including getting my callsign re-issued and purchasing tools and equipment to take with me.

As *Practical Wireless* is read world-wide I'd like to hear from readers, letting me know of any overseas work which I might be able to help with. So, if have any suggestions, please get in touch with me at: **30 Lichfield Down, Walnut Tree, Milton Keynes MK7 7BX. Tel: 07947 488958.**

David Ludlow G4ETX
Milton Keynes
Buckinghamshire

Editor's comment: Could you use a willing volunteer somewhere abroad readers? Good luck David, we all look forward to hearing from when you're working in those exotic locations!

Keep your letters coming to fill *PW*'s postbag

Letters Received Via E-mail

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

amateur radio rallies

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

2001

January 21
The Oldham ARC Rally
Contact: Geoff or Mike
Telephone: (01706) 846143 or (01706) 376454
E-mail: m0aug@thersgb.net or m1cvl@thersgb.net
Taking place at Queen Elizabeth Hall, Civic Centre, West Street Oldham, Lancs. All the usual traders will be in attendance, Bring & buy, Morse tests on demand, refreshments and free parking. Doors open at 1100, 1030 for disabled visitors. Talk-in on S22.

January 28
The Horncastle Amateur Radio, Electronics & Computer Fair
Telephone: (01526) 860320 or (07778) 274535
The Horncastle rally takes place at the Horncastle Youth Centre, The Old School, Cagthorpe, Horncastle, Lincs, (nr Horncastle Police Station). Admission just 50p. There will be Morse code tests and refreshments available.

February 4
The 16th South Essex ARS Radio Rally
Contact: Brian Bellamy G7IIO
Telephone: (01268) 756331
E-mail: briang7iio@yahoo.com
Doors open at 1030 to this annual event which will be held at the Paddocks (situated at the end of the A130), Long Rd, Canvey Island, Essex. Featuring Amateur Radio, Computer and Electronic Component exhibitors, home-made refreshments, free car parking with space outside main doors for disabled visitors.

February 11
The 10th Northern Cross Radio Rally
Contact: John G7JTH
Telephone: (01924) 251822
E-mail: rally@sandalmagna.demon.co.uk
Website: http://www sandalmagna.demon.co.uk/rally/
Taking place today at Thornes Park Athletics Stadium, Wakefield, West Yorkshire, just out of town on the Horbury road. Easy access from M1 J39 & J40 well signposted and with Talk-in on 144 and 430MHz. Doors open 1100 (1030 for disabled and Bring & Buy). Usual attractions plus Morse tests on demand.

February 11
The Cambridge & District ARC Radio, Computer Rally & Car Boot Sale
Contact: Bob G0GVZ
Telephone: (01223) 413401
E-mail: bob.grimes@btinternet.com
This annual event moves to a **new venue -** Lordsbridge Arena, Wimpole Road, Barton, Nr. Cambridge, opposite Mullards Radio Observatory on the A603 off J12 on the M11. Doors open 1000 for disabled visitors, 1030 general public. Admission is £1.50, £1 OAP/disabled and Under 14s free. Talk-in on S22.

February 17
The Reddish Rally
Contact: John McKae G4ILA
Telephone: 0161-477 6702
Go along to St Mary's Parish Hall, St Mary's Drive, Reddish, Stockport. Signposted from M60 Junction 27 for this annual event. Doors open 1000, Talk-in on S22. All tables to be paid for in advance (£8 each), please ring for booking form.

amateur radio news

A comprehensive look at what's new in our hobby this month.

Satellit receiving

New Grundig Available Now!

Interested in listening? Then try the latest Grundig for size.

Nevada of Portsmouth have announced that the new Grundig Satellit 800 EU Millenium Receiver is now available. Sold exclusively in the UK direct from them or through their dealer network, the 800 has a recommended selling price of £599 but will offered for an introductory period to *PW* readers for £549. Weighing in at a hefty 14.5lbs and measuring 20.5 x 9 x 8in the 800 is a radio to be reckoned with!

Features of the Satellit 800 include:

- Frequency ranges of 100-30,000kHz (0.1-30MHz) for a.m broadcast and Shortwave; 87-108MHz for f.m. broadcast and 118-137MHz for Airband
- Synchronous detection to improve the purity of shortwave and a.m. reception.
- Automatic Gain Control. The on-board microprocessor monitors signal strength, adjusting gain up or down to compensate for atmospheric and other conditions. It's like an on-board radio engineer!
- Excellent sensitivity and selectivity.
- Three built-in bandwidths for shortwave, using electronically switched i.f. filters: 6.0, 4.0 and 2.3KHz.
- Sure direct keypad digital tuning.
- Two timer clocks - local and alternate.

For a full review of the Grundig Satellit 800 pick up a copy of the February issue of *Radio Active* magazine, published 19 January.

Nevada,
Unit 1,
Fitzherbert Spur,
Farlington,
Portsmouth
PO6 1TT
Tel: 0239 231 3090
FAX: 0239 231 3091
E-mail: info@nevada.co.uk
Website: www.nevada.co.uk

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

Special Event Station

Worthing Club Raises over £1000!

An Amateur Radio special event station and the annual Children in Need were united to raise a whole lot of money!

On Friday 17 and Saturday 18th November, members of the Worthing and District Amateur Radio Club operated a Special Event Amateur Radio Station in the foyer of The Holmbush Centre, Shoreham, West Sussex (IO90). The Special Event Station was organised by **Chris Delhaye G3NDJ** to raise money for the BBC Children In Need appeal.

Operating as **GB2KIN**, (the KIN initials standing for Kids In Need) the club demonstrated to members of the public their skills in c.w. and 'phone operating. Special certificates were issued to successful children who sent their name in Morse code and two Pudsey bears were raffled.

The club made over 250 contacts mainly in The British Isles and Europe using a Kenwood TS-930S running 100W into a dipole strung between two lamp posts. Their efforts were well rewarded in the fact that they raised over £1500 for the Children In Need appeal.

Worthing & District ARC,
Roy G4GPZ,
PO Box 599,
Worthing.
BN13 1PZ
Tel: (01903) 753893
Web site: http://www.wadarc.clara.net

New date for annual convention

Rochdale QRP Convention 2001

If you're a regular visitor to the Rochdale QRP convention or planning to go for the first time this year then read this!

Due to organisational difficulties with the Rochdale QRP convention venue and clashes with other events this year's convention will take place on **Saturday 13 October 2001** and **not** the 27th as advertised in the GQRP club's journal *SPRAT.* Oddly enough - this means the date has returned to where it was when the conventions first began!

For more information or to find out how to book your place contact **George Dobbs G3RJV** by E-mail at **g3rjv@gqrp.com**

He's a lucky guy!

IC-756PRO Winner

It could be you? - but was it? PW reveals the winner of the Icom IC-756PRO competition.

The *PW* team are pleased to announce that winner of the IC-756PRO competition which featured in the July, August and September 2000 issues is..... **David Warner G4OER from Lincolnshire.** Well done David - we're sure you'd like to join us in thanking Icom UK Ltd for supporting the competition by supplying us with the 'PRO as a prize.

As soon as David has been presented with, and has had time to find his way around his new 'toy', we'll let you know how he's getting on.

A Professional Tool

A First From Yaesu

The latest in PMR hand-helds is something quite different.

The VX-246 is an innovative hand-held recently launched by Yaesu. This top of the range PMR 446 hand-held is built to MIL specifications and has a rugged but lightweight feel to it.

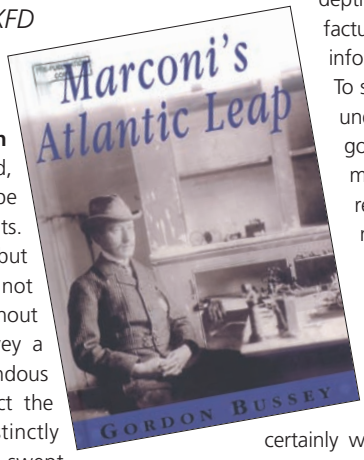
Yaesu say that the VX-246 is the first PMR 446 radio to offer the user, optional voice encryption, full 16 key DTMF keypad and paging facilities. The VX-246 should be available from Yaesu approved dealers by the end of January. For more information contact your local dealer or Yaesu UK at sales@yaesu.co.uk

Yaesu UK Ltd.,
Unit 12
Sun Valley Business Park,
Winnall Close,
Winchester, Hampshire
S023 OLB
Tel: (01962) 866667
FAX: (01962) 856801
Website: sales@yaesu.co.uk

amateur radio books

Nostalgic titles

The year 2001 marks a milestone in radio communications - as it's 100 years since the now famous first transatlantic signal was successfully received. To mark the occasion Rob G3XFD looks at a couple of books.



Marconi's Atlantic Leap by **Gordon Bussey** is a beautifully presented, well-written book, which will be welcomed by radio history students. It's not very technical in outlook but contains many photographs I've not seen before - and these alone (without any of the interesting text) convey a lasting impression of the tremendous engineering feats needed to erect the (then) new technology in distinctly 'unfriendly' locations on storm-swept coasts.

The 96-page hard backed book devotes itself entirely to the story of Marconi's 'Atlantic Leap'. He was only 27 at the time and the drive and ambition he had must have left onlookers in awe!

If you, like me, have ever stood and stated worringly at a simple G5RV antenna being blown about in gale force winds - I've no doubt that you'll view the photographs of the huge antenna arrays at Poldhu (Cornwall) and Glace Bay (Canada) with the same wonder. And they were made from wood!

Inevitably, some photographs in the book are easily recognisable, but on the whole these are in the minority and have been placed carefully, to relate to the very readable text. Additionally, bearing in mind the age of the originals - reproduction and quality is superb. Even blemishes on the originals (including folds) can be seen...and by doing so add to the historic nostalgia.

For the engineering enthusiasts amongst us the author, the Historical Consultant to Marconi PLC (Formerly GEC), has included some tantalising glimpses of the equipment used. To our eyes nowadays it may look like a miniature power station but as I often say in practical articles "It worked".

With excellent maps, facsimiles of telegrams, greetings messages, etc. this book is an excellent read and will be enjoyed by any enquiring mind - technical or not. It **should** be on your bookshelf, as a reminder of what we owe pioneers such as Marconi and also you'll own a special 'Millennium' wireless souvenir.

It's superb value for money at **£6.99** (UK) and when it's published by Marconi Communications 2000 on 29 January will carry the ISBN 0 95389 670 6 reference number (quote this to order from your local book shop). However, as a **special offer** *PW* readers can buy a copy for **£4.60 including P&P** by calling **(01825) 723398.**

The Saga of Marconi Osram Valve (A History of Valve-Making by **Barry Vyse & George Jessop** will partially satisfy valve enthusiasts' hunger for in-depth history of radio valve manufacturing, as Barry Vyse reliably informs me there's more to come!

To say that this book is a massive undertaking (346 pages, with a good index) is an understatement. It's extremely well researched, well written - with many humorous marginal 'out takes' and reflects the co-authors' interest and dedication to the subject.

Barry Vyse ended up as Managing Director of the M-O Valve Company and is certainly well qualified to write on the subject. His co-author George Jessop is of course G6JP of *VHF/UHF Manual* (and many others) fame.

Copiously illustrated, with some excellent quality photographs, diagrams and illustrations the book covers the period from the very early days of valve making in the UK right up to the final closure of the Hammersmith (South West London) factory. Military, domestic and broadcasting valves are covered along with many specialist topics.

For those (like myself) interested in Radar and Second World War technology there's a special chapter. I'm led to understand that this, along with other specialised areas of the first book - will be covered in even greater depth in another volume which is under preparation.

This book **is a must for any valve enthusiast**, let alone the amateur historian. It provides an excellent 'middle of the road' reading style. Congratulations to the authors. The hardback version (ISBN 0-9539127-0-1) costs **£35** plus £4.13 1st class P&P at cost and the softback (ISBN 0-9539127-1-X) costs **£25** plus £4.13 P&P.

Vyse Ltd.,
14 Cranborne Drive,
Pinner,
Middlesex
HA5 1BZ.
Tel: 0208 866 4428

amateur radio clubs

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

DORSET

Poole Radio Society
Contact: Phil Mayer G0KKL
Tel: (01202) 700903
Website: www.pawns.co.uk/PRAS/prs-start.html

Despite the rather inclement weather of late the Poole Radio Society, G4PRS, members' have been busy improving their club antenna system. Meeting every Friday evening from 7.30pm at the Bournemouth & Poole CFE, Constitution Hill Road Site, Poole, Dorset the club welcomes new members and would love to see you there!

PEMBROKESHIRE

Pembrokeshire Radio Society
Contact: Ian Jones MW0CAB
Tel: (01437) 763028
E-mail: mw0cab@lineone.net

The **Pembrokeshire Radio Society**, GW0EJE, is based in the County town of Pembrokeshire and they hold their meetings from 8-10pm every Friday at the Furzy Community Centre, Haverfordwest, Pembrokeshire. They are now registered as a Satellite Centre for the RAE and hope to run Morse tests on demand this year. The cost of the RAE examination will be £2.50 plus the C&G fee inclusive of copious amounts of tea and coffee!

The club have a brand new Club house (thanks to the MOD), and facilities for disabled visitors are excellent. Novice RAE, RAE courses and Morse tutoring are all subject to demand New members are always welcome.

YORKSHIRE

Wakefield & District Radio Society
Contact: John G7JTH
Telephone: (01924) 251822
Website: www.sandalmagna.demon.co.uk/wdrs

Meetings are held every Tuesday from 8pm at the Ossett Community Centre, Prospect Road, Ossett, West Yorks. Meetings are varied and interesting and to give you and idea of what's on offer here's a taster of what's coming in the next few weeks. **6 Feb**: Rally final preparation; **11 Feb**: Northern Cross Radio Rally; **13 Feb**: Rally debrief; **20 Feb**: Talk by **Derek Allen G3WYP** from RSGB; **24 Feb**: Annual Dinner and **27 Feb**: On-the-air/natter night.

NORTHERN IRELAND

Bangor and District Amateur Radio Society
Contact: Mike GI4XSF
Telephone: 0284 277 2383
Website: http://welcome.to/bdars

The Bangor Club meet on the first Wednesday of every month in The Stables, Groomsport, County Down at 8pm. Please note that this is a **new** venue and are no longer meeting at the Clandeboye Lodge.

On Wednesday 7 February at 8pm they are hosting a talk on packet by **Ken Crossan GI0YEW** (sysop of GB7HMI). This is should be an interesting evening and as always, visitors and new members are all very welcome.

MIDDLESEX

Edgware & District Radio Society
Contact: Bill G0STR, QTHR or David G5HY, QTHR
Tel: 0208 958 1255 or (01923) 655284 days or 0208 954 9180 evenings.

The Edgware club meet at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex and meetings start at 8pm. Meetings to look forward to include: 'The Air Training Corp' talk by Malcolm Wood on 8 Feb and the 'History of Morse' by Wayne G0JJQ
22 Feb.

Keep those details coming in!

amateur radio **trade**

Open Day Draws the Crowds

A First For Nevada

Despite being in the Amateur Radio Trade for over 30 years Nevada have only just found the time to hold an open day!

Saturday 9 December 2000 dawned a grey and overcast day but the crowds weren't deterred! Phil, the Commercial Manager, arrived shortly after 6am to find the queue had already started to build hinting that a busy day was on the cards at Nevada's radio showroom and warehouse.

Several Amateur Radio manufacturers attended the day, which turned out to be a huge success with around 500 people attending, some having a travelled a considerable distance. The furthest travellers were from Wales and Doncaster.

Representatives from AOR, Icom, Kenwood, Yaesu and Sycom supported the event by

providing product demonstrations of their latest models and offering help and advice. Visitors could view (and buy!) a wide range of products. Visitors also had the opportunity to fill their carrier bags and cars to the brim by taking advantage of the special 'one-day' bargains on offer, ranging from antennas to rigs and accessories to t-shirts.

The main event was held in Nevada's 12,000 square foot warehouse but even this wasn't big enough to accommodate the radio car boot sale, which was outside and Morse tests, which were held in the offices. There was no reason to go home for a refreshing cuppa either as the Nevada team had thought of everything by 'employing' a 'Hamburger' style van to provide free tea and coffee to all visitors

All in all it was a very successful day despite the timely downpour just as the event was opening causing those in the queue to be quickly ushered into the warehouse - not that they minded - there were bargains to be had! Needless to say with the event proving to be such a success, Nevada tell us that they intend to make the event an annual one.

Photographs courtesy of Mick Honeywell G0ABB

Nevada, Unit 1,
Fitzherbert Spur,
Farlington, Portsmouth PO6 1TT
Tel: 0239 231 3090
FAX: 0239 231 3091
E-mail: info@nevada.co.uk
Website: www.nevada.co.uk

Coming Soon!

A New Dimension in Radio

Icom's new IC-910H hits the dealers' shelves in March - so what's it got to offer?

A new standard in Amateur Radio Satellite technology will be set by the IC-910H v.h.f./u.h.f. all-mode transceiver when goes on sale in March. Designed as an all-mode, multi-band operating rig the IC-910H is a compact transceiver packed with features and is ideally suited for meeting the demands of the serious DXer or satellite enthusiast.

Building on the reputation and quality of its predecessor the IC-821H, the '910H has had a large l.c.d. added, it's power output on transmit increased and DSP facilities added. The option of installing the UX-910 1200MHz allows the operator access to the 1296MHz band and turns the IC-910H into a premier tri-bander.

High sensitivity DSP, satellite communications, speech compressor, VOX, electronic keyer, variable power output, frequency tracking for satellite UP/DOWN link and 99 memory channels are just a few of the multitude of features offered by the IC-910H. Weighing in at 4.5kg and measuring just 24x9x24cm this transceiver would be ideal for contest or field day operators.

For more information contact your local Icom approved stockists or Icom (UK) Ltd., direct.

Icom (UK) Ltd.,
Sea Street,
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Tex's Tips & Topics

Hello and welcome to 'Tips & Topics', an occasional column of tips, tricks and ideas. This column is for you the reader, to show some of the ideas you use to make this hobby easier or more fun!

For our first outing of the 'Tips&Topics' column we turn to a letter from **Jim Brown G0KZV** who sent in the following tips and ideas. Jim's first idea, is an ideal one for those of us who have an old (but very useful still) AVO Model 8 or 9 multimeter.

Jim started his letter with the question "Do you have an old AVO?" Then went on to answer it by saying: "I have a Model 8MkII from circa 1961. It is heavy and not very portable, but is still a good bench instrument. The 1.5V battery for the Ohms range is easily available, but the 15V battery for the Ohms×100 range costs an 'arm-and-a-leg' (when you can find them).

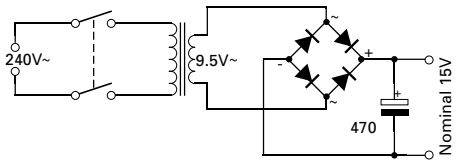

Fig. 1: A simple low current p.s.u. can replace the difficult-to-find 15V battery used for the high resistance range of the AVO Model 8 (or 9) multimeter. For correct operation the off-load voltage should be between 12.5 and 15.5V.

"There's plenty of room on the battery cover to mount a bridge rectifier and capacitor over the 15V battery compartment. I used four diodes and a 470µF 63V electrolytic capacitor out of the 'junk-box'. The a.c. input is from a surplus 9V a.c. plug-top p.s.u. I replaced the original p.s.u. plug with a 'Phono' plug to mate with a suitable socket on the AVO body. The circuit, as shown in **Fig. 1**, works perfectly and is only needed on that one range".

Mono-Stereo

The second idea from Jim's letter concerns making a 'mono-stereo' change-over switch. Jim's idea is to add a small adapter cable to the set-up as shown in **Fig. 2**. The two resistors are of the same value and should be around the same value as the individual headphone ear-pieces. And Jim suggests around 5-20Ω for the normal (cassette player?) headphones that are around 16-32Ω each, although he has used 100Ω resistors for his own headphones that are 300Ω impedance.

Now to look at a couple of feeder ideas from Jim. The first idea is for spreaders and retaining them in place on twin open wires. The basic idea is shown in the illustration **Fig. 3**. A short section of 'off-cut' plastic material has two 1.5mm holes (spaced apart by the separation needed) drilled in the ends.

The 'clamp' for these spacers is a 'hairpin' of thin (0.7mm or 22s.w.g.) enamelled copper wire. The clamp has legs about 50-60mm long. This is slipped over the feeder wire and both legs are passed through the hole, each leg is secured to one 'run' of the feeder wire.

Jim says that "My spacers have never slipped along the feeders, but if you're worried that it might happen, you can always put a dab of adhesive on the twists to lock them in place". A nice simple idea that one!

Jim's second feeder related trick is when using 450Ω slotted feeder to "take it through bushes (the garden variety) with no noticeable losses". You will need a suitable length of 10mm internal diameter garden hose, a longer length of nylon monofilament, a large magnet and a small length of smooth iron bolt with a hole through the end! Baffled - well read on!

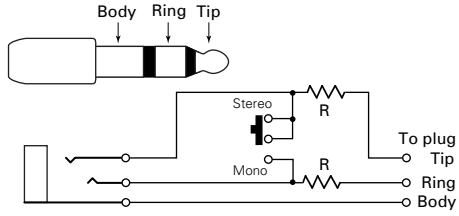

Fig. 2: A very simple stereo/mono switching adapter that can be used with any stereo headphones. The unit should be mounted in a small box if used as an 'in-line' adapter.

The trick that Jim uses is to feed the feeder through a length of garden hose, that is long enough to pass through the bush with a little to spare at each end. But trying to get the 450Ω ribbon through an equally reluctant length of hosepipe can take quite a long time. The solution according to Jim is explained below.

Take the nylon monofilament and tie one end to the short section of bolt.then feed it into one end of the pipe. Secure the other end of the nylon at the same end, so that it cannot be pulled into the hosepipe. Using the magnet on the outside of the hose, draw the bolt through to the other end of the pipe.

The monofilament can be attached to the twin feeder which can then be pulled back through the hosepipe. Then pass the hosepipe through the bush in an inclined path. seal the upper end on the hosepipe with a waterproof adhesive and leave the lower end open to breathe. If the weight of the pipe is a strain on the feeder, the pipe can be tied in place to support points, using a none metallic rope or twine.

Well, there you have the ideas from Jim Brown G0KZV, who wins all of this month's vouchers. Now it's your turn to explain all those tips you've used (perhaps for years) and haven't though about. So what are you waiting for? Get writing!

PW

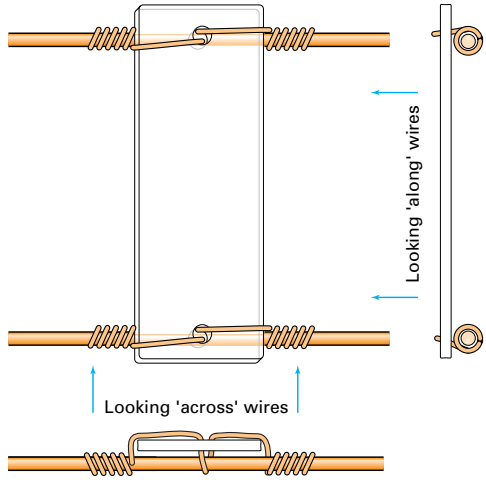

Fig. 3: An 'easy-to-fit' open-wire feeder spacer, see text for dimensions and fitting instructions.

As an incentive, each published 'Tip' gets a £5 Book service voucher for the author. The best idea each month gets an additional £5 voucher as well. So, get writing! G1TEX

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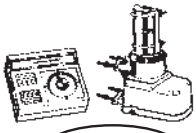

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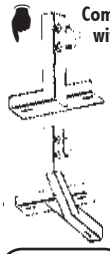

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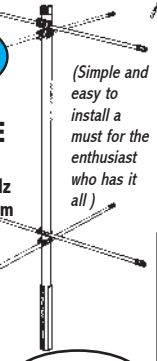

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Freq. Range 0-2000 MHz. Length 1500mm.

This is designed for external use. It will receive all frequencies. at all levels unlike a mono band antenna. It has 8 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals plus there is an extra 3db gain over the standard super scan stick. *(For the expert who wants that extra sensitivity)*

MULTISCAN STICK

Freq. Range Receive - 0-2000 MHz. Transmit 144 - 146 MHz gain 2.5 DBd 420 - 430 MHz gain 4.5 DBd Length 1000 mm.

Although marginally compromising sensitivity the multi scan stick has within its transmitting capabilities plus gain makes it an excellent antenna for the amateur and expert alike.
Comes complete with mounting hardware and brackets.
(Ideal for the amateurs ham radio - user)

IVX 2000

Freq. Range Receive - 0-2000 MHz. Transmit 50 - 52 MHz gain 2.00DBd 144 - 146 MHz gain 4.00 DBh 420 - 430 MHz gain 6.00 DBd Length 2.5 m.

For external use, but at a pinch can be used in the loft. It has been finely tuned to make this Antenna the best there is. It has stainless steel radials and hardware. *(THE BEST)*

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Same as Super Scan Stick but with extra gain, makes it an even better antenna for the amateur and expert alike. *(Ideal for the Ham Radio user)*

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SUPER DISCONE

Freq. Range 25-2000MHz Length 1380mm

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MRP-2000 (Preamplifier)

Freq Range 25-2000 Mhz 9-15v input (Battery not included) 14 db Gain. Complete with lead and BNC connectors.

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MRP-125 (Preamplifier)

Freq Range 118-137 Mhz 9-15v input (Battery not included) 14 db Gain Complete with Lead and BNC connectors.

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Freq. Range 25-2000 MHz.Length 620 mm.

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On Air With The Icom IC-446

Licence-Free Transceivers

Katherine Taylor 2E1HFX, the 14 year-old daughter of the *PW* 144MHz QRP Contest adjudicator Neil G4HLX, jumped at the chance of operating without a licence. "Ideal to show my friends and let them have a go at radio communications" she said!

Katherine Taylor 2E1HFX thinks the IC-446S PMR transceivers are a great way of introducing radio communications to her friends.

When I was asked by *PW* to carry out a review of the Icom IC-446S, I thought "brilliant, not only do I get a chance to try out the PMR 446 licence-free band, but I get to show my friends a thing or two about Amateur Radio". That I have done, and I've had a great time using the two rigs that I was lent to try out.

The Icom publicity on the boxes told me the 446S transceivers can be used 'in the car park, on building or road work sites, at an outdoor gathering or convention, and when skiing or camping'. I however, would use these mostly for conversation and social convenience - to keep in contact with my friends. In brief, I've found that they perform exactly as written on the boxes: 'simple and reliable' (in big **bold** letters).

No Licence Needed

These hand-held radios are PMR 446 approved which means that you don't need a licence to operate, and you can use them in **most European countries**. They have eight channels, these being the eight frequencies of the PMR 446 specification which are 12kHz spaced channels from 446.00625 to 446.09375MHz (n.b.f.m.).

So, as you'd expect, the transceivers perform quite like 430MHz Amateur Radio hand-helds. They are rated at 500mW effective radiated power (e.r.p.), but the stubby little antennas are presumably not very efficient, so the actual r.f. power output of the transmitter must be somewhat lower.

However, there is no provision to use any other kind of external antenna. They are powered by three AA cells (or an optional NiCd pack) which last for typically about ten hours. Just like most Amateur Radio hand-helds, there are two jack sockets on the top for an optional external microphone and speaker or speaker/microphone unit.

When I first picked up one of the models, I thought "they haven't included the antenna"! But I stopped panicking when I found it on the side, instead of being extendable or fixed, it pivots round and tucks away. (This makes the size of the rig more compact).

On the whole it's a good, small size compared to other simpler amateur hand-held rigs but a bit 'clumpy' compared to my really tiny mobile phone! (Dad pays for that!) Quite a few people have suggested using these instead of my phone, but I would find that impractical because the range is not enough and of course they can only contact those who have rigs on the same frequencies.

My friends ran a test to see how far the range of the rig is in use. With one left at home with my sister **Rachael** (first time **she's been seen** with a radio transceiver!), my Dad and I took the other rig on a journey in the car.

On the box it says that the radios have a range of about 3km in wide open spaces, but that doesn't count populated areas. The signal readability was fine up to about 1km across the residential area of our village, but then severely deteriorated at about 1.5 km and totally gone soon after that.

Even when we went to the top of a hill about 5km away, with a line-of-sight path back to home, no signal was received. But we could

● Think you can't use PMR 446? - Tell that to the Marines! Icom supply the US Marines with 446 equipment, so it must be tough.
Photo courtesy of Icom (UK) Ltd.

just hear Rachael, when we used an Amateur-band hand-held transceiver which could receive on the 'Licence Free' frequencies.

The second transceiver was an Icom IC-T8A, suggesting that (maybe the IC-446S has a less sensitive receiver?) or more likely it's limited by the antenna performance. But in practice, for local use within a village like the one we live in deepest Oxfordshire, they would be fine.

Main Attraction

The main attraction of these PMR 446 models is that they can be used by people without a licence. Of course, I couldn't just take their word for it, so I roped in my best friend (a non-licence holder), **Kate Varney** (pictured with me), to help with this review.

I gave Kate the box and instruction manual and let her get on with it! Within a few minutes she had figured out not only the basics but also learnt how to use some of the features, like 'smart ring', etc. (see below).

Kate's success doesn't surprise me, because the instruction manual is put in simple terms (no reflection on you Kate!). And to help further, things like CTCSS are explained fully in a little box at the bottom of the page.

We had a great week, talking until late at night and saving loads on our mobiles phones*! While one of us went down to the shops, the other ordered want they wanted - the excuse for this was "just testing the walkie-talkies" but maybe it was really laziness.

Dad G4HLX please note savings! Editor.

Kate's Report

After a week of convenience, this is what my friend Kate had to say about the 'walkie-talkies:

"These radios are fun and practical, I found them easy to use after a while. The instructions were complicated at first but they explained what they meant quite well. Although they are quite expensive...I think that they are worth it".

● A handy solution to short range communication problems - the IC-446S - versatile, easy to use and cheaper to run than a mobile 'phone!
Photo courtesy of Icom (UK) Ltd.

Katherine 2E1HFX Comments

My friend Kate and I have been referring to the radios as 'walkie-talkies', because in a quiet rural area like ours not many other people are likely to have one of these rigs, so there is no one else on any of the frequencies. So they seem exactly like private two-way radios.

If we lived in a highly populated area and there were maybe lots of people on this band, we could use what the manual calls the 'group' mode. In this mode you can set one of 38 'group codes'- signals only being receivable from another transceiver using the same code. This (so Dad Neil told me to help get my Novice call) actually uses the Continuous Tone Coded Squelch System (CTCSS), the same as employed in most Amateur Radio v.h.f./u.h.f. repeaters.

With CTCSS a low frequency sub-audible tone between 67 and 250Hz is superimposed on the audio and detected by he other transceiver. This was very effective, but of course wouldn't stop you getting interference from other co-channel stations (I learned a lot with these radios!).

The detection of the CTCSS tone is used to activate some of

the other features in this equipment, such as 'smart ring'. When this function is called (by pressing the PTT and one of the other buttons simultaneously) a piercing ring tone sounds on both rigs if the other rig is switched on and in range.

The first rig sends a short burst of signal (presumably with some control code) to the second rig, which starts its ring tone sounding to attract the attention of its user. Whether or not the user responds, the transmitter automatically sends back a response so that your rig is informed that the signal got through, and starts your ring tone sounding too - very clever!

On the other hand, if the other radio isn't switched on or is out of range, then after 10 seconds of trying your transceiver warns you with three beeps.

If you know that the other radio **is switched on** but you would just like to get their attention then there is another type of ring you could use - called the 'call ring'. Basically it just sends a ring tone on the outgoing audio. (I found this useful for when one of us was doing something, and is just like a 'phone in this aspect). For these ringing features, you can choose a ring tone from a selection of ten, most of them very shrill and some with quite annoying tunes!

If you don't want to call the other radio but you want to know if you are in range of each other (and on the same frequency), you can activate the 'Automatic Transponder System' (ATS) on your radio so it checks every 60 seconds automatically by sending out a short burst of power.

If another transceiver is in range with the same CTCSS group code set, it sends back an automatic response which silently causes the 'answer back indicator' on your display to show, until the next check is done one minute later. If no response is received then this indicator flashes constantly.

I would find the ATS very useful if I were using these radios for something active; a widespread treasure hunt or something, where people kept going in and out of range and I needed constant knowledge of this.

Katherine and friend Kate Varney had a great time talking the licence-free way.

Something that I found a little irritating about the Icom IC-446S is that because there are so few buttons on it, you often have to use a combination to make some of the functions work. I didn't find this very intuitive, especially where combinations with the power button are concerned. *PW*

Manufacturer's Specifications

General	
Frequency coverage:	446.00625 - 446.09375MHz
Mode:	F3E (FM)
No. of operating channels:	8 (simplex)
Frequency stability:	±5.7ppm; ±2.5kHz
Frequency resolution:	12.5kHz
Power supply requirement:	4.5V (R6 x 3 or optional BP-202 NiCd pack)
Current drain:	less than 500mA
Operating temperature range:	-20∞C to +55∞C
No. of CTCSS frequencies:	38
Dimensions (excluding projections):	55.5 x 102.5 x 26.5mm
Weight:	180g (including R6 batteries)
Transmitter	
Output power:	less than 500mW ERP
Maximum deviation:	±2.5kHz
Spurious emissions:	less than 250nW (-36 dBm)
External microphone connector:	3-conductor 2.5mm, 2.2kΩ
Receiver	
Receive system:	Double-conversion superhet
Sensitivity:	less than 0.25 ?V (-12dB?V) for 12dB SINAD
Selectivity:	more than 8.5kHz at -6dB
Spurious and image rejection:	more than 65dB
Adjacent channel rejection:	more than 55dB
Intermodulation rejection:	more than 60dB
Audio output power (at 4.5V DC):	more than 100mW at 10% distortion into 8?
External speaker connection:	2-conductor 3.5mm, 8Ω

Product

Icom IC- 446S PMR licence-free transceivers

Pros & Cons

Pros: *Good small size, licence free, fun and refreshingly easy to use and a great way to save money on mobile 'phone bills!*

Cons: *Slightly highly priced and there's no provision for addtional external antenna.*

Summary

'Using these Icom hand-helds was very great fun and refreshingly easy, I would definitely consider buying one (if my friends bought one too) if they weren't so expensive for a schoolgirl. At £109 each inc. VAT they are perhaps a little too pricey for someone like me to invest in (although I might save some money on mobile 'phone calls in the long run).

And of course, I wouldn't use the IC-446S in place of my 430MHz hand-held. But if I was given a pair I would definitely enjoy them and make good use of the gift!

They would really come into their own on family days out, shopping trips, at large outdoor parties or other social functions. If you are organising events or have some other need for short-range communication where Amateur Radio is not appropriate, then these transceivers could be ideal for you".

Prices

My thanks go to ***Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 741741, FAX: (01227) 741742*** *for the loan of the pair of IC-446S transceivers.*
Suggested Selling Price:
£109 inc. charger and batteries.

Radio Basics

This month, Rob Mannion G3XFD does his very best to try to persuade those of you who are reluctant to try making home-brewed printed circuit boards to have a go. Rob says the process is rewarding and can help eliminate those wiring mistakes!

As I'm planning to present some more projects soon, which are best built on to printed circuit board (p.c.b.) layouts, I'm devoting this edition of 'Radio Basics' (RB) to encouraging those of you who are reluctant to try the technique - to have a go.

If you do try...I can assure you that the results can be satisfying indeed. And far from being difficult - making your own p.c.b. design **can in fact reduce the number of wiring mistakes**.

From the correspondence I've received from readers on the subject I understand that the majority of those who have written in on the subject have a number of worries. The major concerns are: **Difficulties with 'dangerous' chemicals, making irrevocable mistakes, lack of confidence, getting hold of the necessary materials and finally - knowing just what to do**.

Well, in reply to the major points raised by the letters and E-mails you've sent in to me, I've prepared the biggest and most important 'pro-PCB' article I've written. So, I hope it encourages you to have a go for yourself....you won't regret trying I can assure you!

Ferric Chloride

Following the correspondence from RB readers I have no doubt at all that the biggest problems that they have is the idea they'll have to work with Ferric Chloride (FC). However, although Ferric Chloride **can be a nuisance and unpleasant if not handled and disposed of correctly** - for the first time home p.c.b. designer-constructor I think it's by far the easiest, cheapest and most reliable copper etchant there is available. All that's needed for trouble-free use is that you follow the simple working rules I'll describe for you. These, together with the use of simple protective (nothing expensive) clothing/protection will greatly reduce the 'Hassle Factor' as my American radio constructor friends say!

Ferric Chloride is available in well-sealed packet, as in **Fig. 1**, ready to use. The Electrolube brand of FC shown in Fig. 1, is available from the Maplin Electronics catalogue (**Ref: XX12N** and costs **£6.99 plus P&P**) packaged in heavy gauge, very sturdy, double-wrapped polythene bags.

The packaging is necessary because FC is **extremely** hygroscopic (i.e. absorbs water very readily) and is also an extremely effective dye. **Be warned** - FC will stain anything a dark, mustard-like greeny yellow colour and will rot fabrics!

Despite the warnings though, FC is very convenient for the home constructor. All you need to do is to wear a 'splash' apron, and rubber kitchen gloves to protect the skin on your fingers - as FC will stain finger-tips too!

If you have an artificial hand like me...place your 'split hook' inside several supermarket plastic bags and operate it through the plastic and you won't upset the National Health Artificial Limb Service! Thrifty two-handed constructors take note - you too can use the plastic bag method!

Once the FC has been exhausted or you have finished with the etchant, you can dilute it with further water (I use an empty - cleaned - engine oil container) and then dispose of it at your local public waste disposal site. Here in Dorset they make no charge for this service and you might be also fortunate in this respect.

So, now I've outlined the precautions you should take, let's get down to business making p.c.b.s in your workshop. It's a fascinating process.

Magic & Radio

I have fond memories of the expressions on my young daughters' faces: "It's magic Daddy" they said - when we developed black and white photographs together in a dimly (red) lit darkroom many years ago. Charlotte and Alexandra had taken the photographs with me, and then they saw the resultant positive prints develop from the negatives that we'd also processed. They were enthralled! The same can happen with you and your own radio p.c.b. work as it 'develops' before your very eyes!

If you attend Amateur Radio rallies or shows the cheapest way to get what you need is to look out for bargain buy p.c.b. material, etch resist pens and FC (usually in granular form but sometimes available as a liquid). However, all is not lost if you don't attend rallies as you can buy what you need via mail order from *PW* advertisers.

I'm pleased to inform you that I've discovered a particular useful little kit to help you on the way to making your own p.c.b.s. The Maplin Electronics 'Student Etch Pack' (order number UR85G) is a newly-introduced kit, **Fig. 2**, which includes a plastic etching tray, an etch resist pen, 250ml of ready-to-use FC fluid and five Synthetic Resin Bonded Paper (SRBP) copper laminated boards.

The kit costs **£14.99** (**plus P&P**) and should prove a further inducement (as everything is ready for you to have a go) to any reluctant p.c.b. draughtsmen (and women) amongst you!

Make A Start!

In future, more of the RB projects will use simple p.c.b. designs so **I strongly recommend you 'join in' and make a start**. However, there's no need to 'run before you can walk' and you can enjoy yourself by practising making simple test boards and even name or callsign badges!

You can make personalised name or callsign badges using very small slivers or p.c.b. material so there's no need to waste the board! Firstly make sure the copper clad p.c.b. material is clean. **But please do not use an abrasive cleaner, pad or brush. If you do the etch resist fluid will follow the microscopic scratches and you'll end up with a very messy design indeed!**

Cleaning is best done using an aerosol switch cleaner spray. Gently spray the copper side of the copper laminate board and left it dry after you've wiped it over with a tissue. (A roll of soft toilet paper is ideal for p.c.b. preparation and cleaning).

When the copper laminate is dry (a few minutes) you can apply the etch resist. Experiment by writing your name - or callsign onto the copper foil- then leave it to dry for a while (45 minutes should be adequate - but don't try to hurry the process or you could damage the etch resist).

If you make a mistake - or aren't happy with the result - you can clean the etch resist off easily immediately after spraying aerosol switch cleaner onto the copper foil. Do it quickly though - as you'll see that the aerosol propelled switch cleaner evaporates rapidly. Using a square or two of 'loo' paper should enable you to get the board clean quickly.

Working tip: For protecting larger areas of copper foil from etchant (to provide an earth plane, or to allow screening) don't bother to

use large quantities of etch resist from the pen applicator. Instead I suggest you 'mask' the board using cheap *pvc* insulation tape. (This can be bought in various widths to help in this application and it's possible to become very neat when using the technique). You can also - with much practice - use the tape to mask the copper to provide tracks.

Working tip: Keep a glass dish or old saucer near to your working position so you get the etch resist 'ink' flowing out of the pen applicator (by pressing down on the pen's barrel, allowing etch resist to flow down over the fibre 'nib' applicator) onto the saucer. Once the resist is flowing the pen is ready to use.

Once you've made one or two boards, let them dry and then place them carefully into the FC etchant. A pair of cheap plastic photographic tweezers are useful for moving the p.c.b. around in the etch fluid.

Working tip: If using the household kitchen sink (not advisable but it is possible!) run enough warm water to surround the etching dish - but not enough to allow it to float. The warming effect will speed up the etching process and protect sink from FC splashes. Same technique can be used in conjunction with a larger tray (a Cat litter type is ideal) in workshop away from the kitchen.

Rocking Motion

The etching process is helped if you apply a gentle rocking motion (alternatively from side-to-side and then from back-to-front) to the etching dish. The gentle waves created provide the immersed p.c.b. maximum exposure to the etchant.

Every now and again you should check how the process is working. The copper should start disappearing (exposing the bare base laminate itself) from the edges. You'll then notice the etching working its way to, and around the etch resist 'tracks'.

Working tip: Don't worry if you see that some of your etch resist tracks are also being dissolved! This sometimes happens if you've not made the etch resist layer thick enough (It's also a problem associated with hand-held pen applicators). You can 'bridge that gap' later with wire or even just by using solder.

Washing & Drying

When you can clearly see that all the copper not protected by etch resist or masking tape has been etched away, remove the board from the fluid and rinse in fresh water. Check to see all is well (if there's any sign of minute speckles of copper remaining where you don't want them - replace the p.c.b. back in the etchant for a while until they are gone).

Working tip: Much wasted time and frustration can be saved if you take care to ensure all copper had been etched from between tracks, etc. This is because even a tiny amount of copper left on the board can provide high resistance (sometimes very low resistance!) pathways, thus causing short circuits and a no working project. Care taken at this stage can make the process a real pleasure and you won't suffer a penance later when you're assembling the project!

When the board has been rinsed, washed and dried you can then remove the etch resist by spraying aerosol switch cleaner onto the etch resist (still protecting the copper underneath). You should then quickly wipe the etch resist away before the solvent evaporates (be prepared to use several doubled-up sheet of 'loo' paper for this job.

Alternatively you can leave the etch resist in place - soldering through it as necessary. However, I prefer not to do this as I don't like the smell of burning etch resists! If you've made a name badge as a practical exercise you can either 'tin' the resultant copper tracks with solder, or leave them as bright copper. The choice is yours.

● Fig. 1: Electrolube branded Ferric Chloride for etching copper clad printed circuit boards. (Ref. Maplin catalogue XX12N).
Photograph courtesy of Maplin Electronics.

● Fig. 2: Everything you need to have a go! The Maplin Electronics 'Student Etch' pack (Maplin catalogue reference UR85G) can provide an ideal introduction to 'home-brewing' printed circuit boards. Photograph courtesy of Maplin Elect onics.

Practice & Perfection

There's no doubt that making your own p.c.b. designs is an art which demands 'practice for perfection'. But, I can assure you it is an enjoyable process. So, why not try it yourself?

My advice is start off small (small boards) and work your way up. Why don't you consider making some 'Island Blob' board like the Rev. **George Dobbs G3RJV** uses? To make your own all you need to do is mask out 24 or so 'Islands' on the copper laminate side of the board and then etch it.

Practice does make perfect, and you will soon start envisaging p.c.b. designs as you progress from basic work to more complicated designs. Additionally, as you make and consider various designs you'll make less mistakes because (rather than hurrying the project) you'll consider each move carefully because you know once you have committed a board to the etchant it's messy and difficult (involving jumper wires and links, etc., to alter it very much.

Indeed, designing and making your own p.c.b. s is a disciplined procedure. But I can tell you from my own experience it's wonderfully satisfying to see a board you've designed and made take shape. In fact, every time I make a p.c.b. I'm always reminded of the wonder on my daughters' faces as they saw photographs appearing 'before their very own eyes' in the paper developer. Home-brew p.c.b.s have the same effect - so have a go and get ready for the next RB projects. Cheerio for now and enjoy yourselves!

PW

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From The Irish Sea - To The

Dr. Peadar Slattery EI2JA recounts, thanks to a superb example of Amateur Radio research and co-operation, the story of two Early de Forest Transmitters and the news reporting by wireless from the Russo-Japanese War 1904-05.

"Here we were at the opposite end of the world equipped in every detail, in pursuance of an absolutely novel idea and one most comprehensive in its development.."

(**Lionel James of *The Times* on the use of wireless in war journalism**).

In October 1903 Lee de Forest, an American wireless experimenter (who was to discover the triode valve in 1906), came to Britain at the invitation of the British Post Office. He had been invited to demonstrate his wireless system which seemed to be faster than that of his competitors.

In America de Forest's name was already associated with wireless. He had recently sent wireless signals from Sir Thomas Lipton's yacht *Erin* in the Atlantic to a land station in the United States. In the previous year the American De Forest Wireless Telegraph Company began to set up wireless stations at New York, Atlantic City, Key West and Havana in Cuba.

In April 1902 the *New York World* reported claims of 40 words a minute for the de Forest wireless system. And the British government – despite the fact that Marconi's Wireless Telegraph Company was established in London – was naturally interested in any new developments in wireless.

In the summer of 1903, Lionel James, **Fig. 1**, a War Correspondent from *The Times*, London, was in New York and learned that wireless telegraphy was being used in the International Yacht Race there. It occurred to James that wireless telegraphy might be useful and the de Forest system was faster than others.

System Faster

The De Forest system was faster than his rival's because he used a signal detector and earphones to hear the signal. Others used a slower device called a coherer which had to be mechanically tapped to get it to work efficiently.

De Forest came over to Europe with Harry Mac Horton who had sent signals from the *Erin*. Both men had built the wireless sets required for the Post Office experiments and brought them to Britain on the liner *Majestic*.

Horton had joined the de Forest company in spring 1902, quitting a lucrative press-wire job to get into wireless. De Forest had the highest regard for Horton, in his commitment to wireless and as a telegraphist.

The experimental stations were to be in Britain and Ireland. Horton was to operate one station and de Forest found a good English-trained telegrapher, named Cornish, to operate the second station.

De Forest dealt primarily with officials from the Post Office in London and had some contact with the Irish Post Office. However, it seems that the officials in Dublin were brought in to assist at a late stage as enquiries made in the last week of October by the *Irish Times* at the Secretary's department of the Irish Post Office established "that no intimation of the intention to carry out such experiments has been received here".

Fig. 1: Lionel James, pioneering 'Wireless War Correspondent' who proved the system developed by the American Lee de Forest could be used to files news reports, nearly 100 years ago.

Holyhead & Howth

The sites selected for de Forest's experiments were located near Holyhead, in north-west Wales and at Howth, near Dublin. The station in Wales was on Holy Island, near Holyhead, overlooking South Stack, (**Fig. 2**) the most westerly lighthouse and headland in the area. The wireless equipment was housed in a temporary shack close to the Coast Guard buildings.

The shack stood about 90 metres (around 300ft) above the sea overlooking the lighthouse and the keepers' houses. Years later de Forest recalled the sunsets which "stretched far across those western waters" in the direction of Ireland. It was a beautiful - but difficult - setting in which to work.

November was characteristically wet and it was not easy to get the English-made Fairbanks-Morse engine and their American generator to the station. Additional problems waited - the site was open and exposed to winds and the shack had to be anchored down with ropes and rock!

The Irish station was located across the Irish Sea on the north side of Dublin Bay, on Howth Head, **Fig. 3**, about 100km (60 miles or so) west of the Welsh station. De Forest described the site as being "in the small hamlet of Howth on a level plateau overlooking the Irish Sea".

The Irish Post Office officials, despite their earlier denial in October that they weren't involved in the experiments, were eventually drawn in to assist. They gave de Forest the use of the Martello Tower cable station at Howth and he was then able to fit his antenna to the existing tall pole and to use his transmitting and receiving apparatus in the tower.

Agreed For Tests

A day - 25 November 1903 - was agreed for the tests. De Forest stayed at the Holyhead wireless station where he met the officials from the Post Office Telegraph Company, the Post Office, the War Office and a representative of the Newfoundland Government: Messrs. Gary, Taylor, Davies and Birehell. At Howth, Henry Pomeroy, district superintendent of telegraphs for Dublin and the (Irish) Midlands, acted as observer.

De Forest used his English telegrapher at the Holyhead station. He sent Horton, the American operator to the Howth station because he could be relied upon to work alone and cope with any difficulties.

The officials wrote out coded messages which Horton and Cornish sent across the Irish Sea at 30 to 35 words a minute. The officials themselves put on the headphones and communicated

e Yellow Sea

back and forth with no difficulty.

De Forest was very pleased with how the tests had gone. But he had to wait for "the tardy report of the tests and findings" as it filtered through the files of the Post Office in London. He knew he was up against the European companies – Marconi, Lodge-Muirhead and the German firm Slaby-Arco (later known as Telefunken).

And – as de Forest put it – "there the matter rested and died". This was an unsatisfactory end to a great technical and organisational effort by de Forest and his team. He then decided to return home.

The shack near Holyhead was locked up and the equipment at Howth Martello Tower was put into storage. **But the real heroes of the experiment – the wireless sets – were to get one more historic outing**.

Rising Tension

In December, Lionel James was asked by his manager at *The Times*, Charles M. Bell, to get ready to travel to the Far East as there was rising tension between Japan and Russia. There was the distinct possibility of the outbreak of war.

James began to study maps, charts and naval and military data of the area in which war might break out. He considered the location of the likely naval war in the Yellow Sea as being suitable for wireless.

James heard that de Forest was in England and about to return to America on the *Majestic* leaving Liverpool on 23 December. He took a chance and booked passage on the same ship. As luck would have it, on 21 December, Bell ordered him to start for Japan.

At this stage, James chose to protect his idea about using wireless by not mentioning it to anyone, including his manager. He travelled to Liverpool with another *Times* correspondent, David Fraser, and boarded the *Majestic*.

How disappointed de Forest must have felt as he sailed along the Welsh coast and through the Irish Sea. But, by Christmas Day there was an upturn in his fortunes. He was approached by James who "tentatively broached the subject that he had been nursing so long" – that wireless could be used by journalists in war reporting.

De Forest rose to the suggestion 'with alacrity' according to James and was 'sold' the idea. De Forest, for his part, had designed the wireless sets and knew their capabilities.(He is likely to have described to James how they could be used in a ship-to-shore arrangement).

Absolute Secrecy

James insisted on absolute secrecy, with which de Forest agreed. By chance Reginald Fessenden, de Forest's 'keenest wireless rival', was actually on board the *Majestic*! De Forest made sure that James did not meet him and before they reached New York a deal was done between de Forest and James.

When the *Majestic* docked both men moved into action. James sent a ciphered cable to his superiors in London. Almost 100 years later, it still conveys the excitement of the events:

"Propose adopt de Forest wireless system de Forest will give plant two stations 250 pounds stop freight Japan operators expenses four months should not exceed 750 more stop propose one station at Weihaiwei other hired boat or Korean coast stop doubtless you could arrange American papers join stop if sanctioned cable Responder [de Forest] New York yes and me Siberia San Francisco"'

James then travelled by express train with Fraser to Chicago to connect with the 'Overland Limited' train to San Francisco. At San Francisco James received a reply from London – "Arranged Forest". *The Times* was committed to the use of wireless in the field, involving, as is clear from the cable, an outlay of £1000.

James then exploded his 'final bomb' on his employers in London as he was about to board the *Siberia*, cabling a request that he needed a ship for his wireless work: "*To Times London. Your consent received and acted upon. Vessel essential cable result Honolulu James".*

Fig. 2: South Stack Lighthouse - on Holy Island near Holyhead. This was the sight for the Welsh transmitter used during the successful wireless transmissions by Lee de Forest in 1903. Photograph courtesy of Gwyn Rowlands MW0BTU.

Sailed For Japan

James and Fraser sailed for Japan with James disembarking at Tokyo "to be in touch with Japanese and military authorities". Fraser went on to Weihaiwei (Weihai today) the British concession port on the Chinese mainland where a land station was to be set up.

Meanwhile, de Forest had not been idle. He decided to use the wireless sets that were still at Holyhead and Howth. He organised his London agent to find Cornish, the English telegraphist employed in the Irish Sea experiments.

Cornish was to go to Holyhead and Howth, pack up the wireless sets and equipment and get them on board ship at Liverpool. He then travelled with the equipment, two tons in weight, to New York where within 36 hours it was to be unloaded, overhauled, repaired, re-packed and transferred to a railway freight wagon destined for the port of Seattle.

De Forest sent two American telegraphists, 'Pop' Athearn and Harry Brown, to Seattle. Meanwhile the wireless sets, ancillary equipment and telegraphers were all safely loaded on board the *Empress of China* bound for Shanghai.

Russo-Japanese War

On 8 February 1904 the Russo-Japanese war began with a torpedo attack by the Japanese on Port Arthur (Lushun today). In Tokyo. James, however, was there - ready and waiting.

James secured an interview with Admiral Saito, the sub-chief of the Imperial Naval Ministry. James was, after all, a civilian proposing to go to sea in a war zone.

But James went much further than merely seeking a journalist's permit when he made his written application to Saito on 12 February: *"I put before him the proposal that he should place upon my vessel a suitable officer from the Japanese Imperial Navy, who while pretending to be my Japanese interpreter, would also be my censor and also an intelligence officer for Admiral Togo's Grand Fleet. In simple wording I offered to bring the Haimun unreservedly into the scheme of Japanese naval intelligence for value received in the opportunities that would then come to me to supply early and exclusive news to The Times".*

On 21 February, the Japanese, sent James an agreement signed by the minister of state for the Japanese navy, which stated:

"I take this opportunity to thank you for your cordial offer to place, if required, your telegraphic apparatus and expert operator at the service of the Imperial Forces and at the same time I hope you will consider that we shall be happy to give you any such assistance as you may require and which is possible for us under the present circumstances".

There were written instructions which dealt with an officer of the Japanese Imperial Navy, Commander Tonami, who was to accompany James on board ship. He was a wireless specialist who had his own Naval cipher books and would act as both a censor and to provide liaison when required.

The agreement between James and the Imperial Navy was secret. Admiral Saito insisted that James must not tell anyone about their agreement including another *Times* correspondent and the Japanese authorities!

Suitable Wireless Ship

Bell, James's manager in London, had searched for a suitable ship for wireless work and the SS *Haimun* was chartered. She was a 1,200 ton steamer, fitted out with de Forest's system of wireless.

Chartering fees, wages and supplies for three months cost £6,000. Seeing her for the first time at Nagasaki on 8 March, James was delighted with the ship.

On 12 March the *Haimun* arrived at Weihaiwei on the Chinese mainland. One hour out from port, James could see at least 30 metres (100ft) of wireless mast standing on the island of Leu Kung.

James was pleased that Athearn and Brown had clearly been busy. There were 'splendid roads zig-zagging up the island bluff to the very top' to the antenna mast.

The following day Athearn assured James that four hours work by himself and Brown would finish the fitting of the wireless cabin and give communication up to 160km (100 miles).

The *Haimun* was ready to sail at 6p.m. That night approximately 115km (70 miles) distant from Weihaiwei, Harry Brown sent James's first news message by wireless from a war zone. **It became a historic 'first'**.

The message was sent, but was it received? Silence followed. Then Brown shouted from the wireless cabin: "That's 'Pop' Athearn – message okay"!

Many governments and journalists opposed James's enterprise in roaming across the Yellow Sea in a dispatch boat with wireless looking for news. The American Minister protested to the Japanese that *The Times* was being shown favouritism.

In reply the Japanese replied that they had no control over *The Times* on the high seas.

Jealous journalistic colleagues told him that the Japanese would sink him if he reported on Naval engagements they did not want publicised. James ignored a British Admiral who said "his action was a flagrant breach of British neutrality". And in mid-March the Japanese admiralty in Tokyo insisted to his many rivals that he (James) was "unauthorised"!

Close Co-operation

James developed a method of working involving close co-operation with the Japanese. He and Tonami built up a great sense of confidence and trust in each other.

Firstly, James would agree his route with Tonami and this would be conveyed to the Japanese Imperial Naval authorities by cable, wireless or by personal contact at sea with Japanese Naval officers (They had Marconi equipment).

In a cruise ending at Chemulpo (Inchon today), James was in touch with several units of Japans Battle Squadron. He also regularly cruised from Weihaiwei across the Yellow Sea to the Korean coast, to the ports of Chemulpo and Chinampo (Nampo today), and northwards to waters east of the Russian-held Port Arthur.

James and his crew were constantly criss-crossing the sea in the hope of finding action. Their mission was to get war news to London faster than any other journalist. This was done by sending a wireless message to Athearn at Weihaiwei, who would then send the dispatch on to London by conventional telegraph wire and cable.

For example, on the evening of 14 March he prepared "a long dispatch for *The Times*" which was to be sent the following day as they steamed down the Korean coast from Chinampo to Chemulpo.

The distance to Weihaiwei at the time of sending was 160km (100 miles) and there was no "Okay" received from Athearn. However, when they reached port the following day Athearn reported that he "had received all messages perfectly".

On 30 March James sent "a fine news budget" from the same location, Pillar Rock, near the port of Chinampo. In reply he got an immediate " Okay".

On 9 April, with the *Haimun* anchored at Chemulpo, "they got Athearn clearly at 150 miles" (Approximately 240km). After a sea-journey finishing on 12 April, James kept in touch with Weihaiwei "often at 180 miles" (approximately 290km).

On 13 April, ten miles (16km) off Port Arthur, James sent a brief but important message to Weihaiwei that the fort guns at Port Arthur had opened fire. James was very pleased because the telegraphic "links were complete to *The Times* on the opposite side of the globe".

Sir William Preece of the British Post Office (who had helped Marconi when he had first come to England) was very impressed. His comments as an independent observer on James's achievement are interesting:

"The Times transmitted much news to Printinghouse Square by Eastern Telegraph Cable: 2,000 uncensored words were one day sent across 180 miles of sea at a mean speed of 30 words a minute, and thence 14,010 miles to London, where they were printed in The Times the next morning with marvellous accuracy".

Model Operator

Jaem's operator, Athearn, based at the land station at Weihaiwei, was a vital link in the chain of communication. He received James's wireless dispatches and arranged for them to be cabled to *The Times* in London.

Athearn was constantly on duty listening to the wireless and even at night slept with the earphones on. When not engaged in his own work he would listen to the various wireless signals that reached him.

Russian wireless traffic using the Popov system transmitting from Port Arthur was heard. And "countless communications from the Japanese warships" and the wireless signals of the British ships *Andromeda*, *Fearless* and *Leviathan* were heard. Athearn also heard an Italian warship using wireless in the Yellow Sea.

The *Haimun* was helpful to the Japanese in a number of ways, reporting directly by wireless to the Japanese navy on 26 March that their attempt to blockade a

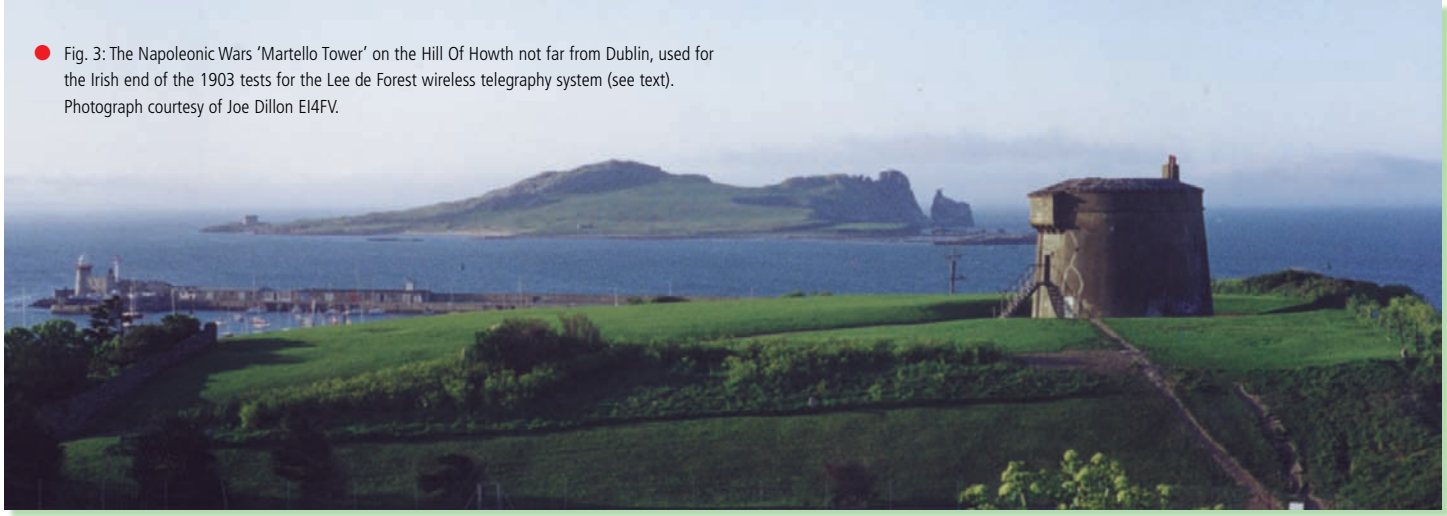

Fig. 3: The Napoleonic Wars 'Martello Tower' on the Hill Of Howth not far from Dublin, used for the Irish end of the 1903 tests for the Lee de Forest wireless telegraphy system (see text). Photograph courtesy of Joe Dillon EI4FV.

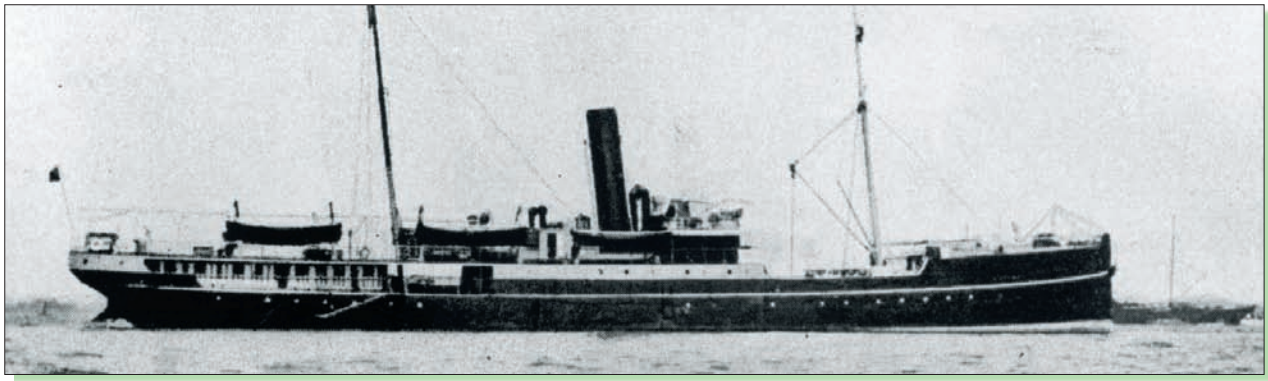

Fig. 4: Still a graceful-looking vessel almost 100 years on - SS *Haimun*, The *Times* despatch and 'Wireless Ship' used during the Russo-Japanese War. (see text).

channel into Port Arthur by using concrete-filled merchant 'blockships' had failed. Also, James sent a message describing the Russian Grand Fleet at sea.

Two days later, the *Haimun* heard Russian wireless traffic between Port Arthur and Chifu (Yantai today), west of Weihaiwei. It was reported to the Japanese and within 48 hours Chifu became silent.

The Russians felt the loss of the Chifu station and early in May a Russian agent tried to bribe James to send signals to the beleaguered Russians in Port Arthur. He refused and that evening instinctively went up to the isolated hill-top wireless station to defend Athearn and the station. The (Russian) agent and a companion arrived at about 11.30pm were turned back successfully by James, with the help of a Colt automatic!

Russians Not Pleased

James was aware that the Russians were not pleased that the *Haimun* was cruising in disputed waters. This was proved on 6 April the Russian four-funnelled *Bayan* cruiser converged on the *Haimun*.

The *Bayan* was flying an Admiral's flag and James believed that the Russians intended boarding. He then sent a wireless message to Weihaiwei 85 miles (137km) away:

"Off Port Arthur, 9 a.m. 6/4/04. To Fraser. Urgent. We are about to be boarded by the Russians, unless you hear from us within three hours refer Commissioner, Senior Naval Officer and Times London. – James".

The Russians fired across the bows of the *Haimun* and she came to a stop. Tonami, the Japanese officer on board knew he was in mortal danger as he had met the Russian captain in Paris and would be recognised.

Tonami decided to hide before two Russian Lieutenants came on board wishing to see the wireless cabin and a copy of the last message sent. The message to Fraser and the possible threat of Japanese action forced the *Bayan* to cut short the confrontation.

On another occasion, 13 April, Japanese wireless traffic may have contributed to the sinking of the Russian flagship, the *Petropavlovsk*. The Japanese set up an apparently weak squadron near Port Arthur to lure out Russian ships over a minefield.

The Russians came out and missed the minefield. However, Japanese wireless traffic, heard by the Russians at that moment, may have panicked them into turning for home and a battleship hit a mine and sank quickly. The next day James' s telegraphist received a message confirming the sinking of the *Petropavlovsk* and the death of Admiral Makarov who had been on board.

Admiral Togo, who knew of the *Haimun*'s secret role, may have come to the conclusion after this incident that the advantages of the *Haimun* balanced the disadvantages. No directive was given as yet. However, it was the Russians who brought James's activities to an end.

Effectively Ended

On 17 April, James began to receive many messages from Athearn in Weihaiwei paraphrasing a Russian statement which effectively put an end to this new form of journalism. The full statement (originally in French) stated:

"The representative of His Majesty, the Emperor of the Far East, has just made the following declaration – In the situation where neutral ships which can be seen from the coast of the Kwantoun Peninsula, or are within the sphere of action of the Russian naval forces, are taken, having on board newspaper correspondents, communicating information to the enemy by means of apparatus not foreseen by any of the conventions, these correspondents will be treated as spies and the ships carrying this type of apparatus kept as prizes of war".

Fig. 5: Map of the area where the SS *Haimun* operated, proving just how effective wireless could be in news reporting (see text).

It was quite clear that the statement targeted James and the *Haimun* as he was the only correspondent on board such a ship in the area described. And when on 21 April, the *Haimun* steamed to Nagasaki to take on coal Commander Tonami received a telegram there which read as follows:

"Military General Staff requests Haimun will not go north of line Chemulpo Chifu until further notice". The telegram effectively put an end to James's wireless work.

De Forest Delighted

In America Lee de Forest was delighted with the success of his wireless system as used in the Yellow Sea. His brother wrote to him at the St. Louis World's Exposition: "They have placarded all the elevated stations in New York with the '*Times*-de Forest' posters and great is the wrath of our rivals, Marconi, Fessenden, and Graf-Arco".

The experiment and innovation with wireless in the War had only lasted six weeks. However, it quickly became clear that the combination of the Lee de Forest wireless sets and the courage of Lionel James had led to the beginning of direct, live, on-the-spot wireless reporting from war zones. Lionel James had broken new ground in wireless and journalism and made history.

PW

Author's acknowledgements: I'd like to acknowledge the use of the reminiscences of Lee de Forest and Lionel James. I'm also very grateful to **Joe Dillon EI4FV** for the initial idea for this article and for photography and fieldwork at Howth, to **Patrick O'Brien GW1SXN** for valuable research on the Holyhead station, and to **Gwyn Rowlands MWOBTU** for a photographic survey of the area around South Stack lighthouse. (It's hoped to commemorate de Forest's achievements and celebrate the centenary of his Holyhead-Howth wireless link by setting up special stations on both sides of the Irish Sea.. There'll be further news up-dates when we have them).
Peadar EI2JA

Dennis Arnold G7OGN enlists the aid of Duncan Cadd G0UTY to 'stretch' the G2BCX antenna design to work on 50MHz.

The 7OGN 8-for-6

A DX Antenna For 50MHz

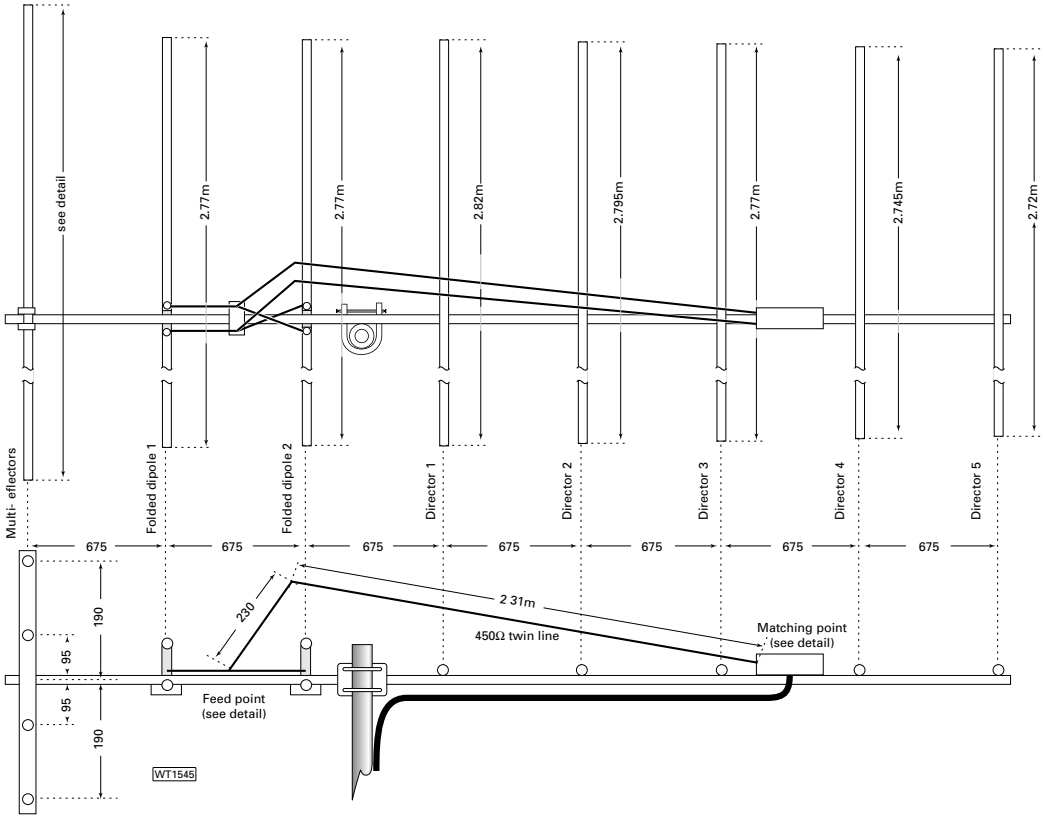

Fig. 1: The antenna that Dennis G7OGN built - seen from above and the side. All dimensions are in millimetres unless stated.

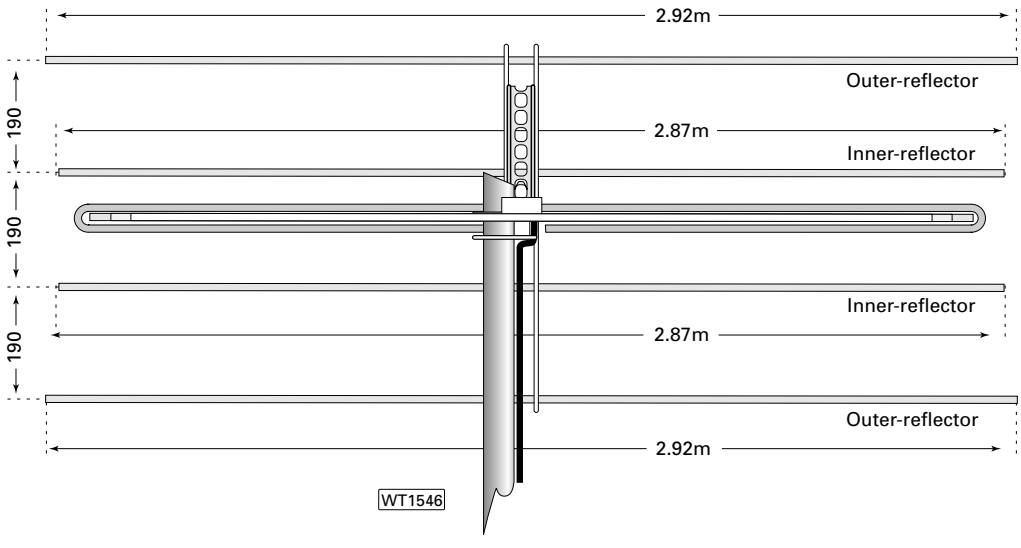

Fig. 2: Looking from the 'sharp-end' into the antenna shows the four reflector elements are longer on the top and bottom elements.

The antenna I'm about to describe started off as a 'I wonder if...' style of idea after I looked at the G2BCX antenna design presented in *More Out Of Thin Air* (and originally in *Out Of Thin Air* too. **Editor**.).

The antenna is based rather loosely on an original design by the late **Fred Judd G2BCX**. It's a design using two driven phased folded dipole elements in combination with other parasitic elements to create a small, but effective beam antenna for the 144MHz band. But would the redesigned antenna work on 50MHz? Read on and find out.

I make few claims of originality for the basic design, but tweaking the new antenna for a decent match on the 50MHz has proved interesting. These tweaks involved the removal of a few elements and a change of element thickness (relative to wavelength). And it's made a difference to the feed-point impedance as you would expect.

In the light of experience, a few practical modifications have been needed. In my new design, all the elements are spaced 675mm apart. Using the computer programs *NEC2* suggested that the input impedance is purely resistive, at around 30-35Ω, but with few reactive components.

Impedance Transformed

The antenna input impedance is transformed, using a matching stub transformer, to the more 'usual' 50Ω needed to match into the coaxial cable. The 450Ω 'phasing' line is bought forward from the the crossed-over feed point between the driven elements to a water-proof box towards the front-end of the boom. This box also contains the 'shorting' bar matching system.

As the 450Ω phasing and λ/2 transformer line is longer than the

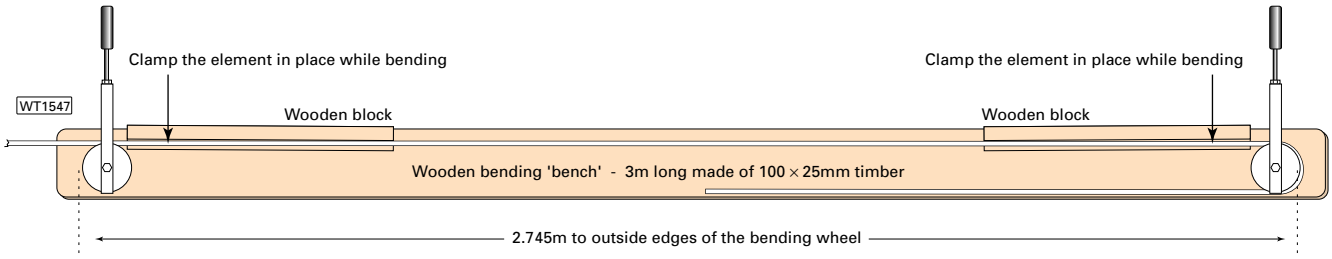

Fig. 3: The bending 'bench' and jig that was arranged to make production of the folded elements easier and more consistent.

distance between the two mounting points. So, it has to be kept away from both elements and the boom by non-metallic supports if it is not to cause losses and mismatch.The feeding coaxial cable then runs from the adjustable feedpoint in the box, under the boom back towards the mast, and then down to the transceiver.

Antenna Layout

Let's have a look at the general construction and layout of the '7OGN' antenna, which can be seen in **Fig. 1** and **Fig. 2**. The two driven elements are folded half-wave dipoles, with five directors and a multi-element director. In the final design I've used 'half-inch' aluminium tube throughout.

The directors are mounted on a small 'sub-boom' with the two outer ones rather longer than the two nearer the main boom. All element spacing is constant at 675mm between element centres. The phasing line should be held in the shape shown with a non-conducting support under the high point.

The Construction

Now it's time to turn to the construction of the antenna, which is quite straight forward. The only tricky bits being the forming of the folded dipole elements. Each element needed to be bent from a single length of aluminium tube for rigidity, but the slightest miscalculation could be costly in tubing.

So, as a compromise on the initial prototype antenna, each element was made up of five pieces of tubing: a 'top piece of 2.67m long, two lower parts - each 1.32m long and two 'U' bends of 9/10mm ($^3/_8$in) for the end pieces. Now the two ends are 'trombone' sliding fit pieces, and could be used to give a slight change in matching to give the best possible s.w.r. reading.

When the best dimensions for the folded elements had been determined (2.77m 'tip-to-tip'), each of the folded dipole elements was made from a single 8m length of 12.7mm ($^1/_2$in) diameter aluminium tubing.

To ensure repeatability, we made a wooden bending jig shown in the diagram of **Figs. 3** and **4**. A bending 'bench' such as the one shown is extremely useful.

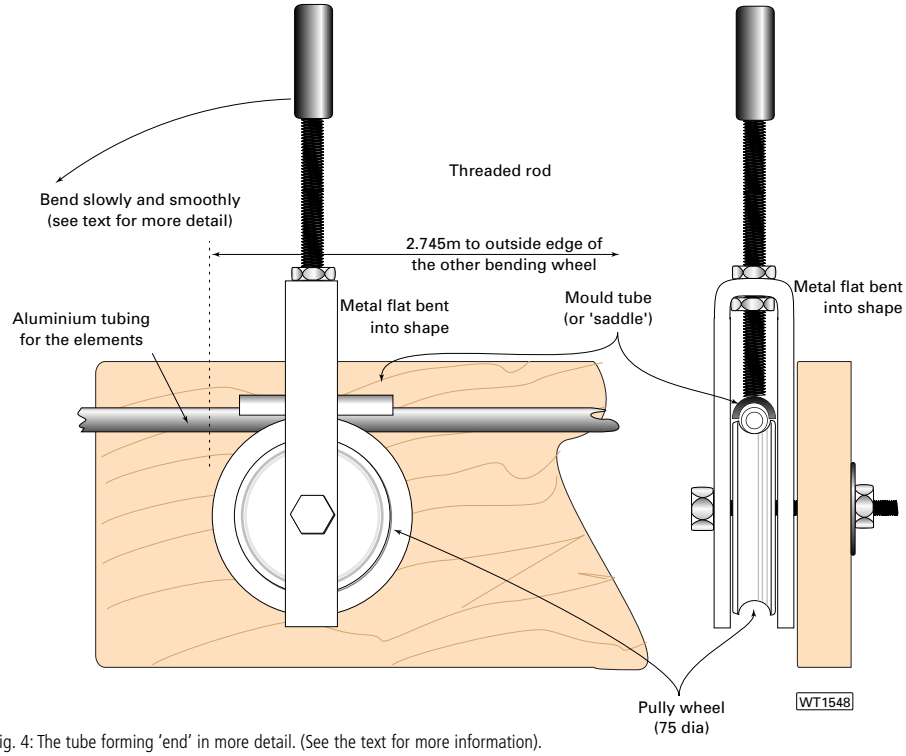

Fig. 4: The tube forming 'end' in more detail. (See the text for more information).

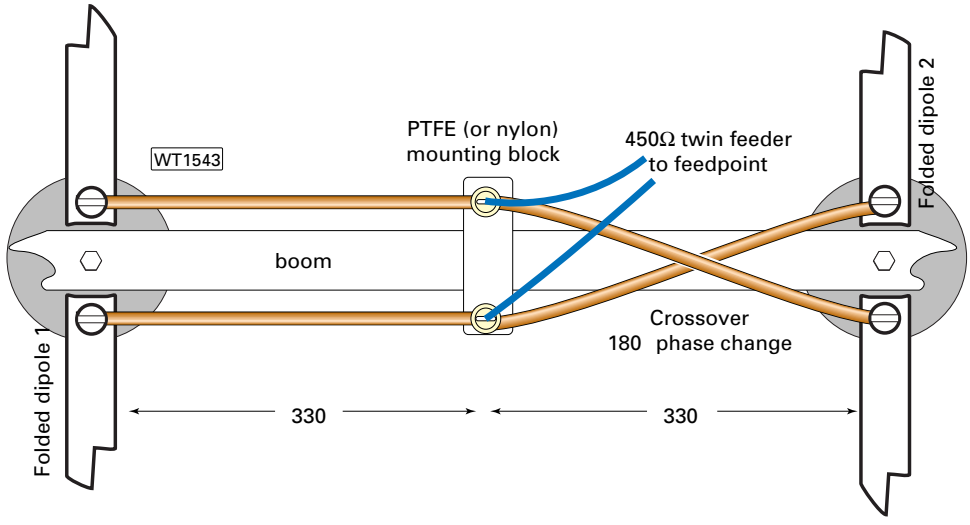

Fig. 5: The cross-over phasing lines can be made from heavyweight insulated copper wire, but should be isolated from each other and the boom. The elements are held onto the boom by commercial dipole mounting kits available from Deecom. (See text for more detail).

Bending Wheels

The bending wheels were two 75mm diameter pulley wheels that held the tubing with a snug fit inside the rim. The mould tube, or

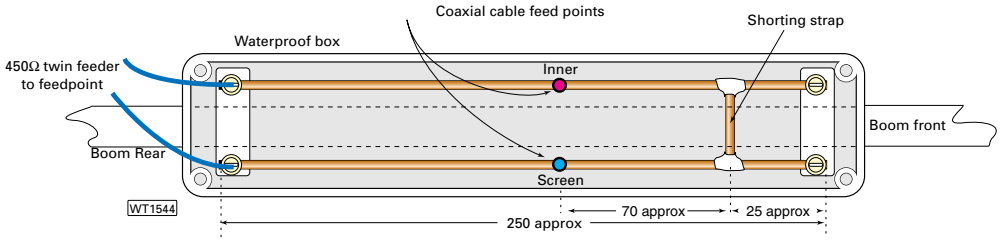

Fig. 6: The shorting bar matching system employed in the antenna. As the impedance can change quite quickly only small movements should be made during 'tuning' and matching. (See text for more detail).

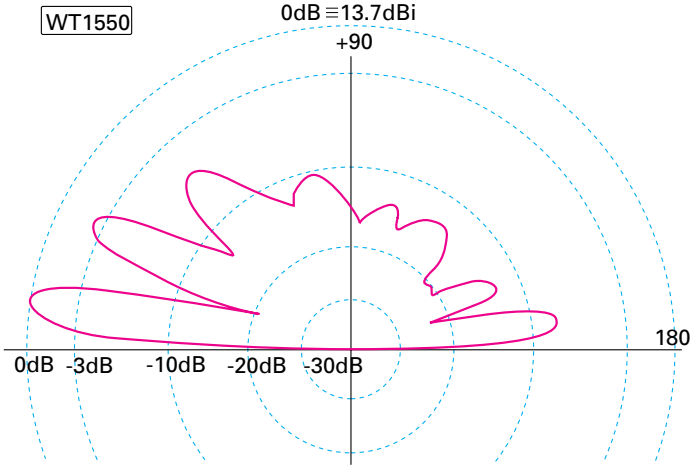

Fig. 7: The theoretical radiation pattern of the antenna in the vertical plane (redrawn from a computer printout).

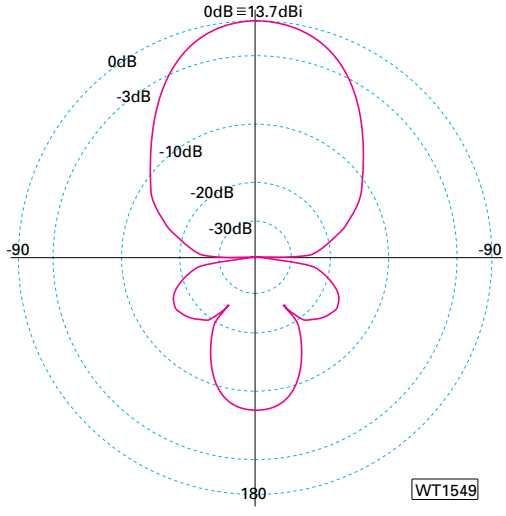

Fig. 8: The theoretical radiation pattern of the antenna in the horizontal plane (redrawn from a computer printout), the forward gain is around 11dBd (13.7dBi).

saddle is a short section of steel tube that had an internal diameter the same as the tubing used for the elements. The 'inside' of this saddle should be as smooth as possible.

The bending bench, or jig, was made from one three metre length of 100×25mm timber with two 75mm diameter aluminium pulley wheels, mounted so, that when the aluminium tube was in place, and bent around the wheel, the outsides of the curved elements measured 2.77m apart. For initial measurements, only short sections of tube were placed on the pulley wheels.

If you don't want to go to the lengths of making your own jig, then tube formers, to aid bending the tubing accurately, should be available from all good plumbing suppliers ('half-inch' Pipe Benders). However, I can recommend making your own jig, if you have a good mechanical workshop available.

Bending Technique

There is a technique for using pipe-bending formers that gives a good smooth bend without flattened tubing. The technique is to have a bending set-up where all the parts fit neatly and closely together. When making the bend, try and carry out the action in a single smooth movement as evenly as possible.

When bending the tube, especially with aluminium, it's no good try to 'take a run' at it, or snatching the thing. This method often leaves kinks in the tubing or changes of direction at the bend. So, with that in mind and having completed the bending of the element, they should lay flat on the ground.

I used two dipole boom-mounting adapters (originally from **Deecom**) as mounting supports for the driven elements. These were mounted upside-down **underneath** the boom and the folded element was mounted above the boom, the mounting bolts also holding the feeding lines from the common point on the upper side of the boom. The cross-over feeding lines are basically as shown in **Fig. 5**.

Matching & Adjusting

Now a few words about how the matching is checked and adjusted. The dimensions shown in The feed-point-box of **Fig. 6**, make a good starting point.The box itself should be made of some weather-proof insulating material, and the items should be isolated from the boom.

Movements of the shorting strap make large changes to the matching and these should be limited to about one millimetre at a time. Changes to the feed-point position cause less of a change in matching and so, may be used to 'fine-tune' the matching. Finally - take care to seal the case before putting the antenna into operation

Radiation Patterns

The radiation patterns, were originally printed out using *xnecview* that runs under the *Linux* operating system rather than the more usual *Windows95/98*. The patterns, **Figs. 7** and **8**, show that the lobes are broad in the horizontal plane (reducing the antenna 'aiming' problems) but quite narrow in the vertical plane. The patterns themselves have been plotted using the standard ARRL plotting conventions, which will readily enable comparisons with other published designs.

For the purposes of modelling, the antenna was assumed to be 10m above a 'Sommerfeld' ground model for 'average' earth. (This computer model assumes a dielectric constant of 13 and a conductivity of 10^{-5} so, it approximates 'the real world' well).

Since there is some cost involved with making this antenna, both in terms of techniques and cash, it would seem to be an ideal club project. The costs being 'shared' among the members. This is my next task to get our radio club (**Northampton Radio Club G8LED** and **G3GWB**) active on 50MHz.

At my own location, where the original antenna is used, I've noted wind speeds in excess of 75knots (around 135k.p.h.) sustained over several days. The antenna has, in spite of the long unsupported elements, survived it all with honours and allowed me to work into '5B4', '9A', 'SV9', 'ZS6', 'ZB2' and most areas of Europe.

This project would have been far more difficult to complete without a lot of help from **Duncan Cadd G0UTY**, who stepped in to help with the mathematics and computer plots for the antenna, when my own knowledge was 'flagging'. Thanks Duncan!

PW

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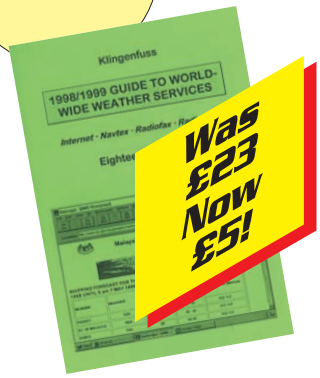

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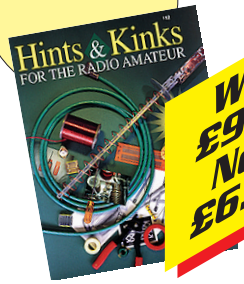

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Warbling Wonder PSK31

Wondering what the warble is? It's probably PSK31! Robin Trebilcock GW3ZCF explains this new data mode and how to get going with the latest techniques to make use of your new PC.

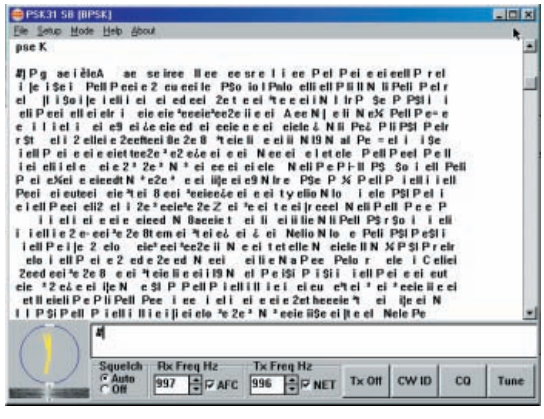
First of all - what is PSK31? You may have heard a strange warbling sound near the top of the Morse sections of the h.f. bands and wondered what it was. If so, then you've probably stumbled upon PSK31 – an incredibly powerful data mode which is gaining rapidly in popularity, with more and more stations appearing each day.

I won't dwell unduly on the theory of PSK31 – that's been fully covered in articles by its originator, **Peter Martinez G3PLX** (*Radcom* December 1998 and January 1999). But the letters PSK stands for Phase Shift Keying. This mode means in practice that the signal contains all the transmitted information in an incredibly narrow bandwidth. In fact, about 31Hz for a well modulated signal.

As the interfering noise contained in such a small spectrum is also very small, the result is that a very weak signal that can be perfectly intelligible. So intelligible that good DX contacts are commonplace with comparatively low power. It's very rare to find PSK stations transmitting more than 50W, yet world wide QSOs are easy to achieve with very modest antenna arrangements.

Band (MHz and m)	Range Low - High
3.5MHz 80m)	3.580 - 3.620
7MHz (40m)	7.035 - 7.045
10MHz (30m)	10.140 - 10.150
14MHz (20m)	14.070 - 14.099
18MHz (17m)	18.100 - 18.109
21MHz (15m)	21.080 - 21.120
24MHz (12m)	24.920 - 24.929
28MHz (10m)	28.050 - 28.150

● Table 1: Signals for PSK31 may be found towards the bottom end of the 'digimode' section of each band. Though until you find your first signals they can seem rather elusive.



● The 'grand-daddy' of PSK software is *psk31sb*. It presents a rather simple interface, but makes few demands on the PC hardware.

● A good startpoint for information and software for the PSK31 mode is http://www.packetradio.org

Very Efficient

The PSK31 mode is very efficient in its transmission of information. Peter Martinez has devised a binary code (a code made up of 'bits' representing either a 'one' or a 'nought'. ***Editor.***)
to represent all the letters and symbols needed for the major world languages, there's even a version available for the Russian cyrillic script. But unless you have the right software for your computer, the resulting 'text' appears as gibberish on your screen. The really clever bit about Peter's code is, that as with Morse code, the most commonly used letters have the shortest character strings, and, are therefore quickest to transmit. The letter 'e', for example, is denoted by '11', whilst 'z' is '11010101'. Peter has devised the name '*Varicode*' for his character set, and it's at the heart of the PSK31 system.

Lower case letters also have less 'bits' and so are quicker to transmit than capitals. So, particularly if you are a quick typist, it's better to stick with lower case, so that the software can keep up with you.

What's needed?

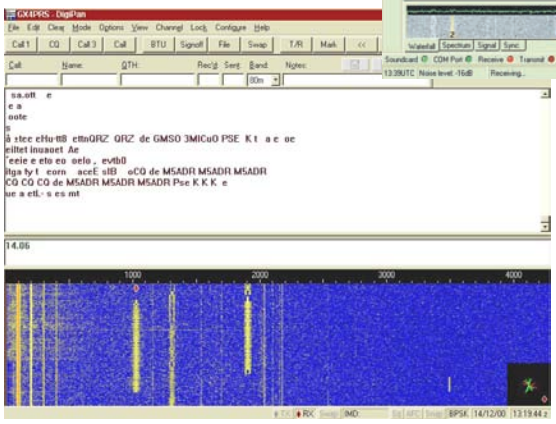
So, what do you need to use this mode? Firstly a surprisingly simple (cheap) computer really! If you have a Pentium based computer, running at about 75MHz or more, with a soundcard, and If you're using *Windows 3.11* or *Windows95/98*, you can get going with PSK31 at minimal cost. However, because of the very narrow bandwidth, you will though, need a very stable rig.

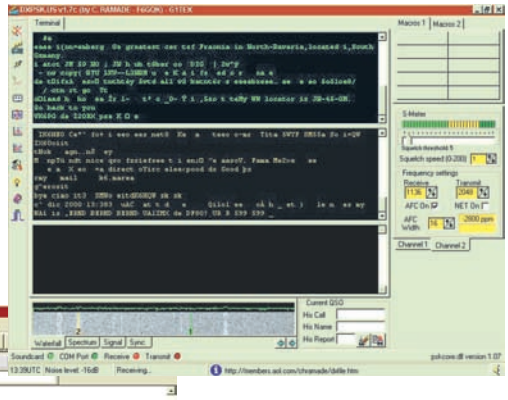
Because of the stability requirements, the still popular FT-101 is usually not stable enough, but almost any transceiver with a crystal controlled synthesiser is generally satisfactory. Apart from that, all you need is a couple of lengths of screened wire to connect the computer to your rig, and perhaps a couple of resistors together with a 100kΩ potentiometer to adjust the

modulation level.

Although the hardware requirements are simple, PSK31 is driven by some incredibly sophisticated software in your computer. But the good news is that this is available to Radio Amateurs as 'Freeware', downloaded from the web.

I advise you to go to the PSK31 'Home Page' at **http://aintel.bi.ehu.es/psk31.html** where, in addition to downloadable software, you will find a lot of useful background information about PSK31, which is well worth reading. (The page wasn't available at the time when I checked! Although I did find that **http://www.packetradio.org** or **http://www.packetradio.org** had some very good information available as well. ***Editor***)





● A 'screengrab' of *Digipan* in operation. The 'waterfall' signal view makes finding PSK31 signals very easy.

● Able to capture two message streams at once *DXPSK* needs a slightly better computer than other software to get the best results.

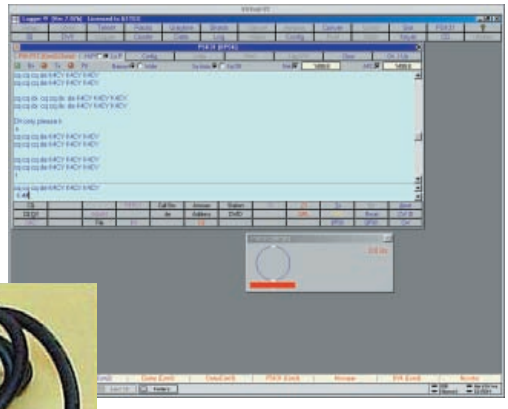
● Ready-built interfaces are available to suit your particular radio.

Web Page Guides

The web pages guide you to the most suitable software for your computer, but the most straightforward for beginners to the mode, is the latest version by Peter Martinez (at the time of writing, this is version 1.08, and you can download the file ***p31sbw108.zip*** which is a 'zipped' (ie compressed) file. This download will take up to ten minutes, after which you will need to use *Winzip* to convert it to a working program.

In operation, much of what I'm about to say will apply to almost all the programs that can decode PSK31. Firstly, **always read the help files**! They're normally very well written, and full of practical hints. The software interprets the warbling in your loudspeaker into live text which appears on your computer screen as it is being typed at the other end. But because the tuning is so critical, fine tuning is not done with the tuning knob of your transceiver, but by varying the audio pitch which the software responds to.

As you or your contact drift slightly, the software senses this and adjusts the pass-band to compensate, (you can see these slight variations in frequency displayed continuously on your screen). The software will keep you and your contact precisely netted together (but make sure that you don't have your RIT switched on, or you will always transmit on a different frequency from your contact, and you will both 'walk' all the way up the band during the course of a QSO).



● *Logger* deals with PSK31 signals, but makes do without the waterfall plots, using only a 'phase-scope' display.

Make A Start

Now to make a start. Make two screened connectors to go between the computer soundcard and your transceiver. Earth the screen of both these leads at the transceiver and the computer ends of the cable.

It's best to use the accessory socket at the back of your transceiver as the voltage levels better match the soundcard input and output levels. Use the microphone input and you will end up blocking the system. Connect the speaker output from your rig to the line input jack of your soundcard, the second lead connects the computer speaker jack to the modulator input of your transceiver.

If you find that there's 'hum', because of 50Hz voltage differences between the two chassis, you may need to fit isolating transformers in both leads, but this is seldom necessary. A couple of ferrite rings around the leads might be helpful if you have r.f. problems, for example, instability of your computer display when you are on transmit.

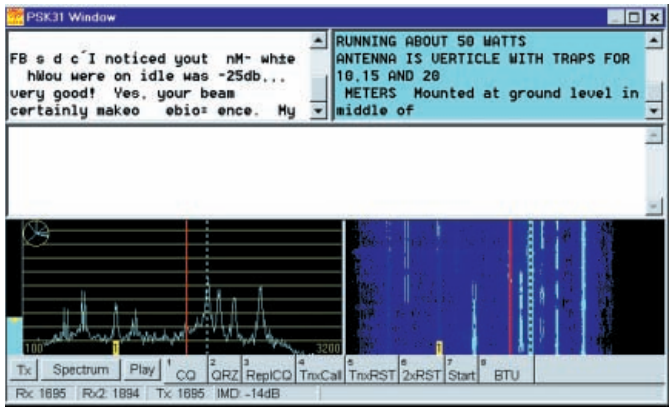
At a pinch you **can** connect the soundcard output to the microphone. input of your rig, but as soundcard output is as high as 500mV and the microphone input needs only millivolts, you will certainly need to make a voltage divider to reduce drive about a hundredfold.

Looking For Signals

Now it's time to look for 'real' signals. But **don't even think about transmitting yet**, you may need to gain quite a bit of familiarity with the mode by listening before transmitting. When running the system for the first time, you need to set some parameters, and this is when you will see two panels displayed. There'll be a large one in which the received text will appear and a smaller one which will show what you yourself have typed.

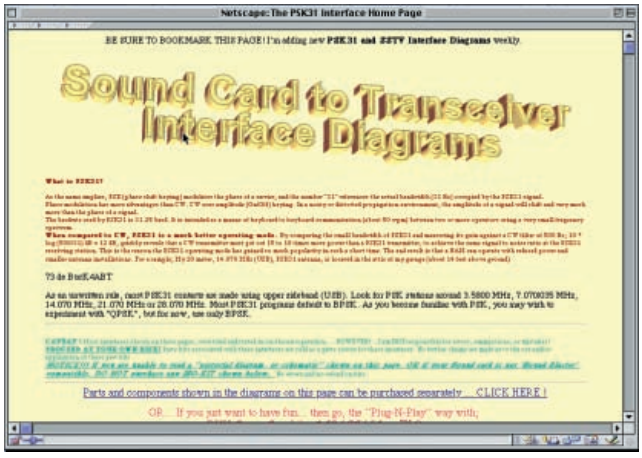
Tuning PSK signals is much more critical than any other mode, so most software has built in two devices to help you. These are the Waterfall display (a rudimentary spectrum analyser) and the Phase Scope. To start, first tune your receiver onto an unmodulated carrier.

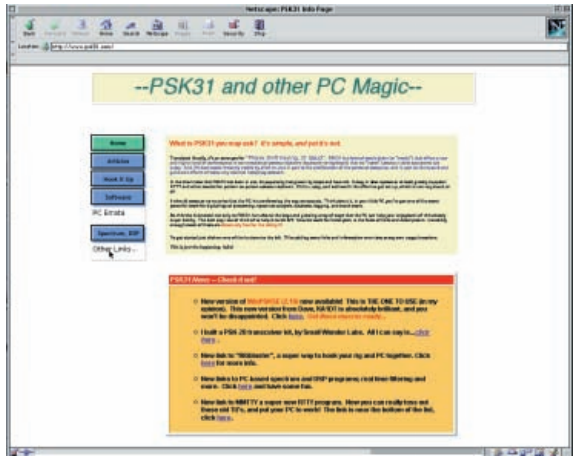
Be careful not to overload your soundcard input – either turn down the audio output from your receiver, or adjust the soundcard sensitivity via the control panel if you're running *Windows 95/98*. When you are exactly tuned, a line will appear vertically on the phase scope, and a pale coloured line (usually yellow or white on a dark background) will appear somewhere in the middle of the waterfall display.



● An interesting single signal display of PSK31 'conversations', but with a spectrum and waterfall display provided simultaneously from PSK31.

● The startpoint to find interface diagrams for many popular radios (suitable for PSK31) is to be found when going deeper into 'packetradio.com' or 'packetradio.org' pages.





● The homepage of http://www.psk31.com

Some Transmissions

Depending on the time of day, you should find some transmissions near the bottom end of the digital communications (Digimode) sections of the IARU Bandplan (see **Table 1**). Listen for the characteristic warbling, and when you have found one (if you're using *p31sbw*) then tune it with your receiver dial as accurately as possible to the frequency you chose from the set-up menu (the default value being 1kHz). Then use the left and right arrows on your keyboard for fine tuning, and the red line will move round the phase scope until it is vertical.

If you're using one of the more visual programs, you should see two close parallel lines on the waterfall – click just in between these to begin decoding that stream. On *p31sbw* just click on the parallel lines to bring them to the centre of the waterfall display, and then fine tune with the left and right arrows until the line on the phase scope, which now extends from the top to the bottom of the circle, is vertical.

When you're using *p31sbw* and you are almost on tune, the phase scope trace will change from red to yellow, and text will start to appear. I suggest that you practice tuning in stations until you feel quite confident with the controls.

Occasionally you may see a signal that covers a much greater bandwidth on the waterfall, and, instead of the usual melodious warble, the signal sounds harsh, with a sort of 'knocking' background. This is likely to be a station overdriving his transmitter, perhaps with too high an output from his soundcard, or he's left his speech processor switched on. Avoid transmitting a signal like this at all costs!

On Air

You are now nearly ready to go on the air, but try a dummy run first before going 'live'. Just turn off the transceiver, then start to type on your keyboard, and the text will appear in the small window, and the phase scope will show only vertical lines. The typed text will then start to appear in the large window, showing that it has been processed by the software and turned into a PSK signal ready to modulate your transceiver.

Click on the 'TX-Off' button and the 'transmitted' signal is switched off and goes in to receive. Or press the 'CQ' button – and your own personalised CQ call should appear on the screen. Again the program will then revert to receive. Finally, press the Tune button, and the phase scope will show a steady green line, corresponding to the steady audio tone sent when tuning up your transmitter.

The Big Moment

Now you're almost ready for the big moment – your first PSK31 transmission! (assuming you have the control cables made up). Switch on your rig and go through the following check list:

❍ 'RIT' off
❍ Speech Processor off
❍ Mode set to upper sideband (u.s.b. - yes! even when you're on 3.5 or 7MHz)
❍ Microphone disconnected
❍ Power output set to deliver a few watts

You should never exceed 50W for a 100W rig – remember you will be transmitting a continuous tone and most transceivers are only rated for a 50% duty cycle.

Tune to the PSK31 segment of your chosen band, and select a region where there are no other stations visible on the waterfall display. Click on that region to bring it to the centre of the display. Click on the 'Tune' button. If your 'VOX' works from the accessory socket the rig will switch to transmit, if not you will have to switch it to transmit manually.

Switch the meter on your rig to 'ALC' and adjust the soundcard output so that the meter just moves above the zero position. This is difficult to achieve using the volume control of your soundcard, you will need to put a potentiometer in the audio input lead to your transceiver.

With my own rig, I use a 100kΩ pot in series with the audio input, because I find that the amount of drive I need varies from band to band, and it's much more accurate to set it up with the pot than by using the soundcard control. You should set the level every session, or on changing your output power level.

Press the 'CQ' button, and wait to see if anyone comes back to you. The very first CQ I transmitted brought a reply from a station in St Petersburg – I was so surprised I could hardly remember what to do next! If you don't get a response after two or three tries, start tuning around for the stations who are about, and you will soon hear a CQ call.

Pluck up your courage and call him, in no time at all you will be having your first PSK31 QSO - and if you are anything like me, from that moment on, there will be no looking back. I have been using this mode for several months and have worked over 80 countries so far – I can't wait to get my PSK DXCC!

Odds & Ends

Now to mention a few odd and ends! You will notice after a while that you often type the same bits of text repeatedly. If, like me, you are a poor typist, you will welcome the 'GNR Front End'. This is another free program, written by **WD5GNR**, which works alongside *p31sbw* and enables you to set up macros which transmit standardised messages

with a single keystroke. Use it for transmitting your name and QTH, or the details of your station. You will find the link to download it on the PSK31 'home page'.

The startpoint webpage **http://www.psk31.com/Software/software.htm** contains many links to much Amateur Radio software including copies of freeware, shareware and commercial programs. One shareware program is *MixW32*, the full version costs $50. The shareware version doesn't contain all the features of the full version, and it will not retain personal information when you close the program, but it has the advantage that it will also work with RTTY with the same soundcard settings.

Newer Programs

Recently there have been many newer programs that make PSK31 much easier to use. The more 'senior' program, called *DigiPan*, was written by **Nick Fedoseev UT2UZ**, and **Skip Teller KH6TY**. When you run this program, you will see a wide panoramic waterfall display which covers the whole audio pass-band of your transceiver, typically about 2.5kHz wide.

On the waterfall's dark background, every station transmitting PSK31 appears as a vertical line scrolling from top to bottom – strong signals producing a bright yellow line and weaker transmissions pale blue. To tune to one of these stations, simply move your mouse cursor onto the line you are interested in and left click. *Digipan* is unsurpassed for a quick overview of who is on or, for finding a clear slot to call CQ.

And if you tick the 'AFC' and 'Net' options on the drop down menu under Set, you will always be transmitting on the same frequency as the station you are copying. Since I discovered *Digipan*, I find myself using it more and more, and it could be a very good starting point for new 'warblers'. It also contains a very comprehensive Help file.

To run *Digipan* and many of the more recent programs, you will need a PC with a 100MHz or faster Pentium processor. You'll also need to be running *Windows95/98*. The program itself is freely available to download, from **http://members.home.com/hteller/digipan**

Strictly Speaking

The type of transmissions I've been talking about so far, are strictly speaking called BPSK (Bipolar Phase Shift Keying). When you are receiving a very weak signal, you may find an unacceptable number of errors appearing in the text using this method. To help Peter Martinez has also developed an even 'cleverer' version called Quaternary Phase Shift Keying (QPSK) which splits the transmitted data into two channels, and by an elaborate set of electronic guessing games can make a better shot of pulling a very weak signal out of the noise.

The penalty for the better ability, is that QPSK is even more critically dependent on the frequency stability at both ends of the link. But if you are having problems, it may be worth inviting your QSO partner to switch to QPSK – all you have to do is click on a button on the screen or a drop down menu box, depending on which program you are using.

You will be amazed to see almost perfect copy from a signal you can barely hear. But don't forget to switch back when you have finished the QSO, or you will not be able to decode the 99% of stations who will be using BPSK.

Accessory Socket

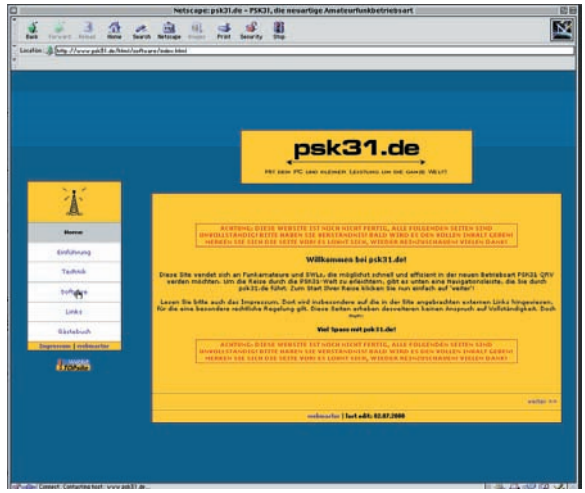
Finally, if the accessory socket of your transceiver will not activate your VOX (as is the case with my IC-775) you may get fed up with using the manual switch to turn your rig from transmit to receive and vice versa. If so, you may be interested in a little piece of hardware manufactured by **Peter Lockwood G8SLB** which is inserted in the lead from computer to transceiver.

This useful circuit will respond to an output of more than about 450mV from your soundcard (ie when you are keying) and electronically switch your rig to transmit through the accessory socket. Peter will customise a set of leads for your rig. Further details are available on **http://www.g8slb.freeserve.co.uk**

I hope my experience has whetted your appetite to have a go for yourself. It is great fun and I've made a lot of new friends and contact using the mode. There is much more detail available in the help files of the various software products I have mentioned, but you can read those again when you have gained a little experience and some of the more obscure topics will then begin to make sense.

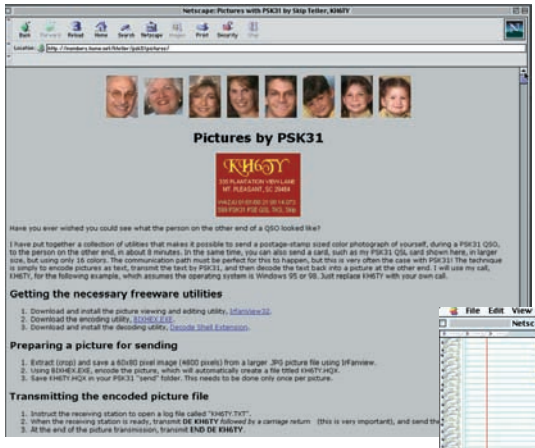
In practice, PSK offers new challenges, and many stations will welcome reports on the readability of their signals from DX listeners. **Go on…..have a go!**

PW



The German homepage for PSK31 information and software hasn't been updated regularly.

Wondering what the warble is?
Now you know!



Using a technique rather like an 'attachments' to an E-mail, you can send a thumbnail picture to the receiving station.

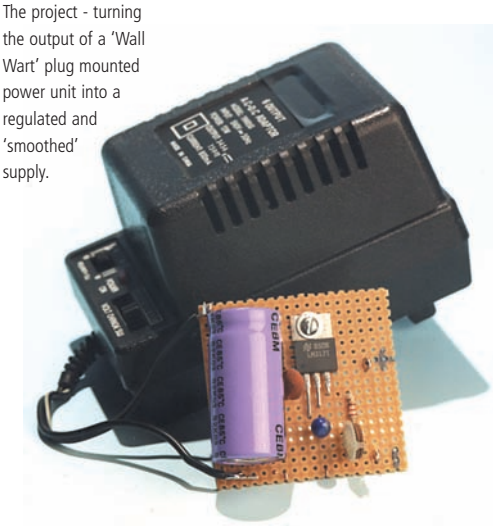
'Follow the butterfly' to find an evaluation copy of *MixW32* for PSK. The author claims it's 'the best in the world'. (And he could be right!).

Carrying On The Practical Way

This month the Rev. George Dobbs G3RJV describes his latest offering as "A Cheap Power Supply Using a 'Wall Wart'. However, before you reach for the clinical remedies - he assures you it's not infectious!

" The good want power"
From 'Prometheus Unbound',
Shelley 1792-1822

Warts and all



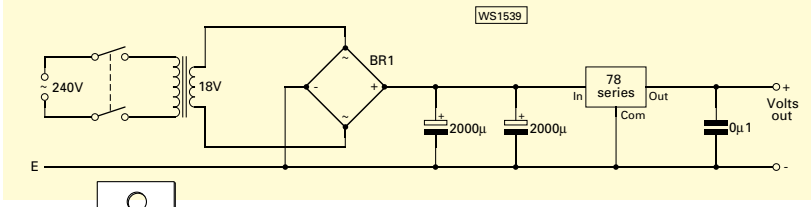
The project - turning the output of a 'Wall Wart' plug mounted power unit into a regulated and 'smoothed' supply.

I enjoy finding appropriate quotations for use in my *PW* column and hope you enjoy this months! However, in Amateur Radio, it's not only the 'good' who want power, we all need it to run our equipment. The commonest power requirement in most of our stations is at 12V d.c. And it's usual for most Amateur Radio stations to have at least one 'beefy' 12V supply for the main transceiver.

Here in Rochdale I have a 12V, 20A, supply under my workbench complete with crowbar protection and noisy fan. **Although I do not have any single piece of equipment that requires anywhere near that amount of power**, I have convenient 12V outlet sockets at several points along the bench. It is a 'belt and braces' arrangement that has served me well for many years.

In addition to the heavy duty unit I have several smaller power supplies. Some of these have fixed voltage outputs and some are equipped with variable outputs which are available for casual or away from the bench use.

My two variable voltage output supplies are very useful for experimental work when supplies of other than 12V output are required. There's always scope for another small stable power supply around the Amateur Radio workshop so this month I'm going to describe a very cheap way of making such a supply. But first, I'll share a few words about typical small bench power supplies and a couple of useful circuits.



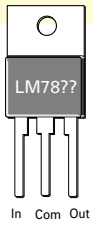


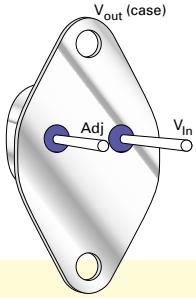
Fig. 1: The circuit diagram of a typical small stabilised power supply using a 78 Series voltage regulator i.c. The example given uses a mains transformer to drive a bridge rectifier although some may use a half-wave rectification system. The inset diagram of a typical LM78 series device - showing pin-out details is also shown (see text).

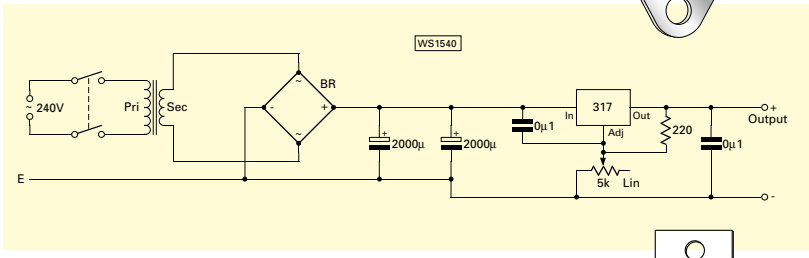
Small Fixed Supply

I recall building my first stabilised power supplies and in those days the easiest way to obtain a stable voltage was to use a zener diode. These were only suitable for low current applications, so for any reasonable current output a series power transistor was required.

The introduction of the now well known 'three-legged' voltage regulator chips has made the job of building a power supply much more simple. The commonest voltage regulation chips are the 78 Series and I'll show an example of their use.

To start, there's **Fig. 1**, which shows the circuit diagram of a typical small stabilised power supply using a 78 Series voltage regulator chip. The example given uses a mains transformer to drive a bridge rectifier although some may use a half-wave rectification system.





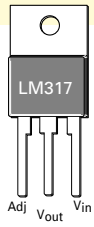


Fig. 2: A typical circuit for a small adjustable voltage power supply using the LM317 series i.c. (inset diagrams illustrate pin-outs for different packaging styles for LM317 devices) The rectification and smoothing are identical to Fig. 1 (see text).

The secondary voltage output of the transformer will depend upon the required voltage, 18V being about right for a 12V output supply. The regulator usually requires some 2 to 3V above the required output voltage and can handle an input voltage up to about 30V.

Pin-outs for the 78 Series chips are also shown in the drawing. The 78 Series regulators come in a variety of options – see **Table 1**. A user merely has to choose the required voltage and maximum required current and select a suitable chip from Table 1.

Small Variable Voltage

A variable voltage output power supply is easy to build using a variable output three-legged regulator chip. Perhaps the commonest chips for this application are the LM317 series.

The LM317 series chips are adjustable positive regulators for 100mA to 1.5A loads. The output voltage is adjustable over a 1.2 to 37V range and determined by two external resistors.

Line and load regulation are actually better than the 78 series of fixed regulators. However, the 317 range does require a minimum load of a few milliamps to ensure regulation.

A typical circuit for a small adjustable voltage power supply using the LM317 series chips is shown in **Fig. 2**. The rectification and smoothing are identical to Fig. 1.

The output from the mains transformer will depend upon the maximum required output voltage. For maximum use of the voltage range it should be about 40V.

In use the LM317 i.c.s have a voltage drop of 1.8V, **so the maximum available output voltage is the input voltage less 1.8V**. (Table 2 shows the choice available in the LM317 series chips).

The diagram in Fig. 1, shows the circuitry required around the LM317 chip. The two resistors required to set the output voltage are usually configured as one fixed value and a variable resistance.

The values shown are suitable for most applications. **A 0.1µF capacitor, wired close to the input of the regulator is essential if the device is mounted further than 150mm (6 inches) away from the smoothing capacitors**.

It can also be useful, in the interests of stability to mount a larger capacitor, say 1µF, across the output of the regulator chip.

Low Cost Regulated

One of my junk drawers is half full of what Americans call 'Wall Warts' (WW). These are the 'DC Power Cubes' complete with pins that plug directly into an a.c. mains outlet.

The WWs are made for powering a whole range of domestic equipment requiring a low d.c. voltage. Some are designed for charging battery powered equipment.

A common variant is the type which has a slide switch offering several output voltages. They are also usually provided with a multiple plug/socket termination.

Some of these WWs (they are also called 'Power Adapters' or 'Battery Eliminators') can be quite beefy. I recently bought one at an 'Everything for a Pound' store, which provides 12V at 1A. This is capable of powering many small items of Amateur Radio equipment and even a QRP transceiver.

Even though such units are convenient and cheap they usually lack adequate smoothing and are poorly regulated, if at all. However, they can be the basis of very useful power supplies for Amateur Radio applications.

The cubes require additional filtering and regulation. Several articles have appeared in the Amateur Radio literature for making such supplies worthy of our use. I recall a whole article by the late **Doug DeMaw W1FB** in the *QST* magazine devoted to their use.

However, for my power supply, I used the ideas offered by **Fred Bonavita W5QJM**, in *Sprat*, the G-QRP Club's journal.

Table 1

LM	78	XX
Manufactuer	**Current Rating**	**Output Voltage**
LM = National	78L = 0.1A	05 = 5 volts
MC = Motorola	78M = 0.5A	12 = 12 volts
AN = Panasonic	78 =1A	
	78T = 3.0A	

(0ther letters may refer to accuracy and case type)

Table 2

Device	Output Current (Max)	Output Voltage
LM317L	100Ma	1.2 to 37 volts
LM317	0.5A	1.2 to 37 volts
LM317T	1.5A	1.2 to 37 volts
LM317HV	1.5A	1.2 to 57 volts

Regulation & Filtering

The diagram, **Fig. 3**, shows a suitable regulation and filtering circuit for a WW supply. I used a 12V d.c., 1A, version in this circuit. **Warning:** Remember to check that the unit **does give out a d.c. voltage** as a few of them deliver a.c. voltages.

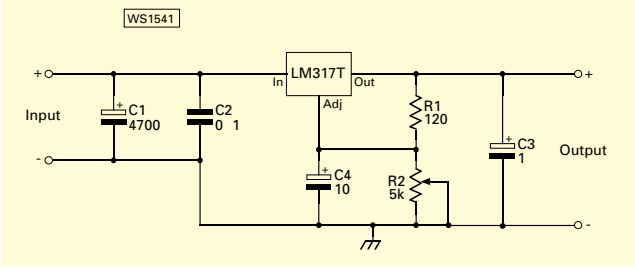


Fig. 3: A suitable regulation and filtering circuit for a 'Wall Wart' plug-mounted power supply. For this application G3RJV used a 12V d.c., 1A, version. Remember to check that the unit provides as a few of them deliver a.c. voltages.

Additional smoothing is provided by a 4700µF electrolytic capacitor. (My unit was sealed so I did not know what capacitive smoothing was already provided). The 4700µF choice proved to be very adequate and I have used it in a variety of applications without any apparent hum.

The regulation is provided by the LM317T as already described in this article. This allows for adjustment of the output voltage to the level required.

Adjustment is by way of a 5kΩ preset type of variable resistor. I bypassed the control with C4 to provide additional smoothing and C3 provides better regulation across a variety of loads. (Both of these are tantalum capacitors).

My version is built onto a naked perf-board and is 'Blu-tacked' to the case of the cube. And although I ought to have put it into a small case...the resultant power supply has been very useful.

The idea has been around for a long time before I got round to trying it…but I will make more of these modified Wall Warts. Have a go yourself!

PW

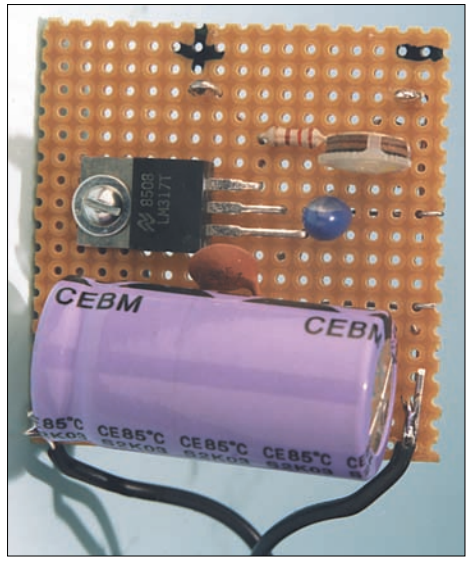


Fig. 4: Close-up photograph of G3RJV's completed 'perf board' regulator unit ready to install inside or onto the 'Wall Wart' (see text).

NEW Icom IC-910H

Available during the first quarter of 2001, the new IC-910H is a dedicated high performance 2/70/23 All mode transceiver. Offering 100W on 2m and 75w on 70cm, the 23cm module is available as an option (10w).

RRP: £1299.99
UX-910 1.2GHZ MODULE £349
FOR FURTHER DETAILS SEE OUR WEB SITE.

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Yaesu FT-50R

This sturdy twin band handie is built to the prestigious MIL-STD 810 specification. We have purchased a small quantity at a very special price. This offer includes the correct NiCads and charger (not cheap copies) and are guaranteed brand new with full Yaesu Warranty.

- 2/70 Transceive up to 5W output.
- RX: 76-200/300-540/590-999MHz
- DCS Digital Code Squelch
- 112 memory channels
- 12V direct input offering 5W output
- High speed scanning
- Alphanumeric display
- CTCSS encode as standard
- Dual watch
- Four levels of power output
- Super loud audio

RRP: £269.
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The smallest twin band mobile offeri output in the world. Despite the incr size, Yaesu went one step further and you a remote head option! (At this st really felt they were just showing off performance is not compromised in and this is a product we can thoroug recommend.

RRP £474 ML&S £299
and we will throw in a FREE YSK-9 remote lead (whilst stocks last) or N deposit & 12 x £27.69 p/m

Yaesu FT-1000MPmkV

A big thank you to all the CDXC members who purchased their new mkV from me at the recently sponsored Yaesu & ML&S HF Iota Convention. This fabulous new product is now available from stock (albeit in limited numbers). If you would seriously consider investing in yet another milestone from Yaesu then call your favourite dealer today. The one who really understands your H.F. requirements.

RRP £2799. or £299 deposit and 36 payments of £92.92 per month.

KENWOOD TS 2000 all-band, all-mode transceiver

Kenwood has developed an All-band, All-mode Transceiver that features a smart metallic-grey design with large LCD and represents a breakthrough in HF performance. It creates an immediate impression of being sophisticated, solidly reliable and superbly suited for the new millennium.

This one transceiver covers the HF/50MHz/144MHz/ 440MHz/1200MHz bands (SSB, CW, FSK, FM and AM modes), with output of up to 100 watts (440MHz: 50 watts, 1200MHz: 10 watts). Since it is equipped with independent 144/440MHz sub-band reception (AM/FM modes only), simultaneous reception on two bands is possible!

The transceiver is equipped with an IF DSP for main-band use (AF DSP for sub-bands). TS 870 technology has thus been adopted for all-mode applications - VHF and UHF as well as HF.

Packet cluster information, so vital for HF operations, can be displayed on the LCD. Moreover, this data can be used for automatic tuning, though it is not possible to connect with a node station using the internal modem.

The new TS-2000 will be available from ML&S, the largest retailer of Kenwood in the UK.

RRP: £1999
or without 23cm option: £1699

TS-2000 *'The Millennium Communicator'*

● **TEL: 0208 566 1120** ● **FAX: 0208 566 1207** ● **Web site: hamradio.co.uk** ● **e-mail: sales@MLandS.**

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Remember! All equipment sold by ML&S is BRAND NEW, not dog-eared, shop soiled, opened, ex-demo, unwanted gift or returns. So there! Full UK manufacturers warranty with all items sold. OPEN SIX

Specials

Yaesu FT-817
5-Watt Transportable Transceiver

HF ♦ 6m ♦ VHF ♦ UHF

TX Frequency:	160-10m, 6m, 2m and 70cms
RX Frequency:	100kHz-56MHz, 76-154MHz, 420-470MHz (Exact frequency range may be slightly different)
Power Output:	5 Watts SSB/CW/FM with 13.8V External DC: 1.5W AM Carrier 2.5 watts SSB/CW/FM with 9.6V NiCad or 8 "AA" batteries (AM: 0.7W)
Operating Modes:	USB, LSB, CW, AM, FM, W-FM, Digital (AFSK), Packet (1200/9600 FM)
Digital Modes:	RTTY, PSK31-U, PSK31-L & user defined USB/LSB (SSTV, PACTOR etc).
Case Size:	5.31"x1.5"x6.5" (WHD)
Weight:	2.6lb (with alkaline batteries, aerial but without microphone).

Estimated RRP:
A Staggering **£799**

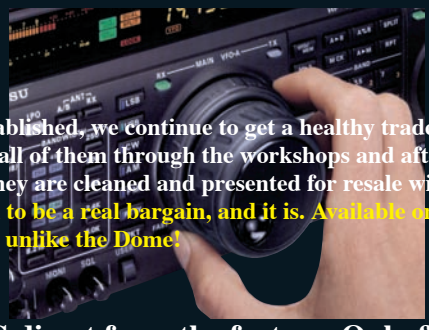
Yaesu VR-500

Whilst this tiny product is a scanner, its so good we thought it suitable to offer as a pocket receiver for use by Radio Amateurs. The added bonus is that itís so small you really can sneak it on holiday with you without the beloved noticing!

- 100kHz-1299.99995MHz
- Modes NFM,WFM,AM,USB,LSB,CW
- Direct keypad entry
- High Output speaker
- Real-Time band scope
- 1000 memories
- Dual watch

RRP £299
ML&S ONLY £199
(WHILST STOCKS LAST)

Yaesu FT-1000MP/AC only £1399 !!



With the FT-1000MPmkV now firmly established, we continue to get a healthy trade in quantity of used 'original' FT-1000MP/AC's. We put all of them through the workshops and after a thorough test (and realignment where necessary), they are cleaned and presented for resale with a proper warranty. At only £1399, this may be seen to be a real bargain, and it is. Available on FREE FINANCE just adds a sparkle to the deal, unlike the Dome!

Stop Press!

Last remaining FT-1000MP/AC direct from the factory. Only £1799 and a GUARANTEED minimum £100 trade-in value of any piece of HF Ham Gear! CALL THE SALES DESK FOR DETAILS.

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Yaesu VX-5R Only £269 including Lithium Ion 5W battery & charger.

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Yaesu VR-5000 New Base all mode scanner from Yaesu. RRP of £799.

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Kenwood TS-570DGE Only £825 or £25 deposit and 48 x £24.34 p/m

Kenwood TS-870S Only £1399 or £100 deposit & 48 x £39.52 p/m

Icom IC-756PRO Now the price of the FT 1000MPmkV has been confirmed, (£2799) the IC-756Pro is looking like a complete bargain! Only £1949 or NO DEPOSIT & 36 x £72.44 p/m.

Icom IC-2800H The only Dual Band Mobile on the market with Colour TFT display & proper 12.5kHz operation. Only £339 or £39 Deposit and 24 x £15.27 p/m.

Icom IC-706mk11G
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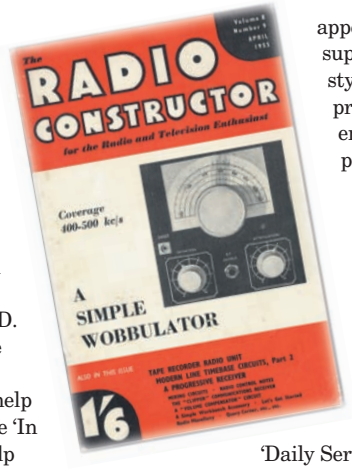
'IN YOUR WORKSHOP'

Mike Mills G3TEV reminds us of the 'In Your Workshop' series in the now closed *Radio Constructor* magazine and the characters 'Dick & Smithy' who were created by the late J.R. 'Taff' Davies. And it seems that the Royal Air Force played its part by providing the original workshop!

The long running and very popular series of 'In Your Workshop' in the now closed *Radio Constructor* magazine may seem a strange subject for an article in *Practical Wireless!* However, I ask you to read on and you'll realise just how important the articles were for many radio enthusiasts.

This article really started when I read an 'Editorial Comment' under a letter on the 'Letters' pages of *PW* by Editor G3XFD. The Editor has also commented about the old *Radio Constructor* on numerous occasions. However, when Rob asked for help in finding out more about the writer of the 'In Your Workshop' series - I knew I could help with some special background information. And even though I don't know a great deal about the enigmatic author...I could shed a little light on the subject! So, I wrote to *PW* and this article is the result!



Generation Of Amateurs

Most of my generation of Radio Amateurs at sometime or other read the *Radio Constructor*. My first copy was brought to me in early December 1950 when I was recovering from an appendicitis operation in the old Gloucester Royal Hospital.

My parents bought the *Radio Constructor* on the station bookstall in Gloucester (in those days computer magazines hadn't pushed our hobby's journals off the shelves!). The copy was Volume No. 4, Issue No. 6 dated January 1951, so it would appear that the magazine started publication about 1946/47.

In the copy of the magazine my parents bought me there appeared an article entitled 'Your Workshop' under the initials 'J. R. D'. The article was headed as follows:- "In which J.R.D. Discusses Problems and Points of Interest Connected With The Workshop Side of our hobby, based on Letters from Readers and his own experience".

Within the article the anonymous author dealt with a.c./d.c. receivers, bench electrical facilities, etc. I was immediately hooked and all the subsequent articles that appeared on a monthly basis. They were superbly written in an effective narrative style which made fascinating reading and provided technical information in an enjoyable, absorbing style of presentation.

National Service

In 1952 I joined the Royal Air Force to do my National Service. And, after training as an Air Wireless Mechanic at Yatesbury, Wiltshire in March 1953, I was posted to RAF Lyneham, also in Wiltshire.

After a couple of months on the 'Daily Servicing Squadron', I was moved to the Radio Servicing Section. There we repaired aircraft radio equipment.

● .....in this section was a Corporal, who seemed to be a law unto himself and spent most of his time repairing obscure faults on American equipment.....he also had various 'projects' on the go which had no relevance to the RAF. 'Taff' as we knew him was writing articles for the *Radio Constructor* magazine and the projects were prototypes for his designs.

In my new section was a Corporal who seemed to be a law unto himself. This 'mystery man' spent most of his time repairing obscure faults on American equipment. He must have been good at his job!

I knew the Corporal had to be good...because

● Typical issues of the *Radio Constructor* magazine. Mike Street G3TEV, along with many others, thoroughly enjoyed the 'In Your Workshop' series which were written by J. R. 'Taff' Davies. (magazines from G1TEX's collection).

anyone who has modified or repaired 'Command' sets will realise what a difficult task this was! It seemed that most American equipment did not appear to be designed for repair.

The Corporal also had various 'Projects' on the go which had no relevance to the RAF and the purpose behind the 'private jobs' left me rather puzzled. Determined to find out more, I chatted one day to a civilian who was working with us and remarked about the Corporal's activities.

I was then told that 'Taff' as we knew him, was writing articles for the *Radio Constructor*, and the 'projects' were prototypes for his designs.

Constant Companion

I remember seeing the cabinet for the 'Constant Companion' receiver, which 'Taff' described in the *Radio Constructor* during 1951, in his cupboard. He also had a thriving 'trade' in repairing radio receivers for various people on the camp (a useful supply of octal based valves were always available in the stores!).

So, this was my introduction to J.R.D., or to give him his full title J.R. Davies, the author of the 'Your Workshop' and various constructional projects. Incidentally, some of his articles appeared under names such as W.G. Morley and others.

The subterfuge in using 'pen' names was (I think) due to an embargo which was in force at that time on service personnel writing for publication without permission from the authorities. When permission was granted, vetting was undertaken to ensure that no 'State Secrets' were divulged.

I'm almost certain that J.R. Davies was an ex-Cranwell RAF apprentice from the late 1930s, who after many years service had only risen to the rank of Corporal. Although just before he left the RAF in 1954, he was at last promoted to Sergeant.

I remember the remark from 'Taff' to us at the time: "If they've only promoted me now to try and get me to sign on again, they have another thing coming as I have a good job in industry lined up with more money than they can pay me"!

Smithy & Dick

On leaving the RAF, J. R. Davies went work for one of the manufacturers of wound components. This was about the time that the 'In Your Workshop' series featuring 'Smithy & Dick' started to appear.

Reading the articles, sections of them seemed familiar. This was because some of the faults, etc., that 'Taff' described I can remember occurring on equipment at Lyneham!

The first article that I can find in my now small surviving collection of *Radio Constructor* magazines featuring 'Smithy & Dick' appeared in the April 1956 edition. An introduction stated that, "This month J.R.D. takes a back seat and as an experiment, hands over to Old Smithy, the Serviceman".

Was the April 1956 article the first of the series? Can anyone with a full set of *Radio Constructor* confirm this? If you can help please let me know.

'Taff' Davies later went to Ferguson Radio as engineer in charge of their television, component and sub-assembly factory at Enfield, in Middlesex. Again this must have been an excellent source of faults for 'Smithy' to describe and torment Dick - his young assistant with during the monthly narrative articles.

Obituary In 1981

I last saw 'Taff' at one of the old RSGB Exhibitions at the Horticultural Halls in the 1960s. From his obituary in the April 1981 edition of *Radio Constructor* it appears he died at the early age of 57, on 11th February of that year.

The talented 'Taff' Davies had eventually left Ferguson and had become a technical journalist, and was also technical editor of *Radio Constructor*. Unfortunately, the magazine did not survive the 1980s.

However, the publishers ('Data Publications') must have had a supply of 'In your Workshop' articles in stock because one appeared in the April 1981 edition, two months after 'Taff' had died. Once that had been published an era had ended.

'Taff' Davies wrote for the *Radio Constructor* for at least 30 years to my knowledge. Perhaps it was even longer...not a bad record for articles which were always of such a consistently high standard (RAF Cranwell must have been an excellent training ground).

I don't know much about the personal life of 'Taff' Davies. Was he a licensed Radio Amateur? The nickname suggests he originated from Wales...but perhaps you know? You may even know the mystery behind the anonymous initials.

Incidentally, by way of a 'tailpiece' to this article...does anyone remember the other magazine from 'Data Publications' titled *The Radio Amateur*? It was edited by the late **Arthur Gee G2UK**, was pocket size like the original *Radio Constructor*, and ceased publication sometime in the mid 1950s.

If you do know something about *The Radio Amateur* there may be another article to come! So, I look forward to hearing about your memories of *Radio Constructor* and perhaps...*The Radio Amateur* too? PW

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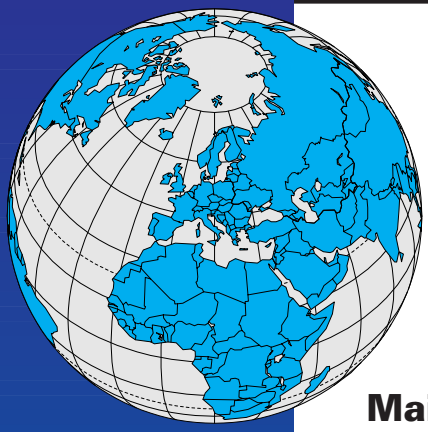

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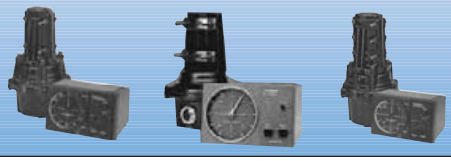

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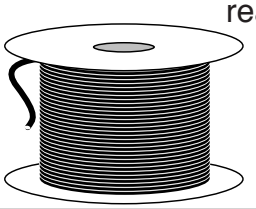

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YAESU	MD-1 DESK MICROPHONE (MINT!)	£80.00
YAESU	MD-100 DESK MICROPHONE	£70.00
YAESU	QUADRA AMPLIFIER HF/6M 1KW	£2,999.00
YAESU	SP-980 EXT SPEAKER	£75.00
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Valve & Vintage

Ben Nock G4BXD has got 'civvies' and service uniform handy behind the 'wireless shop counter' this month! Why?... Because he's looking at some test-gear used 'in the trade' and in the armed services.

A very happy New Year to you all - as this is my first time on duty in the *PW* vintage 'Wireless Shop' for 2001. I hope you had a good Christmas and are looking forward, as I am, to another good year. By way of a slight change to start the year, I'm offering a selection of vintage domestic and military test equipment this time. And to start off, I'm taking a look at the famous range of AVO products.

Many readers will be very familiar with the AVO range of test equipment and their famous Avocet bird trade mark which appeared in their adverts. This was the trade mark of the Automatic Coil Winder & Electrical Equipment Company of Douglas St., London, SW1.

Models 7 & 8

The AVO Model 7 and Model 8 general purpose test meters are extremely well known in Amateur Radio circles. Presented in robust Bakelite cases with fitted leather handles they seem almost indestructible!

Measuring a.c. and d.c. voltage and current and resistance, the Model 8 featured in the photograph, **Fig. 1**, can measure up to 10A and 2500V and down to a full scale deflection of 50 microamps and 2.5V on d.c. The a.c. ranges are similar and the resistance range can be divided or multiplied by 100 times the value shown on the standard mirror-equipped (anti-parallax) main scale.

A thermal cut-out, the small button in the centre of the lower edge, ensures the instrument is protected in the event of being mis-treated. (I have to admit that mine has popped up more than once).

Two batteries are used to power the instrument on the resistance ranges. These are carried in a small compartment at the top (inside) of the instrument, a standard 1.5V and a small 15V 'Hearing Aid' layer-type battery being used.

● Fig. 3: The French made Cimel test set (see text).

● Fig. 2: The Labgear audio frequency power meter which appears to have been offered as a kit (see text).

● Fig, 1: The AVO Model 8 test set and the R/C Bridge.

Unusual AVO

An unusual AVO model recently followed me home, as such things tend to do! My purchase was the AVO Test Bridge, also in Fig. 1, which was designed to test resistors and capacitors and determine their values.

Using the instrument unknown value resistors and capacitors can be tested via the internal system or an external reference standard (a component of known value) can be used. The instrument will test capacitors between five picofarads (pF) and 50 microfarads (μF) and resistances between five ohms (Ω) and 50MΩ.

The set can also be used as a simple a.c. voltmeter for voltages up to 15V at frequencies up to the medium wave (1MHz or so). Very useful.

Personally, I much prefer the analogue type of test meters over the modern digital variety. When you've got your head in a set a quick glance at the moving pointer is usually all that's needed to see if the circuit under test is 'good' or not.

The trouble with digital instruments, although they're obviously very accurate, is the need to actually 'read' the scale, rather than the more useful 'go... no-go' aspect of the moving analogue pointer.

For many years AVO were 'very big' in producing valve testers as well. There are various models of

tester, large and small, but all bear the very familiar styling that was AVO.

Labgear Test-Meter

I was already familiar with the range of receivers and transmitters that the Labgear Company of Cambridge had produced over the years. So, I was very interested to recently find a piece of Labgear made test equipment.

The E5115 AF Power Meter, **Fig. 2**, was apparently supplied as a kit. I have the small handbook that came with the set and it details the construction very clearly. It's very similar to the Heathkit manuals, there being a small box to tick as each stage of assembly is completed.

The unit is designed to measure audio voltages in the range of 25mW to 10W in two ranges and can select between 3, 15 or 600Ω unbalanced input. The audio voltage is passed through a resistor network, rectified and then fed to a 1mA meter. An accuracy of 5% is quoted for the instrument and I'll certainly find it very useful in receiver alignment in the future.

French Connection

Another recent rally find was a French made test meter, the Primacontrole 374, **Fig. 3**, made by the Cimel Company of Paris, France (to distinguish the 'connection' from the Paris in Texas, USA).

The 374 is a 2500 ohms-per-volt test set which will measure voltage, current, resistance and capacitance. Though my French is very rusty (or rouille!) it seems the unit will measure up to 750V, 15A and capacitance from 3pF to 50µF.

Although the 374 looks like a very nice instrument, it does lack the style and sophistication of the AVO range. I will of course be using it to align my French (the one with the resident rodent) Police transmitter that I detailed in my last column.

● Fig. 4: The military test oscillator - whose 'insides' Ben has wisely decided not to investigate further! (see text).

Military Item

At last, an item of militaria - in the form of a crystal calibrator, **Fig. 4**. I was beginning to get worried but I managed to squeeze in bit of 'green kit to justify wearing the uniform here under the 'counter'.

The calibrator, a Test Oscillator Type 17142, seems to have been used for the military airband and similar purposes. The two switches on the unit allow a range of frequencies to be generated between 109 and 396MHz.

As seen on my spectrum analyser, the output from the 17142 offers a range of pips across its range. Helpfully, it provides a spot frequency at 145.8MHz...ideal for testing 144MHz equipment.

The unit is powered from an external 28V supply. A BNC output socket is used and the whole unit is very lightweight but robust. I did have a quick look inside...but quickly closed it up again when it revealed a complicated looking set of circuit boards inside. (I think I'll leave well alone).

● Fig. 5: The unknown 'Indicator Unit'. Can you help G4BXD to find out what it was originally...before being brutally modified? (See text).

Identifying An Indicator

I'd like to ask for help in identifying an Indicator Unit, shown in **Fig. 5**. I believe it to be a Second World War surplus unit and either a radar or navigation instrument. Unfortunately it has been 'got at' by the 'modify-anythingus' animal and seems to have been converted into an oscilloscope.

I would like to restore it to something near its original form, even if from just an external appearance so any information would be a great help. I will of course bring you pictures of the restored item.

Identifying The R3090

Regarding my mention of the R3090 set from my last column, I received a couple of messages about it. From **'Davey' Davey-Thomas G3AGA** came an E-mail: "I fitted and serviced quite a few of these things about 60 years ago. I always understood that the 'R' instead of 'TR' was a security measure to disguise the function of the device, as was the detonator which fitted into a rectangular slot beneath the tuned circuits. The rest of the set-up comprised a Control Box and an inertia switch which fired the detonator in the event of a crash landing, in fact any good thump would send it off"!

Another letter came from **John Heys G3BDQ** (*PW*'s regular 'Antenna Workshop' author), who said similar things including comments about the colour of the set, a point Davey G3AGA also made. Both feel the RAF sets were Grey, rather than Blue.

The two R3090 sets I have are a light blue, I guess nearly grey...but I do see blue there. Both sets have Air Ministry (AM) plates on them and other AM plated sets I have and have seen are also a light blue? So, does anyone have a definitive explanation ?

Well that's all I have space for now so best regards and as always I can be contacted at: **62 Cobden St, Kidderminster, Worcestershire DY11 6RP**, (s.a.e. for replies please) or via e-mail at **g4bxd@qsl.net** and you're welcome to look at my web pages via **www.qsl.net/g4bxd** too. Cheerio for now. *PW*

Antenna Workshop

GONE FISHIN' - FOR DX!

Everyone in the *PW* office was surprised at the sign on Rob Mannion G3XFD's office door which said 'Gone Fishing'. However, it turns out he was 'fishing for DX' with a telescopic fibreglass fishing-rod rather than trawling for his tea!

I received an extra - very welcome - birthday present this year from **Robin Sykes G3NFV of Sycom**. Robin sent me one of the lightweight fibreglass extending 'fishing rod' type of mast which he imports from Germany. These beautifully made telescopic units extend out to 10 metres and are ideal for extremely lightweight portable Amateur Radio antenna use.

Incidentally, Robin knew it was my birthday because we share 2 October together! Next year I'm hoping that we might even find time to treat ourselves (and our respective wives) to a meal together where I'll 'pick up the tab' to say thank you for the portable antenna which has proved so much fun to use.

Incredibly Lightweight

To say that the Funktechnik Fibreglass (referred to as the FTF from here onwards) mast base is lightweight **is truly an understatement**. Weighting in at only 1.58kg (3.5lbs on my bathroom scales) - complete in a neat black cloth carrying 'stocking' it's incredibly easy to handle even when it's extended out to its full length of 10m (32.8ft).

I use the mast base in conjunction with the *PW* 'Tenna Tourer' drive-on base system made by Tennamast, and I've photographed the two together in **Fig. 1**. It's just as though the two were made for each other because the FTF mast fits neatly into the main *PW* 'Tenna-Tourer' base bracket.

Although I don't really need to remind readers about the terrible weather conditions we've had this Autumn, I will because the FTF mast has proved itself in some really unpleasant weather and extremely strong winds. And in fact the heading photograph was taken during a very unpleasant stormy Sunday afternoon with a good steady Force 4 wind blowing all the time, with occasional gusts of up to and over Force 6.

At this point I thought it might be a good idea show readers the very simple system I've had made up for my portable operating. The photograph, Fig. 2, shows what my carpenter friend **Mark Taylor** made up for me.

The 'Taylor Tray' is very simple indeed. Mark provided 'bump and scratch' protection on the plywood board by using water pipe foam insulation covering - simply applied and fixed to the wood edges. In practice the whole system works beautifully and even with the limited grip and lifting capability of my arthritic left arm the lightness of the unit - equipped with transceiver and a.t.u. - enables me to set it up very quickly.

Average time for me to place the board, connect the power leads directly to the battery via very strong 'Alligator' clips, and lay out the radial 'earth' wire is five minutes. Erecting the FTF antenna is just as simple.

● 'Gone Fishing' - for DX. Rob G3XFD's portable set-up ready for action at Holt Heath in Dorset using the Funktechnik fibreglass (FTF) 10m portable mast during a very overcast day.

Up & Away!

On arrival at my favourite 'portable' h.f. site at Holt Heath in Dorset, (It's not so good for v.h.f., although I get a clear 'take off' over the South Western approaches to the Solent towards France) I drive the car onto my *PW* 'Tenna-Tourer' mast base. Once this is done I can extend and install the mast itself.

The photograph, **Fig. 3**, shows the FTF mast fully extended and mounted in the Tenna-Tourer mast base. The outside diameter of the lowest tube on the mast fits very well inside the top clamp of the Tenna-Tourer. When it's fully clamped by the bolted assembly I don't bother to secure the bottom of the FTF mast (it's too large to fit into the swivel mount).

Even in strong winds I found it was quite safe mounted with the single clamp. However, in really strong winds I would take the system down as the very flexible top sections would bend very dramatically!

Most people would probably be able to extend the telescopic mast while holding it upright. I can't! - concentrating on staying upright myself is difficult enough - so I adopt another method.

My technique is to lay the FTF mast on the ground and extend each section fully - tightening it (by pulling it out to the farthest extent possible) until the mast is out to 10 metres. The supplied instructions advise you to 'pull and twist' each section as it 'locks' in the extended position. Well, my worn out left hand can't manage that - but in practice I've found that using my own technique works very well indeed.

● Fig. 1: An ideal partnership - the Funktechnik 10m telescopic mast shown packed into its integral carrying tube (which also forms the base of the mast) and the *PW* 'Tenna-Tourer drive-on mast base (see text).

Once the mast is fully extended on the ground I attach a prepared length of plastic coated multi strand wire (the type which, in various sizes in found in 'mains flex') to the top thinnest section. This is done with a plastic pot-plant label which has been pre-drilled with a hole just large enough to fit the tapering top section.

The label is fitted so that the first section 'spears' it and the taper stops it from working its way down the mast when it's erected. Then before I finally erect the mast assembly I rotate it on the ground so as to create a spiral of wire (approximately 12 turns is adequate) ...once this is done I can - even in a very stiff breeze) place the assembly to the vertical position and lock it in place. Approximate assembly time is around five minutes.

Wet & Dry

In the 'wet' - as our Australian friends term the rain - the system as I choose to use it, works very well indeed. However, several precautions have to be taken (ignore them at your peril!).

Firstly, bear in mind that water will penetrate into the mast through minute gaps. Tough it may be - but it's not designed to be waterproof. Finally on this point, be ready to dodge the water as you collapse the mast after use: I recommend that it be packed away using the reverse of my own adopted erecting method, so that any water can be released as you telescope the section into the 'packed' state.

Make sure all the water is drained - otherwise when stored it can become quite smelly. It's best to leave the mast, with base end at the top and the other - telescoping end - placed onto a sheet of absorbent paper. (Careful you don't spear your foot with the final top section!). After a day or so in the shack the mast will be dry enough inside to replace the top carrying 'bung' with little risk of unwarranted mouldy water odours* **(see note at end of the section).**

The next precaution is one which you'll understand if you've walked by a yacht club's storage pound on a windy day. If you have, no doubt you'll remember the slapping noise made by the sail rigging halyards as they blow in the wind? A simple piece of tape - to secure the wire spiral - cures this problem. (You may just be able to spot it in place in Fig. 3, although the wire is invisible).

***Important Note:** Personally, I do not recommend this mast for semi-permanent erection. There's a real possibility of the build-up of water inside the tubing actually freezing in some conditions, causing the hollow sections to split, causing permanent damage.

Additionally, if water does build up inside the tubing the mast could become quite weighty. How it would load up I don't know! My recommendations are that (if it's to be left for a week or so on a DXpedition or something similar - that self-amalgamating tape be wound at the junction of each section. This precludes vertical assembly, but in the long run it's cheaper than having to buy another mast!

On The Air

Once on the air with this system I immediately realised that it was far more effective than the best mobile whip antenna. Forgive the pun - but its also very much more flexible because it's not necessary to get out of the car to change bands.

● Fig. 2: Nothing better than to be inside the car on a windy, rainy day! The photograph shows the portable equipment board made for G3XFD by a carpenter friend. It's arranged to sit snugly over the rim of the steering wheel of the car, with a manual a.t.u. and the transceiver secured in place with 'bungey' rubber straps with hooks. A variety of transceivers can be accommodated and the Morse key has a small 'table' of its own, conveniently positioned above the vehicle hand-brake lever. The system's radial 'earth' - approximately 40 metres long - is shown leading out of the window (Rob now runs it of the passenger lower door sill). Antenna connection is made through the roof rack mounted mobile antenna base mounting, fed by coaxial cable.

Obviously, as the wire system - including the lead-in to the equipment - is probably well over a quarter wavelength on 7MHz (taking into account the extra wire taken up by the spiral on the mast), the system works exceedingly well on this band. My received signal reports have always been at least one S-point above that given for my 7MHz Pro-Am antennas and despite the fact I expected reports from G/GW/GM and EI to be somewhat lower (because the system favours longer distance contacts because it's a vertical antenna) this does not happen in practice.

The better performance (as an inter G/EI system) I assume is perhaps due to the horizontal section of wire leading to the rear of my car. From there it's fed to the a.t.u. onto the operating board above the driving seat. Using the a.t.u. to advantage and employing the long radial system I've adopted - the system also works well on 3.5MHz. During the deepest winter I'm also considering 'loading' the vertical section with a coil for 1.8MHz use and I'll let you all know how I get on!

On both 14 and 18MHz the system works very well indeed and I find that working DX becomes exceptionally easy. In fact, American stations I work - they're often using 400W and more - have difficulty believing I'm only using 25W of s.s.b. Using c.w. has become much more of a joy because the more potent signal raises (with the help of the sea pathway which, although more than 16km away, is clearly visible from the site) much more distant signals.

Encouraged by the much stronger International Beacon Project (IBP) transmissions on 18.110 and 21.500MHz I really got down to work on one wet Sunday afternoon. I soon worked half a dozen PY stations and receive 5&9 reports, but although elated with the ease of these contacts I was soon to be surprised by 21MHz results -a band I've neglected in recent years.

The system as I use it works superbly on 21MHz. It's so effective that I'm often now resorting to erecting it for that purpose at my (temporary) bungalow home. With the simple vertical wires described previously, I've had hour long QSOs with Eastern Canadians, along with long conversations with stations on the Pacific Coast. Very enjoyable indeed!

Really Portable

Describing my success and enjoyment in the office one morning, Kevin Nice G7TZC (Editor of *Short Wave Magazine*) picked up the FTF mast and remarked on how lightweight it was. "Ideal for

real portable operating - on a mountainside" said Kevin, noting that it would be perfect for a 'backpacker'.

I agree with Kevin - the FTF mast is a truly lightweight winner. I'm tempted to try operating from the *PW* office window - poking it out of the window too!

The uses are limited only by imagination. I wonder how long it will be before I work someone using two FTF systems as a rotary dipole antenna? I've been reliably informed that one Aberdeenshire Amateur uses two FTF masts (erected to 25ft or so) to support a lightweight G5RV antenna - so my imagination is busy already. I look forward to working you on my new FTF system.

Further information on the Funktechnik Fibreglass mast system is available form Robin Sykes G3NFV, at **Sycom, PO Box 148, Leatherhead, Surrey KT22 9YW. Tel: (01372) 372587, FAX: (01372) 361421. E-mail: robin@syscomcomp.co.uk. Website: www.sycomcomp.co.uk**

Usual retail price for the FTF mast is **£61.95 plus £5 P&P**. However, Robin says that for *PW* readers they are available for **£57 plus £5 P&P** (at cost).

PW

● Fig. 3: Between heavy rains squalls the wind gusted up to Force 5 and above at G3XFD's portable working site. In this photograph the FTF mast can be seen bending slightly during a steady Force 4 (retired Royal Navy man's Beaufort Scale estimate!).

One Radio Amateur's National Service

Graeme Wormald G3GGL describes his remarkable (and exceptional?) National Service days. His 'Call up' meant an exciting time on the radio, along with other adventures for Graeme...including learning to fly jets while 'under age'!

During the decade following the Second World War, not only did all British Radio Amateurs have to pass the Morse test, they weren't allowed to use radio-telephone for the first 12 months. And if they didn't get plenty of on-air Morse experience, the Post Office (then the licensing authority) wouldn't **ever** let them use 'phone! Yes, times were tough for the new Amateur on the block.

I used to rush home from school, **Fig. 1**, hurry my homework, swallow my tea, and get on the 'key'. I was fearful lest the Postmaster General refused me a 'phone endorsement on my first anniversary. But fate intervened, as it did for most young men in those days!

Fig. 1: Graeme G3GGL would rush home from school, hurry his homework, swallow tea, and get on the key. He was fearful lest the Postmaster General refused a 'phone endorsement on the first anniversary of his licence. But fate intervened, as it did for most young men in those days!

Six months after getting my 'ticket' I left school and the dreaded 'Call-up' papers arrived. 'Report to RAF Padgate at 1100 hours on 9 October 1950'. That gave me three months to bump up my log and build a modulator for the home-brew transmitter that held pride of place in my bedroom.

Actually, the 'Call-up' wasn't too dreaded because in those days you were brought up to expect it. I was a member of the Combined Cadet Force (CCF) at school, both Signals and RAF Sections, **Fig. 2** and **3**.

The CCF catered for my twin passions of wireless and aeroplanes. I was hoping to put my new-found radio skills to work in the service of the nation...but fate intervened again!

Korean War

The Korean War had broken out a few weeks earlier. The Government had an attack of the jitters, could it be the start of World War Three?

Although conscription had continued after the war (unique in peace-time Britain), the flying branch of the RAF had been run-down. Few aircrew had been trained since 1944, when the Air Force had numbered over a million men and women.

So, in 1950 National Service was extended and pilot training increased tenfold. In 1951 I found myself at RAF Dalcross, Inverness, learning to fly Airspeed Oxfords, **Fig. 4**, which had been in mothballs since 1945.

In the meantime, the Post Office Inspector had visited my home, inspected the log, checked the rig and pronounced me 'fit for 'phone'. So there I was, fully qualified and 500km from my shack...what a disaster!

Fig. 2: Actually, the 'Call-up' wasn't too dreaded because in those days you were brought up to expect it. Graeme says "I was a member of the Combined Cadet Force (CCF) at school".

Three Classes

In those days there were three classes of licence: 10, 25 and 150W - "...total d.c. power input to the anode circuit of the valve or valves energising the aerial...". The fees were £1, £1.50 and £2 respectively.

To put the licence fee in perspective: A copy of *Practical Wireless* cost a shilling (5p) in 1950. That made a 150W licence the equivalent of £88 in today's money!

As an impecunious schoolboy I held a 10W licence but that didn't mean I could put the rig in a suitcase. The whole outfit weighed over 50kg and was about 1.5m high.

So, a crash programme was initiated to produce a 'portable station' on my next long weekend. This took the form of a self-contained 3.5MHz 'phone/c.w. transmitter.

A variable frequency oscillator (v.f.o.) drove straight into the power amplifier (p.a.), an 807 (what else?). Bad practice, but it worked!

A speech amplifier drove a 6L6G beam power tetrode to provide modulation. The whole lot, with power pack, was wedged into a case about 300 x 250 x 200mm.

The receiver was an American BC454. This was known as a 'Command Receiver' and was fitted into the USAF Flying Fortresses for use by the pilot before the days of v.h.f. R/T.

The receiver was very small and used six compact metal-bodied octal valves. All this gear together with a Class 'D' wavemeter to fulfil licensing requirements was packed and sent North.

Treated As Gentlemen

At Dalcross, we were a group of 48 National Servicemen, classed as cadets and treated as gentlemen! Our pay was sufficient to buy 20 cigarettes a day and that was it. Few of us smoked!

Dalcross had been a Second World War Coastal Command Station and in 1951 had just re-opened as a flying school. Ours was the first training school. It was also in use by British European Airways (BEA) as a staging post for the daily 'Highlands and Islands' Dakota and nowadays it's the busy Inverness Airport.

In 1951 the camp was entirely 'hutted' and each of us had a room about 5 by 3m, eight rooms to a

Fig. 3: Graeme says that at school: "The CCF catered for my twin passions of wireless and aeroplanes".

Fig. 4: Once he had been called up for National Service Graeme says: "In 1951 I found myself at RAF Dalcross, Inverness, learning to fly Airspeed Oxfords, which had been in mothballs since 1945".

Fig. 5: Student Pilot Graeme GM3GGL in his shack (actually his bedroom) at RAF Dalcross, Inverness-Shire. It was a room which "was never, ever, inspected by the RAF"!

Fig. 6: Qualifying as a pilot Graeme G3GGL went on to fly twin engined jets but his Amateur Radio Licence was still issued to his Father because hew was still a 'Minor' in the eyes of the law!

hut. Each room had a bed, wardrobe, drawers, chair, table and a pot-bellied stove. **And it was never, ever inspected by anybody**.

We could do exactly as we wished. **My neighbour kept a Vincent HRD motorbike in his room!**

So, as soon as possible, I made a survey...airfield camps are remarkable spacious. After an hour's search I struck lucky. A scrap-heap containing miles of old wiring and conduit. Ideal antenna material!

A selection was spirited back to the huts and work started on an 3.5MHz dipole. It was spring and I didn't need the stove, so the feeder went down the chimney.

The transmitter ran 8W input to the ubiquitous 807, so I suppose about 4W of carrier reached the antenna. Results were disappointing. Nobody came back to my calls.

However, after half an hour's frustration there came a knock at the door. A flight sergeant stood there (sound of knocking knees). Now this was a matter of some consternation.

A flight sergeant (or 'Chiefy' as he was always known) was the nearest thing to God short of the Angel Gabriel. A breed held in great awe.

The voice boomed: "I say, are you G3GGL? I'm Eric GM3EKT, I'm one of the instructors here"...Well, what would you say? ("How are you?...Do come in..." of course!).

Trawling The Bands

It seems that Eric had been trawling the bands and his head was almost 'blown off' by yours truly calling CQ. But he could hear stations replying...and I was ignoring them!

"You're not using that BC454 are you"?'...he asked, glancing at the table...."'The most insensitive device created by man"!

To cut a long story short Eric kindly offered to lend me his BC342 for the next six months. The BC342 was the US Army's ground version of the famous BC348 airborne communications

receiver. Would I like it? I'll say I would! (And did!).

An hour later the BC342 was installed in the new shack, you can see it on the left in the photo, **Fig. 5**, with the diminutive BC454 beside it and the 3.5MHz transmitter beside that. From then on I never looked back.

I worked all over Scotland, as the QSL cards shown **Figs. 6** (my Scottish station's QSL card) and **7** indicate, and into the north of England, about 400km, with that 4W and a dipole which, if the truth were told, never reached higher than 6m and probably dropped to 4m at the ends.

After a few days, the resident living under one leg of my dipole came to my door. He complained that my voice was appearing on the dial of his portable radio. Not on any other station, mind you, just between the Scottish 'Home Service' and the 'Light Programme'!

A little counting on the fingers identified the problem. The second harmonic of his local oscillator was beating with my carrier to produce his intermediate frequency (i.f.) of 465kHz I declined to take the blame. Superhets have a lot to answer for!

Reaching Further

After a few weeks the urge to reach further afield took root. The BC342 brought in tantalising DX on 14MHz, but transmitter I had none. They say that necessity is the mother of invention and it certainly was in that northern clime!

If you look at the photograph of the shack, Fig. 5, you will see hanging on the wall what looks like a stripped-down chassis. **It was a stripped-down chassis**, from an Identification Friend or Foe (IFF) radar transponder set, those utterly useless pieces of surplus sold in vast quantities.

Well, in my case the IFF finally did something useful. On it I mounted a 6L6 power oscillator and, using my one and only 3.5MHz crystal, with the anode tuned to the fourth harmonic on 14MHz.

An umbilical cord weaved down towards the 3.5MHz transmitter where it terminated in an American 5-pin valve base. The 807 was removed and the base plugged in. Power and modulation could then be fed to the 6L6.

Another foray to the scrap yard and a new dipole appeared over the hut. A new feeder snaked its way down the chimney. I worked my first American and I think the best DX was French Morocco, but it could have been the moon!

Fig. 7: The QSL card used by G3GLL during his time at RAF Dalcross (now Inverness Airport) during the early 1950s.

Fig. 8: Once Graeme GM3GGL had a BC342, kindly loaned by Eric GM3EKT who was aso based at RAF Dalcross, he could hear 'G' stations and work them!

Fig. 9: Success brought the DX bug for GM3GGL and following modifications to his simple 'home-brewed' transmitter - the evidence of his 14MHz QSOs started rolling in!

Granted Commission

Later on, during National Service I was granted the King's Commission. I was put in charge of a five-ton, 14,000 horse power, 600mph twin-engined jet fighter armed with four 20mm cannon.

However, The Post Office wouldn't let me hold an Amateur Radio Licence in my own name. It had to be held by my father on my behalf because I was still a 'minor' in the eyes of the law! *PW*

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

I've mentioned previously that my favourite propagation mode is auroral backscatter, especially on the 144MHz band. One unique feature of this type of event is that the Sun always gives sufficient warning that something is **possibly** going to happen. This is because during a coronal mass ejection (c.m.e.) from the surface of the Sun a number of phases occur.

Initially, there is a rapid rise in the level of electromagnetic emissions at all frequencies. This radiation includes radio frequencies, ultra-violet, X-rays and cosmic rays.

At the same time a large amount of very high-energy particles, mainly protons, are ejected. A few minutes later there are emissions of low-energy particles.

The first effect to reach Earth is the electromagnetic radiation that arrives just over eight minutes after the c.m.e. commences. The X-ray radiation can cause a rapid increase in the level of ionisation, particularly in the D-layer.

If the level is sufficiently large a black-out (sometimes called a Dellinger) of the short wave bands occurs with no h.f. signals being heard at all. At the same time strong bursts of noise can be heard on the v.h.f. bands when beaming towards the Sun.

A few hours later the high-energy particles impact the Earth. These particles move to the poles and enter at these points causing a very large increase in the level of polar D-layer ionisation.

The increase is termed polar cap absorption (p.c.a.) and has the effect of blocking out h.f. communications in and over the polar regions. It's the effects of the low-energy particles that give rise to geomagnetic storms and auroral back-scatter propagation. These reach Earth some 24 to 48 hours after the initial c.m.e. event.

So, by monitoring and detecting these effects it's possible to have one or two days warning of an auroral event. I say 'possible' because **you can never be absolutely sure** that the low-energy particles will be on a trajectory which intersects with the Earth or whether their magnetic polarity is of the correct alignment.

MONITORING THE BANDS

In addition to monitoring the bands for signs of impending auroral activity I also make use of propagation beacons, packet radio, DX Clusters and the Internet. And on this subject **Stephan DK8LV** recently announced a significant upgrade to the **DK0WCY** propagation beacon. It now incorporates automatic aurora detection using a Linux PC and a special program written by a student at the University of Marburg. The program is based on the ability of soundcards (with suitable d.s.p. software) to decode c.w. signals on the 144MHz band and determine if the received carrier is via aurora, tropo or just interference.

A tower at the QTH of the DK0WCY (JO44) has two stacked 11-element Yagis beaming directly north. An Icom IC-245 receiver is tuned to 144.412MHz and listens for the SK4MPI beacon (JP70). If it decides that signals are auroral then a 'flag' is sent to the main PC running the DK0WCY beacon.

The evaluation of the 'flag' is then entered into the beacon text which gets sent on 10.144MHz every few minutes. Data is also sent to the European DX Cluster network every hour and to the DB0FHF TCP/IP gateway for updating the online magnetometer data at **www.dk0wcy.de/magneto/magnet.htm** every five minutes.

Several other upgrades are planned for the next few months. These include receiver control to change frequency automatically for other beacons and rotor control to get the best beam-heading.

A new aurora program will read the signal strength of received beacons and send updates to the DX Cluster network if it detects changes greater than 2 S-points. A typical spot would be 'DX de DK0WCY: 144.412 SK4MPI Aurora S7' sent no more than three times an hour. Further details of the DK0WCY project can be found at **www.dk0wcy.de**

Many messages on the packet radio BBS system contain details of solar alerts and forecasts. These can be found under the titles 'SOLAR', 'SUN' and 'VHF'.

The Czech club station **OK0PMU** sends out five daily bulletins. These are GeoAlert (GEOA), Report of Solar Geophysical Activity (RSGA), Solar Coronal Disturbance Report (SCDR), Solar and Geophysical Activity Summary (SGAS) and the Solar Region Summary (SRS).

Neil Clarke G0CAS on behalf of the RSGB Propagation Studies Committee also sends out daily solar indices on the BBS system. The UK DX Cluster network also contains much up to date solar information. Use the command 'SH/WWV' and it will give you the last five sets of WWV data containing the solar flux index (sfi), the daily geomagnetic 'A' index, the 3-hourly 'K' index and the geomagnetic forecast. Of course you can also use the 'SH/DX' command to see what DX is being heard in your area in real time.

DAVID G4ASR HAS REPORTS OF A VERY RARE AURORAL-E OPENING INTO RUSSIA ON THE 144MHZ BAND.

The Internet offers the greatest potential with a wealth of in-depth information and data. There are many sites, so I've shown some of my favourite URLs in the table, **Fig. 1.**

You can also receive Aurora and Sporadic-E warnings via E-mail at home, at work or even on your mobile 'phone! Send an empty E-mail to **robotinfo@bigfoot.com** and the robot will send you back a message with further information.

The Web site **www.gooddx.net** will also give you details of this DX Robot. Although mainly for v.h.f. discussions the 'vhf-dx-discuss' newsgroup is also a good source of solar alerts and details of what you may have missed!

Name	URL address
Solar Terrestrial Dispatch	www.spacew.com
Space Weather Bureau	www.spaceweather.com
NOAA Solar Data	www.maj.com/sun/noaa.html
IPS Radio & Space Services	www.ips.gov.au

Fig. 1: David Butler G4ASR favourite Internet sites.

AURORAL OPENINGS

During October I recorded eight days of auroral back-scatter openings although there were probably far more if you live in latitudes higher than 54° North. In my opinion the best of these occurred at the beginning of the month on October 4 and 5.

In the first opening, between 1430-1830UTC, I made 11 leisurely c.w. contacts on the 144MHz band. Among the QSO's were the stations of OZ1DD (Denmark), YL3AG (Latvia) at 1819km and other operators in England,

Fig. 2: The 144MHz antenna array at the QTH of LA2FGA.

Scotland, Germany and the Netherlands. I even made one solitary c.w. contact on the 50MHz band just to make sure the antenna was still connected!

The event on October 5 was much better with 34 c.w. contacts being made between 1453-1711UTC. My best DX of this opening was again the station of YL3AG, only this time he called me!

Other long distance contacts included the stations of DL3DXX (1161km), DL3HRT (1042km), HB9DFG (902km), OK1VMS (1218km) and OK2AB at 1476km. All these stations incidentally were worked one after the other in a seven minute period between 1523-1530UTC. This is an example of how an additional pulse of ionisation can make all the difference as the auroral event waxes and wanes throughout the opening.

Keep an ear out for the additional pulse of ionisation and when you notice the long distance stations coming through keep plugging away because they won't be there for very long. My beam-heading at this time moved out as far as 60° whereas for most of the opening the continental stations were peaking up on a heading of around 45°. It really does pay to keep swishing the beam around!

Chris HB9DFG reports that the auroral openings on October 4-5 reached not only down to his QTH in Switzerland (47° latitude) but also into Austria (OE) and Croatia (9A). He mentions that he is now using software Version 5.0 in his Timewave DSP-599zx audio filter. The unit is now working much better in 'noise reduction' mode especially with weak auroral signals.

Chris reports that the Timewave can reduce the amount of background noise while the original auroral signal remains on top and is not reduced by the digital signal processing (DSP) algorithm. This is a problem with other DSP software as it is hard to distinguish between background noise and the white-noise of a weak auroral c.w. signal.

Next Chris remarks that it enabled him to copy signals from GM1XOI (IO85) and GM4CXM (IO75), both peaking 41A, during the event on October 4. Unfortunately the GM stations couldn't copy HB9DFG despite that station running 400W into an array of four 9-element Flexa Yagis.

However, the event on October 5 was much better and Chris was able to make c.w. contacts with GM0BQM (1157km), GM4CXM (1241km), G4ASR (IO81), DJ9YE, DK1KO and OZ1DD. Later in the month on October 14 **Reg Wooley G8VHI** (IO92) reported making three s.s.b. contacts between 1620-1750UTC with the stations of GM0HTT (IO79), GM0PWS (IO68) and GM4VVX (IO78). He also reports hearing OZ6ABA (JO57) peaking 52A on s.s.b. and the Norwegian beacon LA4VHF on 144.441MHz.

AURORAL-ES OPENING

November got off to a tremendous start with an auroral back-scatter event that turned into something very rare indeed. The opening on November 6 was first detected on the 50MHz band at 1430UTC with the station of **MM0BQI** (IO85) hearing the beacon GB3RMK via the auroral curtain.

The station of MM0BQI then went on to make contacts with the stations of LA5QFA (JO59), LA8AJA (JO57), PE9GG (JO33) and YL3AG (KO26). The 144MHz band opened up an hour or so later with stations as far south as central England making s.s.b. contacts into Germany, Denmark, Norway and Sweden. This continued to around 1830UTC before signals faded out on that band.

Stations on the 50MHz band were still being worked via aurora when at 1840UTC the Arctic station of JX7DFA (Jan Mayen Island) was heard on c.w. with 559 signals. The Morse note was T9 and heralded the start of an auroral-E (Au-Es) opening. This type of propagation is very similar to Sporadic-E (Sp-E) but instead of the ionisation originating from solar ultra-violet radiation it is caused by the incoming auroral particles.

Usually Au-Es propagation is formed from the ionisation remaining after an auroral storm and when its associated geomagnetic disturbance has subsided. The mechanism which concentrates the ions into a layer sufficiently dense to reflect v.h.f. signals is probably wind shear, the same as for summer Sp-E openings.

On the 50MHz band many stations reported working deep into Scandinavia and the Baltic States. Some of the DX worked from the UK included ES2QH (Estonia), EW6DI (Belarus), LY2MW (Lithuania), OH0KCE (Aland) and YL3AG (Latvia).

The Greenland beacon OX3SIX (50.012MHz) was also heard throughout the evening. This type of event is quite common on the 50MHz band but **very rare** on the 144MHz band. Indeed the last one I can recall was in 1989, some 11 years ago.

It therefore came as a real surprise when the 144MHz band suddenly opened up between 2010-2030UTC enabling some lucky stations to work into Russia and surrounding countries. One of those very lucky stations was Reg G8VHI who heard OH5LK (KP30) at 1900km and RW1AW (KP50) at 2130km, both stations on s.s.b. with very strong signals. At 2025UTC he cracked the pile-up and worked RZ1AWR (2080km) in Leningrad for a new country.

Reg remarks that it was not bad at all considering he was only running 25W into a pair of 14-element Yagis. The station of G4LOH fared even better by working UA1TII (KO78) at 2271km on c.w. and RA3AET (KO85) on s.s.b. over a distance of 2460km. Congratulations to all stations who participated in this event.

DEADLINES

That's it again for another month. Don't forget to keep beaming North for the auroral openings, East for propagation to VK on the 50MHz band, South for t.e.p. into Africa, West via F2 propagation to North America and upwards for the successfully launched AO-40 (P3D) satellite!

Remember to forward any news, views, comments or photographs to the address and by the date given at the top of the column. Thanks for your letters and good luck with the DX. See you again next month.

73 David G4ASR

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

Among all the letters that have arrived here this month is one from **Rees Adams**. It says "Just a note to let you and all *PW* readers know that I have just arrived here in the Falkland Islands. I will be operating as **VP8DCD** on all bands once my 1.8 and 3.5MHz antennas are installed. Most of my operating will be from the club shack at Mount Pleasant. However, I do plan to operate both portable and mobile occasionally. Listen out for me until mid March".

Many thanks for the information Rees, I am sure that many of our readers will be looking out for you on the bands. If you are lucky to catch Rees and want a QSL card, you can send the request direct to: **Falkland Islands Radio, PO Box 260, Mount Pleasant Airport, Falkland Islands** or to his father **G0JLE** in the UK.

DX NEWS

Martin VE3MR will be in Aruba until April. He will be operating as **P49MR** and run 500W to a 5-element yagi. QSL via VE3MR.

Bert WA1O will be operating from Antarctica as **KC4/WA1O.** Bert is a member of the International Antarctic Scientific Expedition and will be there until 15 January. You can QSL via KA1CRP. Also in Antarctica is Gennaddy who will use the call **R1ANP** operating from the Russian base 'Progress' on 14160kHz between 1500 and 1800UTC.

YOUR REPORTS

I am pleased to start off the New Year by welcoming several new reporters to the column. First off is **William Sampson M5WNS** who lives in Chudleigh, South Devon.

Using his Icom IC-706, MFJ-948 tuner, 100W of s.s.b. and an inverted G5RV William worked OT0C (Belgium) at 1454UTC on 1.8MHz. A little earlier on 3.5MHz, V26B (Antigua & Barbuda) made it into his log at 0635UTC.

Also 'listening' on 3.5MHz was **Leighton Smart GW0LBI** from Trelewis, Mid-Glamorgan. Using his Sangean ATS-909 receiver and 70m long wire antenna, Leighton heard ZL4AP (New Zealand) working G4XPH at 0649 and later, VE1ZZ (Canada) working EI6S (Ireland) at 2302 and V47KP (St. Kitts) working LA5QFA (Norway) at 2330UTC.

THE 7 & 14MHZ BANDS

On now to **Ted Trowell G2HKU** on the Isle of Sheppy , Kent who has found the bands 'variable' when he has been able to operate with his Ten-Tec OMNI 5 and G5RV antenna. Ted's 7MHz log lists contacts with JW/DJ3KR (Svalbard) and J3/N2GA (Grenada) both at 2100UTC.

Also active on 7MHz was William M5WNS who caught FS/K4ZA (St. Martins) at 0659UTC again using s.s.b.

All of our reporters found the 14MHz band conditions very mixed this month. **Robin Trebilcock GW3ZCF** in Bishopston, West Glamorgan, worked 7X4MD (Algeria), FJ/AA6YQ (St. Martin), 4Z5AV (Israel), VU2SJC (India) and ZD7JC (St. Helena) using PSK31 between 1950 ant 2130UTC. Robin made two s.s.b. contacts with V26B (Antigua) and P3A (Cyprus) at 2000UTC.

Meanwhile the c.w. of Ted G2HKU found V51AS (Namibia) calling 'CQ' with few replies at 2000 and TF3CW (Iceland) at 2100UTC

THE 18 & 21MHZ BANDS

Don McLean G3NOF in Yeovil, Somerset, has been 'Off the air' for a few weeks with a transceiver problem and has managed just a few short operating periods. His 18MHz s.s.b. log includes A92GE (Bahrain), GJ4RAX (Jersey), HL2DNN (South Korea), VQ9GB (Chagos) and 9V1JA (Singapore) all contacts made between 0830 and 2000UTC. I hope the rig is fixed soon Don!

The IC-746 and inverted 'V' antenna are working well for **Sean Gilbert G4UCJ** who was busy again this month. Sean used c.w. to work EP2MKO (Iran) at 1555 followed later by PJ7/K7ZUM (Netherlands Antilles) at 2108UTC. On 21MHz countries worked include KP2/NU0Q (U.S. Virgin Islands) 1137, YV7QP (Venezuela) 1920 and one s.s.b. contact with OD5/OK1MU (Lebanon) at 1501UTC.

The 24MHz band provided some nice DX with OX3FV (Greenland) 1305, D44CF (Cape Verde) 1524 and D2BB (Angola) all making the log. These contacts were made using a Butternut HF6 vertical and c.w.

THE 28MHZ BAND

The 28MHz band was where nearly all of our reporters spent most of their operating time this month including the second of our new reporters **Andreas Hagland G0MSA** in Heathfield, East Sussex who enjoyed himself in the CQ World Wide SSB Contest. Using his Icom IC-736 and 100W into a 7l8 vertical (ex CB twig, Sigma 40) Andy worked 39 new countries on this band including V47KP (St. Kitts) 1058, VP5DK (Turks & Caicos Islands) 1316, TI5WFM (Costa Rica) 1321, 3V8BB (Tunisia) 1407 and ZS6EZ (South Africa) at 1531UTC.

Finally, on to the log of **David Hamilton M0BVE** who lives in Filey, Yorkshire. David, who is usually only active in the morning, has used a Yaesu FT-840 since passing the RAE. in summer 1998. He finds the rig 'very good' and hopes to fit a narrow c.w. filter to it shortly.

David has a Cushcraft R-7000 vertical antenna and with 100W of c.w. worked 9E1S (Ethiopia), 9J2BO (Zambia), 5V7VJ (Togo), FR5FD (Reunion Island) and JF5HVI (Japan) between 0930 and 1330UTC.

David Hamilton M0BVE has been using an FT-840 for over two years now since passing his RAE. in the summer of 1998.

QSL CORNER

There's just enough space left this month to include a short QSL list starting with CN8WW via DL6FBL, EA8BH via OH2BH, EM1KGG via UT7UA, P3A via W3HNK, R1ANF via RK1PWK, RW2F via DK4VW, T88TU via JK7TKE, TA3D via Bureau or direct to **Yasar Gocet, PO Box 963, 35214 Izmir, Turkey** and V26B via WT3Q.

SIGNING OFF

That's it for this month. Many thanks to all our reporters, both regular and new, for their valuable time and effort. Space was limited so I hope I managed to fit you all in. What about some reports from other areas of the UK such as Scotland and Northern Ireland, etc?

73, Carl GW0VSW

CARL MASON GW0VSW WISHES YOU A VERY HAPPY AND DX-FULL NEW YEAR!

KEYBOARD COMMS

BY ROGER COOKE G3LDI

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THIS MONTH ROGER COOKE G3LDI LOOKS AT POCKET PCS AND ENCOURAGES YOU TO JOIN THE BARTG ORGANISATION.

The following news and information appeared in the Autumn issue of BARTG's *Datacom* magazine. If you are into Data Communications, you should belong to the British Amateur Radio Teledata Group.

Phil Cooper GU0SUP, describes a program from **Bob Furzer, N6BFM**, the author of *LOGGER*. This one is called *ZAKANAKA*, which does a similar job to *Digipan*. *Digipan* is around 500kB whereas Zakanaka is nearly 4MB.

Digipan will happily run on a DX4/100 PC but *Zakanaka* needs at least a Pentium 200, and a minimum of 32MB RAM. That said, *Zakanaka* interfaces well with *Logger* although it can be run independently of that program. Phil seems to prefer it to *Digipan*, saying that it is 'more sensitive with weak signals'. It can be found on the Web site of N6BFM, but is at the time of writing in the Beta stage, so beware of bugs!

One very nice feature of *Zakanaka* is the ability to receive three signals simultaneously. Apart from the main TX/RX window, you can open a further two windows, where each will monitor the progress of another QSO.

The feature could be handy when, for example, you are chatting with someone, but wish to give someone else a call when they finish a QSO. With the extra window open, you simply set that up to monitor the QSO and when they finish, you can click on the signal and call them. Bob is hoping to integrate both CW and RTTY into the program eventually.

EMBARRASING SITUATION

After all my discussion about back-ups, and the several suggestions made by you, the readers, as to what system would be most desirable, I have to admit to a very embarrassing situation.

I had a very cluttered desktop, icons all over the place, lots of downloaded programs that I had tested and left on the machine, and with a 15GB hard drive, I had lots of room to abuse! I have now paid for my lack of tidiness, my lack of back-ups and I really should know better!

I suffered a major crash when my son clicked on an icon which was called 'Good'. I know this was something to do with registry files, but quite what it was for, I am not sure.

Suffice to say I lost all my application files, and had to do a complete re-install of *Windows '98*. This included my E-mails and address books, my book-marked URLs, and all my publications in *Publisher*. I also lost my files in *Excel*. To say that the air was blue is an understatement, but to no avail!

I am now making plans to back-up on a regular basis and keep my desktop clear. I guess it's better late than never, but beware! It **can** happen to you too!

POCKET PCS

Recently, **Ray Soifer W2RS**, paid me a visit and demonstrated his latest toy. It was a pocket PC, with a telephone adaptor.

One of the latest range of devices available Ray's pocket PC can be used for most PC applications. When used for word processing, it struck me that it would be very laborious to use a pencil device on the screen to seek each letter, but to ease that situation, a fold-up full size standard keyboard is available too, which folds up to about the same size as the pocket PC.

Compaq have recently brought out the Aero 8000, a sub-notebook-sized device and has had acclaim from several different sources. It runs Windows CE and as such does not rely on hard disk storage, but instead contains the core operating system and utilities on ROM, with other applications and documents stored either in battery backed-up RAM or on solid-state storage cards, making them very light.

The iPaq H3630 is the first device to use the Pocket PC version of the operating system. This has a contoured silver look and a minimalist set of control buttons, while the colour screen is a high definition 4096 colour display.

Check out Compaq's Website for details on the Aero 8000.

The front has four quickstart buttons for your favourite applications or features, a record button for the voice recorder, an on/off switch and a release button for the stylus. It's powered from an internal rechargeable cell capable of 12 hours use.

Interfacing with a PC or other devices is done either with the on-board infra-red transmitter/receiver or using a cradle. This can be connected to a PC either via a serial port of USB, though the serial lead is an optional extra, aas the UK device ships with only a USB lead.

The iPaq come preinstalled with not only the Pocket PC operating system, but also a selection of Microsoft and Compaq applications and utilities. Compaq's own utilities consist of Qmenu, (a custom menu system for applications), Asset Viewer (a utility for reporting the details and specification of the device for use in asset tracking applications), Qutility (an image viewer), and a back-up utility (Hmmmm!) for your contact list data.

Microsoft's own applications included with the iPaq are *Pocket Internet Explorer*, *Microsoft Word*, *Excel*, *Outlook* and a *PocketPC* version of the *Windows Explorer* file manager. Communication with your desktop PC or laptop is handled using the Microsoft ActiveSync 3.1 software.

The ActiveSync CD also includes several useful utilities and applications that you can install, such as Microsoft Pocket Streets (map viewer), Microsoft Money (financial manager), Windows Media Manager (for handling Windows Media files to be transferred to the device), Microsoft eBooks Reader (a viewer ffor its electronic book format) and the desktop version of *Internet Explorer 5* to allow for the transfer of channels and bookmarks between desktop and device.

The area where the iPaq really differs from all other pocket PC deives is in its lack of any kind of standardised expansion slot. Instead it features a proprietary interface which plugs into a jacket.

The iPaq uses interchangeable jackets to

add support for common interfaces such as PC card and for connection devices such as wireless network cards. This would form the basis of a device to suit a variety of personal and individual needs. Obviously it could also be possible to have an add-on TNC so that a device such as this could form the basis of mobile and portable emergency field stations.

The price of an organizer a few years ago was not far from the cost of the iPaq, which at £382 is not bad value for money. If you want further details, check out **www.compaq.co.uk/products/**

You can also buy PocketPC devices from Casio, HP, Compaq and Symbol to mention a few. Palm is gaining ground and the Palm VX is now available for £299.

The challenge for any mobile system is connectivity, and first on the list of criteria for palmtop computing is E-mail retrieval. Two methods exist for this; synchronisation, and direct access.

Synchronisation is the method of swapping information stored on a desktop system with the information stored on the palm computer. Direct access means retrieving E-mail in the same way as on a standard PC, such as via a POP3 server.

The HP company produce the Jornada 548 for £439. This is obviously a product that is going to catch on, just as the mobile 'phones have. All three products vary a lot in price so it pays to shop around.

CONTEST RULES

I suppose I'm old-fashioned, but I still believe in the old rules for contests. To be honest, the requirement of the exchange of signal reports is totally redundant.

When did you last send or even receive a report other than 599 or 5-9 on SSB? Viewed from the perspective of a non-contester, the activity must look completely inane! I think there should be a complete change the other way. Bear in mind these thoughts are coming from an avid contester.

I operated from GB4ANT for some 15 years and enjoyed it. However, I did have some views that are not shared by other contesters! At the risk of upsetting them, here goes:

* Contests should be restricted to certain parts of the bands. This would enable other amateurs to conduct skeds, have a normal contacts or ragchew, without hearing the incessant CQ Contest, with all the controls on the rig turned clockwise.
* Exchanges should be more involved. The minimum should be a genuine report, exchange of names, locations and equipment, with some other relevant information as well.
* Points should be deducted for bad operating, with every operator expected to report any bad operating heard, including transmission quality.
* The winner will **not** necessarily be the station with the most contacts, but will be the one with the most accurate information exchanges.

● The iPaq H3630 has a contoured silver look, a minimalist set of control buttons and a high definition 4096 colour display.

I suppose I'm being slightly optimistic but here are the views of the BARTG committee regarding the much talked-about multi rig RTTY operators. Such a class can lead to unfair advantages, and it could also lead to a few 'friends' coming around to 'help' with the other rigs.

I suppose you could argue that all is fair in love and contests, but it does detract from the spirit of the event in my opinion. Separate classes are essential to cope with these situations. The following comes from **John Barber GW4SKA**:

"Thanks for all the comments received regarding the rule changes for our 2001 contests. About half were in favour of the 5 minute rule for the h.f. contest, and most of those against the rule were from contestants to whom it would not apply (the expert class operators)! I saw only one comment with a doubt about the expert class, which was that more categories might dilute the value of winning each category, and lead to less interest in taking part. Time will tell, but the CQWW has plenty of different classes and gets huge participation.

The BARTG HF RTTY contest has been running for longer than any other RTTY contest, first starting in March 1965, with Volta following in May of that year. The WAE started in 1969.

Running such an important contest is a big responsibility, and any rule changes are given long consideration. They are introduced after discussion with other contest managers and contestants. There are often reasons for rules which are not obvious at first sight, but are very important to the fair running of a contest.

The five minute band change rule was introduced for two reasons:

1: To restrict the practice of alternate CQing on two or more bands. We have very little space on the bands in which to operate a contest.

This is not helped by stations CQing alternate bands and holding a frequency on both bands. This also leads to the annoyance when you answer a CQ from a station with a huge signal, then have to wait while he answers a reply on his other band.

While this is annoying, there is another bigger danger lurking. It is a very small step for a single op station with multiple radios to start CQing simultaneously on multiple bands. I have seen this happen in two contests this year, on both occasions watching the same CQ come up on 15 and 20 with identical timing.

Take this one stage further, and when a reply is received on both bands, get a friend to assist by answering the second reply! As long as not more than three QSOs were logged in the same minute, the contest adjudicator could never say for certain that these contacts had not been made by just one operator. This is grossly unfair to the majority of decent operators, and the 5 minute rule removes any chance of this happening.

2: To encourage the 'average' station to enter the contest. Most stations taking part in any large contest do not enter the contest (typically about one in four will actually send in a log). Many feel that entering is a waste of time, as they are up against rich men with huge stations, who can run a kW instantly on any band to a big array of antennas. Of course this may be nonsense, but it does stop people entering a test.

The more we can encourage the casual Sunday afternoon ops to actually take full part, the better it will be for all of us. The 5 minute rule gives the single radio station a better chance (not equal, just better), and is enforceable.

Contest managers also have a real need to get entries for their tests, not just signals on the air. The money to run these contests often comes from a small pot, and we have to justify our spending. 2000 stations on the air is fine, but if I only get 25 entries, there wont be a contest next year.

AVERAGE STATIONS

One final point that came up from the correspondence was the odd idea that some contesters have of an 'average' RTTY station. I am convinced that a few top RTTY ops are **totally out of touch** with not only the equipment available, but also the tactics they use when working a contest.

Many new RTTY operators have joined us in the last year thanks to the use of computer soundcards and free software. They should be encouraged to join in the contests, as a superb demonstration of how good this mode can be for DX, **without needing huge powers or towers**.

The average station has one decent h.f. transceiver, a computer with a soundcard, and if they are lucky a tri-bander on a 40ft tower with wire for 40 and 80. Many are limited to a G5RV or a vertical but still have great fun contesting and DXing. I must admit to laughing when I see a two-radio, single tower station quoted as the norm.

Please don't clog up the reflector too much with responses, as we have heard most sides of the story now, but feel free to mail me direct if you wish. Get those soundcard ops on board, let the experts carry on with their excellent work on the technical side, and mark your diaries now for the **BARTG HF RTTY 17 March 2001.**

AND FINALLY...

Back-up? Nah, never have any problems.....
Hmmm
See you next month.

Roger G3LDI

IN VISION

BY GRAHAM HANKINS G8EMX

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I'll start this month with the following news from **Colin Dalziel GM8LBC**, complier of the Repeater Information pages on the RSGB website. Colin says: "The first Amateur Television repeater in the UK to use the 2.4GHz (13cm) band, is being proposed".

The repeater will be situated in Hull, East Yorkshire, GB3VW will provide ATV service on 13cm into Filey, Selby and Scunthorpe, adding to around 30, 1.3GHz ATV repeaters, and a lesser but growing number of 10GHz ATV units now in operation around the country. These presently carry the bulk of ATV activity, which begs the question: 'Why hasn't the 2.4GHz band had an ATV repeater or significant activity before"?

The widely spaced bands of 24 and 3cm (10GHz) became popular for very different reasons. The 1.3GHz band is the first available ATV band above the now crowded 70cm (430MHz), so many ATV operators simply 'moved-up' one band' where they found plenty of spectrum available for colour, sound and ATV repeaters.

Pioneers of ATV with 10GHz discovered 3cm to be astonishingly easy to use, largely free of the radar problems that could bedevil 24cm (1270MHz) and that remarkable distances could be achieved, too. So, perhaps there has been no incentive to try any of the other 'low microwave' bands.

Potential interest in ATV on the 2.4GHz band may, of course, have been deterred after reading the BR68 booklet, which is the *Amateur Radio Licence Terms, Provisions and Limitations* issued by the Radiocommunications Agency (RA) to all holders of UK Amateur callsigns. Booklet BR68 states: 'Users of the band 2400 to 2450 must accept interference from ISM users'. (ISM stands for Industrial, Scientific and Medical and includes microwave ovens amongst many other sources of r.f. power within the 13cm band).

Also, 2400 to 2450MHz is, like so many other frequencies, available to Radio Amateurs on a Secondary basis only. So, the position as I see it, is that received ATV on 2.4GHz may be at risk from incoming interference from ISM r.f. sources, but if we don't 'make the effort', our Secondary User status could, in the long term, be at risk too!

GOOD NEWS

With ready-built ATV transmitters and receivers for 2.4GHz now available and a 2.4GHz repeater in planning, it now looks like this is the ideal time to give 13cm ATV a try!

Simon Manning G1IRG, of the Northampton Repeater Group to reports that: "24cm ATV repeater GB3MV is back in operation from Northampton town centre and came back on air on the August 11. The break in service was caused by a change of site due to the 'usual suspects' – mobile 'phone mast people paying out lots of money and then us being asked to pay the same"!

Simon assures previous users that all repeater details remain as before: "Power out is 14dbW, transmit frequency is 1316MHz, receive at 1249MHz. with just the good old spectrum running the software"! Any enquiries to Simon G1IRG, QTHR or E-mail **simon.manning@ntlworld.com** or via the Northampton Repeater Group's web site at **http://www.northampton-repeater.fsnet.co.uk**

Wales would be a difficult place to serve with microwave ATV at the best of times, and the Arfon Repeater Group has had to cope with site changes too – site rental fees again. The 24cm ATV repeater **GB3GW** was conceived, designed and built by the Arfon Repeater Group to cover the west coast of Wales (Cardigan Bay) and to supplement GB3TM (located at Amlwch on Anglesey) which covers the north coast of Wales.

Derek Whitehead GW3FDZ says: "GB3GW is now located at Pentrefelin which is northeast of Criccieth and which gives excellent coverage of Cardigan Bay, and at a sensible rent! The equipment of GB3GW consists of a satellite receiver (modified for auto switch on) preceded by a low noise pre-amp. The transmitter consists of a frequency synthesised oscillator followed by a Mitsubishi M67715 power module driving a further Mitsubishi power module M57762, giving an output to obtain the 25W e.r.p. A 6.0MHz f.m. sound carrier was added to complete the installation".

Derek adds: "So far so good, but the license granted an output frequency of 1310MHz with an input frequency of 1280MHz. This is the first time to our knowledge that a separation frequency of only 30MHz has been assigned and we believe that we are the first ATV repeater in the country to be operational with such a tight restriction. I am told that the frequencies assigned were a compromise, to prevent possible problems in those parts of North Wales where our other ATV repeater, GB3TM, could be accessed".

GRAHAM HANKINS G8EMX HAS THE LATEST NEWS FROM THE ATV SCENE.

Coverage of GB3GW appears to be better than anticipated with P**at GW0GZQ** located at Moylgrove south of Cardigan at a distance of 60 miles being a regular user. At present there are four other operational ATV stations in the reception area; **Gareth GW0SEO** located at Llanbedrog, **Reg GW1TPS** located at Harlech, **Pat GW6IMS** at Minffordd and Derek himself, GW3FDZ at Dyffryn Ardudwy.

INTERNET LINKS

Wandering through various ATV related links on the Internet recently, I came across **http://www.qsl.net/g8gtz** - the personal pages of **Noel Matthews G8GTZ**. Noel is in Basingstoke and runs 15W of ATV on 1.3GHz, 40mW on 2.4GHz which also multiplies up to 10GHz! Noel's site has many photos of his home shack and portable expeditions on his home page, which includes a link to the 'ATV E-mail reflector'.

The 'ATV Reflector' is an E-mail list that enables any ATV station to inform distant stations of where and when they would be operating portable. Stations subscribing to the list will be sent details of planned ATV activity, plus discussion on any ATV related topic. Sounds like a good idea to me! Give Noel's page a 'hit' and go from there.

Although Web pages and E-mail are a wonderful recourse, it must be remembered that not everyone has access to the Internet, yet. So, if you are building a Web site with loads of text and photos of your ATV exploits, please remember the many folks who still wait for their printed magazines! Editors and column compilers need your news too!

That's all for this month so until next time keep 'in vision' and keep your news and views coming to me.

Graham G8EMX

TUNE-IN

BY TOM WALTERS

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TOM WALTERS PRESEENTS A MULTI-LINGUAL EDTION OF HIS MONTHLY LOOK AT THE BROADCAST BANDS.

This looks likely to be a multi-lingual edition. First, there have been a few changes in the European broadcasting scene. **Deutsche Welle** has expanded its weekday Ukrainian broadcast from 15 to 30 minutes. In the UK you'll have to be up before dawn to catch this transmission - 0530UTC on 5.980, 7.200MHz, and as it's dark it could be worth trying the medium wave on 999kHz (via Moldova).

Meanwhile **Radio Free Europe/Radio Liberty** has reduced its programming to the Ukraine - from daily to Monday-Friday. If you're an 'early bird', and like identifying foreign languages, you can try intercepting these at 0400-0500 on 6.170, 7.165, 7.245MHz and at 0600-0700 on 6.170, 7.165. 0.695MHz.

For a really exotic touch, RFE/RL is now starting to direct its Persian service to Western Europe, where they reckon there is quite a sizeable Persian population. The Persian schedule is at 0430-0730 on 9.585, 12.015, 15.290; 0630-0730 on 15.290; 1400-1500 6.030, 9.435, 11.910, 15.195; 1500-1700 on 6.015, 11.730, 15.410; 2000-2300 on 7.280, 9.835MHz.

There's full frequency information together with nice audio on the RFE/RL web site **http://www.rferl.org** or write to them at **Vinohradska 1, 110 00 Prague, Czech Republic**, FAX: **+42 2 2421 1501**. They don't broadcast in English, but you'll have a field day picking out the languages!

It's well worth acquainting yourself with the sounds of other languages. You don't actually have to learn the languages - just tune into frequencies at times when you know what language is on, and listen to the rhythms and sounds. It's surprising how fast you'll begin to identify the languages.

In particular, try learning how station identifications sound. It will really multiply your listening pleasure enormously, if in the past you've just confined yourself to English.

FOREIGN CHAT RELIEF

For some light relief from all the foreign chat in Eastern Europe try **Radio Romania International** (RRI). It's not all about politics and economics, there's plenty of lighter stuff as well, including some fascinating music - Romania is basically a Latin country surrounded by Slav neighbours, and has a unique culture to match.

The RRI's English service, is on at a sensible times of day, try: 0641-0700 on 6,135, 7.019, 9.510, 11.940; 1300-1400 on 11.940, 15.290; 1700-1800 11.940, 15.365; 2100-2200 7.195, 9.690; 2300-0000 on 9.570, 11.940MHz. If you get a taste for non-English talk, Radio Romania broadcasts in 16 other languages. For web folk, all you need to know can be found at **http://www.rri.ro/homepage.htm** postal address **PO Box 111, Bucharest, Romania**.

MOVE OUT

There's been talk for years, but now it seems it's really going to happen - the **BBC World Service** is going to move out of Bush House in the Strand, London. After less than a year in the job, Director General **Greg Dyke** announced plans for a huge new radio development base attached to the historic Broadcasting House.

Whereas John Birt seemed to be intent on breaking up the BBC family, for the sake of getting the accounts to add up, Greg Dyke says he's a programme man, and will throw more money to producers, and will no doubt encourage them to keep up the sky-high standards that the BBC is famous for around the world.

The first major result of Mr Dyke's thinking on radio is that a whole new complex of state-of-the-art digital production facilities will be thrown up around that grand old building Broadcasting House, in London's West End (opened in 1932). The glittering new facilities should all be ready by 2006. The **BBC World Service** will move out of Bush House, where they have been since the Second World War, and 'go home' to Broadcasting House, where it all began, along with with BBC Radio and Music and BBC News.

It makes sense to share the 'overheads' of accommodation, technical facilities and support staff, not to mention the rent of Bush House, and the move should save a few pennies to plough into World Service programmes. Of course, it will be a pity to leave Bush House behind, but the alternative probably was to move into a soulless, faceless block, miles from central London, in the wilderness of White City. All looks good for getting the World Service back together in one piece, and continuing to make world-beating programmes, as it has now for nearly 70 years.

EXOTIC EXILE

Back to the exotic - and this really is - there are reports that the exile station **Radio Voice of Tibet** can be heard between 1200-1300 on 15.645MHz via Almaty in Kazakhstan, and on 15.685MHz via Dushanbe in Tajikistan. Programs are in Tibetan and Mandarin (the main Chinese language).

Radio Voice of Tibet is just one of many exile stations using rented facilities and these days, of course, many mainline international radio stations are to be heard on transmitters provided by other countries. This is your chance to learn to identify Tibetan!

By the way, don't you think we should be trying to develop this column as a two-way exchange? So, do please pass along anything that springs to mind as you read the column.

If there are particular areas that you'd like me to research, I'm very willing, and if there are any special international listening tips that you'd like to share with other readers, just write to or E-mail me. Please bear in mind though that any news still has to be relevant about three months later.

Well that's it for this month. I hope to hear from some of you, and until next time, happy listening, in whichever of the world's many languages you may happen to discover.

Tom

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AKD 2001 25W 2m f.m., new boxed, cost £195 take £95. MML transverter 28/144MHz, £90. 2m 5W handie(scanner RX), new, boxed with £40 worth new accessories, cost £190 take £90. Tel: (07866) 077249.

Alinco DX70TH h.f./6m TCVR, boxed as new, 6m use only, Heil insert fitted, £400. Yaesu FT-726R 2m (144MHz)/6m (50MHz) base TCVR almost unused since new. Immaculate condition 'K-tone' fitted, £400 plus postage. Tel: John on (01383) 721523 or E-mail j.hilton1@ntlworld.com

All purpose tester Everett Edgcombe in hinged wooden box, 6in meter, instruction book, Weighs about 10lbs, £20 or offer. Suggest buyer collects. Tel: (01202) 884905.

AR8200 scanner and computer control by AOR, leather case, 4 antennas inc. DB-32 and Watson super searcher, all mint condition, boxed £300, chargers inc for both AR8200 and searcher. Tel: (01905) 724843.

Books! *Admiralty Handbook* Vols 1 & 2, 1938, £14 paid. *Antennas* by J.D. Kaus - the 892 page antenna bible , £9 paid. Mobile Handbook by Dave Ingram K4TWJ, £5 paid. Radio Art - 30 postcards of Classic Radius £5 paid. Write to Mr Marris, 35 Kingswood House, Farnham Road, Slough SL2 1DA.

Collins CP1 crystal pack complete, £100. Akai reel-to-reel tape recorder GX215D with ten pre-recorded tapes, 7inch, £50. Tel: (01925) 225067 or E-mail kmahon@connectfree.co.uk

Drake R7 RX ex conditionwith filters fitted, manual £500. Also wanted AR88D in good working order. Tel: (01255) 852737.

Drake SSR-1 communications receiver, good condition with manual, £70. Yaesu FF-501 l.f. filter, £30. Duplexer 1.3-170MHz, 350-540MHz, £12, never used. Wanted coils for National HRO. Tel: Pascal on 0287 135 2804.

Drake TR4C pristine condition, £150 o.n.o. with Shure 444D. Yaesu FT-101ZD MK3, pristine condition, £325 o.n.o late serial number. Tel: G0VZO on 0247 638 2215.

Eddystone 830 and 940 comms receivers with manuals, have been in storage, will need tweeking. £200 the pair o.n.o. G3TOF, QTHR. Tel:(01279) 417000

Eddystone 840A as new, stored 40 years, £100 prefer collect to avoid damage to this beauty. B30/7 wanted for my collection, no scrap,. good price for equal specimen to above. Tel: 0141 649 2328.

FT-101ZD circuit diagram £free. FT-50R hand-held, 2m (144MHz) & 70cm (430MHz), cost new, £199 sell for £100. G0PFH, Sowerby Bridge, West Yorks. Tel: (07747) 001713.

FT-290R, £120. Tokyo HLIKGX h.f. Amp, £450. G400RC rotator, £140. Target h.f. RX, £95. FC-420 a.t.u. brand new, £95. FT-77 h.f. TX/RX, £150. HF6 vertical, £110. MD1 deskmic, £50. SM5, £25. P/X IC-706 , FT-100. Tel: Norfolk (01953) 884305 or (07970) 214039.

Heathkit 2m (144MHz) 1kW linear amp, £100. Ex military transceiver .500kHz, 30MHz, circa 1938 £offers. Ex military variable p.s.u.600A, 35A home-brew. Also various old mics, headphones etc, £offers. Tel: (07879) 084812.

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Index QRP Plus in good condition, £220. Prefer buyer inspects and collects evenings and weekends only please. D. Griffiths G0CEQ. Tel: 0208 368 5681.

JRC NRD 525 90kHz-34MHz, mint manual, buyer collect, £420. No offers. Tel: Brian on (01782) 396453.

JRC NRD 545 DSP receiver plus NVA 319 matching speaker, manuals and boxed as new, £750. Tel: (01803) 529788 after 1800 hours.

Kenwood AT-230 a.t.u., handbook, £150 carriage paid, immaculate condition. Trio R-600 receiver, exc condition, boxed, handbook with Howes CTU 9 a.t.u., £160, carriage paid, u.s.b., l.s.b.. c.w, a.m. great bargain. Tel: George on (01443) 437345 anytime.

Kenwood TS-530SP VFO230 excellent condition, manuals, boxed c.w. and s.s.b. filters fitted new 6146Bs fitted buyer collects or pays carriage £300. Contact Mike G3TNB, QTHR. Tel: Southport (01704) 214012.

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Murphy mains radio A130, baffle board, very tidy, need 1 valve to get working, £25 o.n.o. Philco AC/DC 1960s radio, working order, fair condition, £12. Buyer please collect. Tel: (01244) 310267 evenings/weekends.

Pakratt model PK232 multi-mode data controller with operating manual. Can be seen working, £45 plus P&P. 144/430MHz dual-bander, little used, approx 1.70m high, £25 plus P&P. Tel: (01709) 850517.

***PW* mag**, *SWM* mag 96, 97, 98 3 years, £offers plus carriage. Mr Penny, London. Tel: 0208 6754 622.

Racal 1772 15kHz to 30000MHz, digital read-out professional comms receiver, £240, power/s.w.r. meter seperate read-outs on two meters, £10. Heathkit vtum, valve volt meter, £15. Tel: (02476) 672438.

Racal 1772 prof communications receiver, digital read-out superb condition, original manual, £240. Heathkit valve voltmeter, good condition, £15. Power/SWR meter, good condition. £10. Tel: Coventry 0247 6672 438.

Realistic DX394 receiver, good condition, psu, manual, tele antenna, 150m copper long wire, £90 o.n.o. must sell soon. Tel: Herts 0208 449

Receivers DIY Eddystone 1837, ex factory modules, mechanics, manual, you provide chassis and time £offers. Kenwood R5000, £350. DX394, £75. Datong 0-30MHz converter, £75. Eddystone 898 dial, £25. Tel: Tony on (01905) 641759.

Shack clearance. AOR3030, Signal RS32, Timewave DSP filter, FAX 4 weather FAX, Momentum decoder, weather station, plus antennas, masts etc,. 'Phone for lists, all mint. Tel: (01902) 567070.

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TCS transmitter and TCS receiver both in very good original condition with antenna loading coil. original connectors, some spares, everything required for a p.s.u. and a manual, £295. Tel: (01482) 887938.

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TS-530S transceiver, £200. Tel: Ampthill (01525) 840798.

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Valve collection (large), £450. WS No 52RX, good, £80. CR150 + p.s.u.,

good £80. R107RX x3, good, £150. AVO No 3 valve tester and manuals, £150. PRC9 with p.s.u., £80. B40C, good, plus one spare, £80. Tel: 0208 818 0072 day or (07979) 771264.

Yaesu FT-100 TX/RX v.g.c. with box, manual and seperation kit, £600 o.n.o. Yaesu FT-107 inc internal p.s.u., £200. FTV107R fitted 2m (144MHz) and 70cm (430MHz) transverters, £250 o.n.o. Tel: Pete on (01454) 882465.

Yaesu FT-101ZD, £200 o.n.o. YO901 multiscope, FC902 antenna tuner, FTV901R transverter, Kenwood TR9130, PS20 power supply BO9A base, ST1 stand, SP120 speaker, other items reasonable offers. Tel: Ann on 0238 059 6722 day, 0238 055 1170 eve or E-mail: ale1@soton.ac.uk

Yaesu FT-2700 dual-band 2m (144MHz)/70cm (430MHz) mobile TXCCVR, boxed, manual and in as new condition, £150. G2FTY, QTHR. Tel: (01527) 546048.

Yaesu FT-707, s.s.b. h.f. transceiver, FP7070 p.s.u. SEM z-match, manuals, leads, £350. Tel: G3GX on (01539) 623679 after 6pm.

Yaesu FT-790R 432MHz, all-mode transceiver plus 30W amplifier, £145. Packet radio PK88 TNC plus 2m (144MHz) PMR rig, £85. Datong automatic r.f speech processor wired for 8pin Icom, £75. Tel: (01273) 462696.

Yaesu FT-990 a/c exc. condition, very late, model with filters. Boxed, £760. Yaesu SP6 extension speaker exc. condition, boxed, £65. Sirio CB antenna and cable with T&K brackets, £50 o.n.o. Tel: Andrew on (01642) 278955.

Yaesu FTS-17A CTCSS tone unit, suitable for FT-73, FT76, FT411/811 etc., £15. Yaesu NC-28C battery charge, £5. Yaesu FBA12 dry battery case, £5. Yaesu FT-76 breaking for spares. Tel: Steve on (01225) 329404.

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Yupiteru MVT-7100 scanner, mint , £150. Daiwa electronic keyer plus Hi-mound twin paddle, £75. Trio TR-2500 2m (144MHz) hand-held plus desktop charger, £75. AKD 70cms (430MHz) TX/RX, Mint, £75. Bev West on (01495) 757221 or E-mail: bev.west@vrigin.net

EXCHANGE

Eddystone 888A, AP63993 TX (B28) MK328, RX, MK119 TX., MK123 RX/TX. Will swap for other military equip, RX's , TX's etc,. Sets wanted, any make, type, anything considered. Ben G4BXD. Tel: (01562) 743253 or E-mail: g4bxd@qsl.net

WANTED

5 x 3in speaker for Drake MS7 4Ω, dials calibrated, complete for Drake R$-C. Tel: 0141 562 4571.

A MkII, 3MkII (B2), A MkIII 53/1 RX, 51/TX Paraset , S-phone/ MCR1, SSTR-1, SSR-5, AN/PRC-1. AN/ PRG-5 BP3, AP4, OP3 SE-100/II or any other clandestine radio sets out there. Your price paid. Tel: Bill on 0208 505 0838.

Heathkit wanted for spares. Heathkit gear or manuals, dead or alive, ancient or modern. Also valve data books, cash paid plus carriage. Tel: Mark MW0AWM on (01437) 890228 evenings or E-mail mark@telco4u.net

Kenwood R2000 c.w. narrow filter. Does anyone have a YG455C type filter for sale? Tel: Adrian on (01582) 833451 anytime.

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Philips 'scope PM3240 owners manual and service manual needed. Buy or borrow or pay for copying. Also need skirt, I hood and window that fits on front panel over tube. Tel: Roger Lawson on (01623) 797400, (01332) 393412 or FAX: (01623) 474792.

Probes and graticule fro ex military CT52 'scope. Dave G4EZF, Cheshire. Tel: (01457) 762799.

Racal RA17L or RA117, also accessories, e.g sideband adapter, panadapter etc., and a Racal cabinet for the receiver. Tel: (01482) 887938.

Racal RA63 s.s.b. adaptor your price paid for a clean unmodified and working example, desperate will collect any distance. Cash awaits. David G4JMF, QTHR. Tel: 0151 355 3854 home or 0151 347 2169 office.

RAF pre-war transmitter type T1083 and power unit. Douglas G3KPO, Isle of Wight. Tel: (01983) 567665.

RCS Shortwave kit using 954 Acorn valves (advertised in *PW* 1960/70s) unbuilt/built/complete/ spares also Denco RFCs and Octal coils (can supply box/packing for posting if required). Geoff Moffatt, The Green, Kirk Yetholm, Kelso TD5 8PQ. Tel: (01573) 420415.

Selenium rectifiers for a restoring project. I require three Sentercel RM3 and two Sentercel H3/100 or K3/40 dead or alive, all costs paid. Geoff Holden, 5 Craigour Avenue, Torphins Banchory AB31 4JA. Tel: (01339) 882979.

Shimizu SS105S f.m. boards wanted. would consider scrap SS105S with f.m. boards. Tel: Brian on 0151-625 3632.

Sony V21 and Sony CRF320 in good condition. Tel: 0208 571 7962.

SWM August 1973 (EC10 article). Your price paid. Jim Boal, 53 Belmont Avenue, Belfast. Tel: 028 9028 3789.

T1154, good price paid for one in unmodified original condition. Tel: (01482) 887938.

Urgently required for OAP Commtel 510 instruction manual. Photcopy - anything, can you help? All expenses willingly paid. T. Roberts, 25 Gray Street, Elsecar, Nr. Barnsley. SY4 8JR. Tel: (01226) 747809.

Urgently wanted replacement mains on/off toggle switch for KW1000 linear amplifier. Stan G3XDN. Tel: (01483) 536953 or e-mail: stanleycasperd@compuserve.com

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Woden mains transformer type SRS/152/T secondary 670/0/670V at 160mA wanted to repair old power supply. No other type will do. Tel Denis G3UVR on 0151-6527 454 daytime or 0151-3427 880 evenings.

Yaesu FRG-7 RX. Tel: Gary on 0151 480 2730.

Yaesu FT-26 2m (144MHz) hand-held paging transceiver. Also Yaesu NC42 quick one hour charger for the above, must be in good condition. Tel: (01773) 718222 anytime.

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This month we welcome a new face to the *PW* Book Store - the face of **Clive Hardy G4SLU**. Clive has been licensed Radio Amateur since the early 1980s and enjoys construction and low power operation, although Amateur Radio has taken a bit of a back seat recently in favour of his studies for an Open University technology degree, but now that's complete he'll be back 'on-air'. Amongst Clive's other interests are, playing the guitar, Formula 1 motor racing, and carrying out family history research.

We say a fond farewell to Jean Webber. Ever efficient and a valuable member of the PW Publishing team (having worked in accounts, advertising, books, etc., etc.) We'll miss her and we wish her a long and happy retirement.

To order either use the form on page 82 or please call Clive G4SLU or Shelagh on (01202) 659930

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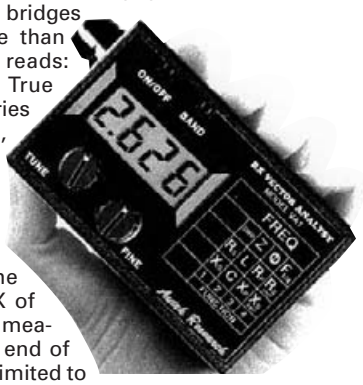

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Our Rob is never lost for words, this time he considers *PW*'s historical perspective

rob mannion signs-off

Rob G3XFD rounds off this month's issue and provides a sneak preview of what's in store and coming soon!

Traditionally, this issue of *PW* is always the most difficult for the Editorial Team to work on - due to the Christmas publishing schedule's demand that we literally work on two magazines at once! However, despite this fact of journalistic life, I can honestly say that for my part I've enjoyed working on the articles which ended up on my (cluttered) desk for sub-editing.

Producing a magazine such as *PW* provides an interesting challenge to myself as Editor,and to the Editorial team as a whole. With the immense amount of historical material to hand on the hobby and our science itself - we could easily fill *PW* with 'radio history' every month to the delight of some readers and to the dismay of others! However, in my monthly 'balancing act' I have to resist the temptation...except that this month we have some exceptionally interesting articles which in their own way look back into history.

● Have you been reading *PW* since the No. 1 issue was published in 1932? If so the Editor would like to hear from you! In 'Radio Waves' (Letter, page 9), Douglas G3KPO says he's been reading *PW* from 1932. So, it would be extremely interesting if other veterans could let us know who they are.

Enjoyable Work!

Preparing **Peadar Slattery EI2JA**'s 'From The Irish Sea' was very enjoyable, even though the article needed 'cutting' for the space available. This article started life when Peadar telephone me over a year ago. What a marvellous example of Amateur Radio co-operation it turned out to be - bearing in mind the help provided by **Gwyn MW0BTU**, **Pat GW1SXN** and fellow Irish Amateur, **Joe Dillon EI4FV**. Well done everyone...I certainly learned a lot from the article!

The 'In Your Workshop' feature well prepared by **Mike Mills G3TEV** (thanks Mike!) started when he wrote to me following some comments I made about the old *Radio Constructor* magazine. The resultant feature brings back many memories and uncovered a few mysteries on the man behind Dick & Smithy in their workshop. Hopefully though - there's more information on **J. R. Davies** to come from *PW* readers.

Let's hope we can pay this talented man some belated further tributes. However, I felt that **John Worthington GW3COI**'s cartoon effectively depicted the scene as it could have been at RAF Lyneham in the 1950s. Well drawn John! Fortunately, although I forgot to bring in some samples of *Radio Constructor* magazine for illustration purposes...T**ex G1TEX** didn't forget his. He got them back too! (Thank you Tex, they were ideal copies to illustrate what was an excellent magazine).

Finally, **Graeme Wormald G3GGL**'s article 'One Radio Amateur's National Service' was fascinating to read! I enjoyed preparing it for publication...but what an unusual experience he had when he was 'Getting Some In' as they used to call National Service. However, was G3GGL's experience so unusual? Did you have a similar interesting time, and did you get a chance to play with radio or were you first introduced to the subject during your 'call up'? Write in...we'll be interested to hear from you.

Next Month

In the next issue of *PW* I'm planning to share my experiences if trying out what most of us would consider a real luxury...a professional modern soldering station form Antex. This unit was loaned to me because Antex thought it might prove useful, especially as it can remove some of those very difficult to recover components from modern printed circuit boards.

Also coming next month are several practical antenna projects...including one from **Ray Fautley G3ASG**. Ray - who normally specialises in using completely 'invisible' antennas - has tried out a system where you can use a mobile whip on your lawn. Intrigued? Make sure you read the article to find out how he got on!

There' also a 'V' beam project by **Edward Rule G3FEW** for the neglected (in my opinion) 18MHz band. I hope it encourages more *PW* readers on to 17 metres! There's lots more to come in the March issue and everyone on the *PW* team looks forward to preparing it for you. Cheerio for now!

next month

Looking forward to the next issue of Practical Wireless? Take a look at what's on offer!

PRACTICAL WIRELESS

THE UK'S BEST AND ONLY INDEPENDENT AMATEUR RADIO MAGAZINE

Next Month in *Practical Wireless*, the magazine that brings you Amateur Radio & So Much More .....

REVIEWED

* Antex workshop and rework soldering station - tried and tested by **G3XFD**.

ANTENNA WORKSHOP

* **Ray Fautley G3ASG** tests out the WBP-1 portable mounting base for whip antennas.

BUILD

* **David Allen** shows you how to construct an off-air 198kHz frequency reference source.

* Prepare for a new antenna season - build a 'V' beam for 18MHz - **Edward Rule G3FEW** shows you how.

FEATURE

* Marconi's transatlantic venture - **Hari Williams** recalls Marconi's pioneering work

Plus all your regular favourites including:

Amateur Radio Waves
Bargain Basement
Club News
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News
Radio Scene
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and much, much more!

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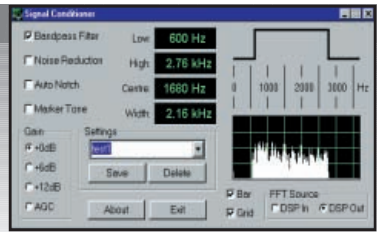

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WRTH 1999 Review

"Five stars for its mechanical design"
WRTH 1999 Review

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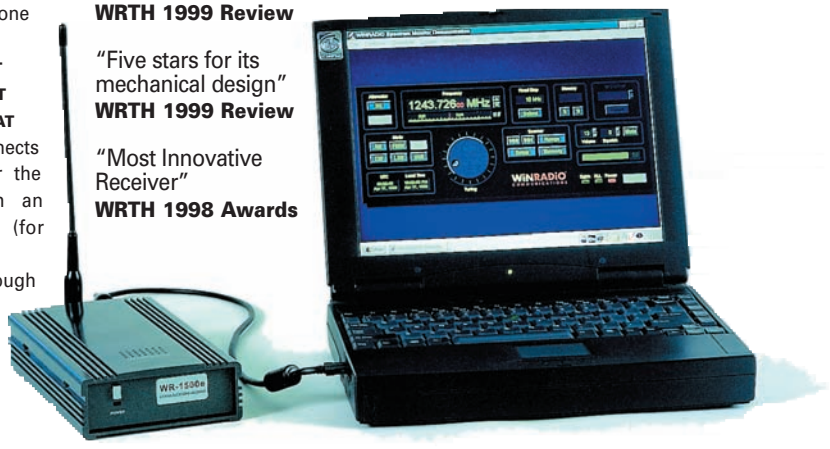

Model Name/Number	WR-1000	WR-1500	WR-3100
Construction of internals	WR-1000i/WR-1500i-3100iDSP- Internal full length ISA cards		
Construction of externals	WR-1000e/WR-1500e - 3100e - external RS232/PCMCIA (optional)		
Frequency range	0.5-1300 MHz	0.15-1500 MHz	0.15-1500 MHz
Modes	AM,SSB/CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W
Tuning step size	100 Hz (5 Hz BFO)	100 Hz (1 Hz for SSB and CW)	100 Hz (1 Hz for SSB and CW)
IF bandwidths	6 kHz (AM/SSB), 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 9 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 9 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
Receiver type	PLL-based triple-conv. superhet		
Scanning speed	10 ch/sec (AM), 50 ch/sec (FM)		
Audio output on card	200mW	200mW	200mW
Max on one motherboard	8 cards	8 cards	3-8 cards (pse ask)
Dynamic range	65 dB	65 dB	85dB
IF shift (passband tuning)	no	±2 kHz	±2 kHz
DSP in hardware	no - use optional DS software		YES (ISA card ONLY)
IRQ required	no	no	yes (for ISA card)
Spectrum Scope	yes	yes	yes
Visitune	yes	yes	yes
Published software API	yes	yes	yes (also DSP)
Internal ISA cards	£299 inc vat	£369 inc vat	£1169.13 inc
External units	£359 inc vat	£429 inc vat	£1169.13 inc (hardware DSP only internal)

PCMCIA Adapter (external): £69.00 inc when bought with 'e' series unit (otherwise: £99 inc)
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"Brick-Wall" Selectivity

Today's Premier class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics saves you precious seconds in a DX or contest pile-up. Yaesu HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

I. IDBT: Interlocked Digital Bandwidth Tracking System

The IDBT feature greatly simplifies operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system monitors the settings of the SHIFT and WIDTH controls, and automatically sets the DSP bandwidth to match the user settings within the net bandwidth of the Analogue IF Filtering.


IDBT: A Breakthrough in Selectivity!


10-pole Collins® Mechanical SSB Filter

II. VRF: Variable RF Front-End Filter

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.


VRF Features Large, High-Q Coils and High-Quality Relays


VRF Typical Bandpass Response (3.5 MHz)

III. 200 Watts of Transmitter Power Output

Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.


Philips Power MOSFETs


High-Speed Automatic Antenna Tuner

IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP , a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd- order IMD suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!


Class A 75 W PEP IMD

V. Multi-Function Shuttle Jog Tuning/ Control Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so you don't have to move your hand position to activate these important circuits during contest or pile-up situations!

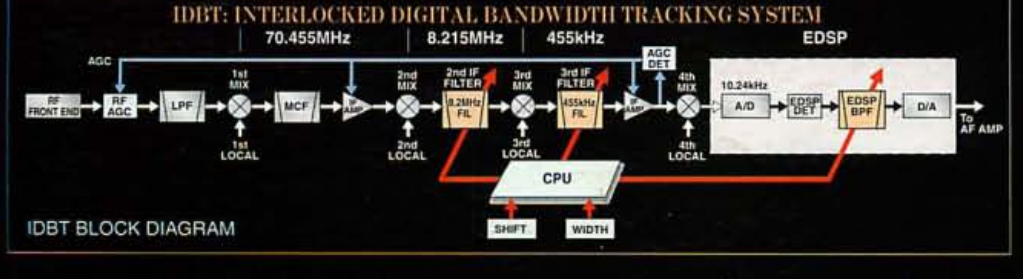

Access VRF and IDBT Features via Shuttle Jog Dial

DC 30 V / 13.8 V Power Supply FP-29

Photo shows optional MD-100A8X Deluxe Desk Microphone

HF 200 W All-Mode Transceiver

MARK-V FT-1000MP



IDBT BLOCK DIAGRAM

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