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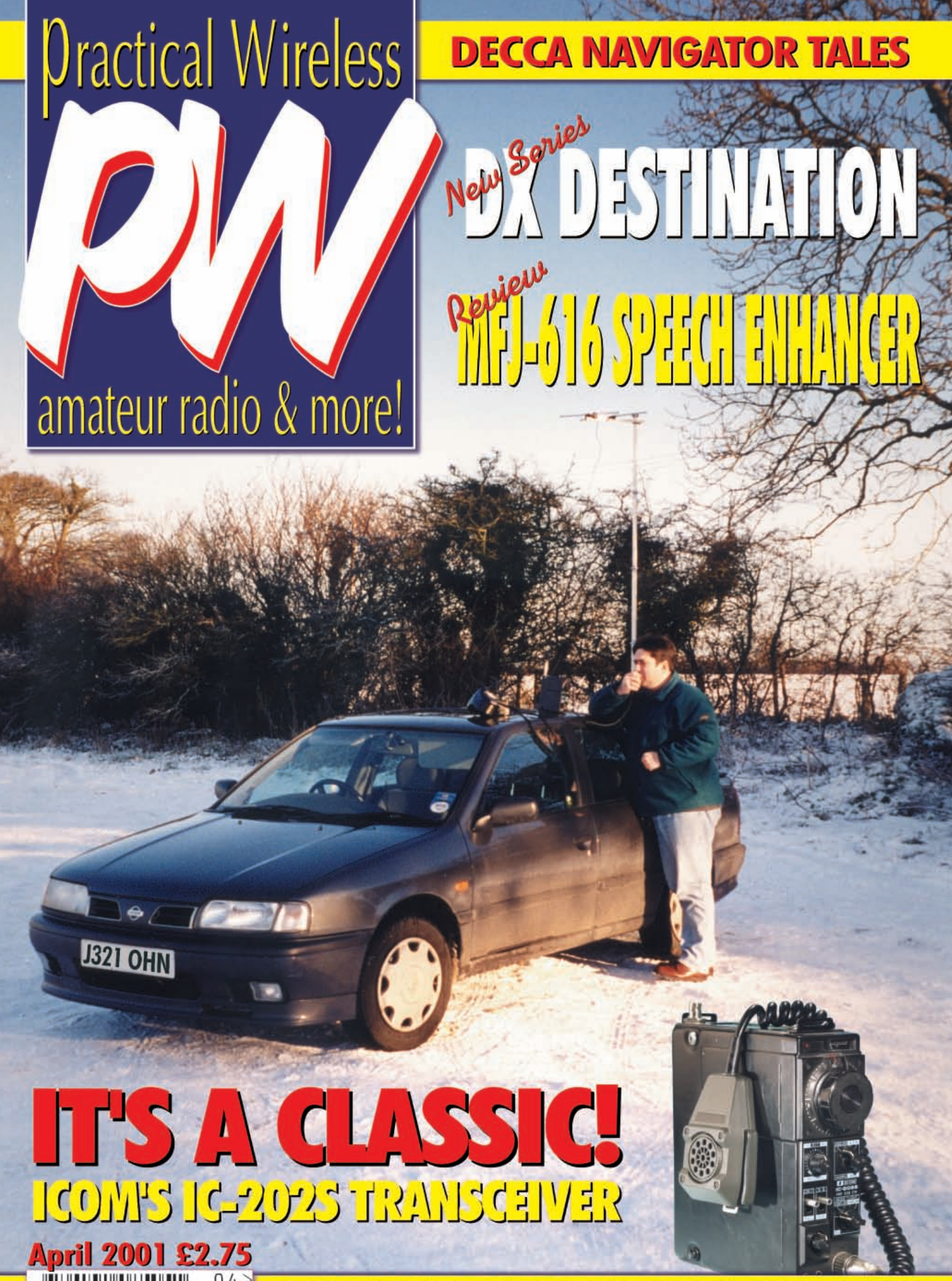

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- 25 / 12.5kHz Steps
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- AM Airband Receive
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IC-910 VHF/UHF Transceiver - Coming Soon The new IC-910 from Icom will shortly be available. 100W on 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. Phone For Details

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YAESU FT-90R Can you believe the size?

2m/70cm Dual Band

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AM Airband Receive

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- 81 Memories 25 / 12.5kHz Steps
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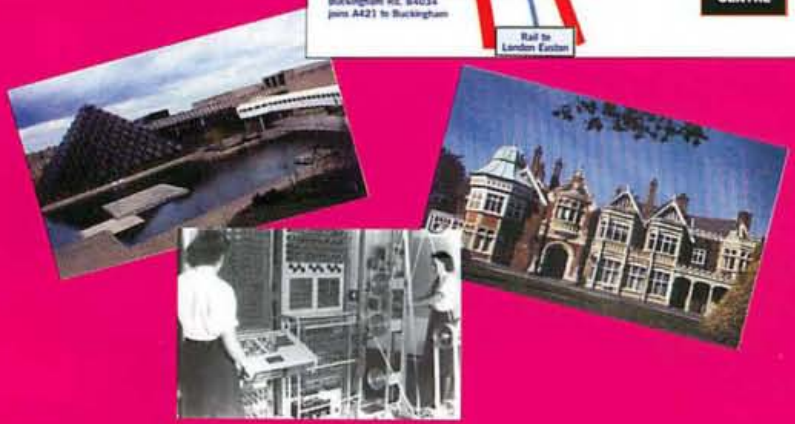

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Cover Subject
Richard Newton G0RSN spent a freezing January day at the top of Bulbarrow Hill, Dorset as he put the classic Icom IC-202S through its paces. Find out how he got on and why he thinks this classic rig is an ideal second-hand buy inside this issue.

Photograph by: **Terry Wood G7VJJ**

Design by: **John Kitching**

April features

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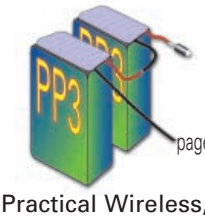

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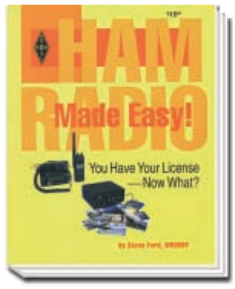
April regulars



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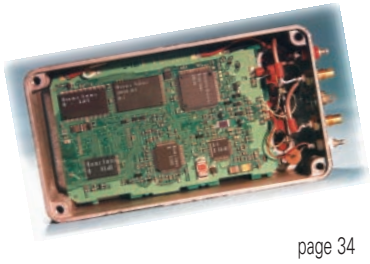

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donna vincent's keylines

Welcome to 'Keylines'! Each month we introduce topics of interest and comments on current news.

With **Rob G3XFD** taking time out from his Editor's chair to receive treatment for his arthritis in hospital I'm taking a turn in the 'chair'. Before I begin though, I'm sure you'll all join me in wishing Rob a speedy return to the office - don't worry he'll be back next month and is looking forward to meeting you at forthcoming rallies, events and club visits he has planned.

With the radio rally season now in full swing you should **all** be making the effort to support your local club's rally by going along to track those bargains down. Remember, rallies aren't just about spending money, they are great places to meet people, make new friends and share and discuss ideas with like minded folk.

Don't forget we welcome **your** ideas for articles you'd like to see published or topics you'd like covered in *PW*. So, make sure you come and have a chat when we're on the rally circuit, it doesn't matter which member of the team you talk to, your ideas will reach us. On that note, I look forward to renewing acquaintances at the RSGB Spring Show over the weekend of 7 & 8th April at Bletchley Leisure Centre - see you there!

Radio Waves

Time for a bit of a moan now. Please, please remember to include your postal address on E-mailed letters intended for publication in Radio Waves. Be assured we won't publish your full address but we do need it to be able to send your prize voucher if your letter gets into print.

Although technology is advancing at a great rate, we haven't yet worked out how to send you your voucher via E-mail in order for you to exchange it for our books at rallies, events and via mail order! So don't deprive yourself of a prize - send your address.

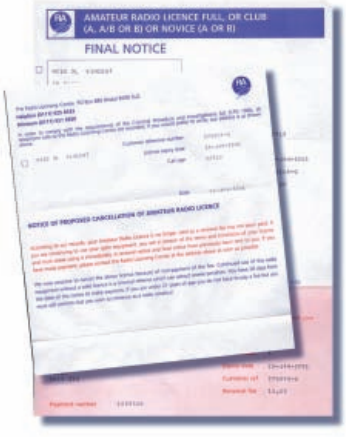
Licence Confusion

Many of us have experienced at some time or other the frustration and often annoyance at receiving a reminder to pay a bill that has already been sent off. Unfortunately due to a postal mix up the Radio Licensing Centre (RLC) have been showered with complaints from upset Amateurs calling in after receiving notification that their paid for licence has expired (proposed cancellation) or that payment is overdue! **You are not alone!** Rob and I both received notices to that effect and so contacted the RLC for their comments. **Matt Tiley**, Deputy Manager responded and here's what he had to say:

"We, at the RLC do apologise for any delays experienced by licence holders in the receipt of their renewals and validation documents. We have experienced a number of postal strikes in the Bristol Area during January. We print the first reminder six weeks before the licence's renewal date. This hopefully gives the renewal enough time to reach the licence holder before expiry of their licence.

"If there is a need to send any further reminders there is the wording 'If you have made your payment within the last two weeks, please ignore this reminder'. We are currently reviewing the layout of the reminders at this moment, and are planning to increase the prominence of this wording so as to put licence holder's minds at rest if they have already made a payment. However, if licence holders wish to give our office a call on the helpline number, they are always more than welcome to do so".

So there you go, just a case of gremlins in the system. Please don't panic if you receive a reminder after you've sent off your payment, but if you are really worried, call **0117-925 8333** to set your mind at rest.



Plenty to read

I hope you'll agree that this issue is packed with plenty for you to enjoy. Read how **G3FDC** rediscovered his love of Amateur Radio thanks to the MFJ-616 unit, relive the days of the Decca Navigator system with **GM8MMA** and find out how a trip to Russia led **G3KXF** to experience an exciting new innovation in radio. Enjoy - but remember things aren't always what they seem!

Stop Press!

Just as this issue was going to press we received news of the death of **George Jessop G6JP**, aged 93 on 11 February. George was well known in the Amateur fraternity through his work with the Radio Society of Great Britain. He was elected to the Society's council in 1968, going on to become President in 1974 and then General Manager and Secretary from 1975 to 1977.

George also wrote many books, including co-authoring *The Saga of Marconi Osram Valves* as featured in the February issue of *PW* on the News pages. Despite his failing eyesight, George served as an RSGB historian right up until his death. He will be sadly missed and our thoughts and sympathies go out to George's family and friends.

73 Donna G7TZB

practical wireless services

Just some of the services *Practical Wireless* offers to readers...

Subscriptions

Subscriptions are available at £28 per annum to UK addresses, £35 in Europe and £38 (Airsaver), £45 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Practical Wireless* and *Short Wave Magazine* are available at £55 (UK) £68 (Europe) and £74 (rest of world), £85 (airmail).

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.

Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., FREEPOST, Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **(01202) 659930**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **(01202) 659950**.

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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

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

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.

Proposed Licence Structure Changes

● **Dear Sir**

After having written in reply to the Radiocommunications Agency regarding the proposed changes to the Amateur Radio Licence structure, I've been disappointed in some of the comments I've received and heard over the air, regarding the potential introduction of the proposed Foundation Licence.

The comments have ranged from "It'll turn the hobby into CB" to as far as "We simply don't want these people on Amateur Radio". Now where have I heard those comments before?

The full proposals for the new licensing structure **have not even been formalised yet let alone published** and already it seems there is significant opposition. My own thoughts on the subject are that anything that will increase the profile of Amateur Radio here will be a good thing and assure that the hobby expands and does not wither on the vine.

Even my own 14 year old son, who has always considered Amateur Radio as an old man's game (I'm only 40!) is considering having a go for the Foundation Class Licence, and if he's successful it will mean a 100% increase in the Amateur population of my home at least!

I have personally written to the RA to compliment them on their new approach to the hobby and hope that they will continue in this direction. As for the negatives - well, remember the introduction of the 'B' licence, then later the introduction of the Novice licence, and recently of the A/B licence?

Well they didn't bring the downgrading or destruction of the hobby as many doom-mongers had loudly predicted. On the contrary, they brought in much fresh new blood to the hobby and good Radio Amateurs they turned out to be too!

Leighton Smart GW0LBI
Trelewis
South Wales

What A Surprise!

● **Dear Sir**

What a pleasant surprise! Browsing through the magazine shelves last summer in WHSmith's I chanced across the June issue of *Practical Wireless,* a magazine I had not seen or read in over 40 years!

I was looking for a magazine with a decent small ads column and at last had found one, and with proper articles on radio, past and present as well! Most contemporary magazines purportedly devoted to radio and electronics seem to be full of gimmicks and flim-flam 'how to boil a kettle quicker using 10,000 NAND gates', or some such rubbish! and nearly all their ads seem to be full of computer stuff, no valves, coils or other proper radio stuff. Here at last was a radio magazine devoted to just that.

As one who cut his wireless teeth in the days when transistors were still just a laboratory curiosity, I really enjoyed the article on valves, what memories that brought back! Having found several web sites on the 'net' devoted to vintage radio, I am encouraged to try and make a fresh start at what could be a really fascinating hobby.

What really spurred me to write to you was the issue of falling numbers of newcomers in the magazine's *Radio Waves* and by **Chris Edmonson VK3CE's** comments in his Aussie Oracle column. Certainly, the Morse Code requirement will have some effect on recruitment, but I believe there is more to it than that.

Let me explain: Before the Second World War, there were almost no commercial manufacturers of Amateur Radio equipment, so the would-be Amateur had to read up on radio theory and then get to work with soldering iron and tools and build whatever gear he needed to get going. He was, in effect, the *Complete* Radio Amateur and was deeply appreciative of what he had created.

After the war, huge quantities of ex-military equipment appeared on the surplus market, some of it requiring little or no modification to operate on the Amateur bands, thus making it easier for newcomers to get started, leading to a rapid rise in the number of licensed operators, many of whom had served in the armed forces and could appreciate radio for itself. However, the screening of the film *Convoy* and the coming of the Japanese invasion fired people's imagination and desire to just communicate, leading to the explosive rise of (at that time, illegal) CB radio.

The limitations of CB soon began to show and many decided that the effort of obtaining an Amateur Radio licence would be well worthwhile. It was the proliferation of these that, in part, led to my quitting the ranks back in 1984.

Now a new revolution has taken place, with the coming of the true mobile 'phone and the Internet, and the tumbling of 'phone line-time charges as competition hots up. So now those who just want to communicate have no need for the hassle of obtaining a licence to transmit and are departing the ranks, where they did not really belong anyway.

I'm afraid the manufacturers must also shoulder much of the blame, as it is they who have taken the magic and the technicality out of Amateur Radio operating and reduced what used to be a very absorbing hobby to the level of radio-taxi operating. Perhaps their chickens are now coming home to roost!

Why waste hundreds of pounds on a 144MHz hand-held transceiver with its extreme limitations when a mobile 'phone is cheaper and more versatile? How well I remember my very first QSO, way back in 1965, on 430MHz using the most bizarre contraption imaginable. It had taken months to build and get working, but I had done it all by myself. How many plug-in box operators can say the same?

On-air talk should be mostly to do with radio. I suspect that the only real answer to the problem of declining numbers is to try and get over the message that a simple, be it ever-so-humble, home-brewed rig can give much more personal satisfaction than the most expensive, gimmicky, feature-laden plug-in box ever made. It also provides a subject for technical discussion and interchange of ideas which, surely, differentiates Amateur Radio from the commercial kind?

After all, a radio signal is only a parcel of energy flying through space. It works equally well regardless of the level of complexity or sophistication of the apparatus generating and receiving it. And just what hope does an impecunious 12-year old would-be newcomer have when he sees every radio magazine full of adverts for must have boxes costing hundreds, nay....now thousands, of pounds? One can only hope that the steady growth of web sites devoted to old time radio, and the handful of home-brew sites, and of course, the excellent articles in *PW*, might just help to trigger a larger scale revival of true Amateur Radio, where the radio itself is every bit as important as the operating of it.

Chris Atkins (Formerly G8AFA)
Sherborne
Dorset

Memories & PCB Tips

● **Dear Sir**

I have just had my first read through the February 2000 *PW* and thought a few comments worth while. Firstly, on seeing the Editor's request for news of early readers, and although I can't go back to the first edition my introduction came when as a young teenager in the 1950s I can recall discovering *PW* amongst the magazines and papers I delivered. I think it's probably safe to confess now that one enthusiast in Birmingham always

received his *PW* a day or so late. However, I have bought my own copy for a little over 40 years!

On the subject of printed circuit boards, personally I have found the very worst way of applying etch resist is with the Dalo pens. These pens always seem to streak, blob and never produce an even cover so I use a laundry marker pen. This type is far superior to the purpose made pen and much more likely to be available in the local stationery shop.

Permanent overhead projector type marker pens are also okay. For large or medium areas a small brush and Humbrol enamel or cellulose paint works very well. The use of the senior management's nail varnish, whilst effective could prove a health hazard when the use is discovered by an angry wife! All of these resists may be cleaned off with a wet Brillo pad plus a spot of washing up liquid to leave a first class clean copper surface.

If you drill before you paint and etch, a piece of Veroboard/perf board taped to the board provides an excellent drilling template so that your in-line holes are lined up and correctly spaced. Finally, for fellow scrooges, empty, cleaned Flora or other non-metallic food containers can be re-used as etching baths and I assure you I have no connection with the manufacturers of any of the products mentioned!

I have recently moved on to use photo techniques for p.c.b.s, great fun, easy and very satisfying. Well done Editorial Team...keep up the good work at *PW.*

Brian Smith G4EQC
Burntwood
Staffordshire

Editor's comments: Interesting memories Brian! My *PW* arrived behind schedule too because the late Leo Worboys G3AFD (who became a very great friend) whose shop I bought it from...read it first! Although a very great fan of *PW*, Leo was never known to buy his own copy. Regarding the p.c.b. techniques you adopt, I too have tried a variety of etch resist delivery techniques. The main advantage of the Dalo pens is the resist can be quickly removed with aerosol switch cleaner and it provides good protection for the wanted copper tracks. Recently I to have started using Permanent marker type pens and they have proved very effective. Although the resultant etch resist markings can't be removed easily (if you make a mistake) it does seem easier to make finer tracks, etc. Finally, I've found that it's perfectly acceptable to solder through the etch resist covering to make good quality joints. Radio Basics readers will see this technique soon on a modular unit receiver I'm working on for the column.

Take A Bow

● **Dear Sir**

I would like to tell you of the excellent service that I have received from **Bowood Electronics**, in Baslow, Derbyshire.

On New Year's day, I posted a small order to them for some electronic components for a project that I was building. There was, as far as I know, no postal service on that day.

Three days later, my wife phoned me at work, and in the conversation, mentioned that a package had arrived for me. When I arrived home, I found that it was the components that I had ordered on New Years day. They were beautifully packed and the quality was excellent, and there was even a hand written note inside wishing me a happy New Year. After all the bad publicity that we hear about some suppliers, I think that these people need a mention in our magazine know that in future, Bowood Electronics will be my first port of call when looking for components. All the best to you and the *PW* team,

Jack Nelson G0DNC
Stockport
Cheshire

Editor's comments: Always pleased to hear of good service from our advertisers to our readers I duly contacted Bowood Electronics for their reaction:

Bowood Electronics' Positive Reaction!

● **Dear Sir**

Thank you for your E-mail regarding Jack Nelson's letter. Our first reaction was Wow! what a letter! Being a new company and *PW* advertiser we are delighted with Mr. Nelson's comments. With regard to the information you require on our staff and history, I'm one of the Directors along with my son Benjamin. My wife Janet and daughter Catherine also help me with the administration.

I have been employed selling electronic components for 27 years prior to setting up my own business last Summer. Our aim is to provide a service to radio and electronics enthusiasts by trading at radio rallies, providing a mail order service through advertising and having our own website which is currently under construction. With our best wishes to the *PW* team's health and happiness in the coming year. Regards.

Will Outram
Director
Bowood Electronics

● 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.

March 11
The 16th Wythall Radio & Computer Rally
Contact: Chris G0EYO
Telephone: 0121-246 7267
E-mail: chris@g0eyo.freeserve.co.uk
Takes place at Wythall Park, Silver Street, Wythall, near Birmingham on the A435, just two miles from J3 on the M42. Doors open from 1000-1600 and admission is £1.50. There will be plenty of traders, a bar and refreshments, plus a big Bring & Buy stand and talk-in on S22. There will also be a unique free park and ride for easy and comfortable parking.

March 17
The 8th West Wales Amateur Radio & Computer Rally
Contact: Ray GW7AGG
Telephone: (01686) 628778
E-mail: enquiries@mwmg.demon.co.uk
Demonstrations on h.f., v.h.f., packet on the air, amateur radio and computer traders, Bring & Buy, clubs, special interest groups and catering facilities will all feature at the West Wales rally which is being held at Penparcau School, Aberystwyth. Doors open 1000-1530 and admission is £1. There are good parking facilities with easy access for disabled visitors and traders.

March 17
Junction 28 QRP Convention
Contact: Duncan G4DFV
Telephone: (01623) 465443
Website: www.qsl.net/snadarc
In association with the G-QRP Club the South Normanton Alfreton & District Amateur Radio Club are proud to present this new rally for 2001. The event will be held in the Village Hall Community Centre, Market Street, South Normanton (near Alfreton), Derbyshire. Situated just five mins from M1 junction 28 and the A38. Billed as a traditional radio event (no computers), it will feature a variety of component suppliers, kit dealers, vintage and radio surplus and special interest groups. There will also be lectures during the day by leading Amateur Radio personalities. Hot and cold food and drinks will be available and there will also be a licensed bar. Free parking, talk-in on S22. Doors open 1000 and admission is £1.

March 18
The Bournemouth Radio Society's Annual Sale
Contact: Olive and Frank
Telephone: (01202) 887721
This sale now in its 14th year will be held at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth from 1000 until 1600 today. Visitors will find Amateur radio, computer and television traders, accessory traders, antenna suppliers and a Bring & Buy stall. There will also be specialised groups and clubs attending. Talk-in from G1BRS on 144MHz S22. Admission just £1. Home-made refreshments available.

March 18
The Norbreck Amateur Radio, Electronics & Computing Exhibition
Contact: Peter Denton G6CGF
Telephone: 0151-630 5790.
Organised by the Northern Amateur Radio Societies Association (NARSA) this show will be held at the Norbreck Castle Exhibition Centre, Blackpool. Don't miss the largest single day exhibition in the country. Morse tests will be available on demand.

April 21/22
The London Amateur Radio & Computer Show
Tel: (01923) 893929
This year's London show will take place at a new venue. The show will take place at Alexandra Palace, Wood Green, London N22. There promises to be the usual mix of traders, specialist interest groups and bargains too. Look out for *PW, SWM* and *Radio Active* representatives at the show.

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

amateur radio **news**

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

Antennas for Roaming

New HF Antennas

Looking for an antenna that works from 3.5-50MHz, that's fully portable and will fit in your pocket? Look no further.

Waters & Stanton PLC have recently introduced a range of portable h.f. antennas. Although primarily designed for use with the new FT-817, the range is suitable for use with any other low power portable transceiver.

The ATX Walkabout antenna is designed for use on all bands from 3.5-50MHz as well as the WARC bands. This telescopic antenna measures approximately 1.65m long and is fitted with a BNC connector, making it ideal for the new FT-817 or any other QRP portable radio.

To change bands, all you have to do is plug the 'wander lead' into the appropriate socket on the base coil and fine tuning adjustments are made using the 10 section telescopic whip. The whip unscrews from the base matching coil. When packed down, the antenna measures only 32cm. The ATX Walkabout is currently available for £69.95.

In addition to the ATX antenna, W&S have also introduced a range of single band models for use on any band between 3.5 and 50MHz. The antennas in the AT range are similar in dimension and specification to the ATX Walkabout. For further details and prices contact Waters & Stanton direct.

Waters & Stanton PLC,
22 Main Road,
Hockley,
Essex,
SS5 4QS
Tel: (01702) 206835
FAX: (01702) 205843
E-mail: info@wsplc.demon.co.uk
Website: www.wsplc.com

Lost but not forgotten!

Calling all M5s

Have you been neglecting your QSL cards? If so read on....

Graham Ridgeway G8UYD/M5AAV The Radio Society of Great Britain's QSL Sub Manager for the M5 series of calls would like to remind *PW* readers to collect QSL cards that are waiting for them at the bureau. If you are unsure as to whether you have any cards or not, check Graham's website at **http://www.users.zetnet.co.uk/g8uyd/** Remember you **do not** have to be a RSGB member to collect cards.

Expedition news

Minkies Boys On Air

The Minkies Boys are making plans to take part in the 2001 Islands On The Air (IOTA) contest.

The expedition team known as the Minkies Boys will be operating from Isle de Sein EU-068 in a bid to take part in this year's IOTA contest. The island is in CQ Zone 14, ITU Zone 27, Latitude. 48°02N, Longtitude. 04°51W, Locator IN78NA, DIFM AT-007 & DDFM 29 and is situated off the Guernsey coast.

The Minkies team will be under the co-ordination of **Wilfried ON4AVA**. The full team is yet to be announced, but many of those taking part will have been on previous expeditions, including The Minkies Reef (Plateau des Minquiers) in 1997, Guernsey in 1998, Ouessant in 1999 and last year to the Isle de Sein. In 1999 the Minkies Boys were placed seventh world-wide out of the Island participants and hope to improve on their achievements this year.

The team are currently looking for forms of sponsorship to help with the financing of the expedition, either financially or by the loan of specialist equipment. Anyone who sponsors the team will be credited in the form of publicity on the four-sided full colour QSL card sent for all contacts made. If anyone feels they can help they should contact **Bill Abrahams ON9CGB G0MEU** direct.

Bill Abrahams ON9CGB G0MEU
P.B. 38,
B-8510 Marke,
Belgium
Tel: +32 056-210 924
FAX: +32 056-226 014
E-mail: on9cgb@qsl.net
Website: http://www.qsl.net/on6ck

A great day out

Vintage Wireless and so much more!

If you've never visited the Amberley working museum then make this the year you do!

The Amberley working museum is described as Sussex's best kept secret. Nestling under the South Downs on the site of former chalk pits the 36 acre site boasts hundreds of exhibits including vintage wireless, telephone exchange, printing works, narrow guage railway, SEEBOARD electricity hall and traditional arts and crafts to name just a few.

Wednesday 14 March sees the Museum open its doors to visitors for the first time this year. The planned programme of special events for 2001 promises some interesting and fascinating insights into a variety of activities and working practices. Events to look out for include:

- Science Week - 16 - 26th March
- Collectors Weekend, everything from dolls to penknives - 9/10th June
- The All Electric Show, early gadgets and vintage radio - 23/24th June
- AEC Bus Show - 16 September

Admission to the Amberley Working Museum is £6.50 for adults, £5.80 for over 60s and students and £3.50 for children aged 5-16, under 5s - free. So go on make a day of it - there's something for all the family to enjoy! We advise you to check open times before setting off.

Amberley Working Museum, Amberley,
Near Arundel, West Sussex BN18 9LT
Tel: (01798) 831370
FAX: (01798) 831831
E-mail: office@amberleymuseum.co.uk
Website: www.amberleymuseum.co.uk

Time for a party!

Join in the Fun

In a bid to encourage newcomers to Morse operating the European c.w. association, FISTS CW club invites you to a party.

The EU/FISTS QRS party contest takes place from 0001 hours on **Sunday 22 April** until 2359 hours on **Saturday 28 April**. This event provides an opportunity for EUCW club members and non members to meet and exchange greetings, as well as working towards the prestigious **Worked EUCW Award**.

Although not a contest in the true sense the EUCW/FISTS CW club party concentrates on the element of taking part more so than winning. However, it does give those with a thirst for a challenge the opportunity to win awards.

Taking place on all-bands except WARC using c.w. only, participants may use any type of Morse key except pre-programmed computers or keyers. The speed of the QSO should be determined by the speed of the slower station and not at more than 14w.p.m.

The call used during the contest must be QRS/EUCW and stations may be worked or logged once a day in each band used. To qualify for an award logs must contain date, UTC, band, call worked, info sent/received and score claimed for each QSO. Scoring is determined in the following way:

Classes/Scoring

A Members of EUCW clubs using more than 10W input or 5W output power.

B Members of EUCW clubs using QRP (10W input or 5W output or less).

C Non-members of EUCW clubs using any power

D Short wave listeners.

Class A/B/C - One point per QSo with own country, 3 points per QSO with other European countries.

Class D - Three points for complete logged QSO.

Multiplier - All classes: 1 multiplier point for each EUCW club worked/logged per day and band.

Completed logs together with a summary, which must include entrant's full name, call and address, EUCW club, class entered, multiplier claimed, total points claimed, station details, including type of key used, power used, comments, one vote for Most readable Morse heard and signature should be sent to the Contest Manager.

Keith Farthing M0CLO,
FISTS/EUCW Contest Manager,
85 Colnailhurst Avenue,
Braintree, Essex CM7 5PY
E-mail keithm0clo@hotmail.com

amateur radio clubs

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

CHESHIRE

Mid-Cheshire Amateur Radio Society
Contact: Niall Reilly G0VOK
Tel: (01606) 871413
Website: www.midcars.co.uk
Meetings are held at Cotebrook Village Hall, just off the A49, between the Fox & Barrel and Alvanley Arms, at 2000 hours every Wednesday. The club offers lots of activities and events and are a registered RAE & NRAE exam centre. Visitors and new members always welcome .

DORSET

Poole Radio Society
Contact: Phil Mayer G0KKL
Tel: (01202) 700903
Website: www.pawns.co.uk/PRAS/prs-start.html
The Poole club meets on the 2nd Friday of the month. Main meetings are usually held in Lady Russell Cotes House, Bournemouth & Poole College of Further Education, Constitution Hill Site, Poole at 1930 hours Other activities usually take place in the nearby shack on the same site unless mentioned. The planned programme of events inlcude: Natter (shack) on **27 April**; Operating (shack) on **4 May** and Geoff's Challenge - construction contest on **11 May**.

MIDDLESEX

Edgware & District Radio Society
Contact: Bill G0STR QTHR or David G5HY QTHR
Tel: (02089) 581255 evenings or (01923) 655284 days/(02089) 549180 evenings.
The Edgware club meets at 2000 hours every other Thursday at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. All visitors are welcome so why not go along?

NORTHERN IRELAND

Glengormley Electronics Amateur Radio Society
Contact: Charlie GI4FUE
Tel: (02893) 351903 or (07909) 686396
Website: www.gn0xyz.com
The Glengormley Club meet at Glengormley High School, Room 18F, 134 Ballyclare Road, Glengormley BT36 8HP. Forthcoming events to look out for are: Natter night on **12 March**; Operation from Donaghadee festival as GB0DDF on **16/17th March**; Talk on vintage radio restoration by Brian GI4KEQ on **26 March** and a proposed quiz night in Maloneys Restaurant, Ballyclare Road, phone or visit website for details on **9 April**.

SUSSEX

QRZ Amateur Radio Group of Sussex
Contact: Stuart Constable M0CHW
Tel: (01435) 863020
Website: QRZargos@demon.uk
The QRZ Amateur Radio Group of Sussex (QRZ ARGOS) meets at 2000 on the second Friday of each month at the Community Hall, The Coach Park, Wartling Road, Eastbourne (near the Sovereign Centre). The club hold a project evening each month and offer a varied programme of events and topical talks. Evenings of interest coming up are: Valve Development - the early years by Barry Vyse, co-author with George Jessop G6JP of The Saga of Marconi Osram Valve on **6 April**, Antennas by Peter Dodd G3LDO on **11 May** and Development of Rocketry during World War Two, by John Betlake, former curator of Space Technology at the Science Museum, London on **8 June**.

Keep those details coming in!

amateur radio trade

Repeater system goes abroad

Sierra Leone supplied by SMC

South Midlands Communications Ltd. (SMC) recently supplied a v.h.f. multi repeater system to a UK governmental department in Sierra Leone.

Hampshire based South Midlands Communications Ltd., having previously supplied equipment to the troubled areas Sierra Leone were recently approached to supply a multi repeater system. The equipment comprised of the SMC Eclipse repeater fitted with 60W transmitters and configured for 100% duty cycle operation.

Reports from the region stated that during the troubles, the SMC system out-performed all other communications equipment in the area and was utilised by several UK agencies. For further details, please contact:

Mr Bill Simons,
South Midlands Communications Ltd.,
S M House,
School Close,
Chandlers Ford Industrial Estate,
Eastleigh, Hampshire SO53 4BY
Tel: (0238) 024 6200
Fax: (0238) 024 6206
Email: sales@smc-comms.com
Website: www.smc-comms.com

Essential novice pack

Get Started With Lake

Get started in radio with Lake Electronics' new Starter pack

As the Novice RAE course involves several practical projects which require the use of various small components Alan Lake has recently added a Starter pack to his range.

Each Starter pack contains essential ingredients to complete many of the projects, including stripboard, small bulb with holder, battery holders, resistors etc., together with generous lengths of connecting wire and solder. Priced at just **£4.60 plus £1 P&P** the pack is affordable as well as being useful. If you order one or more kits the postage is free.

In addition to the new Starter pack, Lake are also stocking a selection of low-priced small tools, ideal for the newcomer to the hobby. These include pliers, side-cutters and a soldering iron. For details of the full kit range, prices and selection of tools send an s.a.s.e. to:

Lake Electronics, 7 Middleton Close,
Nuthall, Nottingham NG16 1BX
Tel: 0115-938 2509
E-mail: g4dvw@btinternet.com
Website: www.lake-electronics.co.uk

Radio Basics

You might think that the simple little project on offer from Rob Mannion G3XFD is rather 'tongue in cheek' - but you'll find it very helpful. So, get busy...it could be just what the doctor ordered!

Amongst the large number of letters and queries I've had from readers who follow the Radio Basics (RB) series in the last few years relates to the problems associated with radio frequency projects. And almost without exception, the problems encountered have been due to the constructor's lack of practical experience, knowledge and suitable test equipment.

Obviously, I'm, not criticising anyone for not having a go - no, instead it's my intention to do my best to help you all. Fortunately, together we can soon overcome the lack of experience and knowledge...that's the job of any radio hobby magazine and in particular the RB series.

This month's project is also - in it's very simple way - aimed at adding an extremely simple item of test equipment...and one with a memorable name! The name - the Spatula - is intended to be humorous of course, but also draw attention to how it's used.

Remember those trips to the doctor's surgery many years ago...when they depressed your tongue and asked you to say "Aaah" whilst the physician examined your throat? Well, that simple wooden spatula - now replaced by a plastic version - allowed the physician to get a valuable look at the patient's throat, one of the human body's natural 'windows' to assess problems.

In the same way as the doctor's tongue depressor the RB Spatula Mk1 - more about MkII later - allows for closer unobstructed examination for possible problems. However, whereas the physician's tongue depressor permits unobstructed viewing of a possible sore throat and swollen lymph nodes - the RB Spatula provides an excellent method of checking for the presence of radio frequency (r.f.) energy.

Readers who have followed the RB series from the beginning will remember that in the past I've suggested the use of a home-made r.f. 'sniffer' device using self-supporting coils of wire together with a diode, **Fig. 1**. The diode rectifies the very small amount of r.f. energy enabling the current provided to me monitored on a sensitive multimeter and this is the same circuit used by the RB Spatula.

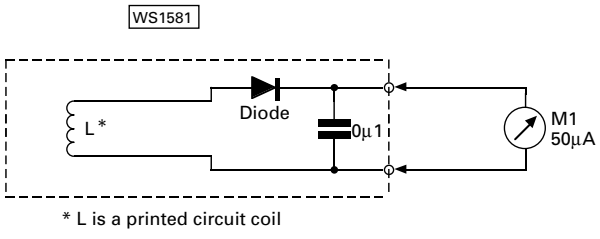
● Fig. 2: Photograph of the RB Spatula project showing etched and un-etched designs. The p.c.b. design lay outs allows for the diode to be connected in circuit from the centre of the etched winding of the sensing coil to the meter connection (long strip p.c.b. version), thus providing the necessary link. Alternatively, the diode can be placed in circuit as shown in the version made using a hardwood handle (see text).

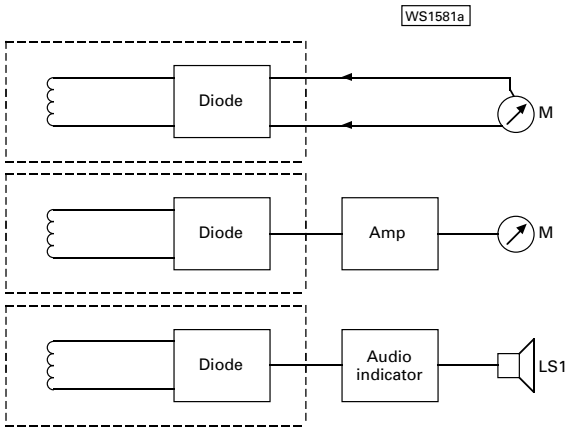
Any signal diode will work well in the circuit. However, to make sure you've got a really good sample (they can vary in performance) I suggest you choose one which provides good results in a crystal set circuit.

The circuit is about as simple as can be, although the accompanying block diagrams show the later stages of the project. These later add-on stages will provide amplification to increase the sensitivity of the instrument using a single transistor, and final refinement will add a special form of audio indication

However, although the effective little 'sniffer' gadgets **do work well**, several readers have written in to me asking for help because of that so common problem...winding coils. So, that's the reasons

● Fig. 1: The circuit for the Radio Basics Spatula radio frequency sensing device which can use a dedicated 50µA meter or can be used with a multimeter. Also shown are the block diagrams showing future additions to the circuit to increase sensitivity and provide audio indication of the presence of an r.f. signal (see text).





why the RB Spatula came into being.

No Coil Winding!

Because so many less experienced constructors - along with some of the more experienced! - have difficulties in winding coils, I realised eliminating the coil winding had to be the first consideration. Achieving this goal proved to be extremely simple and the answer provided other advantages!

The photograph, **Fig. 2**, clearly shows how I overcame the coil winding problems...by using printed circuit board (p.c.b.) techniques. But oh dear! - I can imagine the groans from some of our readers who might be thinking "There he goes again...suggesting p.c.b. techniques...and I don't have any experience with etching".

Well, reluctant readers, I can assure you that the Spatula MkI **is an absolutely ideal project to start making your own p.c.b. designs**. Additionally, by using a pick up coil which is effect an etched copper track instead of a coil of wire...you'll be able to make it very thin indeed. This will in itself also make the use of the Spatula between coils and components because it is so thin.

You'll have several choices on how the Spatula can be fabricated - it's up to you to choose and it may well depend on what p.c.b. material there is to hand. In Fig. 1, you'll see a ready-to-etch p.c.b. design for an all-in-one Spatula which only requires a simple strip of p.c./b. material.

In the strip version the end opposite to the p.c.b. etched design coil provides the handle. Note that their are two possible locations for the diode, Fig. 2, to be placed into the circuit - it can be used, very conveniently, to provide the jumper link between the centre of the p.c.b. coil or be placed in circuit half way up the strip towards the end where you hold the gadget.

Using the long strip for the Spatula is convenient, although not that elegant. However, in the MkII version which is under development now, I'm planning to provide you with a simple little add-on integrated circuit project to provide audio indication of the presence of r.f. So, you may prefer to make the strip version...or perhaps be adventurous and make several types!

The second method, also shown in Fig. 2, can conveniently use one of those small pieces of p.c.b. scrap which seem never to be thrown away. The photograph shows one of the etched p.c.b. coils mounted on to the end of a rather neat hardwood chopstick, provided at Chinese restaurants. Even though I can't use chopsticks...waste not want not!

Making The PCB

Making the p.c.b. is simplicity itself and I encourage you to have a go. To help, I suggest that you refer to RB in the February 2001 *PW* where I discuss sources, techniques and materials you'll need.

Using an etch resist pen you can soon trace out the required designs on to the p.c.b. material. Note that in **Fig. 3** I've demonstrated two designs - the spiral track is fine if you have a really steady hand! However, if you're not too steady - like me - try the rectangular track design. Either design will work well enough for our purposes.

Using the Spatula

Using the Spatula is simplicity itself and it can be used with either a dedicated 50µA meter or a multimeter set to the same range. Suitable meters are frequently found at rallies and Amateur Radio shows for £2 or so - often calibrated in volume units (vu) for small tape recorders.

Firstly, because the resultant etched coil is not insulated and could cause short circuits - you should insulate the etched copper track coil winding with a square of pvc insulating tape. Even with the tape in place the coil will still be extremely thin.

To test for the presence of r.f. all you have to do is to place the coil end very near to the circuitry which you wish to check for r.f. activity. If you're using a switch selected instrument, make sure it's set to a high reading 10mA or so), and then reduce the full scale deflection (f.s.d.) range until you get a good deflection. If using a dedicated 50µA meter...be prepared to move the Spatula promptly to reduce the risk of damaging the meter.

With care you should now be able to prove whether or not a regenerative oscillator/detector is working or whether or not it's oscillating uncontrollably. To do this - place the coil very near to the oscillator/detector coils and adjust the receiver's reaction/regeneration control. When the circuit passes the point where it oscillates (the threshold) you should be able to see an indication on the Spatula's meter as r.f. energy is radiated from the circuitry.

● Fig. 3: A clear look at two of the coil designs. Choose the design you feel happiest to draw!

If you find that the receiver's circuitry is radiating all the time - even when the reaction/regeneration controls are rotated fully in either direction - there's a fault to be investigated on the receiver. Usually, the fault will be caused by too much feed-back, and this is often caused by too many turns on a reaction/regeneration coil, or poor screening between stages.

In practice you'll find the Spatula very useful, especially if you don't own many test instruments. Believe it or not it can even help with troublesome audio amplifier circuits!

If, for example, you've just built an audio amplifier using an integrated circuit (LM380, 384, etc.) and find it's producing very squeaky audio with howls and whistles...r.f. oscillation could be the trouble. Placing the Spatula coil near to the i.c. may produce quite a strong reading on the meter. If it does...you've got an r.f. oscillator-audio amplifier unit! (Another clue is the fact that the i.c. will be running very warm indeed and taking more current than expected). Extra 0.1µF decoupling capcitors, or a small ferrite bead on the i.c. input should cure the problem.

So, there you have it...Spatula MkI. A useful little gadget to have around... ideal for fault finding, transmitter setting-up and many other jobs. Later on this year I'll show you how it can become even more useful...but in the meantime I hope you find it helpful in your workshop. *PW*

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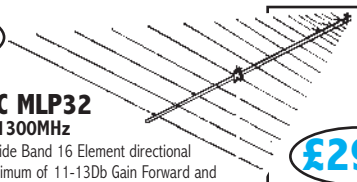

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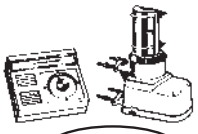

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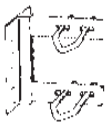

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Tex's Tips & Topics

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!

Back in the February Tips & Topics column, **Jim Brown G0KZV** sent in an idea using a plug-top power supply to replace the unusual 15V battery that is used in the AVO model 8 and 9 series of multimeters. This battery is both difficult to find and can be more expensive than many users are willing to pay. Jim's idea (p13 February *PW*) had the advantage of using a simple p.s.u. to create the 15V needed, but it meant that the meter was dependent on nearby mains for operation on the higher resistance ranges.

From **Ben Nock G4BXD** comes an idea that should restore the portability back to the meter when used on the higher resistance ranges. Ben says that he uses two series connected 9V batteries (see **Fig. 1**) with five small silicon diodes in line to reduce the voltage from the nominal 18V to the required 15V. A good idea Ben, and they should last rather a long time.

I would also advise anyone using this technique to check the state of the batteries every month. As the capacity is well in excess of the original battery, they will probably last a very long time. So long in fact, that you'll most likely forget them and they'll start to physically disintegrate, making a mess in the battery housing and corroding the contacts.

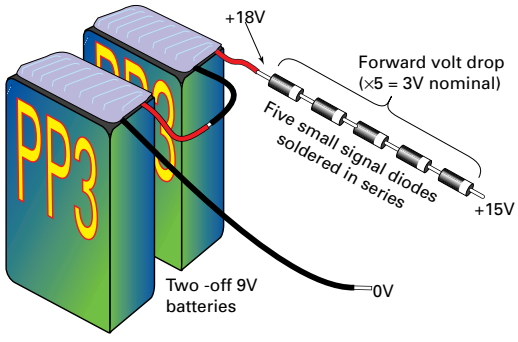

Fig. 1: A simple method of achieving a 15V supply from two small 9V batteries from G4BXD.

Paint Remover

Now a simple trick for removing paint from around proposed chassis earthing point, that has arrived on my desk from **Godfrey Manning G4GLM**, columnist for sister publication *Short Wave Magazine*. Godfrey says that trying to grind away the paint on boxes to allow a good connection for an earthing point is now a thing of the past with him.

The secret is to use a small amount of an Acrylic paint remover, but the secret is in how it's done. "Drill a small pilot hole in the position of the tag (no more than 2mm diameter). Then block the outside of the hole with Blutack. Next, using a washer with a hole just slightly larger than the tag body, glue it in place (centred on the pilot hole) inside the chassis. The glue I use is Pritt Stick."

Godfrey went on to say "Gently and momentarily press the release of the paint remover release knob, to allow a small blob of the sticky remover to ooze out onto cotton wool then quickly apply it to the hole in the washer, pressing it into place. At this point the paint will start to fizz, bubble and then lift off the underlying metal.

"At this stage wash quickly under a briskly running hot water tap to stop the process. The paint should now have separated from the metal and may be removed with a fingernail or a small wooden spatula. Drill out the hole to the correct size and fit the nut bolt and tag as required". A simple idea Godfrey, but one that will improve the look of a home-brew project no end.

UB40 Jig

Now another simple idea for the home-brewer. This one is from **Peter Macbeath**, which he calls The UB40 Jig. This jig needs the minimum of tools to make, is very cheap and makes assembling components in a p.c.b. very much less prone to drop out as you turn the board over.

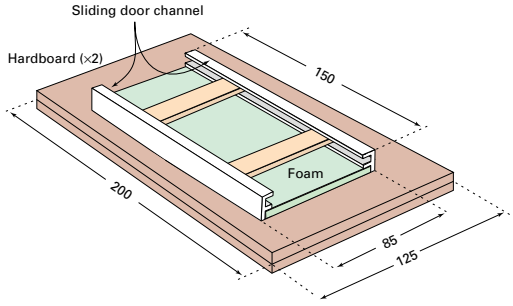

Fig. 2: Component soldering made easy with this UB40 Jig from Peter Macbeath.

Look at the illustration of **Fig. 2**. The base is formed from two pieces of hardboard about 200×125mm in size. The top piece has an oblong hole cut on it, around 85mm wide and 150mm long. Two lengths of plastic (or metal) sliding door channel material are stuck into place along opposite long sides.

A small piece of foam material about 10mm or so thick is stuck into the hole too. To form the clamps, two short lengths of either a thin plastic, or wooden material are cut to length to fit across the two upper channels. These should be able to slide freely along the jig, but should not fall out at all.

In use, the components to be soldered in place, should be pushed though their correct holes on the p.c.b. and then, holding the p.c.b with the components uppermost, place the foam side of the jig (upside down) on top of the pc.b. Pressing the p.c.b. into the foam, invert the pair and then press down the p.c.b. sufficiently to allow the clamping pieces to be put over the edge of the p.c.b.

Now you can take your time to solder and check each solder joint on the component legs before clipping the excess wires. You can repeat the process until all the components have been fitted to the board. The only problem may occur if the soldering iron is too hot, or held in place for too long, then you can melt some of the foam. Be careful, foam can give off some rather noxious substances.

Final Tip

My final tip is from **James Brett**, who says: "The correct way to feed a dipole antenna is with a balanced connection. It is not always convenient to mount a balun on the centre point of a wire dipole to be able to use a coaxial cable down lead.

"The best solution is a twin feeder to the balun which can be boxed and mounted conveniently or fitted as part of the a.t.u. A very suitable balanced feeder is found in heavy duty loudspeaker cables having the figure of eight cross section.

"A cable with two cables made up of 79 strands of 0.2mm diameter copper wire, is available from Maplin and other audio and electronics shops is ideal. My calculations show that the characteristic impedance is around 70Ω which ensures a good match to a simple wire dipole. The multi-strand construction of the cables gives plenty of flexibility."

Well, that's all I have space for this time so, £5 book vouchers all around for each of the tips. And the extra voucher winner is - well I have to admit that my favourite is the tip from Peter Macbeath who gets the extra £5 voucher. The reason is because I've often hunted on the floor for small components that have made a bid for freedom on turning the p.c.b. over. That said, congratulations all! See you next time.

Tex

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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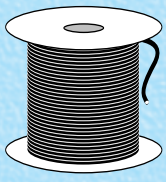

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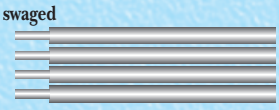

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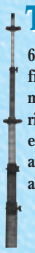

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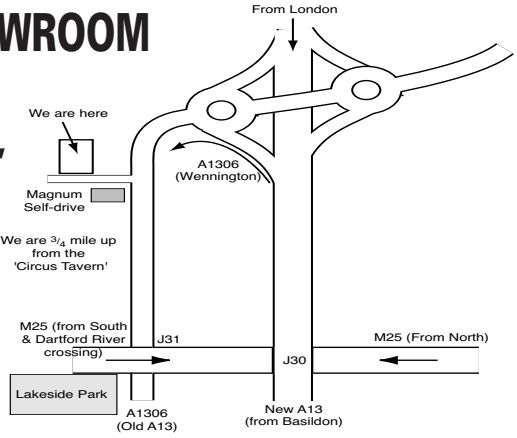

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MFJ-616 Speech Intelligibility Enhancer

The Rev. Hubert Makin G3FDC had been searching for equipment to restore his enjoyment of Amateur Radio previously denied him by deafness. Upon purchasing an MFJ-616 he was soon on his way to enjoying Amateur Radio again.

My experiences with the MFJ-616 began when the Editor of *PW* sent me some information on a new unit from MFJ. The Editor knew of my problems and the great interest shown by *PW* readers following the publication of my letter entitled 'Hearing Problems' in the May 1999 issue of *PW*.

Along with the information on the MFJ-616 came the following statement: "I almost gave up my ham radio hobby" said **Martin Jue K5FLU** the President and Founder of MFJ Enterprises. "It got to where I was troubled carrying on QSOs. I could hear, but I just couldn't quite make out all the words. My hearing problem almost put a stop to my life-long hobby. There was no way I was going to give up ham radio. Research showed me what to do".

The MFJ-616 owned by the Rev.. Hubert Makin G3FDC which has proved a great help in restoring the pleasure of Amateur Radio to someone afflicted by the burden of deafness.

Attitudes Puzzling

The attitudes towards the deaf are completely puzzling. I have never understood why blindness arouses instant and universal sympathy and a desire to help, whilst to be hard-of-hearing seems to cause some hostility and avoidance of the sufferer. After all when you cannot hear what is being said, you're completely cut off from people.

Fortunately most Radio Amateurs are clear speakers but there are some who talk as if they have a rag in their mouth. I've experienced some irritation because I could not hear what was being said in a QSO, but the irritated chaps and ladies will not accept it when I say: "But I've heard those words clearly in previous QSOs so, doesn't it suggest that it's you who is not a clear speaker"?

I think that **all** Radio Amateurs, as a matter of courtesy, should be aware of the clarity of their speech by recording their spoken voice or by asking their friends. This applies to all who use the telephone and the commentators on radio and television.

For example, it's surprising how many commentators on the Open University programmes have poor clarity of speech. I would have thought that the producers would make sure that they employed those with good quality speech.

Hearing Damaged

My hearing was damaged at sea during the Second World War. I was in the Royal Navy Volunteer (Wireless) Reserve, (RNV(W)R) before the War and was called up just before war was declared in 1939.

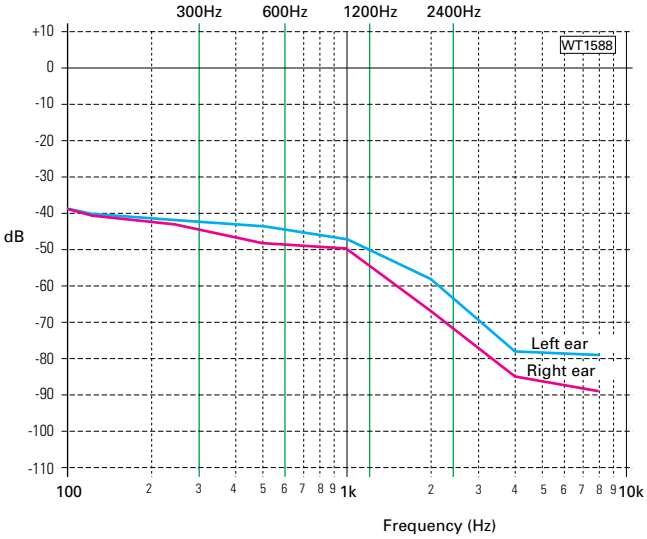
I was at sea within two weeks as a Telegraphist on a mine sweeping trawler, HMT *Stella Rigel*, based at Harwich, and experienced a lot of enemy action. After three years at sea I was declared unfit for sea duties. This was because my wireless cabin had been built underneath the gun platform, (a silly place to build a wireless cabin!) and I became what we called 'bomb happy' and was unable to distinguish between two or more Morse signals coming through. Tinnitus (noises in the ear) also made it more difficult.

After about six months in hospital, I was sent to teach radio at Portsmouth Technical College (Navy Division) although we were billeted in the Grammar School. I was eventually demobbed as a Petty Officer Radio Mechanic after working in charge of radio communication on a Radar Development and Training Squadron in the Fleet Air Arm.

Unfortunately, my hearing and other symptoms got worse and I was eventually awarded a War Pension. Nowadays I can hear the noise but cannot distinguish between two sounds and this makes being on the air with Amateur Radio and being in a group of people very difficult.

Like many other people, my life has been a difficult one because of the Second World War. Nevertheless, Amateur Radio has been a consuming passion!

Fig. 1: The plotted audiology report graph which illustrates Hubert G3FDC's hearing impairment (see text).



Most of my time in Amateur Radio has been spent in constructing all my apparatus. My station was all home constructed until the advent of s.s.b. when I acquired a KW Viceroy which has been very much modified. I still have an all-valve rig, mainly because of my failing sight, although a lot of my ancillary apparatus is solid state.

After graduation as a Communicating Scientist I became Head of Science at a large secondary school and taught the Radio Amateurs' Examination at night school for about 30 years. At the age of 60, some 20 years ago, I retired and was ordained in the Church of England.

Experimenting For Years

I've been experimenting for years in an effort to restore my hearing curve to what it ought to be, using electronic enhanced audio. I thought it would be just a case of restoring the lost decibels of my hearing curve as plotted by the local hospital audiology department.

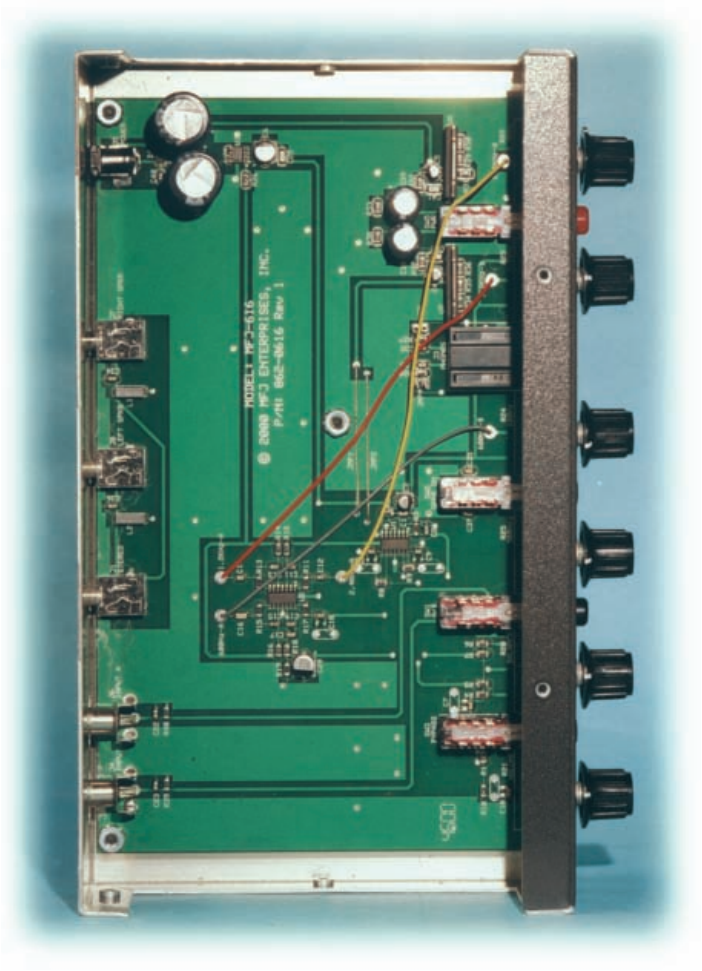
I tried to build selective amplifiers based on the 741 operational amplifier. But I was not clever enough to obtain an adequate flat top on the response curve, using just resistors and capacitors.

It took me a long time, though, to realise that our hearing has a large subjective content. For example, my wife has been very hard-of-hearing since she was a girl, and her hearing is much worse than mine (according to the plotted audiology graph). However, she often is able to tell me what people say when I cannot make them out.

Hard-of-hearing Radio Amateurs suffer an additional restraint in not being able to **use their sight to aid their hearing**. An example of what I mean is that if I can see subtitles on Television, I can usually hear what's being said. Something queer is going on in the brain, so I had to abandon the decibel approach and think on other lines and that's how I came to buy the MFJ-616.

Intelligibility Enhancer

The MFJ-616 Speech Intelligibility Enhancer (SIE) unit helps to make speech clearer with electronically enhanced audio. It's designed to drive two identical high quality speakers installed a metre or so apart. This configuration improves intelligibility by enhancing frequency response.



● Fig. 3: Deceptively simple inside, the MFJ-616 has proved very helpful to G3FDC (see text).

Every radio or TV receiver has different audio characteristics and everyone's hearing response changes over time. This SIE unit tailors the sounds especially for the individual's hearing.

The audio band is split into four overlapping octave ranges centred at 300, 600, 1200 and 2400Hz. Each range can be attenuated or boosted by about 20dB to give full control.

Two powerful monolithic integrated circuit (i.c.) amplifiers deliver deep, rich and undistorted audio to high quality speakers (not supplied) A front-panel balance control aligns the speakers for dead-centre positioning, regardless of speaker placement or differences in ear sensitivity. This allows the user to equalise the perceived loudness to each ear.

There's a jack socket for headphones which are normally attenuated and two inputs which enables the user to switch between rigs with the press of a button. Also provided is a bypass function, **a very useful device**, to compare the source audio with the enhanced audio by pressing the button.

Personally, I would have thought that a power supply would have been included with, or within, the MFJ-616. There is certainly plenty of room in the case for a transformer, rectifier and filter components.

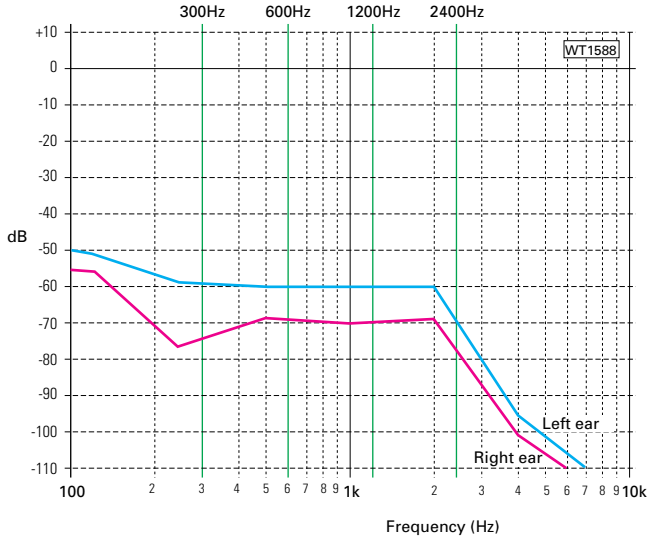
However, a voltage regulator chip for 8V has been installed and an external 12 to 15V d.c. power supply capable of delivering 1.5A is required. **Note: The power supply should be well regulated, otherwise hum and noise could occur**. The manual informed me that unregulated d.c. sources may damage the unit, and more than 15V should never be connected to the MFJ-616.

Apparently, the user is expected to provide power from their own station supply. I am an old fashioned valve man and my main units are of the valve type, using high voltages. Consequently, I was irritated that I had to provide my own low voltage supply!

Fortunately, I had the components (solid state) at hand and soon constructed a suitable power supply, with a 12V regulator. Although my rigs used to be completely home constructed, I had not constructed anything for a while and I had a lot of difficulty soldering, especially the contacts of the small 3.5mm jack plugs which are used.

At this point I should mention that at 80 years old...it's not just my hearing that has deteriorated but my sight has done so too. Because of this I had to consult the awful American style circuit diagram because I made a silly mistake. I put my mistake down to the onset of senility and pressed on. Like many European constructors I'm used to an earth/chassis rail and a voltage rail in circuit diagrams and

● Fig. 2: The plotted audiology report graph illustrating the hearing loss of G3FDC's wife. It can be seen that this graph and that shown in Fig. 1, graphs have roughly the same shape. However, G3FDC wife's graph is further down on the decibel scale (see text).



cannot abide earth connections and power connections pointing in all directions. Nevertheless, I achieved a lot of satisfaction in completing the tasks and I was ready to start using the MFJ-616.

Research Results

Before I present my experiences with the MFJ-616 I think it will be helpful to consider some background facts. To this end I've prepared some results from research on speech intelligibility in hearing English words.

The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000Hz. These contribute 83% of word intelligibility. Frequencies from 500Hz to 1kHz. contribute 35% of word intelligibility and 35% of sound energy.

Frequencies from 1000 to 4000Hz. contribute 48% of word intelligibility but only 4% of sound energy. In contrast, frequencies from 125 to 500Hz. contribute 55% of sound energy but only 4% to word intelligibility.

In other words, nearly half the speech intelligibility is contained in the 1000 to 4000Hz frequency range and with only 4% of the speech sound energy.

On the other hand, the low frequencies 125 to 500Hz. have most of the speech energy but contribute very little to word intelligibility.

If you suffer from deafness, it's useful to look at the audiology graph prepared by those who supplied one's hearing aid. To give you an idea of what you'll see...the graphs shown were prepared by the audiology department at my local hospital.

The graph in **Fig. 1**, is mine and graph in **Fig. 2** is my wife's. It can be seen that the graphs have roughly the same shape, but my wife's graph is further down on the decibel scale. Obviously, there are serious deficiencies in the frequencies which help intelligibility.

I'm hoping that an adjustment which is fine for me will be fine for my wife. It seems that all she has to do is increase the volume in her hearing aid after I have adjusted the SIE for myself.

To test all conditions, I carried out three types of tests :

Test 1: Listening to Allan Bennett's monologues on a good hi-fi amplifier. I had to be sure that no distortion was generated in the equipment. I had difficulty in hearing them when I first got the cassette.

Test 2: Listening to recorded Open University (OU) programmes in which I had difficulty in hearing and of which I had some correspondence with the university about the problem.

Test 3: Listening to my Amateur Radio station receiver. Remember that there can be an additional problem with badly adjusted s.s.b. transmissions.

Fig. 4: Rear panel view. Note that the MFJ-616 requires an external power supply (see text).

Preliminary Adjustments

Now I was then ready for the preliminary adjustments. And to start, the controls of the SIE unit were set as follows :

Volume:
At the 10 o'clock position.
Balance:
At the 12 o'clock position.
Frequency controls:
Set all four at the 12 o'clock position.
(If adjusted **anti-clockwise**, attenuation takes place).
If adjusted **clockwise**, amplification takes place.
Balance:
Adjust so that the sound appears to come from the centre of the two speakers.
Bypass button switch:
To be pressed in. (i.e. enhanced sound on - source sound off).

I started my testing by listening to Allan Bennett's monologues and increased the amplification in the two upper frequencies, and pressed the MFJ-616's bypass button switch to compare the source with the enhanced sound.

Next, I adjusted the settings comparing the results with the source until the speech became clearer. I then turned to the two lower frequencies and found **to my amazement** that they needed some attenuation to increase the intelligibility!

I continued this kind of adjustment, switching backwards and forwards with the by-pass button switch, until I could hear clearly what was being said. This was really amazing when you consider that I could not hear clearly without the SIE unit.

Adjustments needed for the tests: The lowest (300Hz) frequency control was at about 8 o'clock position. The other lower (600Hz) frequency control was at about 10 o'clock position.

The highest (2.4kHz) frequency control was at about 5 o'clock position. The other higher (1.2kHz) frequency control was at about 2 o'clock position.

I did the same test the next day and found that my adjustments were different, but not that far out. It seems as if my hearing varies from day to day.

However, my wife found she had to adjust to different setting adjustments on the MFJ-616 than I had, so I was wrong in my previous assumption. This made me a little uneasy about this subjective approach.

Nevertheless, we could both clearly hear signals which we hasn't been able to hear clearly before.

Greatly Encouraged

Obviously, I was greatly encouraged to proceed with the two other tests. And for the next stage I used my OU recorded programmes.

Fortunately, I had recorded two programmes, which were ideal for comparison and testing. One had a bad clarity of speech accompanied by a lot of very noisy background (music?) which had nothing to do with the content of the programme.

It may be that what I experienced only applies to me. I have great difficulty in distinguishing between two sounds. The background (music? I wasn't sure) appeared to me to be so overwhelming that I had to abandon any attempt to try to resolve the intelligibility. No matter how I adjusted the SIE unit I got no further to hearing what was said.

Although I suppose feature programmes require background music, I've campaigned for years to remove it from learning programmes, **unless it adds to the script**. I wonder what the opinion of the use of background music is with the readers of *PW* is on this matter?

The results led me to the conclusion that my experiences with the OU recordings demonstrates that we cannot expect the SIE unit to perform miracles. However, I wrote and complained to the BBC - who transmit the programmes - about this and received a sympathetic reply.

Associated With Content

Despite the problems with the OU tape, I was very fortunate in recording another programme where the background noises were associated with what was happening in the programme, and the clarity of speech was fair,

but I still had some difficulty in hearing.

However, I was able to adjust the Speech Enhancer whilst listening to the second programme so that I could hear without any difficulty. Does this result not perhaps show that the source audio has to be within certain limits of clarity?

My experiences showed that the SIE unit can help in increasing the intelligibility of high pitched and low pitched speech (i.e. speech from both women and men) but some clarity of speech has to be there. I was able to tell the BBC producers (of the OU programme) to compare these two programmes but I have not had a reply from them.

Happily, I've now found that it's possible to resolve the intelligibility of speech with most Open University programmes with the MFJ-616.

Amateur Radio Transmissions

Now it was crunch time...and I was ready to try the SIE unit on Amateur Radio transmissions with it connected to the headphone socket of my communication receiver. This would be the acid test I thought.

I'd decided to spend a morning and an afternoon listening on the 3.5MHz band to try to find as many different kinds of speech as I could. It turned out I didn't find any with bad clarity of speech and in fact had a lovely time!

Once on the band I found no difficulty in adjusting the SIE unit to hear clearly. It seemed uncanny when I kept pressing the bypass button to compare the source with the enhanced speech.

Tuning over the band I found a few operators that I couldn't decipher what they said. The signals were a little faint and probably a better receiver would have raised them. My all-valve receiver, double superhet, is home-constructed: Mark 1 completed in 1967, and Mark 2 in 1979.

I can now understand how Martin K5FLU felt when he used the MFJ-616 for the first time on Amateur Radio transmissions. It was **much easier** adjusting the SIE unit for good results and I suppose that this is because of the narrow band-width of s.s.b. transmissions.

One interesting result was that I noticed I had no need to attenuate the lowest frequency. The only difficulty I had was with my Tinnitus. When this is causing problems my Tinnitus manifests itself as (usually) a high note and high frequencies are amplified with the SIE unit, which can be very confusing, especially with Morse code. Fortunately, Tinnitus was not present most of the time but it can be triggered.

I tried to listen without my hearing aid and although it was a little difficult I managed and tried using the headphones. However, I much preferred using the speakers and wearing my hearing aid.

I found myself getting more and more confused as I was testing the SIE unit. After thinking about why, I realised that all my thinking for such a long time had been wrong. I had mistaken ideas about my ears and hearing and found that there's such a lot that I don't understand and is also difficult to accept.

I had thought for a long time that improving my hearing was just a matter of restoring the lost frequencies to their original level and I only considered the decibel gains needed. The MFJ-616 showed me it was far more complicated than that!

If a frequency, say, was 30dB down then I thought that all I had to do was to increase the volume of that frequency by 30dB. Preparing to write this article, I spent a long time trying to think of how best to do this and even asked the advice of **Tex Swann G1TEX**, the *PW* Technical Projects Sub-editor. I wanted an objective method of doing this.

Fig. 5: The Rev. Hubert Makin, a sprightly 80-year old, seen at the operating position of his station in Halifax, Yorkshire.

Product

The MFJ-616 Speech Intelligibility Enhancer Unit

Pros & Cons

Pros: There's no need to attenuate the lowest frequency, the unit is easy to use and it definitely improved the clarity of the speech hard.

Cons: A power supply is not supplied with the unit.

Price

The MFJ-616 is currently available from Waters & Stanton PLC, Tel: (01702) 206835 for **£149.95**

Repeatable Experiments

As a scientist myself, I've always been aware of the repeatable experiment for validity of the result. But found that I could not repeat exactly the adjustments made. In practice I had to adjust the SIE unit every time I started to listen.

In practice, a lot of the content of an Amateur Radio transmission is expected and I had no difficulty in hearing that. I hope other hard-of-hearing Radio Amateurs will bear me out when I say we can usually hear (perhaps pre-empted) **expected speech**. This is nearly the same as if we can see the subtitles on television, we can usually hear what's being said because the eye assist the ear.

Then there's the delayed hearing. What has been said often comes to me after I have switched over to transmit, and I sometimes feel a little daft.

Then, there is another situation, that the brain can learn to interpret a voice. I have found that this does not take long. The ear (or rather the brain) seems to learn quite quickly.

Personally, I have a feeling that I'll become even more skilled at using the MFJ-616 the more I use it. My brain will somehow learn something. Which brings me to the question "Does your mind know what your brain is doing"? The answer seems to be in this case - **No it does not**! However, the MFJ-616 Speech Intelligibility Enhancer really does help me to hear. So, why should I worry? *PW*

THE VOICE FROM WAY DO

When Eric Pickering G3LPS had the sad duty of sorting out the radio effects of his good friend Tom Edleston G2BUR, he came across a certificate dating back to 1923 and information about the voice from way down east.

It's inevitable that some time or another Radio Amateurs will find themselves helping to sort out a friend's radio equipment when they've become a silent key. Normally this duty will entail sorting out transceivers, old valves, receivers, wires, lots of books and the many other 'bits and pieces' that we enthusiasts tend to accumulate over the years.

So, like many others I found myself called in to help sort through the belongings of a dear friend - in this case it was **Tom Edleston G2BUR**. As expected there was a great deal of interesting stuff to be looked through, enough to keep me occupied for a long while!

I knew much about my old friend: He'd been just too young for the First World War and was awaiting call up just as the Armistice was signed. And when the Second World War started he was working on important cable maintenance for the Post Office Telephones (now disappeared into the mighty British Telecom). However, working through the piles of papers, sorting things out I discovered Tom had a hidden talent!

Although Tom and his late wife had been married for many years, they had no children, so after he had died aged nearly 91 in 1992, there was no-one else to check through the papers and although it was, as I've already mentioned, a sad duty - I learned much. This included finding out my friend was a creative writer!

There, amongst all the papers was a certificate and letter from the Institute of Post Office Electrical Engineers announcing Tom had won 1st prize in their essay competition for his entry featuring television - in 1939! I only wish I'd been able to read the essay - it must have been fascinating.

During his active life - he'd spent many years on the old Post Office Radio & Interference Service - Tom had been a keen amateur photographer. Many photographic prizes came his way.

However, Tom became increasingly frail in his late 80s and even tuning up his beloved FT-101 became difficult for him. Even after reading, reading and doing his best to understand the tuning up techniques he had to finally give up. It must have been a sad day for my good friend and not long after that he had to go into a nursing home and it wasn't long before he became a silent key.

As I continued my sad task, I saw there were piles of old radio magazines, some dating back to the pre-Second World War years, together with more modern publications. However, there amongst the old copies of *Wireless World*, *Short Wave Magazine* and the odd vintage issue of *Practical Wireless* there lay a certificate and booklet dating back to 1923.

The certificate, **Fig. 1**, even though it does not produce that well for use in the modern day *PW*, was still in good condition - was made out to one **Ernest Thomas Edleston** and was dated 15 October 1923. Of course, the certificate was to Tom himself and he'd got it when he was 23 years old, in the very early days of broadcasting - direct from the United States of America which seemed so very far away in those days.


No. 4951

Round Hills Radio Corporation

South Dartmouth, Massachusetts

This is to acknowledge that the communication of Ernest Thomas Ed
of Bolton, Lancashire, England, has been checked with the log of Radio
Station WMAF of the Round Hills Radio Corporation, South Dartmouth, Massachusetts
to be in accordance therewith.

WMAF

Dated: Oct 15, 1923.

ROUND HILLS RADIO CORPORAT
By

Walter H. Mas
Asst to the Pres

● Fig. 1: The certificate - but what frequency did WMAF transmit on?

The information on the certificate made interesting reading:

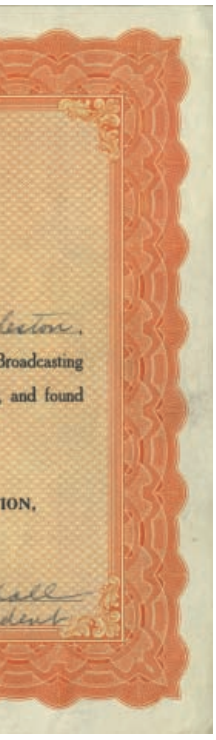
The certificate was numbered *No. 4951* and it stated *Round Hills Radio Corporation, South Dartmouth, Massachusetts. This is to acknowledge that the communication of Ernest Thomas Edleston of Bolton, Lancashire, England, has been checked with the log of Radio Broadcasting Station WMAF of the Round Hills Broadcasting Corporation, South Dartmouth, Massachusetts and found to be in accordance therewith.*

Despite the care taken to produce the certificate, there was not a single mention of the wavelength (wavelength was usually quoted in those days) which the station transmitted on. Despite reading through the nicely produced booklet *The Voice From Way Down East* - full of flowery prose (plus what we would call 'spin doctoring' today) there's no real clue to the frequency they were working on - which was one of the reasons why Tom had written to them in the first place.

● The Operations Room at WMAF.

Was WMAF a short wave station or did it operate on the medium waves? Few technical details are given in the (nicely produced, it must have been an expensive item to produce even in the 1920s) booklet, although the illustrations show a beautifully 'period' style transmitter - and antennas - which could be capable of operating on h.f. as well as medium waves. That's why I first got chatting to **Rob G3XFD**, Editor of *PW* during the Rochdale QRP Convention to see if we could find out more about the station.

OWN EAST



Interestingly, the booklet does **briefly mention that the power of the transmitter was only 500W**, not very high even for a medium wave transmitter of its day. In fact, as I mentioned in my original letter to the Editor of *PW* when suggesting this article might be of interest to readers - that power is often exceeded by DXers nowadays!

Looking Into History

Reading the booklet *The Voice From Way Down East* is like looking into history. It's also attractively illustrated and it provides much background on a typical privately owned larger broadcasting station like many in the USA then. And there can be no doubt that Tom Edleston would have been delighted to have received the certificate and booklet.

I remember Tom telling me that when he started off in the wireless hobby he was using home made crystal sets and those were the days when you really did have to use a crystal (not a ready made semiconductor diode!). Then you had to adjust, very carefully, a coiled springy steel wire which made contact with galena (a lead ore crystal) or carborundum.

Later Tom went on to use a surplus First World War receiver. What this receiver used I don't know but I remember Tom telling me that his Father confiscated the receiver from him to stop Tom 'listening in at all hours'.

Later on Tom found that the receiver was still in use. His Father had bought another pair of headphones so that mum and dad could listen in together!

So, back to the booklet where, despite the beautiful flowery prose there is just enough technical information to interest us in 2001. Added to the technical information I'm left to wonder at the thrill Tom received when he first heard the WMAF transmissions.

Colonel Green

The founder behind the Round Hills Corporation was one Colonel Green - Edward Howland Robinson Green to give him his full name! He was from a local land-owning family on the Eastern seaboard of America who had (according to the booklet) arrived in the 'New World' along with the Pilgrim Fathers on board the *Mayflower*. Colonel Green's ancestry - it was claimed - went back to the cabin boy on the *Mayflower* - one John Howland.

The Green family had become what we would call here in England 'Landed Gentry' and had all the privileges and all the money which was needed to buy them! This helped the Colonel to establish the transmitting station to best advantage in a truly beautiful part of America.

Colonel Green became interested in wireless in 1896 in connection with his work for an American Railway company. He then got interested as a listener in the early 1920s when he was laid-up ill in bed. That's when the bug took hold (the radio bug that it - not the illness!) as the Colonel saw the possibilities of radio broadcasting.

● Colonel Edward Howland Robinson Green.

Incidentally, it wasn't only radio frequency broadcasting which attracted Colonel Green. No Sir, he wasn't going to miss the opportunity of people not hearing his wireless because they didn't own receivers - instead they could listen to the output of huge loudspeakers mounted on the top of a stone water tower.

From the tower (I quote from the booklet) "Through the loud-speaking projectors on the tower an audience scattered over a half mile radius can hear the programme clearly". A good idea (perhaps) at that time...but not so environmentally friendly today eh?

But, now back to true 'wireless' broadcasting! Within a few weeks the Round Hills Radio Corporation was formed and a Western Electric 100W transmitter put into action - presumably on medium waves as Station No. 1. By then work was well under way with No. 2 transmitter - the 500W station heard by Tom in far away England.

● Round Hills House and WMAF (taken from *The Voice From Way Down East).*

First Programme

The first programme from No. 2 transmitter was produced on 1 July 1923. The No. 1 transmitter was still used for 'local' programmes - there was a studio built into the transmitting station - but Colonel Green overcame the problems of getting 'artistes' to the remote station - over 100 miles from New York by road - in a (then) novel way...by linking the station to New York by telephone landline.

Programmes originating from the opera or studios in New York were relayed via special telephone lines to Hartford (Connecticut) and following amplification at a telephone repeater station were then sent to Providence and finally to New Bedford and on to Round Hills. It was quite an achievement in those days, especially when you consider broadcasting was only just getting underway here in Europe - and of course the technique became standard practice in broadcasting (the Post Office did the job here in the United Kingdom).

The final radio transmissions were sent via 150ft high twin towers using a centre fed T antenna. Almost certainly they would have been on medium waves and although I couldn't find any record in Tom's archives...I wouldn't be at all surprised if I'd discovered that it was this station Tom had been caught listening to from America...long past lights out!

Perhaps it was the 'Voice From Way Down East' that Tom's parents had been listening to at night - after the receiver had been 'confiscated'? We'll never know of course, but it's an amusing end to the story isn't it?

If you have any knowledge about station WMAF, the Round Hills Broadcasting Corporation and its subsequent history and the frequencies they transmitted on - why not write to me?

Additionally, if you want to see a photocopy of *The Voice From Way Down East* booklet and certificate - please send an A4 sized s.a.e. (75p stamp please) to the Editor of *PW*. You too can then take a look back into history - just as I did when sorting out my friend Tom G2BUR's papers. I'm so pleased I got the opportunity. *PW*

Antenna Workshop

SMALL-LOOP RECEIVING ANTENNAS

This month the late Joe Carr K4IPV looks at antenna design for a receiving antenna. With the ability to null-out local interference, it might allow you to work stations that are otherwise lost in the noise.

When Joe wrote this article for us, he added the following postscript: "I would like to thank those who welcomed me as a columnist for *Practical Wireless* after my first column. It's truly an honor to be named to this post, and I will endeavour to be worthy of the honor the magazine has done me".

Sadly Joe became a silent key on the 25 November last. A loss, not only to his family, but to the whole of Amateur Radio. An obituary appeared on pages 10 and 11 of the March 2001 issue of *Practical Wireless*.

Let's face it the bands are crowded today. In fact, they have been crowded for quite some time, and with more and more wireless services coming on line every day the situation doesn't look promising. We can, fortunately, do something to reduce the apparent QRM on the bands from the viewpoint of the receiver.

For the low frequency bands the situation can be ameliorated by the use of a small-loop antenna. At frequencies up to about the 6MHz band, the small-loop antenna may be the key to reception.

The problem is not so much gain as it is the directivity of the antenna. On the low frequency bands directivity is hard to get, if you count size as important and who owns enough land to put up a 3.5MHz three element Yagi beam?. The directivity of the small-loop antenna could be ideally suited to such operations.

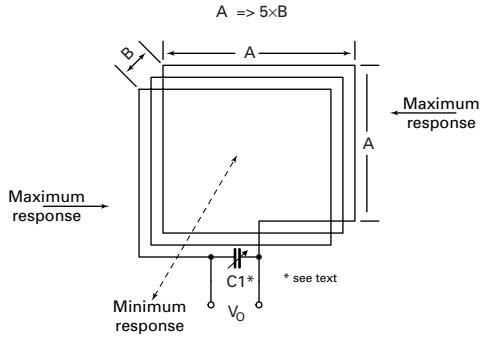


Fig. 1: The small-loop antenna is physically small in relationship to the wavelength, but has many advantages. See text for more detail..

Small Loop Antenna

So what is a small-loop antenna? And how does it differ from a large-loop antenna? The difference is primarily one of wavelength. One textbook lists a small-loop antenna as a loop antenna with an overall wire length of less than 0.18λ, while another textbook lists the overall length as less than 0.10λ. The illustration **Fig. 1** shows the concept of a small-loop antenna.

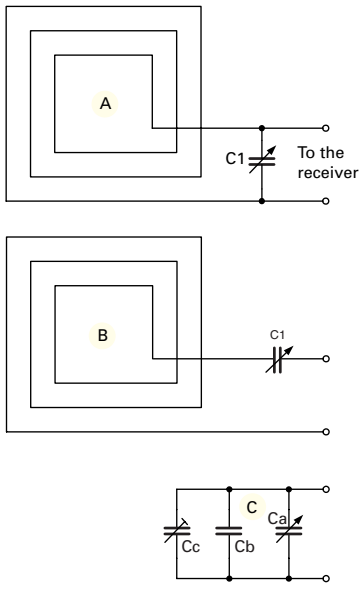


Fig. 2: The various loop tuning schemes: A parallel tuned loop is shown above a series tuned loop, and below them both, is a scheme for padding the capacitor value.

I have shown the square type of loop, although they're circular, hexagonal and octagonal styles as well. The square loop is a little bit easier to build than the others, so I chose that one to illustrate the point. The comments are appropriate to all small-loop antennas, however.

A large-loop antenna, on the other hand, has a length of at least 0.5λ (λ/2), with most being either one or two wavelengths long. A consequence of the difference in size is that the r.f. current flowing in the small-loop antenna is uniform…it's the same throughout the antenna, no matter where you look at it. The large-loop antenna, on the other hand, produces distinct voltage and current nulls and maxima throughout the length of the wire.

There may be one or more turns of wire in a small-loop antenna. The length of the sides is A, and the depth of the winding is B in Fig. 1. The only constraint is that the length of A must be at least five times the length of the loop winding (B).

The winding turns can be either planar wound (all in one plane) or solenoid (one layer) wound. Of these, the planar wound results in a sharper null (theoretically that is, as it's difficult to achieve in practice!), while the solenoid wound form is often a little easier to implement.

The tuning capacitor in Fig. 1 is optional, but is highly recommended. The reason is that the output voltage of the loop is increased markedly by the presence of the capacitor. I've seen some books quote that the output voltage is increased by the *Q* of the capacitor, which can be 100 to 500. The capacitor should resonate the loop inductance to the frequency being received.

Radiation Pattern

The radiation pattern of a small-loop antenna is the standard figure of eight pattern with the nulls aligned broadside to the plane of the loop (the maxima are off the ends of the loop). This points out another difference between the large-loop antenna and the small-loop antenna.

The pattern of a large-loop antenna is just the opposite of the small-loop one. The nulls are off the ends and the maxima are broadside to the plane of the loop. It is those nulls that make the antenna an exciting prospect for receiving on crowded bands. The gain of the small-loop antenna is less than that of a dipole, although larger than an isotropic antenna.

But the gain is not the real issue. The real issue is the depth and sharpness of those nulls. By placing the nulls (in their deepest extent) on the offending interfering station you increase the signal-to-noise ratio (S/N) of the situation.

And radio reception is a game of S/N – period! This works if there is a difference in azimuthal direction of more than a few degrees between the two stations. Even though the desired signal is not in the maxima

of the loop, it will perform wonders on the desired signal if the ratio between the two signals is improved (made bigger).

Works Wonders

Not only does the small-loop antenna work wonders on the reception of weak signals on the low frequency bands, it also improves the performance of some receivers on those bands. If the dynamic measures of the receiver's performance are at all compromised by the crowded conditions, then the loop is the answer.

Those dynamic performance parameters include the dynamic range, the third-order intercept point and the desensing signal levels required. The problem is too much r.f. at the r.f. amplifier and the mixer stages, and that drives these stages beyond their capability, producing increased intermodulation distortion noise (IMD) products. This is especially likely to affect the receiver is the third-order difference products ({2F1}-F2 and {2F2}-F1) are present.

Tuning Schemes

Look now at **Fig. 2**, which shows two different tuning schemes for the main loop. The parallel tuned version is shown at the top, while the series tuned version is shown just below. There are apparent differences between series and parallel resonant circuits, but the practical difference is not audible.

Getting the capacitance range needed does not depend on the availability of the exact capacitor. The lower part of Fig. 2, shows a parallel arrangement in which a trimmer capacitor and a fixed capacitor are used to pad the value of the variable capacitor. Any series, parallel, or series-parallel combination of capacitors can be used in this application.

Loop Impedance

The loop impedance of the loop in Fig. 1 is typically very high, but your receiver wants to see a low impedance feed (a value of 50Ω is a popular choice). The answer to the problem is to use a coupling loop within the main tuned loop.

The coupling loop is shown in **Fig. 3**, is concentric with the main loop, a multi-turn tuned loop similar to Fig. 1. The coupling loop may be one or two independent turns of wire that forms a low impedance coupling to the receiver.

Sometimes, the smaller coupling loop is also tuned, as shown by the additional coloured capacitor in Fig. 3. But the capacitance value required resonance is typically several times the capacitance needed to tune the main loop. For that reason, one only occasionally finds the coupling loop tuned as well.

Shielding the Loop

Shielding the loop in its own Faraday cage, makes good sense, even if it can be a pain doing it. Shielding the loop, reduces capacitance coupling to nearby voltage sources minimising local noise pickup.

Shielding, or screening the loop has another beneficial effect, as the loop interacts with its environment. The benefit is of reducing the effects of the distortion to the loop's radiation pattern.

The distortion differences are due to capacitance coupling to the environment and their effect is to reduce the sharpness of the nulls. Indeed, in extreme cases the small-loop antenna can show very shallow nulls.

Reduction of nulls, affects the signal-to-noise ratio that can be obtained with the loop! I've seen loop nulls deteriorate from better than –40dB in the direction of a null (maximum being 0dB), to less than –15dB. the change of 25dB (or more) is a significant deterioration of the loop's pattern!

The shielding of the loop antenna is shown in **Fig. 4**, in this case a circular loop is used, but the same discussion could apply to other forms as well. In the drawing of Fig. 4, the loop only has one loop for sake of simplicity, but it may have many turns.

Note that the shielding is not continuous. There is a gap in the shielding that can be as little as a few millimetres width. The effect of the break is preventing the shield from acting as a single-turn loop in its own right.

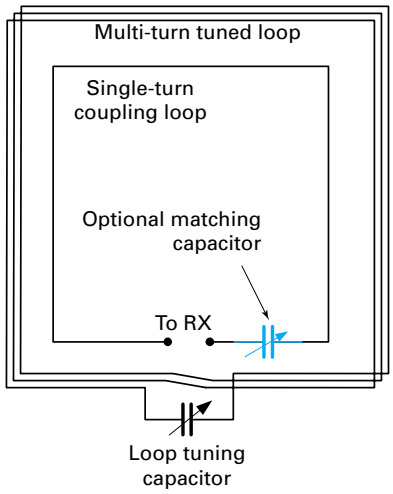
The shielded loop antenna then is sensitive only to the magnetic field component of the electromagnetic signal, rather than the electric field component, the typical wire or tubing antenna responds to the electric field rather than the magnetic one.

Peeking Through

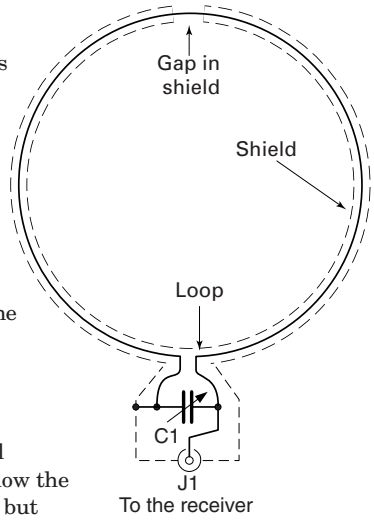
By shielding the loop, allowing only a small segment to peek through the shield, you allow the magnetic field vector to affect the antenna, but not the electric. The noise generated by lightning and man-made spark oriented interference on the band, tends to be electric field oriented so, the shielded small-loop antenna also tends to discriminate against this form of unwanted noise

So, small-loop antennas are antennas with an overall wire length less than 0.18λ or 0.10λ. The result of the small size of the antenna is that the current flowing is the same at all points within the antenna.They have advantages over large-loop antennas which shows distinct voltage and current nulls and maxima.

Try a small loop out and I'm sure you'll come to the same conclusion: that small-loop antennas with their figure of eight radiation pattern can be used to null out interference, increasing the S/N of the desired signal. Try it…you'll like it. PW



● Fig. 3: The use of a coupling loop can make matching to the input of the receiver much better. Although the coupling loop may be at resonance, it's unusual because the value od the capacitor is often much larger than the main loop tuning capacitor.



● Fig. 4: A shielded loop has many advantages over an unshielded one. (see text for more detail).

The Racal-Decca Navigator

Many people take GPS hand-held navigation systems for granted. Billy Williamson GM8MMA recalls the pioneering Decca Navigator which provided an excellent service for decades before satellites were launched.

Fig. 1: The Decca Navigator system in use by Dorset Police, aboard their launch Alarm off the Dorset coast in 1990. The photograph - taken by the late Rob Mackie, was featured in the article On Track With The Racal-Decca Navigator, published in the February 1990 issue of *PW*.

Fig. 2: A mark 12 Decca Navigator receiver (see text).

It's a well-worn phrase but surely the switching off of the Decca Navigator (DN) - latterly known as the Racal-Decca Navigator - system at the end of March 2000 did indeed mark the end of an era. The DN had its roots in the Second World War Gee system which used synchronised radio pulses from several geographically separated transmitters. By precisely timing the arrival of these pulses it was possible to work out the position of the receiver relative to the transmitters.

Unlike Gee and its other derivative Loran (**Long Range** Navigation), Decca was not a pulsed system. Instead the four transmitters, one master and three slaves transmitted phase synchronised low frequency continuous waves.

Phase Difference

The Decca receiver monitored the phase difference between the master and each of the three slaves continuously and displayed these on three special meters, called Decometers. The Decometers were colour coded red, green and purple and special charts marked with corresponding coloured lines were used to determine one's position.

The eagle-eyed reader will have spotted a snag. If all these transmitters used the same frequency how could the receiver know which signal came from which transmitter?

The answer is that the transmissions were not on the same frequency but on harmonically related frequencies. These could be easily converted to a common frequency by multiplication. For example if the transmitted frequencies were: **Master** 85.000kHz, **Red** 113.333kHz, **Green** 127.500kHz and **Purple** 70.833kHz.

Then comparison for red would be carried out at 340.000kHz (four x master, three x red), green at 255.000kHz (three x master, two x green) and purple at 425.000kHz (five x master, six x purple).

The Decometers had a large and small hand, like a clock. One complete revolution of the small hand moving the large hand one division, termed a lane.

Early versions of the system were just like that! You switched on the receiver before you started your voyage: the small hands took up their correct positions indicating decimal parts of a lane and you set the large hands to the correct lane numbers.

Since you knew where you were, you just took the numbers from the chart. After you set out, the

Decca Navigator antennas at the Chain 6c Green Slave station at Lerwick on Mainland Shetland. Commissioned in January 1958 the station converted to Mark 10/12 operation in October 1964.

Decometers would always be correct, provided the receiver was never switched off. To overcome this difficulty the lane identification (LI) system was devised, the first model to use it was the Mark 5.

I've already mentioned that the transmitted signals were harmonically related. The fundamental frequency was around 14kHz. If we term this *f* then at regular intervals the master would transmit signals at 6f + 5f while the slaves would transmit 8f + 9f in sequence. From these signals at *f* could be obtained.

Comparing phase at a much longer wavelength in this way - in effect - superimposed a coarser grid on the existing pattern and allowed the correct lanes to be identified. A fourth Decometer was switched in by relays to display the result.

The fourth Decometer was of unusual construction; using a six legged pointer and a triangular shaped 'thing'. These were officially termed the **Vernier** and **Sector** respectively but were colloquially known as the Spider and the Bat! You took the readings from whichever leg of the Spider was covered by the Bat.

Surprisingly Reliable

The Mark 5 was surprisingly reliable considering its complexity for it used **no less than 76 valves**. Most of the circuitry was taken up by the four receivers.

Strangely enough the receivers were of simple tuned radio frequency (t.r.f.) design, not new-fangled superhets! Interestingly, one reason for the large number of valves was that high stage gain was avoided, to reduce unwanted phase shifts.

From a servicing point of view, for people like myself, the equipment was reasonably good. Most troubles were caused by faulty valves or dirty relay contacts, which was just as well as only the top of the chassis was accessible in its operating position.

Almost all Navigators were rented so in the event of more obscure faults developing a replacement set could be fitted. Naturally it required quite a hefty power supply and at first this was supplied by a rotary transformer.

If possible the engineers certainly never changed a rotary transformer if it could be avoided as they weighed about 40kg. Manoeuvring that up an engine room ladder and then perhaps across half a dozen boats tied alongside before reaching the pier was no fun at all!

Aircraft Use

Later the Mark 10 (multi-pulse) system was developed for aircraft use, and the Mark 12 receiver was used for surface craft. The basic system was the same as the Mark 5 - but the LI arrangement was quite different - master and slave stations transmitted 6f + 5f + 8f + 9f in sequence. This produced pulses at *f* in the receiver where their phase was compared.

The Mark 12 had other improvements. For example, the receiver was a superhet and instead of the one chassis had three. They were vertically mounted and could be swung down on hinges to allow better access for service.

If the Mark 12 set did have to be changed only three multi-way plugs had to be undone. It was a far superior system and its introduction caused a severe and understandable drop in demand for the Mark 5.

Most Common Fault

Probably the most common fault in the Mark 12 was the failure of the valve designated V50. When this happened the lane identification Decometer jumped around at random instead of going through its sequence.

On encountering these symptoms the engineer found that the quickest procedure was to change V50, which in the great majority of cases cured it. If it didn't then almost certainly something had happened to the antenna or earth connection.

My account describes how the fault-finding was usually done, but it was possible to create an impressive effect by reversing the process. I knew of one engineer who made a regular habit of this.

The engineer would first check the antenna and earth, then attach his meter to various points in the machine's interior, taking readings and making sounds indicative of satisfaction or surprise. He then took out a circuit diagram - this was a huge thing which had to be unrolled almost like a roll of wallpaper. It was rarely used by engineers in the field or afloat, it being easier in the case of an awkward fault to fit a replacement receiver and take the faulty one away for a bench service.

After lighting his pipe the engineer in question would examine the diagram closely, muttering technical mumbo-jumbo to himself. Back to the receiver for more readings accompanied by appropriate noises, then back to study the diagram again.

After repeating the performance a few times he would exclaim "Eureka! - I know what's wrong" whereupon he would replace V50. The machine would spring to life, greatly impressing his audience.

I was once obliged to adopt similar tactics. I was boarding one of the famous little wooden-hulled coastal 'Ton' class minesweepers when an extremely upper class voice called down from the bridge.

The voice said: " I say, are you the Decca expert"?

Modesty, and indeed honesty, would normally have prevented me from me from making such a claim, but I was obviously the person he was looking for.

"Well....yes I said, rather weakly.

Afraid we're just leaving he replied. "We've just had a message that some chaps are encroaching on our waters. Perhaps you could have a quick look"?

Rather startled by this threat of imminent invasion I climbed to the bridge where an extremely young officer showed me the faulty Decca equipment.

"It stopped working when I changed channels on the way here" he said.

At this point I should explain that it was necessary to switch to a different chain when you sailed out of the service area of one set of transmitters into another. Two switches had to be operated to

Fig. 3: A Mark 12 LI Decometer showing the display which earned the nickname Spider & Bat (see text).

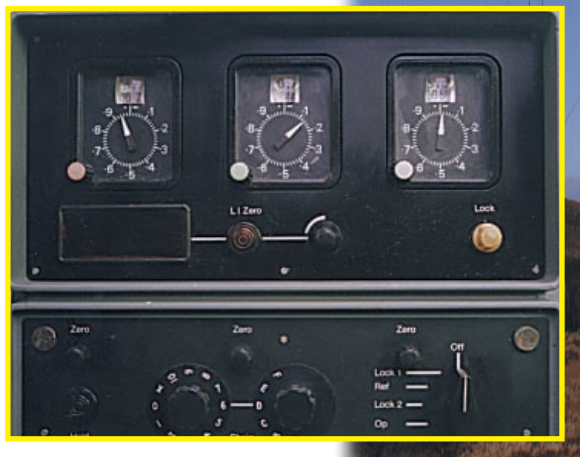


Fig. 4: The Mark 21 Decca Navigator receiver. The rectangle below the left-hand Decometer is the LI digital display which used Nixie tubes (see text).

...continued from page 31

achieve this, one marked with numbers which selected a crystal, and the other with letters which selected a frequency pulling capacitor.

The chain used in the area we were in was 6c but I saw at a glance that the officer had switched it to 6b. It was not possible to point this out privately to the young fellow as his superior officers were taking a close interest in the proceedings, obviously expecting the expert to work some miracle.

So, rather than embarrass the young man I performed a little deception. I removed the cover and changed a valve at random. I then went back to the display unit and twisted knobs and pushed buttons as if this was an important part of the cure.

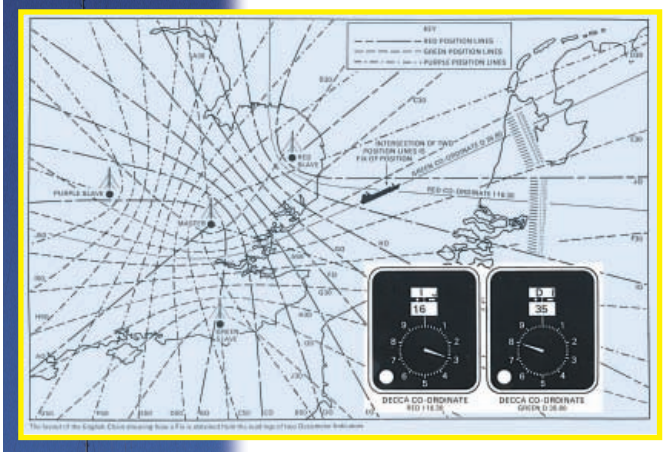


Fig. 5: Chart showing the basics behind the now closed Racal-Decca Navigator system. (Courtesy of Racal Decca).

In the process I managed to switch unobtrusively to chain 6c. Of course it immediately started to work probably convincing the officers of my expertise. Incidentally, although I studied the papers for several days afterwards I never did find out what happened to the chaps who encroached on our waters!

Valves & The Customs

As many of the vessels we serviced were foreign and valves fitted to them had technically been exported, records were kept and from time-to-time a Customs & Excise official would check on our valve stock. **This was fine in theory** but in practice it was difficult to ensure that the records were really accurate.

We operated a 24 hour service and at busy periods it was not unusual to work into the early hours of the morning. It was also common to have to fit several valves to a receiver to bring its performance up to standard.

At such times the temptation to leave the writing-up of the records to a more civilised hour was often overwhelming. Unfortunately, by that time there was often some confusion as to which valves had been fitted to which vessel!

So, to avoid any possible embarrassing moments with HM Customs & Excise one of our engineers came up with a simple scheme. Since in general, a faulty valve looks exactly the same as a working one, whenever he changed a dud valve which looked nice and new he retained it.

The substitute valves were kept in a separate box in the workshop. If the Customs official found that we were short of certain valves a quick search of the workshop would reveal the exact number required.

Looking back, I can't recall that we ever had to resort to this ploy. But as it's rather an obvious one I cannot help wondering how many times, at service departments up and down the country officials solemnly counted dud valves.

Author's Credits

My thanks Jimmy Stout and Jimmy Anderson of Racal-Decca, and Jimmy Smith of H. Williamson and Sons for their help in the preparation of this article, shortly after the shutdown in 2000.

Smuggling A Receiver

More serious was the time I accidentally became involved in technically smuggling a complete receiver through the Iron Curtain. It happened when a colleague and I were working on a large East German stern trawler which had two pieces of faulty equipment; a radar, which was fairly easily repaired, and a Mark 12 navigator which had an irritating intermittent fault.

At length we decided that we would have to change the receiver, but on this set the plugs had been connected together by a wire and a lead seal fitted. However, we found it possible to change the set without breaking the seal, and this we did.

It was only as we watched the ship sail off, bound for Newfoundland that we began to have some misgivings. On returning to the depot our worst fears were confirmed. There we found the information that a number of Navigators had been sold to East Germany and *must on no account be changed!*

So, in order to cover his tracks as far as possible the engineer fitted it to a foreign vessel, Danish I think, and we heard no more about it. With the switching off of the system and the end of the Cold war I think that the story can now be told.

Replaced By Transistors

Eventually the Mark 12 was replaced by the Mark 21, a totally different animal....gone were the valves, replaced by transistors. The whole works consisted of a few large printed circuit boards and I can remember a colleague and myself fitting one to the Icelandic research vessel the *Arni Fridriksson*.

I have to say **we were not impressed with the equipment** - not the ship. The *Arni Fridriksson* was quite a large steel vessel. It was easy to provide a good earth and antenna on it but the Mark 21's performance was only a little more than adequate.

The installation instructions specified massive earth connections and a seven metre **dead vertical** antenna. How it could be maintained dead vertical when the ship was at sea it did not say!

However, all the problems were solved when Decca supplied us with modified oscillator boards. Performance was then excellent and the Mark 21 was, of course, far more reliable than the older valve models. Servicing became reduced, for the most part, to simply changing p.c.bs.

At about the same time oil exploration ships began to arrive, fitted with satellite navigation systems. This was the Transit system, developed as part of the Polaris submarine missile programme. Large, cumbersome and expensive and in addition to the receiver it required a Doppler sonar and a computer the size of a domestic washing machine. The system was, nevertheless, obviously the shape of things to come.

Decca's Fight

Decca did not give up without a fight! They introduced the 10355 LAT/LN converter which could be connected to a Mark 21 and automatically converted the readings to latitude and longitude.

The Mark 52 could give Decca or lat/long co-ordinates directly as well as having other features such as speed and heading display. The MNS 2000 attempted to *Be all things to all men* by using Decca,

Loran C, Omega and Transit all went too, and ultimately GPS was all-conquering. Today a unit the size of a mobile telephone can give you your position world-wide. It's a far cry from the days of 76 valves and a 40kg rotary transformer power supply. PW

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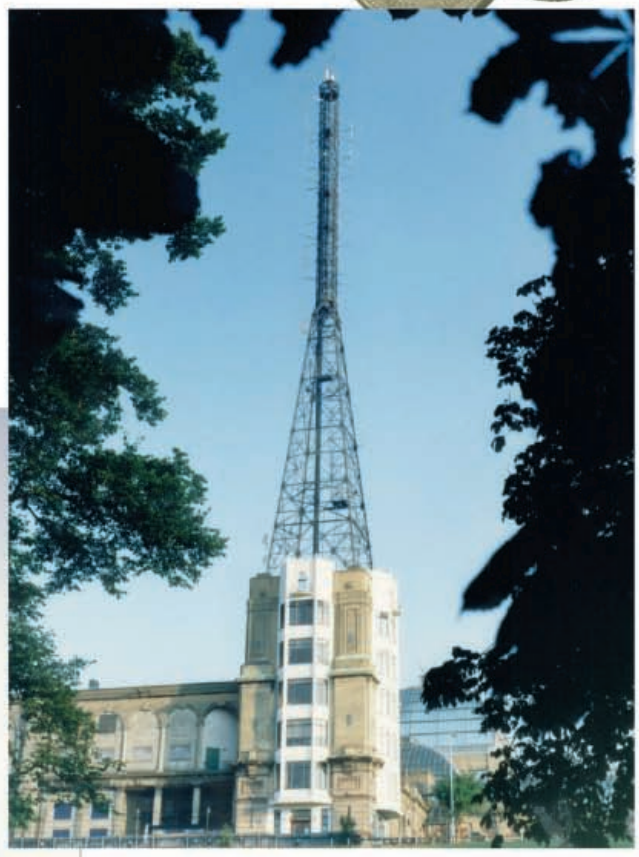

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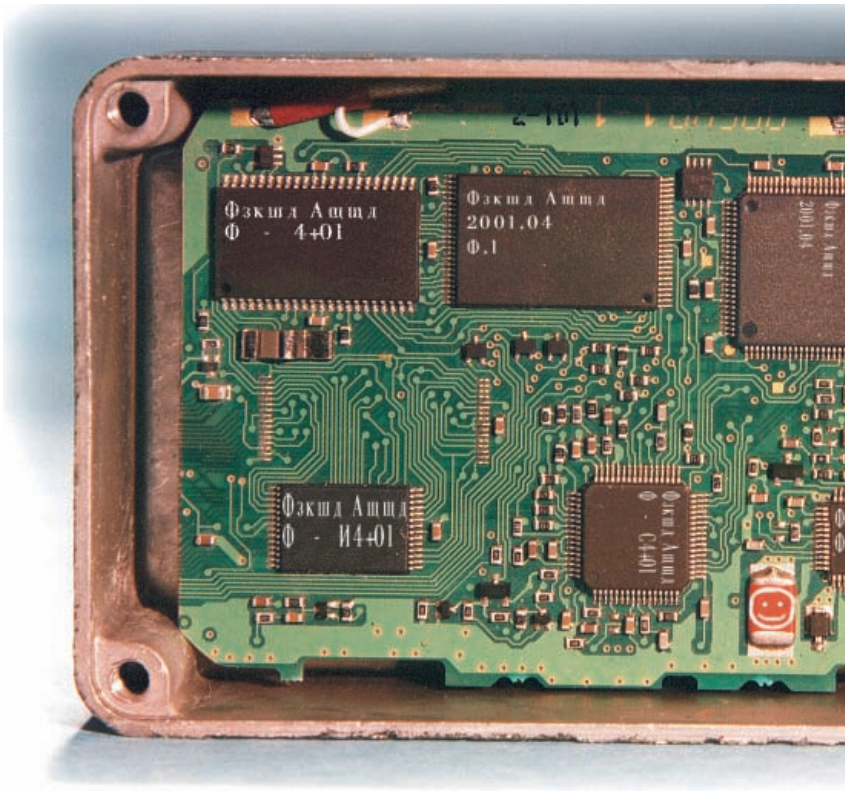
THE SWITCH-MODE HF

Denzil Roden G3KXF found himself in the lucky position of experiencing an exciting new innovation in terms of radio. Read about what he saw in a recent visit to the former Soviet Union.



Throughout the history of radio communication, epochs have marked technological changes that have revolutionised the methods and efficiency of information transfer. More recently, microprocessors extended the range of control facilities available to wireless operators, while digital synthesisers have reached previously unimagined heights in performance and at dramatically reduced costs.

First introduced in the 1960s and 70s to increase speeds of data modems, digital signal processing (d.s.p.) evolved from audio use, to perform very effective filtering in receiver intermediate frequency circuits, as in the IC-756PRO.

Those and other significant advancements naturally lead me to wonder what innovations remain to be discovered. Being in the right place at the right time, I was very lucky to be one of the few allowed to try out, what is sure to become another leap forward in wireless technology, resulting from the blending of two separate engineering specialities, transmit/receive switching(T/R) and switch–mode power supplies (s.m.p.u.).

Techniques for T/R switching have been subjected to intense research, mainly directed towards improving frequency–agile systems for military applications. In some respects, it has developed into a specialised science in its own right. Such research has already benefited Amateur Radio, most noticeably as QSK (c.w. break–in) which was already superb as far back as the early 1980s.

High speed r.f. switching techniques, integrated with some important efficiency enhancements derived from s.m.p.u. developments, has made practical the first ever all digital receiver. This innovation has not originated in Japan as one might expect, nor in the USA, or Europe. Instead it comes from a relatively new research laboratory in the former Soviet Union.

The module described, is one of only four prototypes from the Smolensk Radio Institute (Ыыдутыл Штыегегшеу Кфвшш) in the town of Smolensk near Sevastopol. Located in what is rapidly becoming Russia's Silicon Valley on the Black Sea coast, Smolensk is 1300km south of Moscow.

Silicon Logic.

The entire receiver being configured with silicon logic, requires addition only of standard low cost display and control mechanisms. Tuning, memories and other extensive control facilities are no different from other modern equipment, however the synthesiser is replaced by new frequency determining logic block.

This article deals only with the unique features of the digital front-end. The r.f. module shown in the photograph comprises four dedicated microprocessors on an 85×50mm circuit board. Two u.h.f.power f.e.t.s on the underside, are encapsulated in a beryllium thermal block which is bonded to the main cast alloy chassis of the receiver.

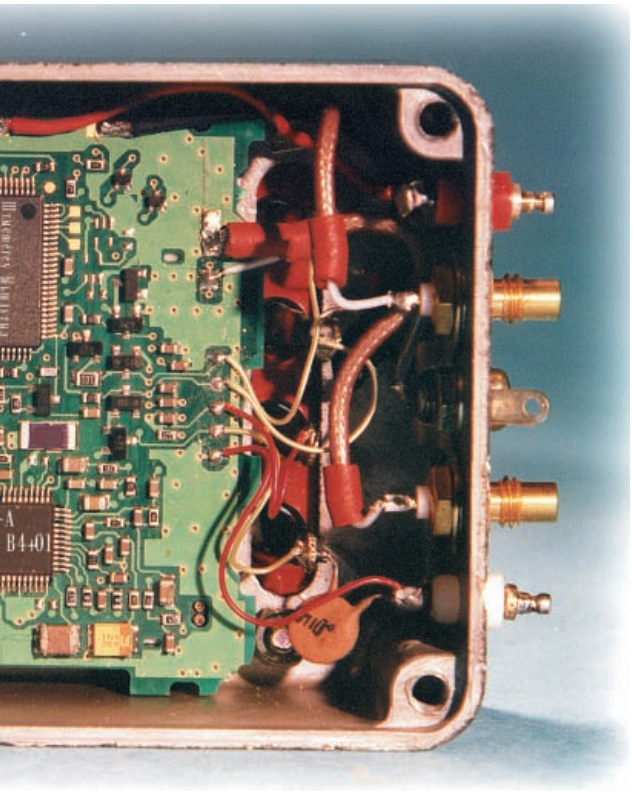
Two stages of signal frequency d.s.p., each governed by a separate microprocessor, drive the power f.e.t.s, superseding traditional tuned circuits. The first stage determines selectivity and is inter-related with the i.f. and audio d.s.p. settings of the receiver back-end.

The second processor's main function is to digitise the wanted signal, but it also attenuates dominant out of band signals and noise. It can additionally function as an impulse noise gate, which at signal frequencies, is ultra efficient.

Complete absence of conventional mixers has in effect reinvented the direct conversion receiver. However, instead of mixing, the wanted signal is digitised to the frequency chosen for the i.f. to be used. The omission of synthesised injection signals with their inherent noise sidebands, coupled with super r.f. selectivity, gives an enormous reduction in background noise.

Programming the frequency determining logic, enables a wide range of fixed or tuneable i.f. configurations. In order to gauge the extent of

RECEIVER



performance improvements, I used the front-end, first into my Corsair 2's conventional 9MHz crystal filtered i.f. and then into the d.s.p. i.f. of an IC-756PRO.

The full performance benefits will not become apparent until the companion interactive d.s.p. i.f. and audio modules are integrated. Only one set of those modules exists and remains in Russia undergoing further development work.

Third Microprocessor

A third microprocessor is the master controller, managing all interfacing between the modules internal components, plus the serial data links to the external frequency determining logic and to the i.f. and a.f.d.s.p. controllers.

Lastly, one microprocessor is dedicated to controlling the a.g.c. for the front-end. This stage is also fully digital and works in accordance with the d.s.p., a.g.c. and manual gain controls, of the i.f. and a.f. systems, thus optimising signal/noise performance under all conditions. The remaining LSI devices provide RAM and logic interface functions.

Performance

The performance of the system has to be experienced to be believed! The front-end is capable of consistent performance between d.c. and u.h.f. Initial results, show the sensitivity and intermodulation performance over the range 10kHz and 60MHz, apart from being greatly superior to the best currently available receivers. The stages are also perfectly linear, which contrasts with the expected wide variances between bands exhibited by conventional receivers.

In addition, the a.g.c. response is also perfectly linear. Such linearity suggest alternative use as a frequency sensitive d.c. to u.h.f. voltmeter. Being completely digital the a.g.c., threshold, slope and gain, can all be programmed, so for example a linear S-meter can be programmed in steps of any value (dB per S-point).

Despite using the latest top specification test equipment, measurements on the complete receiver are limited due to inadequate noise performance of signal generators and analysers. However, measurements have proved to be consistently better than other leading receivers e.g., with a 2.4kHz s.s.b. filter, the skirt width measures 3.5kHz at –80dB's.

Throughout the range, minimum discernible signal (m.d.s.) is better than 0.03µV, while Intermodulation and reciprocal mixing measurements are more than 20dB better than any other receiver.

Following up on this success, research is commencing into development of d.s.p. enhanced test and measuring products, and into fully digital transmitters. World-wide patents have been obtained and funding has been generously given by an anonymous South African benefactor.

Substitute IF

No measurements were made with the substitute i.f.s, but on switching on, I was struck by the complete absence of discernible noise even at maximum gain with the antenna socket shorted. It's nice to know that anything heard **must** be originating from the antenna.

The most striking improvement is absence of intermodulation, even while tuning very close to the local medium wave broadcast repeater (a quarter mile away). a.m. and s.s.b. audio quality are excellent. The reception clarity when I tuned through DX pile-ups was a real pleasure, it was so easy to resolve the very weak signals.

Must Have One!

I soon discovered that this innovative receiver was a joy to use and that I **must** have one! All credit must go to the Russian developers who brought together their revolutionary concepts and produced such a well engineered product.

The latest manufacturing methods for microwave processor chips were obtained during a two year sojourn at leading USA integrated circuit manufacturers. During which time reciprocal licence activities by **Glas W0DKA** and **Rock WH1SKY** caused havoc on the bands.

During my visit. leading engineer **Tanya Xlakova** commented that, during the period leading up to perestroika and beyond, of the Soviet Regime scientists in the Russian states, while otherwise unoccupied, had plenty of time to think, dream and innovate.

My thanks go to Tanya and her staff for, the loan of the equipment, their unstinting help, advice and hospitality. Also to my friend **Tony ex–G3XLA** for his services as language consultant. Incidentally, Tony is the First G to obtain a Full Russian amateur licence RN1AL! *PW*

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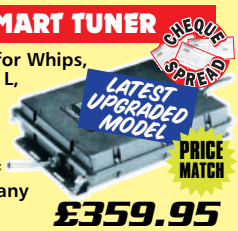

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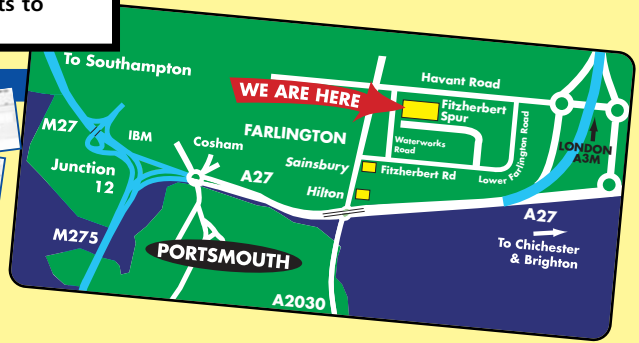

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IT'S A CLASSIC!

The Icom IC-202S Transceiver

● It's a classic - the pioneering Icom IC-202 which Richard G0RSN enjoyed using in the snow!

Regular *PW* author Richard Newton G0RSN tries out a radio which many regard as a modern classic - the popular Icom IC-202S. By all accounts it looks as though he really enjoyed the job!

Amateur Radio is one of those hobbies that invites, or even begs, for nostalgia. As we see the ever smaller, ever more versatile equipment appear on the market I think anyone who truly loves radio, real radio can not resist, every so often, spending a wistful few seconds looking back at the pioneering people and radios that have brought us into the 21st Century.

My chance to revel in nostalgia came when I walked into the *PW* offices one day and the Editor excitedly recounted how much interest there had been in the recent *It's A Classic* series in the magazine. He explained how he now wanted a v.h.f. rig to take the stage and asked me if I would do a piece on the Icom IC-202S as it is considered to be a true classic.

Ground-breaking & Pioneering

Ground breaking and pioneering are two words that could easily be used to describe the Icom IC-202S transceiver. Additionally and having now had the chance to use and enjoy it, I would add enduring to the list. I'm sure those lucky people who still own an Icom IC-202S would agree with me.

When I saw the radio I was carried back in time, and although this is a rig that you may not remember when hearing the model number...it's appearance is unmistakable. It's a portable 144MHz s.s.b./c.w., transceiver that stands upright, with the controls and tuning knob on the vertical panel. I recognised it straight away, as it was this radio that sparked my interest in Amateur Radio as a child.

My dad, **John G8EAM**, now sadly a silent key, owned an Icom IC-202S and was so proud of it. On seeing the radio I was transported back in time to the top of North Hill, near Minehead to the days when, sat in a car when my Dad working other stations with his Icom IC-202S and a Halo antenna.

● Fig. 1: Close up view of the front panel showing the simple controls on the crystal-controlled IC-202S.

The Icom IC-202S was certainly *cutting edge* technology when it entered the market around 1978/1979. It was a replacement for the Icom IC-202E that had been introduced about a year before.

Although I could not find any mention of *PW* having ever reviewed the Icom IC-202S, I found an an advert for the radio was found in the March 1979 issue of the *Short wave Magazine*.

The IC-202S was billed as an improvement over the IC-202E due to the introduction of a c.w. side tone and the addition of lower side band! The advert went on to say that the receiver had been 'hotted-up' making it even more suitable for use as a base station.

On air the transceiver could run either 'barefoot' using its rather impressive 3W output, or as a prime mover. The transceiver was also said to have had an, extremely clean signal that was perfect for driving a linear amplifier.

A Cousin

The IC-202S had a 433MHz cousin...the IC-402S. And should you have wanted to have owned a IC-202S in March 1979 it would have set you back £199 including the VAT. The IC-402S would have set you back £288 including VAT.

So, what would you have got for your £199? Well the Icom IC-202S was **and still is**, in my opinion, a good looking radio. It has a rugged but somehow pleasing appearance and has a lasting a professional feel.

The aluminium die-cast frame protects the transceiver and houses the nine **C** cell batteries that provide the power for portable operation. The sides are designed to snap off easily to replace batteries and NiCad battery packs could also be used.

The IC-202S was supplied with a dynamic microphone, and microphone case. Also supplied were a shoulder strap, power cord, 3.5mm plugs for the Morse key and extension speaker, an ear phone, nine C type dry cells with tubes and of course the instruction manual.

On the top panel of the radio - as originally supplied from Icom - there was a telescopic whip antenna. However, on the review radio a BNC antenna socket and a helical whip had replaced this.

There are also anchoring plates for a carrying strap and a microphone clip. On the rear panel was an SO239 antenna socket for connection of an external antenna. On the review radio this had been removed and blanked off as it had been made redundant by the BNC on the top. A three-pin 13.8V d.c. socket is provided on the rear panel for connection to external power or charging.

Plain & Simple

All controls on the IC-202S are on the front vertical panel and they're all plain and simple. At the top is a red l.e.d to indicate there's power to the unit and battery condition. There's also rather cute combined **S/RF** meter, well situated at the top of the panel giving an indication of transmitted power and received signal strength.

Next is the large tuning dial, which I found easy to use. The markings were accurate and I didn't miss the comfort of a digital read out at all.

As the transceiver is crystal-controlled there's also a switch to select which crystal you wish to use. The IC-202S operates between 144 and 144.400MHz using two crystals, which are then tuned using what proved to be a very stable VXO indeed.

There are also two spare crystal sockets - they had optional extras even then! The handbook points out, with considerable emphasis, that with the correct optional crystals, a lucky owner would be able to work through the OSCAR satellites.

The **On/Off Mode** switch, selects lower or upper sideband (l.s.b./u.s.b.). This can also select a rather good backing lamp illuminator that lights up the tuning dial and **S/RF** meter. There's also a **RIT** switch for resolving stations that are a little off frequency without changing your transmit frequency. Connection of a Morse key and extension speaker is by use of 3.5mm jack sockets.

The IC-202S is also fitted with a noise blanker, and from the accompanying literature, it would appear this was a major selling feature at the time. The **Volume** control is also located on the front panel as is the four-pin microphone socket. The internal speaker is behind one of the side panels.

Instruction Manual

It was the IC-202S's instruction manual that first showed the difference between then and now. There was a wealth of information in the manual, far beyond what each button did!

The manual provides technical data and instruction for aligning the VXO, adjusting the final stage idle current and noise blanker sensitivity. In fact there was technical detail and instruction on how to align and adjust just about everything...it transfixed me, but suffice to say I did not adjust or align anything!

On pawing through the handbook, it would appear that it was fitted with a MuTek front-end in about 1989. This enhances the receive side of the radio and will be familiar to those who have owned other s.s.b. rigs such as the Yaesu FT-290.

On The Air

I was dying to get on air with the IC-202S. My head was still spinning with all those wonderful memories of watching Dad operating /A (remember /A?), and /P from North Hill and Dunkery Beacon on Exmoor with his IC-202S, his cobbled together mast and home-made 5-element beam. I'll let you guess what - or should I say **who** the antenna rotator was!

So, here I was all those years later and I was going to be able to operate an IC-202S, I just needed a rotator... (Have I ever mentioned my father-in-law **Terry Wood G7VJJ**?).

Terry and I set out to a hilltop in Dorset called Bulbarrow Hill. It was a cold, well actually, freezing day between Christmas and New Year.

As we got just beyond Blandford Forum we started seeing the snow. By the time we came to rest on Bulbarrow Hill, about 280m a.s.l. (915ft or so), we were in a couple of inches of snow! What I do for Rob Mannion! *Point taken Richard...see you at Christmas.* **Editor**.

The view from Bulbarrow was incredible, it was cold but the sun was shining, we could see into Somerset, Wiltshire and - so it seemed - well beyond.

Product

The Icom IC-202S Transceiver

Pros & Cons

Pros: *Good looking, rugged, controls are plain and simple and performance proved excellent.*

Cons: *That I couldn't keep it for longer!*

Summary

The bottom line is I would love to own an IC-202S, it offers an opportunity to do some QRP hill topping or will do just as well attached to a linear and external antenna at home. All-in-all it's a transceiver well worth a look if you see one at a rally or on the second-hand shelf. It would be the perfect rig to use in the annual PW QRP contest! I look forward to working you in that event later this year - you will be on the air then won't you?

Price

RRP: *£199 when new*

Thanks

Richard Newton G0RSN and everyone on the PW Editorial team, would like to thank Roy Walker G0TAK for the loan of his precious IC-202S. Without Roy's help we would not have been able to provide the in-depth look at this classic little transceiver. Thank you Roy! Editor.

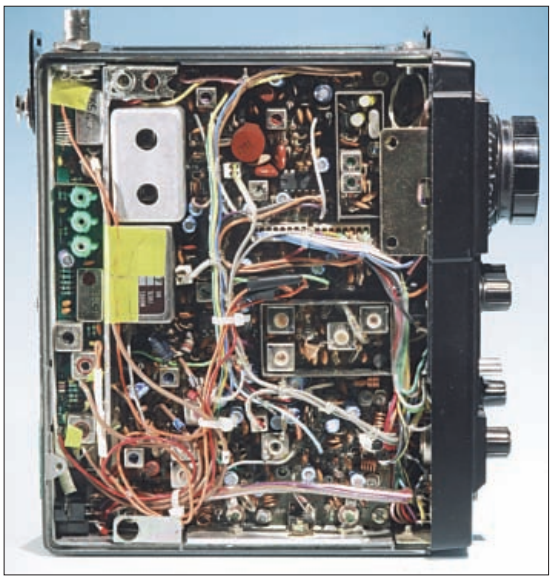

Fig. 2: Inside chassis view of the more than 20-year old IC-202S. Not at single surface mount component to be seen!

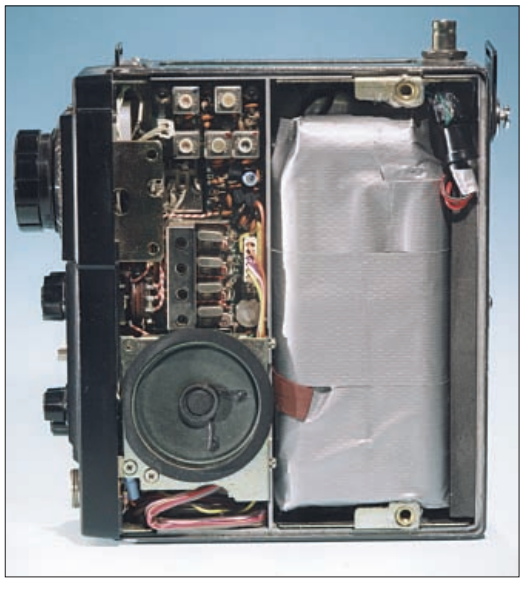

Fig. 3: The battery compartment - providing a good idea of the size of the transceiver. Note the four crystals above the loudspeaker. Note that this transceiver has been modified to take a BNC antenna socket (see text).

Continued on page 42

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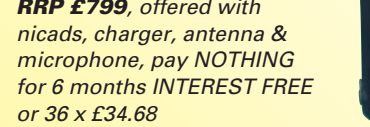

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- DSP

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Manufacturer's Specifications

General		
Number of Semi-conductors	Transistors	19
	f.e.t.s	7
	Integrated circuits	7
	Diodes	36
Frequency coverage	144 – 146MHz	
Frequency stability	Less than 200Hz per hour at +25°C	
Antenna impedance	50Ω unbalanced	
Power supply requirements	13.8V d.c. ±15% Negative Ground 800mA max.	
Current drain	**Transmit**	
	A3J	Approx. 540mA
	A1	Approx. 750mA
	Receive	
	At maximum audio approx. 250mA	
	With no signal approx. 90mA	
	Dial light	Approx. 50mA
Dimensions	183mm (H) x 61mm (W) x 162mm (D)	
Net Weight	2.kg including batteries	
Transmitter		
Crystal controlled	VXO controlled (see text)	
Emission mode	A3J (l.s.b., u.s.b.) and A1	
Power output	A3J	3W (p.e.p.)
	A1	3W
Carrier suppression	More than 40 dB below peak power	
Unwanted sideband suppression	>40dB down at 1kHz a.f. input	
Spurious radiation	>60dB below peak power	
Microphone	Impedance	600Ω
	Input level	10mV typical
	Dynamic or optional Electret condenser microphone	
Monitor (c.w.)	Built in (level adjustable by volume control)	
Receiving circuitry	Single conversion superheterodyne	
Intermediate frequency	10.7MHz	
Modes	A3J (l.s.b., u.s.b.) and A1	
Spurious response rej. ratio	>60dB	
Sensitivity	<0.5 V for 10dB S+N/N	
Selectivity	±1.2kHz at –6dB	
	± 2.4kHz at –60dB	
Audio Output	>1W	
Audio Output Impedance	8Ω	

We unpacked the IC-202S, an HB9CV 2-element beam and a portable mast. Terry was in charge of mast and antenna and I got the gruelling job of connecting the coaxial cable to the transceiver!

● Fig. 4: "I think this microphone has frozen to my face" says Richard G0RSN as he operates from Bulbarrow Hill in Dorset during sub-zero temperatures!

We operated with the Icom IC-202S perched on the roof of my car. The scene was idyllic, sun, snow, views and radio! Wonderful!

It must have been about -5°C, we had to wear gloves to operate, I wondered how the radio would react to change in temperature from the car to outside. I needn't have worried. It did not slip one bit, the only drifting was either the snow or due to me moving the dial accidentally as I shivered!

I knew my brother, **William G7GMZ** was out and about with his Icom IC-706 and Dad's old halo antenna so, using my full 3W, I called on 144.300MHz and what a lovely signal came back. I was extremely impressed with the audio from the IC-202S, the internal speaker and audio circuits produced a very pleasing audio indeed, Terry remarked on how good he thought it was as well.

● Fig. 5: "The things fathers-in-law do for their sons-in-law" says Terry Wood G7VJJ as he takes his turn to freeze while operating the IC-202S.

William was a very good signal with us indeed. He was running no more than 10W, in fact nearer 5W and was mobile, about 64km (40 miles) away from us in Somerset. William gave us a good report and we had a good old chat before I then went in search of another contact.

I tuned the band...but not a *dickie bird* was to be heard, just gentle s.s.b. white noise. So, hopefully, I put out a CQ call on 144.300MHz and to my surprise and delight there came a reply from **John G1WUU** in Paignton, Devon.

John was running 60W into a 13-element Cushcraft beam, he was about 96km (60 miles) away from us. We both gave each other good reports. Terry then suggested it may be even better if we stopped working John off the side of the beam and actually pointed it at him! After we had done this John was able to drop to 6W and we had a very pleasant, armchair type chat.

After our chat to John we had begun to start feeling the cold a bit. Next, following a non-productive scan of the bands we packed up and went home having had a very enjoyable afternoon in the company of the Icom IC-202S.

Very Impressed

Both Terry and I were very impressed with the Icom IC-202S. It was, as I've mentioned already, a *cutting edge* transceiver when it entered the market place over 20 years ago and in my opinion it's still very much a radio to be reckoned with now. Both John and William gave the transmitted audio a good report and the sensitivity and selectivity was excellent.

It's also worth mentioning that Bulbarrow Hill is an extensively used radio site housing v.h.f. and u.h.f. repeaters, pagers and all sorts of radio nasties. We were situated within a kilometre or so of the transmitter sites and although my modern bit of kit in the car suffered from break-through I did not hear a thing on the IC-202S!

What a super rig the IC-202S (still) is! The 3W did us proud and the receive performance was excellent. However, it's important to remember that the review rig appeared to have had a MuTek front-end added and that will have improved things somewhat. *PW*

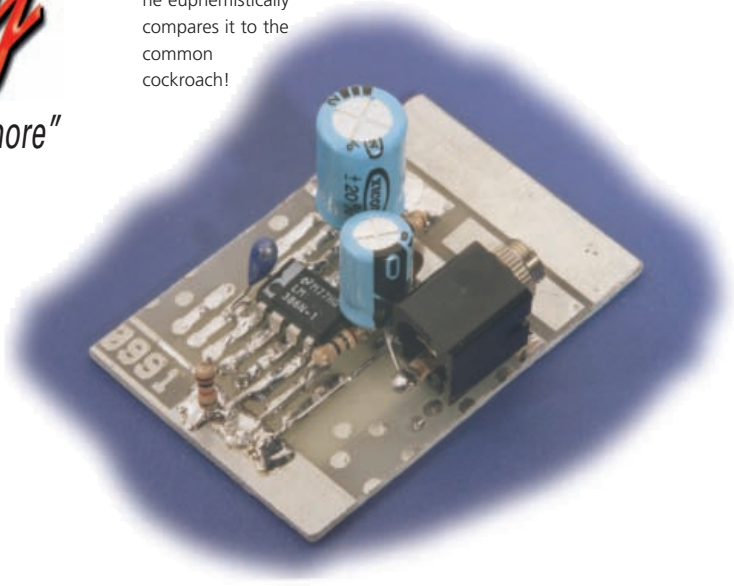
Carrying On The Practical Way

This month, the Rev. George Dobbs G3RJV discusses using the LM386. Intriguingly he also describes the chip as a cockroach of a device and provides the usual appropriate quotation.

"You imperfect speakers, tell me more"

William Shakespeare,

from Macbeth.



● The LM386 features in G3RJV's article this month where he euphemistically compares it to the common cockroach!

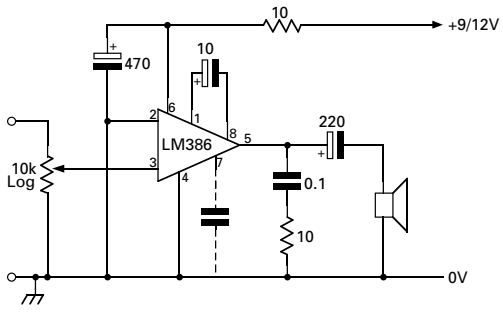
I have seen a reference to the LM386 audio amplifier chip referring to it as 'the cockroach of audio amplifiers' - in other words it's very common! Readers of this column will know that it has often featured in my circuits for simple equipment. The LM386 may not offer the ultimate in audio sophistication but it has the merit of being very cheap. It's also very easy to obtain and uses very few external components to make it function.

Making *silk purses out of sow's ears* may be a fruitless exercise! Despite that, this month I want to discuss some of the ways in which the LM386 might be used to better advantage.

The LM386 is a useful audio amplifier package with adjustable gain. The voltage gain is set internally to 20 (26dB) but with the addition of an external capacitor between pins 1 and 8 the gain can be increased to 200 (46dB).

In use the current drain is only 4mA, and a typical quiescent power drain is a mere 24mW. This makes it very suitable for battery-powered equipment.

WS1584



● Fig. 2: The typical high gain (46dB) configuration for the LM386. In this example the input is single ended (see text).

Several Flavours

The LM386 comes in several 'flavours', corresponding to the available power output into an 8Ω load. The LM386N-1 can supply 325mW, the LM386N-2 gives 500mW, the LM386N-3 gives 700mW and the LM386N-4 gives 1W. They all function with a supply in the range 5 to 12V, although the LM386N-4 will accept up to 18V.

The diagram, **Fig. 1**, shows the functional layout of the device as supplied in the National Semiconductor data sheet. Pins 2 and 3 provide for a balance input. Although many applications, including most of mine, tend to ground one of these pins and use it single-ended, it's usually more stable when fed with a balanced input.

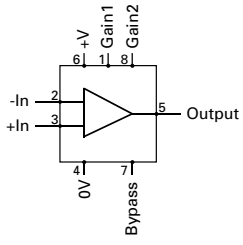
The balanced input will require a **common mode** volume control: a potentiometer between pins 2 and 3, not going directly to ground as in the single ended input. A simple resistance-capacitance combination low-pass filter on each input will also improve the performance.

Pins 1 and 8 can be used to set the gain externally. Connecting a 10µF capacitor between these pins increases the preset voltage gain of 20 to 200. The gain may be adjusted between these two levels by adding a series resistor.

A bypass capacitor can be added between pin 7 and ground. A capacitor in the 1 to 10µF range is useful if large signal distortion is experienced. The supply voltage is connected to pin 6 and the 8Ω output comes from pin 5.

● Fig. 1: The functional layout of the LM386 device as supplied in the National Semiconductor data sheet.

WS1583



High Gain Configuration

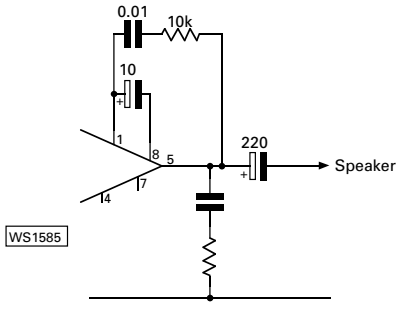
The typical high gain (46dB) configuration for the LM386 is shown in **Fig. 2**. In this example the input is single ended.

Input resistance on the LM386 is in the order of 50kΩ so a potentiometer of about 10kΩ (logarithmic track) provides a simple volume control.

The supply line is decoupled with a large value (470µF) capacitor ideally placed as close as possible to pin 6. The output at pin 5 is capacitively coupled to the 8Ω load - a small loudspeaker or portable cassette type headphones are suitable.

A low frequency roll-off

● Fig. 3: Using the LM386 at high gain increases the internally generated hiss. Hiss can be reduced by adding a capacitor and resistor between pins 5 and 1 to act as a bass boost (see text).



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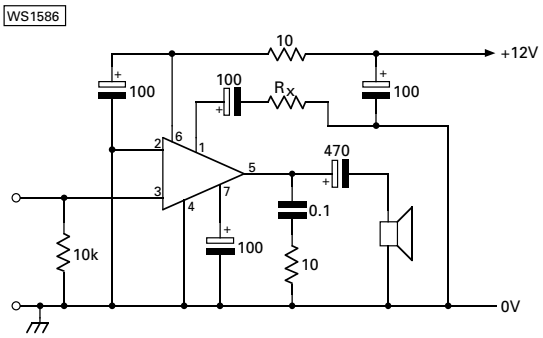

Fig. 4: A rather unusual circuit for the LM386 amplifier discovered by G3RJV - but it comes with a health warning! (see text).

filter, 0.1µF and 10Ω, helps to prevent motor-boating. This basic circuit has done sterling work in many of my projects.

Unfortunately, using the LM386 at high gain does increase the internally generated hiss. However, one common fix for such hiss is to add a capacitor and resistor between pins 5 and 1 to act as a bass boost. The diagram, **Fig. 3**, shows this arrangement.

The values of 0.1µF and 10kΩ in Fig. 3, are suggested by **Don Kelly KA5UOS**. I have also seen 0.005µF and 4.7kΩ used and the National Semiconductor data sheet recommends 0.003µF and 10kΩ.

So experimentation is in order! However, it's easy to make the LM386 oscillate if the capacitor is too high or the resistor is too low...so **forewarned is forearmed**!

Unusual Circuit

The diagram, **Fig. 4**, shows a rather unusual circuit for the LM386 amplifier. I've seen several version of the circuit but the original idea came from the JF1OZL web page - **http://www.intio.or.jp/jf1ozl**

In the circuit of Fig. 4, gains of over 70dB are claimed for the LM386. Pin 1 is used to control the gain by altering the value of Rx.

Decreasing the value of Rx increases the gain of the LM386. The original values for Rx against gain is shown in **Table 1** below.

Rx [ohms]	Gain [dB]
3.3	74
10	70
33	54
100	44
820	34

Fig. 6: An audio amplifier built using the circuit featured in Fig. 4. George 3RJV says it works...but uses a lot of 100µF capacitors!

I must admit to being sceptical about this circuit. I say this because I've had experience of the LM386 taking off with the gain set to 46dB. I well remember one of the '386 audio amplifiers producing a lovely big signal at the top end of the 14MHz amateur band!

I bread-boarded the circuit using 10Ω for the value of Rx and it certainly did work with plenty of gain and no apparent instability. **It does generate a fair amount of high frequency audio hiss.**

I can only commend readers to try the circuit for themselves. The LM386 is cheap enough for experimentation but this circuit does use a lot of 100µF capacitors!

Circuit Classic

The final LM386 circuit I offer is somewhat of a classic. It was first suggested by my old friend **Roy Lewallen W7EL**. Roy and I have spent many happy hours together in the UK and the USA, not only at radio events but touring around with our wives.

The W7EL Optimized QRP Transceiver first appeared in the American Radio Relay League's *QST* magazine in August 1980. It was such an innovative transceiver that portions of the design have become standard circuits in QRP projects to the present day. The original article had the opening lines, "High-performance, direct conversion receiver may seem self-contradictory" (wrong!).

The circuit, **Fig. 5**, is a simple method of muting an LM386 amplifier (or other amplifier) when it's used in a transceiver design. The f.e.t., an MPF102 or similar device, acts as a series gate. When the transmitter is keyed the gate switches off blocking the audio input to the amplifier.

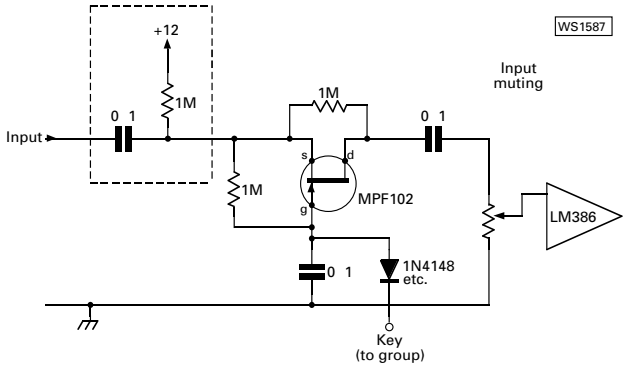

Fig. 5: A simple method of muting an LM386 amplifier, or other amplifier, when it's used in a transceiver design. The MPF102 f.e.t. or similar device, acts as a series gate (see text).

The 1MΩ resistor between the source and the drain of the f.e.t. allows a small amount of audio signal to reach the amplifier to monitor the keying of the transmitter. This value can be lowered or raised for more or less audio signal presented to the amplifier. The resistor can be omitted for complete muting perhaps if a separate sidetone oscillator is used to monitor the keying.

The correct working of the switching relies on a small positive voltage being present at the source of the f.e.t. This may be present if the circuit is d.c. coupled from another stage. If not, or if you're in doubt, the additional parts shown inside the dotted line are required.

The 1MΩ resistor feeds some voltage from the supply line and the 0.1µF capacitor isolates this from the source of the audio signal. The circuit also assumes that the key grounds the key line.

I cannot count the number of times I, and others, have used Roy's little circuit. And although the LM386 may be regarded in the same way as a cockroach...there's plenty of mileage in it for the humble - but keen - home constructor. Enjoy your experiments. PW

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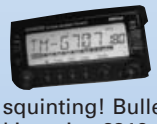

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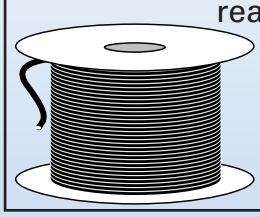

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PLUMBER'S DELIGHT - A COLLINEA

Peter Lewis MI0APE raided his local d.i.y. store to find the bits to make up an effective antenna system for the 144MHz band.

Having just acquired a 144MHz transverter (second-hand), I wanted to make a cheap but simple 144MHz antenna. I knew from talking to other people that 144MHz activity in Northern Ireland is very low. Most of the activity is on the local repeaters. I ruled out building a 144MHz beam as I didn't want to use a rotator.

I felt the cost of buying a rotator was too expensive for the amount of activity and would not be cost effective. I just wanted a simple, but effective antenna that I could use to listen to the 144MHz band. The antenna described here, has some gain over dipole and has an omnidirectional polar pattern.

The last time I used 144MHz at my old QTH I used a 3λ/4 antenna with a λ/4 matching stub. This worked quite well and stood the rigours of bad weather (my old QTH was around 200m above sea level). It's often very difficult to obtain aluminium tubing in Northern Ireland so I had to find alternative material to use for the antenna. The material needed to have the characteristic of a low resistivity, support its own weight and had to be available in various diameters and lengths - at a low cost.

Short Lengths

The material I came up with was copper pipe for the short lengths used in the antenna, it would be rigid enough to hold its own weight. After choosing the material I started to work out dimensions of 3λ/4 antenna with a λ/4 matching stub. This design is formally known as the J-Pole.

The diameter I choose for the antenna was 0.75 inches; this was a compromise between covering the whole of 144MHz with a reasonable s.w.r. Using narrower pipe gives the antenna an higher *Q* and it also may be too flimsy to stand weather battering. If you made the diameter greater than this, it will give you a lower *Q* but the antenna weight increases with diameter, not to mention the cost as well.

I found the formula in the *ARRL Handbook* is given as 468/F = for the λ/2 element length. The answer is given in feet, but the formula is derived from λ=c/F. This is where λ is the wavelength and c is the speed of light (in the appropriate units) and F is the frequency in Hertz.

Speed Of Light

So, working in metres, and using 3×10^8 m/s for the speed of light and using the band centre frequency of 145MHz gives a value for λ=1.035m. It's usual to reduce this figure to around 95%, so taking into account the slightly slower velocity of r.f. in a metal conductor.

The figures for the various dimensions are as shown in **Fig. 1** and **Fig. 2**, the two ways to feed the antenna most often shown in textbooks. I have tried in the past to feed the antenna as shown in Fig. 1. However, I found great difficulties in obtaining a good match as shown by a low s.w.r. So, in this version I've opted to feed this antenna as shown in Fig. 2.

Joiners and couplers, such as the 90° angle piece, come in two types. One type (preferred) that you solder together and the other type that screwed together and has a small olive to hold the pipes in place (compression type).

I used the soldered type that has the solder already on the inner surfaces. So, you just have put them together and heat them. I used a portable gas stove to heat the joints. I also found it useful to have a piece of solder to hand to make a joint strong and firm.

Average Bend

On average each bend will need to have the copper pipe length reduced by about 12mm This will take into account the bend of the angle piece. Each join should be treated as a job and the joins should be allowed to cool down before soldering the next one. When you've finished the last join, you should have a J shape made out of copper pipe which will lay completely flat on the floor.

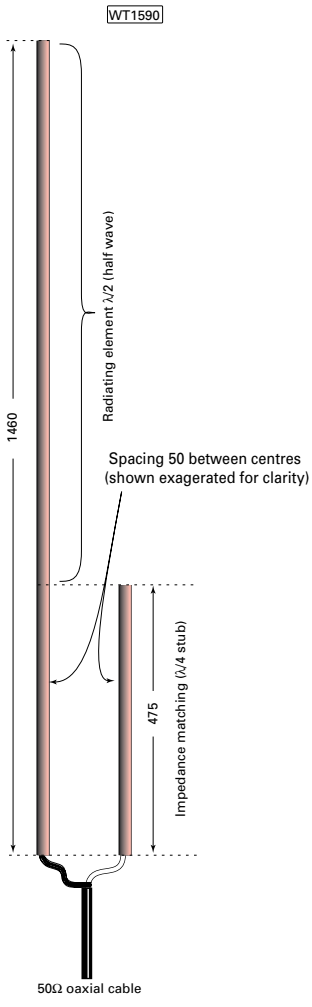


Fig. 1: A simple (almost) J-pole antenna, that Peter MI0APE has found difficult to get an adequately match, is often still shown in many books on antennas.

Tie pieces of string on the top and the bottom and hang the antenna by these pieces of string and use the bottom string so that it keeps it firm and use a brick to hold the antenna in place. The antenna should be at least 500mm above the ground and away from large objects.

Now cut a piece of UR43 coaxial cable some five to seven metres long and put a PL259 plug on one end. At the other end of the cable, strip the outer insulation back about 70-80mm and separate the inner and braid. But a better option is to add an SO239 socket to the antenna as described later.

To make the connections to the copper pipe, I use jubilee clips. Slip the ends of the coaxial cable inner and braid under the relevant jubilee clip and tighten then up so the wire doesn't move.

Please remember that braid and inner should be attached to their correct pipe. Use an s.w.r. bridge (or use a transmitter on low power, set to 145MHz) and measure the s.w.r. If it is too high (>2 :1) then the jubilee clips should be moved up or down in small movements to bring the s.w.r. to a minimum.

R FOR 144MHz

Jubilee Clips

Mark the position of the jubilee clips with a pencil (about 77-80mm from the bottom). Now stick or bolt the plastic strip a little above the feed-points. Solder a thick copper wire to the inner of SO239 another one onto the flange of the SO239 socket . The wire used for these connections should ideally be at least 2mm diameter.

Fit the SO239 socket onto the plastic strip as shown in **Fig. 3**, and solder the free ends of the copper wires to the body of the jubilee clips. It would be easier if you loosen each jubilee clip before doing this - that's why you should mark their positions.

It also helps if you have a high wattage iron. But if you don't have access to one, don't despair, just clean off the end of the wires and the area of the copper pipes and use the jubilee clips to clamp them both together.

Measure the s.w.r. again for this new permanent connection! Should the s.w.r. have changed significantly, move the jubilee clips fractionally to obtain a better match. You should be able to achieve an s.w.r. of around 1.2:1 with care.

On the side of the antenna away from the plate with the socket on, attach a piece of strong plastic sheet which is as wide as the antenna and 350-400mm long. Glue or bolt this plate to the antenna. This is the mount to hold the antenna onto the mast.

The antenna itself should be mounted on a short insulated stub mast of around of at least 750mm long. I used a short length of a broom handle fitted into a piece of plastic drain pipe that is around 50mm longer than the section of broom handle.

Snugly Together

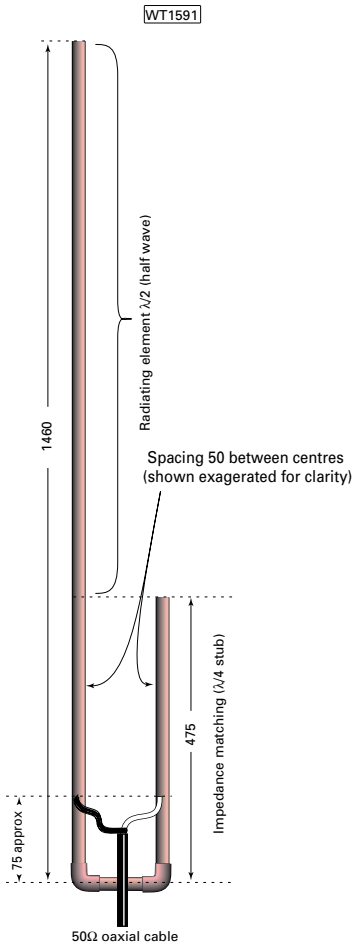
Make sure that the broom handle and plastic pipe fit snugly together, you may have to find the correct diameter broom handle to make them fit. Lodge the broom handle inside the pipe leaving 25mm clear at either end. Fill this space with a car body filler (this is to stop the wooden pole from rotting).

Attach the strengthened stub-mast onto the plastic sheet by using bolts. Then mount the antenna and stub-mast on top of your ordinary metal scaffold pole, or mast, using U bolts to hold them in place. Leave a gap of at least 75mm between the scaffold pole and the bottom of the antenna. Again you should recheck s.w.r. and if needed, make suitable adjustments.

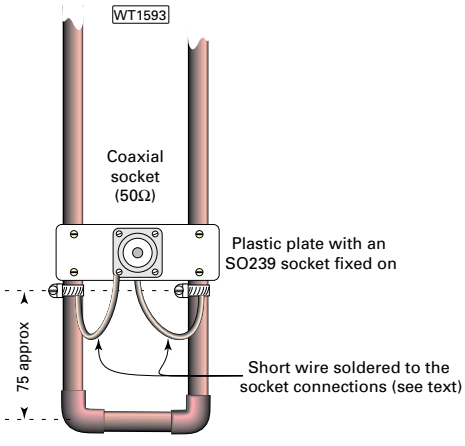
This antenna is equivalent to a dipole as the matching stub does, itself, not radiate. It also has a reasonably low propagation angle that can give some gain over other antennas. But should you need more gain, you can turn the antenna into a collinear.

Changing the antenna into a collinear one is done by adding another λ/4 phasing stub at right angles at the top of the first radiating element, then a further λ/2 element above that. The basic layout is shown in **Fig. 4**. Put it together as before by soldering. It's a good idea to use some more plastic strengthening plates on the new phasing line. although it does make it more prone to wind damage.

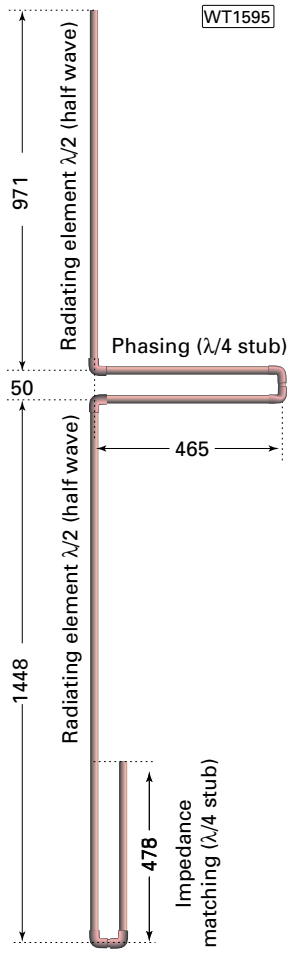
Perhaps instead of soldering this new section on you could join it on using the olive type of joiner so, the antenna can be dismantled. This method makes the antenna portable and easily stored in two halves.



● Fig. 2: Closing the bottom of the matching stub section allows a much better match to be achieved by moving the feed-points up and down slightly to find the correct impedance point.



● Fig. 3: A plastic plate with the SO239 socket, with 'pigtails', mounted on it makes it easier to connect the coaxial cable to the antenna. See text for more details.



● Fig. 4: Adding another phasing stub and radiating element turns the J-pole into a collinear antenna. It can be effective, although a little heavier than the more usual aluminium version. The coaxial feed details remain the same.

Painted Surfaces

You should also paint all the copper surfaces with a varnish or with with Hammerite paint. You should also fill in around the SO239 socket with epoxy resin glue or car body filler. This will help to keep the water out of the socket and a wrapping of self-amalgamating tape will help to do the same thing on the plug side.

You should now have an effective and, above all cheap antenna that will work remarkably well over most, if not all of the 144MHz band. *PW*

Valve & Vintage

Judging by the warm smell of polished wireless-set cabinets, the dim glow of valves and the hint of wry humour...it's obviously Charles Miller on duty in the vintage shop. This time he's taking a nostalgic look at American midgets!

Back in the late 1940s large numbers of American midget wireless sets were still in everyday use in Britain. The reason for this was that during the Second World the Board of Trade had imported 100,000 of them to make up for the virtual extinction of domestic radio production in this country due to the needs of the Military. The numbers had further been swelled by the sets brought over here by members of the American forces.

Many engineers disliked working on midgets but I was fascinated by them and thus willingly took on the jobs that my colleagues avoided. In due course I determined that I would build a midget of my own, and for reasons which now escape me I decided that it should be a 'short' superhet using a frequency-changer, an i.f. amplifier and a combined detector, a.v.c. rectifier and output stage.

My decision, in itself was not too blameworthy but the way I went about it was, with hindsight, ill-advised. The set was, of course, to use American metal or GT (Glass Tube) Octals and in the absence of purpose-designed double-diode-pentode I pressed a 6B8 into service.

The pentode section of this actually was intended for use as an i.f. amplifier but the March 1949 issue of *Wireless World* had published a design for a two-valver using EF50s for both detector and output stages by no less a person than S. W. Amos of the BBC's Training School. Whilst even the mighty and prestigious EMI was using a Z77 as the sound output valve in some of its television receivers, so why shouldn't I follow suit?

The answer was, of course, that presumably *Wireless World* and EMI knew what they were doing. On the other hand I, patently, did not.

High Slope

The EF50 and Z77 were both high-slope valves with anode currents of 10mA or more and thus could be cajoled into giving almost a watt of audio output, whilst the 6B8 drew only a few milliamps and had a miserably small slope. Thus to expect it to provide adequate output when driven directly from a detector was, to say the least, wildly optimistic, this was not the only inherent error in my design, however.

The other two stages used a 6K8 as frequency-changer and a 6K7 as the i.f. amplifier. There was nothing wrong with them *per se* but since I decided to use a selenium rectifier to provide the high tension (h.t.), the sum total of the valve heater voltages was only 18.9V. This was sheer folly, because, this being an a.c./d.c. set, it meant that I had to drop no less than 211.1V @ 0.3A from our 230V mains.

To save your having to work it out, the dropper resistance had to be a shade over 700Ω and it would dissipate in excess of 60W. The problem here was that available 0.3A droppers went up only to 650W because that was ample for the usual 0.3A chains used in tuned radio frequency (t.r.f.) and superhet midgets.

However, it was possible to obtain 800Ω droppers for sets using 0.2A chains and maybe one would stand a bit of an overload? Well, possibly it might have put up with passing, say, 10% or 15% more than its rating but to impose a 50% overload really was asking for trouble and I duly received it.

Another Basic Fault

Another basic design fault lay in the way that I mounted the selenium rectifier. These devices were about three to four inches long and about an inch overall in circumference, measured across the cooling fins.

At either end was a 4BA threaded stud for mounting purposes. The correct way to do this was to have two small brackets set at right angles to the chassis and the correct distance apart for the rectifier to sit horizontally between them, in which position air could flow evenly over all the fins and keep them cool.

The wrong, but temptingly easy way, was to drill a single 4BA clearance hole in the chassis and mount the rectifier vertically by only one of the fixing studs. This resulted in the fins being poorly and unevenly cooled, which in turn caused the rectifier to overheat, emit a smell of rotten cabbages and eventually to break down.

Mind you, S. W. Amos made the same mistake in his *Wireless World* midget. So I can claim that better men than I had lapsed as well.

The tuning and local oscillator coils were **Wearite P** types, partnered by Weymouth midget i.f. transformers, all sold in the shop where I worked. These were (and still are) excellent components and the first two stage of my midget worked extremely well. Even so, they could not feed enough detected a.f. to that 6B8 to produce much more than a whisper of sound from the loudspeaker.

In the end I had to concede that the set would never be any good unless and until I interpolated an a.f. amplifier twixt detector and output. The problem being that there simply was no room on the chassis for another valve holder.

I worked my way round this one by using a 955 acorn triode suspended in the wiring on the underside of the set. This valve had a heater rated at 0.15A @ 6.3V so I shunted it with a 47Ω resistor to enable it to operate in the 0.3A chain, now increased to a total of 25.2V and requiring a slightly reduced mains dropper value of 680Ω.

Although the intended job of the 955 valve was to work as an oscillator at what was then called u.h.f., it functioned well enough as an a.f. amplifier and the little set started to work astonishingly well. It used to sit by my bedside and provide me with late-night entertainment from the American Forces Network's main station in Germany, which transmitted on 240m with a power, as the GI announcers used to say, "of one hundred thousand watts".

Powerful Transmitter

In the days of the Nazi regime the powerful transmitter had been used for bombarding Britain with propaganda broadcasts, to which end the aerial (**watch it, RM!***) had been built to direct most of the energy towards us. Thus the signal arriving here after dark was extremely powerful, enabling the listeners in this country to hear all the favourite U.S. radio programmes, shorn of their commercial breaks.

At 2300 hours CET the sound of Charlie Barnet's Band playing *Skyliner* - and I'll wager that a few mature readers will still be able to hum or whistle every bar of it, even after an interval of half a century - introduced Sergeant Ralph 'Muffet' Moffat, arguably the finest DJ ever to be heard regularly in Europe.

Gentlemen now abed in England should curse themselves that they were not there to hear him, as Shakespeare undoubtedly would have said had the old lad

been up and running in 1949.

Naturally, I was glued to the loudspeaker until the final record had been played and the station had closed down to the stirring sounds of *So Proudly We Hail*, by which time it was one o'clock in the morning GMT. By then I was apt to drop off to sleep without remembering to switch off the receiver.

Dropping off inevitably happened to me and in the early hours of the morning the selenium rectifier, over-heated beyond its endurance by the also over-heated mains dropper, erupted. It then caused the winding of the latter to disintegrate into myriad small spirals of red-hot resistance wire which were projected across the room and proceeded to droppeth on me, not at all like the gentle rain from heaven!

Gentle reader, if you have never been awakened at 3am by a shower of hot wires you have missed a never-to-be-forgotten experience. As I came to from deep sleep the dropper was still discharging missiles in my direction and I had to brave them in order to get to the mains socket and wrench out the plug.

No man can expect to explode a selenium rectifier in the wee small hours and not draw attention to himself and I was no exception to the rule. My parents arrived at my bedroom door to be greeted by the powerful aroma of rotten cabbages and a lively discussion took place, over which I shall draw a veil.

The midget didn't remain out of action for long, however, haven't learnt from experience, I replaced the kaput dropper by a resistive mains lead, this time of the correct 0.3A rating. This had a resistance of 60Ω per foot, so for my 680W I required a prodigiously long lead in excess of 11 foot three inches.

The lead ran at a gentle heat and I used to wrap it around myself to keep warm on winter nights in a room in which it was common for a glass of water to freeze by the bedside. Who needs electric blankets?

Not very long ago I heard the comedian Bob Monkhouse describe in a radio interview how he did exactly the same in 1939 and I suspect that a lot of other non-centrally heated listeners did as well.

*****_This is a warning readers daring Rob Mannion to change aerial to antenna_ - PW's _Editorial style!)_. **Editor**.

Making An Oscilloscope

Once the midget was in good working order I turned my attention to another project which engaged the interest of many radio enthusiasts in those days, which was to make an oscilloscope. Very few of us had any actual need for such a device but numerous slim technical books, such as those published by Bernard Babani, assured us that once we had built one it would prove to be the best thing since sliced bread.

Some general ground rules had been laid down for these home-built 'scopes, one being that you started with an ex-Government Indicator Type 62, used in the GEE radar system and available from Lisle Street for about 25 shillings.

All too often when an old price such as this is quoted some clever-dick writer (or Sub-Editor) will refer to it ironically as 'princely' and equivalent to £1.25 today. In fact, 25 shillings was just over half my weekly wage, so work out the modern equivalent from that!

Again, certain writers who know no better consistently disparage British Second World War radar and radio equipment, alleging that it was poorly designed and built. That's patent rubbish as anyone who has had real experience of it will know full well!

The 62 unit was a fine example of the skill and workmanship of A.C. Cossor, Ltd., and even as a callow youth I felt a certain aversion and subsequent guilt about butchering mine. Incidentally, two or three years ago I bought my second example after nearly 50 years at a country auction sale. The 62 had not been touched in all those years and is now, after a minimum of servicing, part of a re-created GEE simulator).

The trouble was that the expense did not stop there, because after buying the 62, the new owner had to provide the unit with l.t., h.t. and e.h.t. supplies. The first two were easy enough, for there were plenty of scrap radio sets from which power supply stages might be scavenged, but obtaining the e.h.t. was a different story altogether.

The VCR97 cathode ray tube (c.r.t.) in the 62 unit needed about 2.5kV on its final anode. So we constructors had to buy a suitable transformer, again from Lisle Street, for nearly as much as the Unit itself. It too was ex-Government and was again soundly constructed with the windings being brought out to inch-high corrugated porcelain insulators.

I wondered what equipment they had been used and I was to find out about 18 months later in vastly different circumstances. Jumping ahead, by that time I was a Ground Radar Mechanic with the RAF and a colleague and I were despatched from our Lincolnshire base to Ventnor, Isle of Wight, to look after the local Chain Home (CH) gear.

I have to say that we were appalled by the accommodation we were offered in one of the standard 30 men billets. But as I've run out of time and must close the shop...you'll have to wait until my next turn for the exciting conclusion to this story! *PW*

● .....the lead ran at a gentle heat and I used to wrap it around myself to keep warm on winter nights in a room in which it was common for a glass of water to freeze by the bedside. Who needs electric blankets?

Trader's Table

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

Last month I described the excellent conditions that occurred on the 50MHz band during December. The band was open via some form of ionospheric propagation mode virtually every day during the month with numerous openings into Africa and North America.

By January 1 however, it was just like a switch had turned off the propagation. The world-wide DX signals dramatically disappeared and all that was left was a smattering of weak auroral back-scatter events and some fairly insignificant Sporadic-E openings.

Auroras were reported on January 3, 21, 23, 24 and 28 all being restricted to very local traffic such as Scotland to central England. The station of **MM0AMW** (IO75) heard the Greenland beacon OX3SIX (HP15) at 2100UTC on January 21 peaking 52A but the opening was very brief. The beacon runs 100W into a dipole and is located in an optimum location to indicate auroral propagation.

On January 11 the stations of **G4HBA** and **G4IGO** (both in IO80) reported hearing the JW7SIX beacon located on Svalbard in the Arctic Ocean. Signals from the beacon were peaking 599 and were probably heard via Auroral-E (Au-E) propagation.

During the winter period (December-January) there is normally a small peak in Sp-E propagation. Openings of this type were reported on January 7, 9, 16, 22, 23 and 24 with s.s.b. contacts being made with stations up to 1500km or so from the UK. Countries worked during the period included Belgium (ON), Czech Republic (OK), France (F), Germany (DL), Italy (I), Poland (SP), Portugal (CT), Spain (EH), Switzerland (HB9) and the station of OD5/OK1MU (KM73) operating from Lebanon.

Right at the end of January there was a glimmer of hope that some more DX might be returning to the 50MHz band. On the 27th there was a small trans-equatorial propagation (t.e.p.) opening to Africa. Among the stations heard or worked from central UK were 3C5I (Equatorial Guinea), 6W1QU (Senegal) and ZS6WB (South Africa).

By the time you read this in March, the optimum path on the 50MHz band will be to the south of the UK. You can expect to find t.e.p. openings to South Africa around midday.

If you only operate on the 144MHz band then you can't take advantage of the numerous ionospheric propagation modes that occur at lower frequencies. Consequently, apart from a few weak auroral openings and the Quadrantids meteor shower on January 3, there was very little else to report during the period.

The only event of any note occurred between January 13-16 when an area of high pressure developed enabling tropo contacts to be made from many parts of the UK into mainland Europe and Scandinavia. Contacts were made on c.w. and s.s.b. with stations located in Germany (DL), Switzerland (HB9), Norway (LA), Denmark (OZ), Sweden (SM) and Poland (SP).

Dave Edwards G7RAU (IO90) on the Isle of Wight reports hearing or working the stations of DJ7RI (JO54), HB9RDE (JN37), OZ5KM, SM5BSZ (JO89) and SP3VSC (JO73) and numerous other stations. In North Yorkshire the station of **G4LOH** (IO94) reported hearing the beacons DB0FAI (JN58), LA3VHF (JO38), LA4VHF (JP20) and OZ4UHF (JO75). He also heard the Lithuanian stations of LY2BAW and LY2SA (KO14).

Conditions were also very good on the 430MHz band and higher frequencies. At the QTH of **John Quarmby G3XDY** (JO02) many s.s.b. contacts were made on the 430MHz band including the stations of OZ1ANA, SK7MW, SM4DHN (JP60) at 1176km, SM6CEN and SM6UUZ. John is also active on the 1.3 and 2.3GHz bands and was very pleased to work the station of SM4DHN on both these bands. Other contacts included OZ2OE and SK7MW on the 1.3GHz band and SM6ESG on the 2.3GHz band.

MARITIME ACTIVITY

Andy Adams G0KZG/MM, well known for his maritime mobile exploits on-board the *Royal Research Ship Charles Darwin* has provided me with details of his final trip last year. He regards the three month voyage between July to September as his most successful ever with over 450 c.w. and s.s.b. contacts being made on the 144MHz band. These of course were accomplished from locations in the North Atlantic ocean - many hundreds of miles away from the nearest station.

A total of 19 countries were worked with 253 successful contacts being made via meteor scatter. Over 100 contacts were made using tropospheric propagation, 72 via auroral back-scatter and 29 via Sporadic-E.

Andy was also active for a limited period on the 50MHz band making around 60 contacts. A truly remarkable achievement.

This year Andy will be remaining on the *RRS Charles Darwin,* but instead of sailing around the cold North Atlantic, he's heading for warmer climes in the Indian Ocean. Consequently he has decided to drop activity on the 144MHz band and will be active on the 50MHz and h.f. bands.

Andy will be running 100W and a 5-element F9FT Yagi on the 50MHz band and a magnetic loop antenna covering 10 to 30MHz. This equipment will be operational when he sets sail from Southampton on March 4 sailing towards Durban, South Africa (arriving on April 12) via Madeira, Tenerife and Cape Town. He will then cruise around Mauritius, Seychelles, the Durban area and then up to Muscat in Oman. Andy mentions that he is looking forward to having many contacts with UK stations on the way south as he has a good take-off over the back of the ship.

THIS MONTH DAVID BUTLER G4ASR HAS YOUR USUAL REPORTS OF ACTIVITY ON THE VHF AND UHF BANDS AS WELL AS GIVING DETAILS OF A PREMIER VHF CONVENTION.

FIRST CONTACTS

Jonathan Kempster M5AEO has written in for the first time. (Welcome Jonathan and thank you for your positive comments regarding the column). Jonathan is active from Milton Keynes (IO91) on the 50 and 144MHz bands.

Jonathan enjoys operating with s.s.b. on the 144MHz band and since putting up a 5-element Yagi in the loft space he has managed to make his first contacts into continental Europe during the recent good conditions. His experience of the 50MHz band is somewhat different.

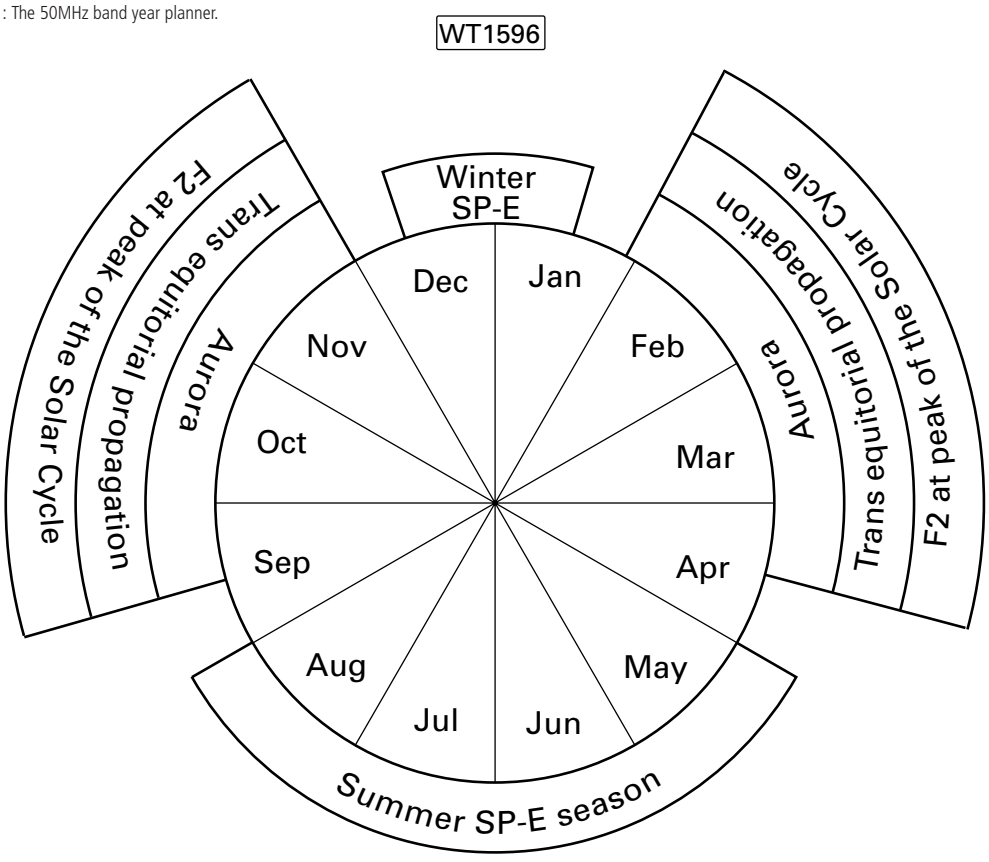
So far he has only experienced one opening on that band into eastern Europe. He uses an Icom IC-746 transceiver running 100W into a Halo loop but all he seems to hear is a dead band for most of the time.

Jonathan asks what is the secret to knowing when the band is open and does he stand any chance with his humble set up?

To monitor for any opening you could spend 24 hours a day, 365 days a year, tuning the bottom 150kHz of the 50MHz band. This is hardly practical, although I have heard of a few operators who seem to do just that!

One way of getting to know when the 50MHz band will be open is to gain an understanding of the different types of propagation modes that occur on this band. With this knowledge you are then in a position to know what to expect on a monthly basis and in general terms as to what time openings should take place. Then it's just a matter of monitoring the band at the right times to ensure that the Sun is being co-operative!

● Fig. 1: The 50MHz band year planner.



The propagation modes that you will encounter on the 50MHz band all occur in the ionosphere within the **E** or **F** layers at heights of around 100 and 300km respectively. Tropospheric contacts with stations up to a few hundred kilometres away can of course be made at any time, but this isn't regarded as a DX mode at these frequencies.

The main modes are Sporadic-E (Sp-E), Aurora (Au) and Auroral-E (Au-E), trans-equatorial propagation (t.e.p.), meteor scatter (m.s.) and F2-layer (F2). There's also other modes such as field-aligned irregularities (f.a.i.) and ionospheric scatter, but these are not as common as the six main propagation modes.

The diagram, **Fig. 1** shows the DX propagation modes and when they are expected during the year. The main Sp-E season is in the summer with a much smaller peak mid-winter.

Aurora, trans-equatorial and F2 propagation occur around the periods of the spring and autumn equinoxes. Large scale auroral openings can occur at any time of the year however, F2-layer propagation only exists for a year or two around the peak of the sunspot cycle.

During very good solar cycles the F2 season can continue right through the winter season. On top of this are the major meteor showers. These occur on specific dates throughout the year with February being the only month that doesn't have a major shower.

The chart is only a guide and doesn't guarantee when the band will actually be open. However, it will give you a reasonable idea when the 50MHz band should be open.

Jonathan M5AEO mentioned that he is using a Halo antenna. This is basically a horizontal loop which possesses less than unity gain. Although it can receive horizontally polarised signals over a 360° coverage, it will have less gain than a simple dipole.

In practical terms, the only propagation mode with which Jonathan will achieve consistent results using a low gain antenna is Sp-E during the summer months. Signal strengths are enormous and the 50MHz band can be open for hours at a time.

VHF CONVENTION

From this year the annual RSGB VHF Convention has a new location. The RSGB Spring Show and v.h.f. Convention (as it is now called) is being held at the **Bletchley Leisure Centre, Buckinghamshire** and **not** at Sandown Park racecourse as in previous years. By the way, that's Bletchley Leisure Centre **not** Bletchley Park where the Enigma decoding machine is housed!).

The show and convention is being held over a two day period on April 7-8. One of the highlights of the event will be a series of lectures arranged for both days.

The provisional programme includes two talks by **Simon Lewis GM4PLM** entitled 'A beginners guide to the microwave bands' and 'A beginners guide to microwave construction'. **Charlie Suckling G3WDG** will be continuing the microwave theme with a talk on the recent advances in microwave techniques.

The UK Six Metre Group (UKSMG) have also planned a full programme of events including lectures by the **OX2K** DXpeditioners who put Greenland well and truly on the 50MHz map last year and the world's top DXer **Peter PY5CC**. Come meet and listen to the man who has worked over 200 countries on the 'Magic Band'. For those just starting on the 50MHz band, **Clive Davies G4FVP** and **Trevor Day G3ZYY** will be presenting a beginners guide to operating.

Finally, I will be, on both days giving an audio-visual talk entitled 'Making more miles on v.h.f.' This is a DX operators guide to all the different propagation modes that can be encountered on the v.h.f. bands. The talk describes the propagation modes, when they occur and how you can use them to work more DX on the v.h.f. bands. This is a convention and show definitely not to be missed.

DEADLINES

That's it again for another month. 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

ICOM

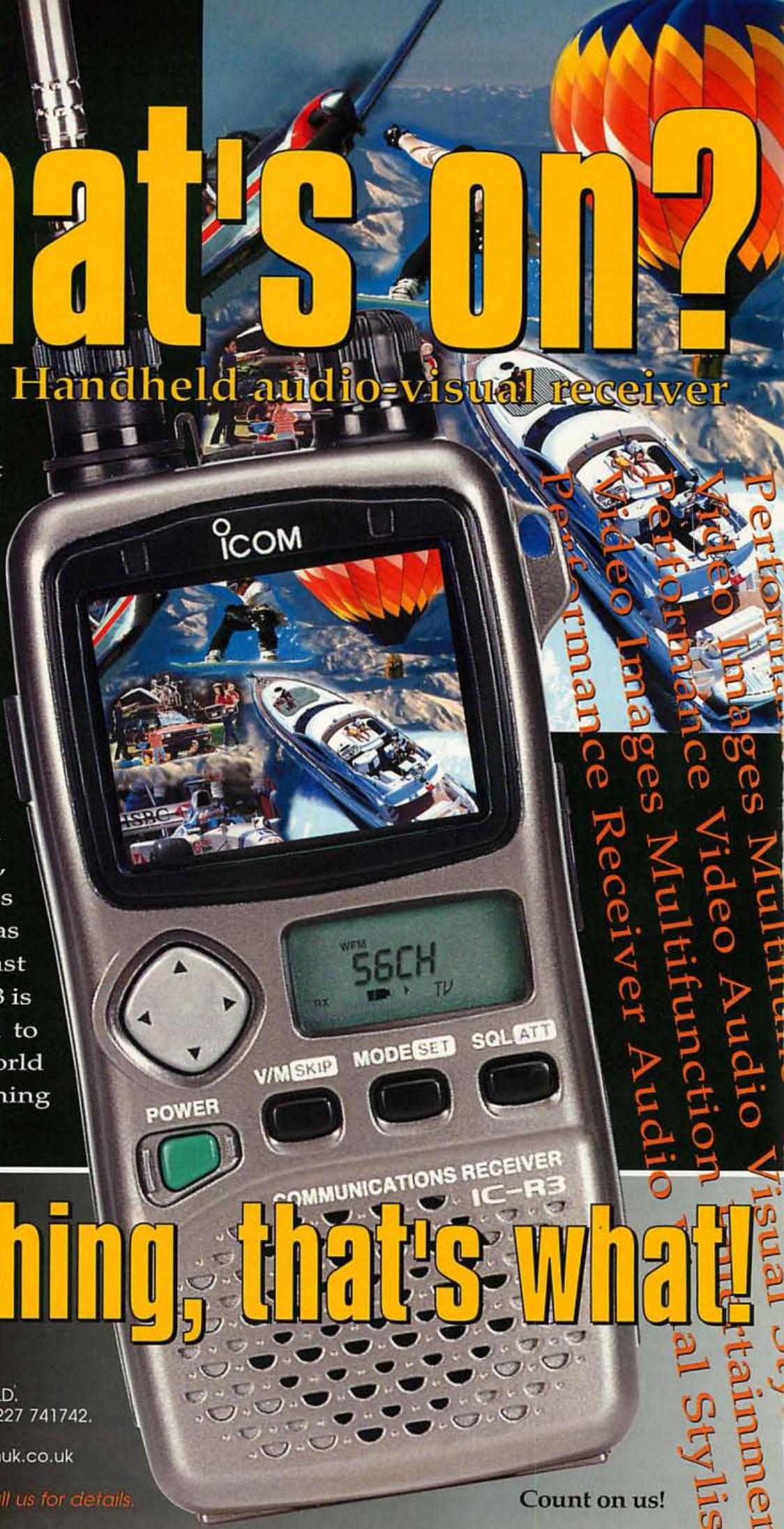
What's on?

The IC-R3 Handheld audio-visual receiver

The NEW ICOM IC-R3 is a compact and stylish handheld radio receiver with a 2" colour screen.

The merging of both radio and TV technologies into one product offers a varied combination of audio and visual broadcasts.

You can watch terrestrial television, view video images from wireless cameras or listen to broadcast bands. The Icom IC-R3 is a product guaranteed to open a whole new world of visual and listening pleasure to you.



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HF HIGHLIGHTS

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

CARL MASON GW0VSW HAS NEWS OF DXPEDITIONS, LUCKY CONTACTS AND YOUR REPORTS.

First this month I have some DX news. *Practical Wireless* reader **Vince Lear G3TKN** will be visiting The Gambia on the 10 April for one week and will operate as C56VL using an IC-706 and a 20m Windom antenna. Vince will concentrate on 7 & 14MHz c.w. with some s.s.b on 28MHz if conditions and time permit. Please QSL via his homecall.

BARRY ARS DXPEDITION

Members of Barry Amateur Radio Society are flying down to Ascension Island for the start of their DXpedition on the 19 March. Operating will be **Glyn GW0ANA** (QSL manager), **Doug G0WMW** and **Richard GW4BVJ** who will be accompanied by his fiancé Sheri, their logistics manager. The group plan to operate on all bands 1.8 to 50MHz using various modes including c.w., s.s.b, SSTV, PSK31 and RTTY during their eight day stay on the Island.

A good deal of l.f. activity is planned and to this end Doug has built a 22m Dragon Special vertical antenna. This should put out a strong signal on the l.f. bands at its planned site 304m above sea level.

Other antennas will be used including a Force 12 Yagi, phased twin Butternut and Gap verticals and a beam for 50MHz. Richard is working on a web page which can be found at **www.dxpedition.co.uk.**

The group will move on to St. Helena on the 26th for two weeks before returning to Ascension for the flight home. Callsigns have yet to be arranged. The object of this DXpedition is to commemorate the passing of 100 years of Morse communication from these islands.

The DXpedition would welcome any financial support from the DX community. If you would care to make a contribution, which will be acknowledged, it should be sent to Glyn at N**irvana, Castle Precinct, Llandough, Cowbridge CF7 7LX**.

YOUR REPORTS

On to your reports now and the 1.8MHz log of **Ted Trowell G2HKU** on the Isle of Sheppy in Kent. Using his Ten Tec OMNI 5 and 70W of c.w. Ted worked 5B4AGC (Cyprus) and TK/DL7HZ (Corsica) around 2100UTC despite some "very patchy conditions" on the band. Ted also wonders if anyone else noticed the lack of signals on the bands during the eclipse of the moon on the 9 January?

Meanwhile **Sean Gilbert G4UCJ** in Milton Keynes has spent more time listening than operating this month. Despite this, Sean found time to operate on 3.5MHz logging T77C (San Marino) at 2104 and AA1AC/VP9 (Bermuda) later on at 0118UTC using c.w. and a Butternut vertical antenna.

● Sean G4UCJ had a lucky strike when he left his IC-746 on frequency while making a coffee and upon returning 4W1CW (East Timor) was waiting to QSO.

THE 7 & 14MHZ BANDS

John Heys G3BDQ in Guestling near Hastings has spent a good deal of time on 7MHz of late using c.w. from a TS-870 into a half-wave dipole. Operating in the evening around 1900UTC John worked CO2FU (Cuba), CT3/DL3DXX (Madeira), HL1DH (South Korea) J73ALN (Dominica), JW3FL (Svalbard) and TF8GX (Iceland) plus a string of Japanese and American stations.

Other activities include DXing on 136kHz where John has now worked 14 countries. Finland (OH) is the latest addition to his country total. Keep up the good work John!

Running very low power (v.l.p.) this month was **Eric Masters G0KRT** in Worcester Park, Surrey. Using a QRP Plus and only **950mW** into a W3EDP antenna Eric had contacts with LY2FE (Lithuania) 1212, HB2DAX (Switzerland) 1545, 5A8ZC (Libya) 1607, F6ACD (France) at 1405 who was also running v.l.p. and finally UW7I (Ukraine) 1647UTC. Nice going with such low power Eric.

THE 18, 21 & 24MHZ BANDS

On to 18MHz now and a report from **Roy Walker G0TAK** in Clevely, near Blackpool. Roy was pleased to contact R1FJV (Franz Josef Land) at 1024 for a new country and a little later 'bust a pile-up' to work VK4GRR (Australia) at 1046UTC. These contacts were made using a QRP Plus and 5W of c.w. into a G5IJ monopole. Thanks for the points in the original QRP contest Roy!

The 21MHz band on s.s.b. was where **Don McLean G3NOF** in Yeovil spent a good deal of time using his Kenwood TS-950 and trapped dipole. Don's large log lists contacts with DX1DBT (Philippines) 0927, BY1DX (China) 1014, BN0X (Taiwan) 1103, P43E (Aruba) 1130 and later in the day V21YA (Antigua & Barbuda), A35RK (Tongo), AH8A (American Samoa) all around 1725, V51AS (Namibia) at 1815UTC and finally 8P9JW 9Barbados) at 1915UTC.

A new country on 24MHz now for Sean G4UCJ who was more than pleased to work 4W1CW (East Timor) with 4W QRP at 1046UTC. It appears this was a very lucky contact.

The operator called CQ on the exact frequency Sean had left on his IC-746, while he went and made a cup of coffee. He came back and managed to work the station just before a large pile-up erupted a few minutes later!

THE 28MHZ BAND

Having had a class B licence for some 30 years we now welcome new reporter **Mike Baker** in Stowmarket, Suffolk. Mike has enjoyed a new lease of life since passing the 12w.p.m. Morse test.

Using the re-issued callsign **G3SUK** Mike has wasted little time getting on the h.f. bands using his IC-746 and Carolina Windom. New countries already worked include Pakistan (AP), Grenada (J3), Reunion Island (FR), Panama (HP) and South Shetland Island (VP8). This month's s.s.b. contacts on 28MHz include AA4V (USA) on Palms Island NA-110 1507, TA1BE (Turkey) 1525, CO8LY (Cuba) 1609 and ZX5TP/1 (Brazil) on SA-029 at 1647UTC.

Finally, up to Trelewis in Mid-Glamorgan and the log of **Leighton Smart GW0LBI**. During a lunch time session Leighton worked CN8MC (Morocco), RA3LBI (European Russia), KP4V (Puerto Rico), KG4AS (Guantanamo Bay) and D68BT (Comoros) using 20W of s.s.b. from his President Lincoln transceiver into a 10m vertical. The last two contacts both new countries. Well done Leighton!

SIGNING OFF

It's good to see a few more reporters joining the ranks this month. Many thanks to you all and to all those who have sent me letters or E-mail. I hope I have managed to fit you all in.

73, Carl GW0VSW

KEYBOARD COMMS

BY ROGER COOKE G3LDI

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PACKET: G3LDI@GB7LDI

ROGER COOKE G3LDI HAS BEEN BUSY ON HIS KEYBOARD AGAIN THIS MONTH LOOKING AT IONOSPHERIC SIMULATION TESTS

Ionospheric simulation has been used to accurately model the ionosphere for some time now, in order to test new modems and other communications equipment. One of the experts in this field is **Johan Forrer KC7WW**, who kindly offered to test MFSK16 in the same way as other Amateur Radio modes he has assessed.

Johan has sophisticated digital signal processing equipment, which he uses commercially to accurately model the ionosphere. Unfortunately the ionosphere is quite random in its effects and while the models are as well, the results obtained cannot be used to provide a figure of merit for the mode or modem under test. You need to look at the result of sending a standard file and assess the performance for yourself.

A standard series of test conditions has been specified by the CCIR and Johan has tested many Amateur Radio modes using the CCIR POOR standard and his equipment. The CCIR POOR system represents one of many possible scenarios and is perhaps not as 'poor' as conditions we sometimes try to use!

Have a look at Johan's web page for more details and results from other modes. The URL is: **http://www.peak.org/~forrerj/hfpsk.htm** The results do not imply that any one mode is necessarily better than any other under other simulated conditions, or on air.

The conditions for **all** the results were CCIR POOR, i.e. a simulated ionospheric propagation test signal consisting of the transmitted signal subjected to two equal-power rays with 2ms differential path delay, 1Hz doppler frequency spread and sent to the receiver against Gaussian noise with the Signal/Noise ratio set at -10dB in a 3kHz bandwidth.

The results shown on the Web site are for the following modes and software:

* The original text file test message.
* G3PLX PSK31, 31.25-baud differential 2PSK with varicode and no FEC. G3PLX software.
* G3PLX QPSK31, 31.25-baud differential 4PSK with varicode and FEC. G3PLX software.
* IZ8BLY PSK63F, 62.5-baud differential 2PSK with varicode and FEC. IZ8BLY Stream V0.7.
* ZL1BPU MFSK16, 15.625-baud 16FSK with varicode, FEC and interleaver. IZ8BLY Stream V0.7.

Other modes have been tested and the results can also be viewed on Johan's Web page. It's very illuminating and I think some opinions will be changed regarding MFSK16 after looking at the results.

Obviously I cannot reproduce the results here as it would take up far too much space. Indeed, editing such results would be a nightmare in itself. However, this is very worthwhile reading and might change a few minds!

However, this is now happening with the data-mode part of the band. In particular, the new mode, MFSK16, is becoming quite popular but has a problem. Where is it transmited?

The MFSK mode is not wanted in the RTTY or the Packet/Pactor sections. It is not welcomed on the PSK31 frequency, so where do the operators go?

The following comments were in a recent *N2HOS* newsletter:
The MFSK mode, a 16-tone implementation of legacy technology, was described in detail by its author in the January issue of *QST*. The article, with its promise of great performance at low power and modest antennas and free software (utilising your existing computer), stimulated a great deal of trial. And why shouldn't it? This is indeed the proverbial free lunch!

There appears to be an interesting cross section of users. On the one hand, many jaded rag-chewing RTTY operators of yore took to MFSK as quickly as they had PSK31, maybe even faster. They were delighted to find that the mode fitted into their view of the world.

The folks at the other end of the link wanted to carry on a keyboard conversation, too. Wow! Who needs RTTY, which is now used primarily for contests and DX work, when a little gem like this attracts the kind of people who wish to chat away on h.f.? And maybe works DX as well as or better than a kilowatt worth of RTTY from a beam!

On the other hand, the ease of entry led many new operators straight into the digital world. After all, it is simple (well not perfectly simple but it is cost free) to hook up and get on the air. Why not try it?

The newer data modes are very robust and obviously we are limited with frequency spectrum. However, I feel that room should be made for them. After all, it **is** part of our remit as Amateur Radio operators to be experimental, not just exchange numbers with each other.

RADIO RAGE!

You have heard of road rage, I've reported on computer rage a while back, well, now it's the turn of radio rage! If you take a listen to some of the DXpeditions operating their split working of a pile-up, then you will know what radio-rage can be.

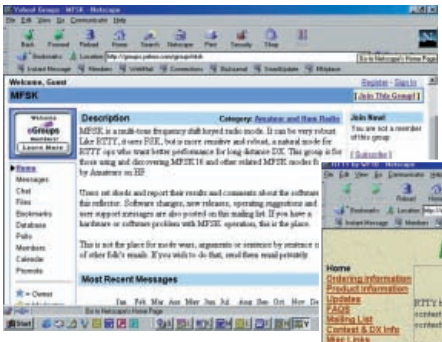
If an operator is on air for ages without so much as a callsign, QSL information, or they're working an enormous split – and I have heard some suggest a 50kHz split – then they are attracting radio rage. They are making a rod for their own backs and deserve whatever they attract.

Fig. 1: Packet is still alive!

As with PSK the 'newbies' jumped in as never before. Suddenly, the air was full of joyfully new and strange warbling, sort of an other worldly sound, generated by the sixteen tones of MFSK16. So, what's wrong with this picture?

The bands were leaping with new digital sounds, PSK down around 14.070 and MFSK around 14.080MHz, frequencies long quiet except during those contest weekends or those few days a year when some genuine DX rears up on the bands.

Shouldn't everyone by happy? We soon found out that the answer was a resounding **no**! In a word, MFSK was judged to be an invader polluting the RTTY space with random, mindless QRM.



● Take a look at the MFSK reflector.

Follow their logic. All agree that the XX.080-XX.090 space isn't used much. It's empty! But, say the heavy-hitters, 'it's allocated to RTTY and XX.080 is the DX frequency and if we allow MFSK to operate around there many of the RTTY community won't be able to work the priceless DX that is coming up any day now.' Let's move to their next point, 'We'll set up a band plan leaving PSK down around .070 and then push MFSK to above .090, where they won't bother us.'

Assume for a moment that the band plan makes sense. Do you think the RTTY ops will stay between 14.080-.090MHz during the next contest or the next time a DX station comes on the air?

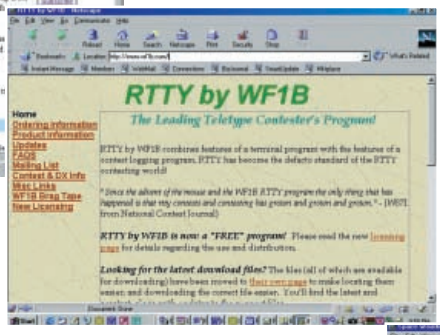
You can bet your bottom dollar they will fill the entire space between .065 to 99.5 and above on any band that has propagation, and do it around the clock. Then desert the space until next time. Yes, their theme song is *I'm going to fence you out, but don't you fence me in*. In other words, they strive to have it both ways and neither life nor amateur radio offers that opportunity.

A flood of Internet messages then followed the opening salvo. Some ranted and raved, some suggested that RTTY is doomed while others remained neutral but thoughtful. **Luciano I5FLN**, a respected Amateur who has been around the digital field for years, spoke out. This ardent DXer feels the new modes attract technically capable Amateurs now using radio in brand new ways.

Luciano went on to say "We must not, let their presence damage the Amateur spirit we value so highly. Then he concluded "these innovations in RTTY and digital systems have made it more attractive to users and listeners. We must think about that"! Yes, Luciano, indeed we must!

Entering his third year spearheading the FCC's Amateur Radio enforcement effort, Special Counsel for Amateur Radio Enforcement **Riley Hollingsworth** says radio rage could become a bigger danger to the future of Amateur Radio than rule breaking. "It's the infighting and arguments and juvenile spats that's going to come back to haunt us if we don't just grow up. It will do the service in, if the Amateur community doesn't put a stop to it".

Hollingsworth said that he's encouraged that the FCC's enforcement program has the support of 99.9% of the Amateur community and that the vast majority follow the rules. But, he said that radio rage in the form of such things as on-air squabbles or frequency fights can degrade the bands just as quickly as outright rule breaking.



● Ray WF1B's free RTTY contest software.

Hollingsworth said that while much of the radio rage is technically not illegal, it reflects poorly on Amateur Radio and can balloon into an enforcement issue. More importantly it's rude or intemperate on-air behavior and might provide just the sort of ammunition that an entity seeking additional spectrum will use against Amateur Radio.

I have long thought that to demonstrate Amateur Radio to a visitor to the shack would make me a laughing stock if that demonstration revealed some of this extremely poor operating! Writing this column, I have to prepare copy two months in advance of it being read, so this may have been sorted out by the time you read this.

However, it's still worth a visit to **http://groups.yahoo.com/MFSKCALLFREQS/polls** where you can read, digest the information and vote. If you are getting interested in MFSK16, then take a look at the MFSK reflector at **http://www.egroups.com/group/MFSK**

FREE RTTY!

Ray WF1B has made a surprising announcement. At the beginning of this year, Ray said this about his *RTTY* program: "I have thought long and hard of a way to give my *RTTY* contest software to the community". So:

1: *RTTY* will now be a 'free' program
2: *RTTY* support will be available for a fee
3: *RTTY* source code will be available to all

For more details look at **www.wf1b.com**

In the first instance we must thank Ray for this magnanimous gesture. This will bring more new blood into the sport we call RTTY contesting, establish the software on new platforms like *Linux* and *Windows*, and add new and exciting features to a tried and true performer.

Secondly, we recognize that his efforts revolutionised the digital world as his software became almost as pervasive as *Microsoft Windows*. While Bill Gates may have made a lot more money than Ray, I doubt he made nearly as many true friends. Ray's tireless efforts to improve the product and the hobby took countless hours, but his efforts never ceased.

The digital community owes him a huge debt of gratitude and hopefully, he will be formally recognized for his contribution this year at Dayton or some equally prestigious venue.

SPACE

If you are a space buff make sure to spend some time at: **www.spaceweather.com** The NASA organisation loads this site with information of special interest to us including, among other things, propagation information. Sign up for the newsletter. They don't bombard you with meaningless E-mail but focus on significant news.

● Space buffs should spend some time at www.spaceweather.com

SUFFOLK DATA GROUP

There is still a lot of enthusiasm for Packet radio. The Suffolk Data Group (SDG) have a very keen, albeit small, membership and produce their very own newsletter. They also hold regular workshops for the progress toward a better network. The guys shown in **Fig. 1** at a recent workshop are **Jason G7OCD** and **Graham G4ILN** busy at the SDG TCP/IP workshop in December configuring a system for operation on 70cms (430MHz).

Many thanks to Andy for keeping me on the SDG newsletter mailing list Other Packet groups do a similar thing, so if you would like some publicity for your group, please let me have some copy. I receive some of the newsletters via E-mail and print them here. That saves the originating group money too.

That's all for this month so until next time keep those keyboards communicating and remember to let me know of any interesting finds.

Roger G3LDI

IN VISION

BY GRAHAM HANKINS G8EMX

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GRAHAM HANKINS G8EMX UPDATES US ON ATV REPEATER STATUS AND HAS NEWS FROM NEW ZEALAND.

Radio Amateurs in and around Birmingham have been trying to put a 1.3GHz (24cm) amateur TV repeater on air for several years. So it's high time for an update, because the project is certainly not forgotten or abandoned!

It was some considerable time before the **Beacons Repeater Group** (BRG) was offered a suitable site. Over recent years the University of Birmingham, a tall office block in the city centre and a farm on high ground had been suggested and considered.

Tests had been made at the university and the farm. All these possibilities had foundered, the farm had been the most likely site, but r.f. propagation predictions indicated that there could be a possibility of interference to the aircraft radar installation at Clee Hill.

The latest offer, a Beacons Repeater Group member's private house, is located in a reasonably elevated Birmingham district and the r.f. prediction test is just about favourable. A transmitter, receiver and Alford Slot antenna are available, yet an ATV repeater to serve the Birmingham area is still not in operation. Why not?

The BRG chairman, **Alan Kendall G6WJJ**, explains: "The application for a 24cm ATV repeater still keeps staring up at me, but one of the sticking points is closedown operators. The site chosen is in Erdington, so anyone willing to be on the list please let me know!"

For any repeater, voice, data or ATV, the need to switch off the transmitter quickly may arise at any time. Before a repeater licence is granted, there must be four named individuals who are, usually, no more than 30 minutes away from the repeater site and ideally at least one who is within 15 minutes. These people must also be easily and readily contactable most of the time.

Now of course it's not expected that those four persons must never stray away from their repeater and be sitting vigilant by the telephone in shifts! The licence application will ask for an estimate of what percentage of their time they could expect to be available and of course, one of the four will probably be an occupier of the site or the owner of the house anyway!

While only a licenced Radio Amateur can re-activate a repeater transmitter after close-down, **anyone can switch it off**. If you think you could help, please contact me, G8EMX on 0121-706 7384 or via E-mail to **graham@ghank.demon.co.uk** and I'll pass the information on to Alan. Alternatively why not come along and speak to the BRG at the Wythall Rally at Wythall Park, Silver Street on Sunday 11 March.

Bletchley Park's ATV demo station ident.

AUKLAND ATV

Now to the other side of the world. A Christmas card from **Michael Sheffield ZL1ABS** brought seasons greetings and news of the Amateur Television scene in New Zealand. Auckland's second ATV repeater at Whitford is on air after three years work. To briefly remind everyone, Auckland's first ATV repeater was ZL1BQ, which transmits on European Channel 39, a frequency of 615.25MHz and normally receives on 1280MHz, but is switchable to receive on 1249MHz.

I have not been able to establish, either from Michael's card or his web site, the callsign for the Whitford ATV repeater, but a sketch in his card shows that it can receive at 1280MHz or Channel 39, transmitting on 1249MHz. Are you with me so far?

Grant ZL1WTT was the first to work through Whitford and ZL1BQ channel 39 linked for the night in the reverse direction.

The normal direction is Whitfield permanently receiving ZL1BQ at 615.25MHz, but stations can break in to Whitford on 1280MHz and be re-transmitted on 1249MHz.

I gather, Grant transmitted into Whitford on 1280MHz, Whitford relayed Grant's picture on 1249MHz into ZL1BQ, which, finally, transmitted Grant's image on 615.25MHz. I hope I've got that right!

The latest ATV innovation in New Zealand is a project to construct a Short Term Special Purpose (STSP) ATV repeater. The STSP unit will be equipped to transmit and receive on the 70 (430MHz), 50, 23 (1296MHz) and 3cm (10GHz) ATV bands and include a 2m (144MHz) transceiver for ATV control, plus a 6m (50MHz) transceiver!

The STSP repeater would be for particular events and the first planned use will be the 2001 Easter Technology Convention in Whangarei. My thanks to Michael Sheffield for the news from New Zealand, and for his reference to his own web site at: **http://www.geocities.com/mjsheffield/michael.html**

BLETCHLEY PARK

The British Amateur Television Club (BATC) will be holding its annual rally at Bletchley Park on Sunday 6 May. This will be the BATC's second year at the Bletchley venue, dubbed the Enigma Rally mainly because of the excellent Cryptology Museum within the grounds. Also, maybe, because the site can be a bit tricky to find - Bletchley Park was, after all, a secret location during the Second World War!

Once you've reached Bletchley town (almost a navigational exercise on its own) keep heading for the railway station and there are some local signs. If you have Internet access, keep watching the BATC's pages at **http://www.batc.org.uk**

Rally organiser is **Dave McQue G4NJU**. Dave tries very hard to put a strong emphasis on television and amateur radio related tables and exhibitors, but there is always something for everyone.

Every two years the BATC usually holds its Bienniel General Meeting (hence the name hi!). The previous BGM was held at Shuttleworth in August 1999, however, the club's constitution does permit the BGM to be held after three years have elapsed.

For reasons far too involved to elaborate here the BATC chairman **Trevor Brown G8CJS** has decided that the next BGM will be in 2002. I mention this now, to save you all waiting in anticipation for the date and place!

That's all I've got room for this month to keep your letters, E-mails and photos coming to the address at the top.

Graham G8EMX

TUNE-IN

BY TOM WALTERS
PO BOX 4440
WALTON
ESSEX CO14 8BX

E-MAIL: tom.walters@aib.org.uk

Part of Radio Australia's cash boost means increased transmissions to East Asia.

TOM WALTERS HAS GOOD NEWS FOR AUSSIE BROADCASTS, AN UPDATE FROM AMERICA AND TAKES A LOOK AT DIGITAL TRANSMISSIONS.

Good news for starters from **Radio Australia** (RA). In November's Tune In I reported that RA was getting some money that would help to reduce the hefty cuts previously imposed. Now I have some news about how the Aussies are going to spend the cash.

Radio Australia is boosting transmissions to East Asia, a key audience for them, with new broadcasts in Mandarin, Khmer and Vietnamese. Having sold off the short wave facility near Darwin to UK religious broadcaster Christian Voice, RA has to look outside the country for transmitter strength and the new transmissions will be via BBC Singapore, VOA sites and a transmitter in Taiwan brokered by Merlin Communications of the UK.

Here's a look at part of the new RA service. English: 0800-1130 and 2200-0130 on 15.240MHz and you could also try 0000-0800 on 17.750 & 21.725MHz approx. New transmissions in other languages include Indonesian at: 0000-0030 on 17.750, 21.615; 0400-0430 on 17.750, 21.875; 0500-0600 on 11.745, 17.750; 0800-0830 on 11.550, 17.750; 0900-0930 on 17.750 and 2130-2330 on 11.550, 11.695, 15.415MHz. Chinese at: 1400-1530 on 9475, 15.435MHz. Vietnamese at: 2330-0030MHz on 15110 and Kmer at: 0500-0530 on 17.865 and 2300-2330 on 9.730MHz. Not very user-friendly times for Europe, where reception will be marginal anyway, but these are mostly breakfast-time and evening broadcasts and the time-difference is about nine hours.

A pretty esoteric item from the VOA's *Communications World* programme private station WWFV in Tennessee has been licensed to transmit in RTTY and multi-frequency shift keying (MSFK) as a service for hearing-impaired listeners. A simple hook-up with a PC enables text to be transmitted, and decoded so it appears on the screen.

You can apparently receive some quite controversial material from WWFV. The station has been heard at 2300 on Sun-Fri on 5.085MHz and 1800-1900 Sat-Sun on 12.172MHz and at 0500-0600 on 3.720MHz. The station, callsign **WGTG**, uses sideband for much of its voice broadcasting.

Communcations World also mentions reception from Jupiter. A bit of a cheat, perhaps, as scientists converted signals received aboard the NASA spacecraft *Cassini* when it was close to Jupiter into audio. Not just international, but interplanetary broadcasting! Does Jupiter send QSLs?

AMERICAN BROADCASTING

Now for an important batch of decisions from the US Broadcasting Board of Governors (BBG). In its second annual strategic analysis the Board has taken action to redirect resources in international broadcasting.

The Board says that stations such as **Voice of America** must provide accurate, objective news and information and must support emerging democracies, as well as making creative and cost-effective use of the Internet and other new media.

The effect of the Board decisions is firstly the elimination of VOA Portuguese to Brazil, Thai and Uzbek and secondly the reduction of VOA broadcasts in Bulgarian, Romanian, Slovak, Armenian and Turkish. The third effect is the increased broadcasting in Arabic, Indonesian, Hindi, Macedonian and Spanish to the Americas.

Radio Free Europe/Radio Liberty will cut back short wave in Armenian, Bulgarian, Latvian, Lithuanian, Romanian, Russian, Slovak and Ukrainian and increase f.m. broadcasting and enhance Arabic and Farsi (Persian).

The Broadcasting Board of Governors, created in 1999 when VOA was given editorial independence, is responsible for policy and budgetary oversight of all US Government-supported civilian overseas broadcasting, including the Voice of America, Radio Free Europe/Radio Liberty, **Radio and Television Marti**, **WORLDNET Television** and **Radio Free Asia**. The Board is appointed by the President and confirmed by the US Senate and the Secretary of State is an ex oficio voting member of the BBG. So, if you track any of the transmissions listed here, you'll need to revise your frequency listings.

INTERNATIONAL DIGITAL

International digital radio draws nearer, with test transmissions being carried out by **Digital Radio Mondiale** (DRM). Tests were carried out in late autumn from Russia to France and Russia to Tokyo, with further tests from Ecuador and Bonaire. The DRM station believes that public service can start in 2003, although special radios will be needed.

The DRM steering board has approved the technical specifications for their digital radio signals and approval of the standard will now be sought from the International Electrotechnical Commission and the European Telecommunications Standardization Institute. The DRM system will be competing with others such as Eureka 147 (DAB) and WorldSpace which is now using extra satellite capacity to broadcast into Europe and will use ground booster stations to fill in the parts that satellites can not reach.

Radioropa used to transmit on 261 longwave from Burg, in what used to be East Germany. They used to relay the BBC, Radio France International, YLE and Radio Austria. They wanted to transmit in digital mode on 261, but the local German state denied permission, so they had to shut down. The path of digital progress is not smooth.

Perhaps Radioropa should look abroad - exchange is usually no loss. For instance **Radio Canada International** has a new daily English transmission to South Asia at 1500-1600 on 15.360, 17.820MHz via Flevo in the Netherlands.

The **RCI** station's English transmission to Africa at 1900-2000 now comes not from Meyerton, South Africa, but from the BBC's Ascension Island site, to improve propagation to West Africa. And RCI's Arabic service at 2100-2130 on 5.860MHz is now via Hörby in Sweden, while in return Radio Sweden gets a prime site for its North American evening transmission - Sackville 0230-0300 on 9.560MHz.

BROADBAND DATA

Short wave listeners watch out for this one! The Germans are considering using electric power lines to get broadband data into homes. As the data in the wires will occupy frequencies between 1.6 and 30MHz and as electric power lines are unshielded, you could get interference on your short wave receiver. So resist the idea if it is proposed near you.

Are the days of number stations numbered? **North Korea** has suspended transmissions of numbers read by a woman, presumably sending messages to spies, although Morse numbers transmissions continue. Voice transmissions used to begin with the *Red Flag Song*, the *Song of General Kim il-Sung* or the *March of the Guerilla Army*. They don't make them like that any more!

That's all for this time so until next month stay tuned-in and remember to let me know of any interesting finds on the broadcast bands.

Tom

DX DESTINATION

BY ED TAYLOR G3SQX

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DORSET BH18 8PW

E-MAIL: G3SQX@email.com

ED TAYLOR G3SQX HAS RETURNED TO THE UK. HE BEGINS A FASCINATING QUARTERLY SERIES GIVING DXPEDITION IDEAS FOR EVERYONE.

When I told the Editor, **Rob G3XFD**, that I would be leaving the USA, we decided we had to say goodbye to my Scene USA series that had been running in *PW* for five years ago. The final article appeared in January, so once again I've become G3SQX instead of N0ED.

I mentioned to Rob that I'd become interested in the idea of special 'DX holiday' type articles. These would involve taking some radio gear to an interesting location and to operate. Rob mentioned that he'd been doing that for years and that it was great fun, even though people think it's very difficult and really it isn't.

This was the beginning of the DX Destination idea. "I've operated from quite a few places," I said, "and could write about them as well. Let's ask for readers' experiences and photographs, then we'd have a great series." Rob was enthusiastic: "We'll make it quarterly, and you can cover all aspects of the subject. Start writing"!

HAVE RADIO - WILL TRAVEL

So, what will be the topics I'll be covering in DX Destination? Firstly I'll look at all aspects of operating away from home, including low-cost options - I'm aware that everyone has budgets and some are fairly small.

I also plan to look at planning a trip, what to take, how to set things up, and how to operate successfully. Then I'll cover what has to be done in the follow-up to a visit.

Fig. 1: Featured Destination - Guernsey, Channel Islands.

The main emphasis will be on amateur radio operation without too much preparation or formality. I'm thinking of situations where you can take a few days, maybe even a week or two, to get on the air. Many radio opportunities can be combined with a family or tourist holiday, or possibly a business trip.

I won't really be considering the full-scale DXpedition, where a large number of amateurs go to a rare location, then operate in shifts on many bands simultaneously. This is a specialist activity, requiring lots of equipment and costing a great deal of money. If you ever get invited to participate in something like this, you will already be talking to some very experienced DXpeditioners!

The goal generally is to organise things so that one or two individuals can take everything on a plane or stowed in the boot of a car without too much trouble. Of course, I'll also explain about the backpacker style of expedition where you might carry v.h.f. and u.h.f. gear in a pack. You have to plan carefully, but the reward is to operate from some of the highest points in the UK (or elsewhere).

Each article will cover one or two specific aspects of a DX holiday in some detail. I'll address topics such as finding somewhere to operate, sorting out any licensing arrangements, deciding what to take, getting to grips with antennas, transporting rigs, forming an operating strategy and dealing with QSL cards.

I've had some experience of operating in different locations, but I need contributions from **you**, the readers. Why? because one of my favourite activities is to find a QTH which is desirable on h.f. cw., perhaps just on one or two bands.

I like to call CQ and work any resultant pile-up - dozens, perhaps hundreds of stations calling at once. Trying to contact everyone who calls is (for me) challenging and mind-stretching.

Now, I think this is huge fun, but it's not everybody's cup of tea. Your ideas of what **you** might like to achieve on your expeditions will tell me what to write about in future columns.

I also need to hear from you about what you've done and where you've been. If you have a good tale to tell, I'll talk to you and we'll make it into an article. If you have some photographs as well, that will add to readers' enjoyment and appreciation. Don't imagine that your exploits will be too insignificant to interest people, explaining how you got on the air from a hotel in Liverpool can be just as fascinating as how you worked the world from Mozambique!

GOING PLACES

In each DX Destination I'll be writing about one or two good places to go and operate, either recommended by readers, or which I have visited personally. Let's jump straight in, and I'll tell you about somewhere that you might not have thought of. My featured QTH this time is the Island of Guernsey.

Guernsey is one of the Channel Islands, which are part of the British Isles. But most people don't really realise where they actually are, look at **Fig. 1**. Even though the Channel Islands come under the British Crown, they are quite a lot closer to France than to England. Of course, there are links to France going back in time and you can learn more about the interesting history of the islands if you visit.

The Channel Islands are independent of the UK government, with their own parliaments. The laws are generally similar to those in the UK, but some are quite different.

They use pounds and pence on the CI, like in the UK, issuing their own coins and stamps. The climate is similar to that in the south of England, but usually a few degrees warmer. There are splendid beaches, cliffs and other scenery.

There are several things which make Guernsey an ideal location for a DX holiday. It's easy to get to, there is a good ferry service from the south coast and several airlines serve

Fig. 2: G3SQX operates at the Guernsey Amateur Radio Society

Guernsey from all over the UK. There are plenty of things for non-radio aficionados to do, so if you're travelling with the family, they won't feel left out.

From the radio point of view, Guernsey is a not rare DX, but is quite sought-after, both on h.f. and v.h.f. If you want to be popular on the air, it's a fine place to be. I have operated as GU3SQX and worked into Japan on 15m and 30m at 100 QSOs an hour all day long.

If your interests are above 30MHz, you have great potential on s.s.b. and c.w. In addition, the 100km or so distance to the British coast, and 30km from France mean that you will often have a wide choice of 2m (144MHz) repeaters, there's great DX potential even with the lightest of openings.

GUERNSEY AMATEUR RADIO SOCIETY

The major factor which makes Guernsey such a pleasant place to operate from is that you can use the facilities of the Guernsey Amateur Radio Society (GARS). They have an excellent permanent shack a few minutes' drive from Saint Peter Port, the island's capital. Because you can use their antennas and some equipment, you would basically only need to bring a rig.

The members of the Society welcome visitors, either to operate, or just to attend their twice-weekly meetings. They have a wide range of interests, in radio, computing and other technical matters. There always seems to be someone who is willing to help visitors in getting set up on the air, and I have been very impressed with the Society's hospitality, of which you can see a sample in **Fig. 2**.

Fig. 3: Some of the antennas at Guernsey Amateur Radio Society.

The antennas available at GARS change from time to time, but there is always a good selection of dipoles for the lower bands. A beam for 20/15/10 about 20m high means that the h.f. bands are well covered.

There are v.h.f. antennas on the same tower, and a packet cluster system covering the whole island. See **Fig. 3** for an idea of what is available. If you want to erect your own, a field next to the shack can be used for temporary antennas by arrangement with the farmer.

With such convenient facilities, it's not surprising that GARS is a popular place. Various groups make reservations in advance to operate during the major contests.

It's particularly valuable in the **Islands on the Air** contest, because Guernsey is both an island and a country. So, if you want to use GARS for a contest, make sure you don't clash with another group. Contact details are in **Fig. 4.**

I told **Phil Cooper GU0SUP**, president of GARS, that I would like to feature the club in my first DX Destination. "That would be good," he said, "We welcome visitors. Even though everyone here tries to get on the air as much as we can, there are always amateurs who want to work Guernsey. On my favourite mode, RTTY, every other contact is with someone who's having his first GU QSO. Apart from that, it's a beautiful island". I agree, having walked part of the spectacular cliff path, which circles the entire island, and provides a new, breathtaking view every ten minutes or so.

Perhaps I should add a note about using other people's stations. There is a risk for a club such as GARS, in that they let Amateurs come in with few formalities and use the station facilities. Although there is often little supervision, I think I can skip the homily about not taking away other people's property, most amateurs are basically honest.

However, visitors should be very careful to follow a few simple rules, which are really common sense. Treat the shack, equipment and antennas as if they were your own. Leave things as you found them and get help if you don't know how to use something properly.

If you do cause damage, you must confess and pay for it. Be polite to neighbours of the club (for example, farmers or anyone complaining of interference), and treat them with respect, remember the club has to live with any public relations mess you have left behind! In many cases buildings and land are made available to clubs at below-market cost, but these concessions can be withdrawn after a bad experience.

The GARS and some other clubs, ask for a donation from visiting operators, to help with general maintenance and the replacement of equipment. This is entirely reasonable and you should check before arriving. Radio societies build up their stations over the years with members' funds and it's fair to contribute towards running costs as well as towards future improvements.

TELL ME MORE!

I'm relying on your help to make this column successful. I would like input on two main topics:

1: Your experiences of operating your station away from home. I would like to know where you went, the places you operated from, the equipment you used, how you set things up, any problems with officialdom, the people you met, and anything else that could be informative to DX Destination readers.

Don't forget the column will include all types of holiday DXing, ranging from a quick jaunt up a local hill, to a fairly serious trip to a rare country. If you have previously written to Scene USA on this subject, please contact me again so I can gather more information.

2: Subjects that might interest you in a future DX Destination. If you would like to know about any aspect of taking your radio on a trip, I'll try to cover it.

Sometimes the easy questions have difficult answers, for example, "What antenna should I take for a weekend of operating on the h.f. bands?" I'll deal with this and other points that you raise in future columns.

Each DX destination will show a selection of helpful sources of information, usually from the internet, see **Fig. 4**. There are many sites available and we'll mention a few each time. If you can contribute to the list, let me know.

The next column will be in the July issue and the deadline for mail is the middle of April. Please write to me at the *PW* offices or via E-mail at the address at the top of the column.

73, Ed G3SQX

Useful Resources

Guernsey Amateur Radio Society
www.gars.org.gg
(01481) 239773 Tuesday & Friday evenings

Guernsey Tourist Board
www.gtonline.net/business/tourism/htdocs

G3SQX takes a DX holiday
http://www.qsl.net/n0ed/GU3SQX.html

General tips on DXpedition planning
http://www.dxholiday.com/dxresources.htm

Fig. 4: Useful resources for DX Destination readers.

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AR88LF, original working, clean condition, handbook, £195. R1155A, modified, needs attention, £50. reception set DST100 MkIII plus pwer pack, needs attention, £80. Selection of new boxed or wrapped valves, £offers. Eric Irons, Northampton. Tel: (01604) 770487.

Back copies of *Practical Wireless, Radio Constructor, Practical Television*, 1950-1972 some complete years, variable condition. Also selection of old electronic books, valve data, variable condition. £offers. Eric Irons, Northampton. Tel: (01604) 770487.

BNOS 432MHz 50W linear amp, £140. Navico AMR1000s 2m (144MHz) f.m. mobile, £90. R107 WW2 reception set + handbook, £75. Could deliver upto 100 miles. Alan , Royston, Herts. Tel: (01763) 262443.

Collectors item valve set, make Stella, model ST160A working. £offers. Tony G0VEA, Glos. Tel: (01684) 299430.

Complete months of *Practical Wireless* 1978-2000. Complete months of *Radcom* 1978-2000. Two bundles of assorted electronic mags, two bundles of *Pilot* mags. £**free**, must be collected. John G4KJV, Nr. Malmesbury. Tel: (01249) 720456.

Cushcraft R7000 vert 7 to 28MHz inc. WARC, stored unassembled indoors last two years. Exc condx, £175. Yaesu MD100A8X, desk mic, boxed, mint as new, £70. Tel: (02392) 265101 or E-mail: lears@tesco.net.

Diamond V2000, base antenna as new, £35. Panorama AVDFHB whip and MMR-5F mag mount, brand new , £15. 7A power supply, £15. 15m RG213 (new), £10. Tel: (07748) 904969.

Drake R8B communications receiver, show room condition, frequency range 10-3000kHz, memory function, 1000 programmable memory, alphanumeric display with v.h.f. convertor, £800. Tel: 0161-764 7329.

Eddystone EC958 RX 10kcs to 30mcs a.m./c.w./s.s.b. table cabinet with home-brew plinth speaker, g.w.o. prefer buyer inspects/collects or rv by appointment due to weight with manual. Jim McGowan M5AIP, Romford, Essex. Tel: (01708) 340304.

FT-50R dual-band handie 2m/70cms (144/430MHz) with plug in charger, manual, box, optional FBA-15 battery case, leather case and antenna adaptor, £115. Gareth, Newbury. Tel: (01635) 281841.

G5RV deluxe never used, full size, £35. Tel: Mike on 0161-688 9680 or (07713) 971876.

IC-706 h.f. + 50 + 144MHz transceiver v.g.c. £425. Yaesu FT-101ZD h.f. transceiver + WARC bands, v.g.c. £150. MFJ antenna analyser 160-2m (1.8-144MHz), £60. Kenwood 2m handy with charger, ear piece mic, £60. All goods, post extra. Tel: Gary on (01224) 712370 or E-mail: cug@clara.co.uk

IC-728 h.f. transceiver excellent condition, f.m. tone generator fitted, fully boxed, ready to go, £400 o.n.o. Tel: (01909) 475267 or E-mail: g0ceb@aol.com

Icom 746 h.f./6/2m (50/144MHz), built-in a.t.u. RS746 remote,. complete with lead/software very good condition with manuals, £850. Tel: 0121-778 5612.

Icom 765 h.f. transceiver internal a.t.u. audible frequency read-out, extra a.m. filter, general coverage etc.Fist mic plus M8 desk mic boxed with all manuals, first class condition, non-smoker. Alan G4YYD, Bury, Lancs. Tel: 0161-797 7893.

Icom IC-706IIG h.f. to 70cm (430MHz) mobile radio boxed, c.w., manual, two power leads, mobile bracket, mobile hands free mic plus hand mic maybe able to deliver, £795 o.n.o. Tel: (07801) 640094 or E-mail: stephen@thersgb.net

Icom IC-R7000 receiver v.h.f/u.h.f/h.f. with remote, boxed and manual, excellent condition comes with discone antenna, bargain £400. Tel: (01474) 823797 or E-mail: zipwax@bigfoot.com

ICS Electronics FAX 4 weather FAX, £150. R & D Electronics weather station - wind, speed, direction, min/max temp, barometer, £120. Garmin GPS3, £200. AOR 3030 R/X, £320. Global 2000 a.t.u., £45 all mint. Tel: (01902) 567070.

Isoloop 10-30 h.f. antenna with LC2 loop controller. Cables, spare stepper motor. Used only in roof space, £99. Buyer collects. Len G0RDV, 3 Rydalside, Kettering, Northants NN15 7DR. Tel: (01536) 514544.

J-beam antenna type 7530153 (153.175MHz) current production cost £345 sell for £100. Small quantity (on 10ft poles), also some three and four port circulators. £offers. Tel: Anthony on (01908) 373114.

Junkers Morse key, £380. JRC Morse key type KY-£A, £70. Norwegain marine Morse key, £40. GTV107R with 6/2m (50/144MHz) and 70cm modules, £250. FT-107 TX/RX inc. internal p.s.u., £200. Tel: Pete on (01454) 882465.

Kantronics KAM+ TNC £100. Yaesu VX5R with boom mic headset, antenna adapter, charger, packet cable, £230. Carriage extra. Tel: (01935) 422973. E-mail al@g3vlq.freeserve.co.uk

Kenwood 520SE, desk mic, a.t.u., speaker, v.f.o. new o/p valves, £350. Trio TS500, new o/p valves, £150. Yaesu FC-707 a.t.u., £60. All with manuals, call for further details, buyer to collect or pay carriage. Tel: Mike on (01983) 0873306 or E-mail: mikes@sthelens70. freeserve.co.uk

Kenwood TS-140S 100W transciever with matching p.s.u. a.t.u.speaker, mint condition, boxed, manual, mobile supply, cable, fist mic, will not seperate items, no offers. Bargain £565. Tel: (01227) 281976 or E-mail: blondie382@excite.com

Kenwood TS-440S h.f. 0-30MHz, all-mode v.g.c., boxed and manual, £300 o.v.n.o. Simon, Swindon, Wiltshire. Tel: (01793) 870811 after 2.30pm weekends.

Mosely TW33M 12/17/30 unused, unopened, make me an offer. Wanted TH2MkIII, spare parts, boom to mast bracket and clamps. M5AAG, Wetherby. Tel: (01937) 844755 or (01977) 603096.

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Novice 70cm (430MHz) base/mobile Yaesu FT-730 10W, £90. Graphic equaliser Technics, £50. Post extra. G3VSJ, QTHR, Herts. Tel: (07050) 037248 before 9pm.

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(430MHz) 20W linear, £60. Yaesu FIF-2320 CAT computer interface, mint, £45. Mike G7NBE, Leicestershire. Tel: (01530) 461660.

Sailor type T122 a/s s.p. radio, sailor type R105 n.w., l.w., m.w., s.w. NAV/telephony + antenna, made Allborg Denmark. Circa 1950, very clean working, not tested. £offers please. George Griffiths , Staines, Surrey. Tel: (07760) 434367.

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Taylor valve tester with handbook. Function generator with handbook all in v.g.c. £offers. Send A4 size s.a.e. for list of radio books and magazines etc,. Tel: 01414-6499160 or E-mail dm.76@virginnet.co.uk

Vintage Murphy A122, £50. Ultra plastic R786, £30. FRG7, £150. Sangean ATS803A as new boxed, £70. Den clearout all excellent and in working order. Mr Reed, Old Vicarge, Malton. Tel: (01653) 693028.

Yaesu FT-1000MP with remote keypad, silent key sale, max five hours use, immaculate, £1250 o.v.n.o. 25A p.s.u., twin meter, £60. Cushcraft 80-10m (3.5-28MHz) vert, £95. Tel: (01269) 87007.

Yaesu FT-1000MP, SP8, MD 100, all mint boxed. FT-900 cat Collins filters in FP800 p.s.u., mint boxed, like new all this rig. Ten-Tec Pegasus DSP, h.f. computer control 100W all-band three months old, boxed, very good. Yaesu v.h.f. FT-212RH, 25W. Kenwood SP940 new in the box, never used. Drake Speaker good for TR4 or other. Mr Paim G0UUT, Norwich. Tel: (01603) 742733 or E-mail:g0uut@arrl.net

Yaesu FT-101Z c.w. narrow filter spare set of new valves not working on 28-28.5MHz will be minor fault hence £80. Buyer to collect. Stewart G1HHO, Nr. Bournemouth, Dorset. Tel: (01425) 621945.

Yaesu FT-102 a.m./f.m. board fitted, boxed, manual, £200. FTV-107R transverter 28/144MHz, boxed, manual, £80. Heathkit HW8 g.w.o., manual, £80. Trio R1000 RX, manual, boxed, £150. Buyer collects. Don G4HNE, Southport. Tel: (01704) 213192.

Yaesu FT-726R 430/144/50MHz plus Sat board, as new, mint condition, no scratches, £450 o.n.o. Tel: (01246) 551261 or E-mail: paul@g7uib.freeserve.co.uk

EXCHANGE

Kenwood trans/rec TS-830S only ever used on receive needs mic, u.s.b., l.s.b., cww, cwn, unmarked cabinet with owner manual. collection only. Want Yupiteru MVT-7100 good condition with owner manual. Tel: (01525) 860912 after 6pm and weekends.

Strumech BP60 tower, G1000SPX rotator all antennas, PRO5000 12V winch, tower and winch cost £2396 four years ago. Want Kenwood TS-870S or TS850SAT or w.h.y. must be v.g.c., manuals, boxed, etc,. Mike, Wakefield. Tel: (01924) 373779.

WANTED

16-20A p.s.u. Also a radio such as FT-747, must have digital read-out, w.h.y.? No fancy prices please, 77 years old and knocking at heavens door! Tel: (01536) 522007 or E-mail: tommyfos@supernet.com

Advance components *Q* meter type T1 or type T2 working or not. Tel: Dennis on (01255) 435581.

Apple Macintosh Plus 800k discs or anything relating to this vintage set-up, e.g. hard drive, start-up discs etc., Tel: Mike on (01986) 896658 or E-mail: bbms4ozone@compuserve.com

Codar communications 100V receiver unmodified, please state condition and price. Tel/FAX: (01234) 720591 or E-mail: bombarde@beeb.net

Dual-band 144/430MHz mobile transceiver will exchange 150A MIG welder turbo cooled in good condition with gas etc., Tel: (01254) 832350.

Eddystone 850, 870, 880 receivers, any condition considered also Eddystone accessories, speakers, panadaptors etc., anything Eddystone always wanted. Tel: Steve G8EBM on (01335) 360755 or E-mail g8ebm@compuserve.com

Eddystone receiver EC958/7 or 7E, might consider other variants. Tel: Tony on (01494) 778352.

EZI tune for SEM transmatch tuner. Richard, Liverpool. Tel: 0151-724 5649.

KDK2025 MkII in good working order or p.a. unit VP15E13 fair price paid. Tel: (01582) 607949.

Looking for a cheap TX/RX with a digital read-out also a p.s.u. for same. Want to revive a lost interest but cash a bit of a problem. Tel: (01536) 522007 and ask for Tom.

Morse keys wanted by private collector all types of straight and bug keys, all telegraphy related items wanted, also Heliograph, anything considered. Tel: Gerald on (01189) 834307.

Original or photcopy of operating instructions for Hansen FS210 automatic s.w.r. and power meter. Also battery case FBA5 for Yaes FT-203R hand-held, costs reimbursed. Bill, Looe, Cornwall. Tel: (01503) 263495.

PRC-6 handie talkies, American, French or German version wanted please. Also spares for BC611 inc. power units, w.h.y.? John G8BXO, 3 Westpark, South Molton, Devon EX36 4HJ. Tel: (01769) 573382.

Racal accessories wanted e.g. side-band and l.f. adapter, panadapter, MA79 transmitter driver, MA144 a.t.u. aerial multicoupler, etc. I also need a case for my restored Eddystone 830. Will travel to buy. Tel: (01482) 887938.

Reception set R209 MkII dead or alive. Alignment info for Hallicrafters Sky Champion model S20. Bill, Hereford. Tel: (01432) 279641.

Signal R532 instruction manual, original or nice copy. Tel: (01275) 845351 ask for John.

Two CB radios must be slimline handsets with flexible antenna any make considered will accept one CB alone. Tel: (01253) 593360 or (07899) 736511 ask for Alex.

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Don't forget the corner flash!!

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For Sale

TECHNICAL MANUALS, AR88, CR100, R210, HR0. £5 each. Circuits £1.50. Hundreds available. SAE list. Bentley, 27 De Vere Gardens, Ilford, Essex IG1 3EB. Tel: 0181-554 6631.

VINTAGE SERVICE DATA. Radio, Audio, Electrical, TV & Cimema - 1900 to 1970s. Complimentary Newsheet. 50 Meddon St, Bideford, Devon, EX39 2EQ. Tel/Fax 01237 424280. E-mail: savoy.hill@virgin.net Web Site: http//freespace.virgin.net/tudor.gwilliam-rees Visa & Mastercard.

THE RF-KIT CATALOGUE. send 2x 2nd class stamps or browse www.rf-kits.demon.co.uk Hands Electronics, Tegryn, Llanfyrnach, Pembs SA35 OBL. Tel 01239 698427.

QUARTZ CRYSTALS 1MHz/£2.95, 1.4MHz/£3.95, 3.2768MHz/£1.95, 3.932160MHz/£3.75, 4.0MHz/£1.00, 4.194304MHz/£0.75, 6.0MHz/£1.54, 7.03MHZ/£3.95, 8.9985MHz/£2.95, 9.0MHz/£2.95, 9.0015MHz/£2.95, 10.0MHz/£1.54,10.106MHz/£3.50, 10.245MHz/£1.54, 10.7MHz/£1.54, 11.155MHz/£3.50, 16MHZ/£1.54, 21.04MHz/£4.75, 21.06MHz/£4.75, 28.060MHz/£3.75, 45MHz/£1.75, 9MHz X-Tal filters for SSB & CW from £30.00/unit. 5MHZ, 6MHz, 10MHz OCXO's £12.50/unit. X-Tal circuits, applications booklet/£5.00. Cermamic resonators, applications booklet/£3.50. Wanted freq. sweep generator to 25MHz. Good price paid. IQ-Electonic Design. Tel: 020-8391 0545. E-mail: japj69@netscapeonline.co.uk

PSK-31 ISOLATED INTERFACES suitable for RTTY SSTV. Full information. johnny@melvin.com www.g3liv.co.uk Tel: 01912 843028.

WIRELESS WORLD MAGAZINES 1940s and 1950s. Bound copies. Other radio books. Tel: 01233 732394.

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Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Practical Wireless* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The publishers of *Practical Wireless* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

Valves

VALVES GALORE Most valves available from stock. Otherwise obtained quickly. Please send SAE stating requirements or telephone. **VALVE & ELECTRONIC SUPPLIES** Chevet Books, 157 Dickson Road, Blackpool FY1 2EU. Tel: (01253) 751858 or Fax: (01253) 302979. E-mail: chevet@globalnet.co.uk

VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ. Tel: 01484 654650/650725. Mobile:- 07733 283084. Fax: 01484 655699. E-mail: wilsonvalves@surflink.co.uk Visa etc. Fast & personal service.

VALVE ENTHUSIASTS: Capacitors and other parts at attractive prices! Ring for free list. Geoff Davies (Radio). Tel: (01788) 574774.

BEST CASH PRICES PAID for valves KT88, PX4, EL34, EL37. Complete collections usually welcome. Ask for wanted list.

Billington Export Ltd., Unit E1, Gilmans Estate, Billingshurst RH14 9EZ.

MINIMUM ORDER £50. Tel: 01403 784961. Fax: 01403 783519. E-mail:- sales@bel-tubes.co.uk *Visitors please phone for appointment.*

VALVES AND ELECTRONIC COMPONENTS Large stocks. Send for list to: Stuart Scott, 19 Portway, Steying, W. Sussex BN44 3QF. Tel/Fax: 01903 815118. E-mail: triumph.76@btinternet.com

VALVES WANTED NEW AND BOXED!! KT66 GEC £35, KT88 GEC £60, EL34 & EL37 Mullard £27, EL84 £4, DA30, DO30, PS25 all at £120 each. PX4 globe shape £70. DA100 GEC £150, ECC83 Mullard £5, GZ32 & GZ34 Mullard £10, ECC32 & ECC33 Mullard £15. Other types wanted. Colomor (Electronics) Ltd. Tel: 01403 786559. E-mail sales@colomor.demon.co.uk

TOP PRICES PAID

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

Langrex Supplies Ltd.
1 Mayo Road, Croydon Surrey CR0 2QP.
TEL: 0181-684 1166. FAX: 0181-684 3056.

Holidays

NORTH WALES HOLIDAYS – Caravan - bunkhouse - camping. Elevated rural site, two miles from beach, use of shack and antennas, open all year. Tynrhos, Mynytho, Pwllheli. Tel: 01758 740712. Packet address: GW4VAG@GB7BAY#55.GBR.EU

Wanted

WANTED FOR CASH Valve or solid state communication receivers Pre-1980. Preferably working and in good condition. Non working sets considered also domestic valve radios. Items of Government surplus wireless equipment and obsolete test equipment. Pre-1965 wireless and audio components and accessories. Pre-1975 wireless and TV books and magazines. Also, most valves wanted for cash. Must be unused and boxed. CBS, 157 Dickson Road, Blackpool, FY1 2EU. Tel: (01253) 751858 or Fax: (01253) 302979. E-mail: chevet@globalnet.co.uk

EURO
Electronic Services

Wanted: all types of communication and test equipment. Any quantity, any condition. Tektronix, Hewlett Pack, Firebird, B.T., W&G and others.

Euro Electronic Services.
Tel/fax 01782 768848.
E-mail: mbutters@euro.bissnet.co.uk

Exchange

ICOM IC-Q7E Unused exchange for good condition Icom IC-2SET. Telephone Peter, Leamington Spa 01926 421028.

Miscellaneous

INTERESTED IN VINTAGE TECHNOLOGY? The OTS Vintage Technology Catalogue is packed with lots of interesting items for the vintage wireless, television and telephone enthusiast, collector and restorer. Send 2 x 1st class stamps to: Old Time Supplies, P.O. Box 209, Banbury, Oxon OX16 1GR.

WIRELESS SET FAULTY? I am able to repair any old valve radio, valve Hi-Fi amp, crystal set, communication receiver, etc. Enquires R. B. Kerr. Tel: 01349 852332 (Invergordon).

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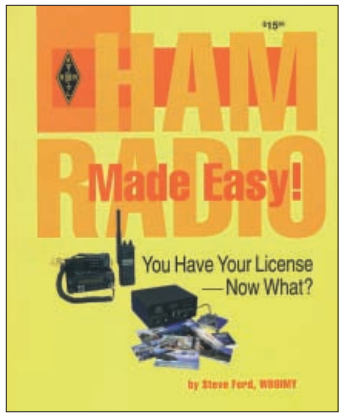
Own this ideal 'holiday' companion at the **special price of £10** inc. £1 P&P (UK), £12.50 inc. P&P (overseas). Offer closes **11 April 2001.**



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Where we link what's happening now with what happened 'way back when'

topical talk

The PW team bring you topical chat, notable events and take you back in time to radio days gone by.

The Space Age reaches 40!

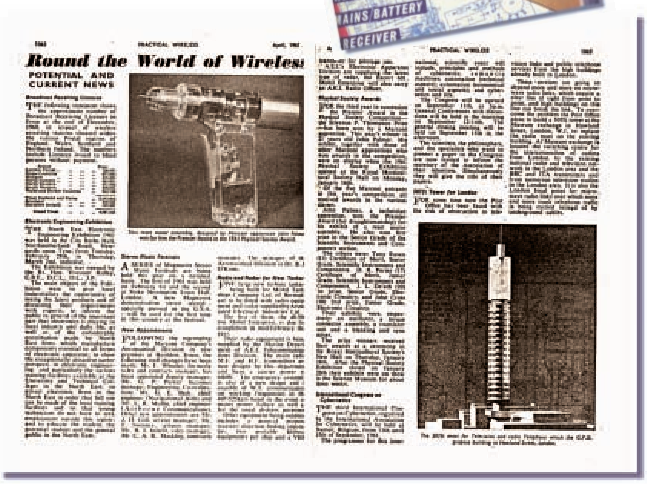
What were you doing 40 years ago? Believe it or not 1961 was the year that Yuri Gargarin oribited the Earth aboard a Russian-made spacecraft, the exact date being 12 April 1961. To mark the fortieth anniversary the **Voice of Russia** is running a quiz and inviting listeners to enter. Answer the following questions and either post your entry to **Space Quiz, Voice of Russia, 25 Pyatniskaya Street, Moscow 113326, Russia,** FAX to: **(007095) 950 5648** or E-mail to **letters@vor.ru** and you could win prize, the closing date for entries is **12 April 2001**:

1: What do you know about Yuri Gargarin?
2: What fields of space exploration were trailblazed by Russia?
3: What major international project is now being carried out in space?
4: What do you know about the first joint Soviet US venture in outer space - the Soyuz-Apollo flight?
5: In what fields are the results of space research put to use on Earth?

Tune in to Voice of Russia and listen to their Russia-in-Space series which covers the Russian contribution to space exploration and will help you with the answers. Two types of prizes will be awarded; Winners and Encouragement and special awards will be given for drawings, snapshots and stories relating to space exploration.

All entries will be judged by a panel headed by cosmonaut **Vlasimir Solovyov**, the deputy Chief of Russian Mission Control and **Yuri Koptev** who heads the Russian Aeropsace Agency.

For details of VoR's programme schedules check out their website at **www.vor.ru** Thanks to **Mike Terry** of **British DX Club** for supplying this information.


Round the World of Wireless
POTENTIAL AND CURRENT NEWS

Looking Back

Of course if you remember Yuri Gargarin's space mission the chances are you were scouring the bands to hear the transmissions from space and reading *Practical Wireless*.

Pictured here is the cover from the April 1961 issue together with the News pages entitled Round the World of Wireless.

Stories featured that month included a report on the Electronic Engineering Exhibition which took place in late February and early March. The exhibition featured exhibits designed to inform the public of the important part that electronics played in daily life, as well as the contribution made by firms in the North East of England in the manufacture of essential components for electronic apparatus.

You would also have read how The Post Office were proposing to build a 507ft mast for television and radio telephony at the Museum Exchange in Howland Street, London. The mast was proposed to overcome the obstruction problems caused by the high buildings built in London. The obstructions meant that microwave radio links, requiring a clear line of sight from point-to-point, were being broken.

Who remembers the PW Roadfarer project? This was a self-contained battery operated portable a.m./f.m. receiver. Maybe you built one following the free blueprint? If you did let us know.

We hope you've enjoyed this 'blast from the past'. If there's anything from days gone by you'd like us to dig out of the *PW* vault, write in and we'll see what we can find.

next month

Looking forward to the next issue of *Practical Wireless? Take a look at what's on offer!*

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* We preview the London Amateur Radio & Computer Show.

GET BUILDING

* **Tony Harwood G4HHZ** shares his design for a 14-21MHz trap dipole antenna.

FEATURE

* **Colin Redwood G6MXL** explains how to get started with slow scan television.

MINIATURE PROJECTS

* Surface mount technology is put under the microscope by **George Dobbs G3RJV** in Carrying on the Practical Way.

LOOKING AT

* Continuing with his bi-monthly series **Gordon King G4VFV** takes a look at the signal strength meter.

Plus all your regular favourites including:

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Club News
Keylines
News
Radio Scene
Valve & Vintage

and much, much more!

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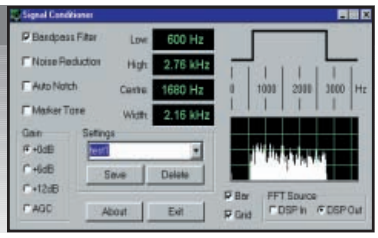

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Each stand-alone unit connects to your PC through either the basic RS232, or through an optional PCMCIA adapter (for high speed control).

The units are powered through either your existing 12v supply, or through an (entirely optional) NiMH rechargeable 12v battery pack.

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)
PPS NiMH 12v Battery Pack and Charger: £99 inc when purchased with 'e' series unit (otherwise: £139 inc)
The WiNRADiO Digital Suite: £74.99 inc when purchased with a WiNRADiO receiver (otherwise: £81.05 inc)

To receive your completely free (no obligation) info pack and WiNRADiO software emulation demo disk all you have to do is get on the internet and go to our website at http://www.broadercasting.com. If you don't yet have easy access to the internet then by all means feel free to telephone us or send a fax.

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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

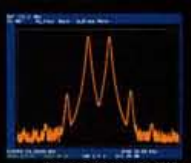
Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.


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!

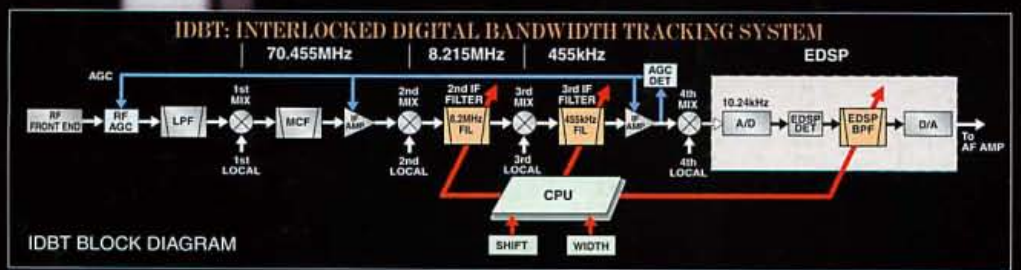

Access VRF and IDBT Features via Shuttle Jog Dial

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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