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Merry Christmas

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Your chance to purchase one of the most popular "all-band, all-mode" transceivers at a very competitive price. The IC-746 offers 100 Watts output on all bands and has a receiver performance to match.Limited stock at this price.

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Plus £7.50 Carr.

You've read the rave reviews, and you have seen our recommendation on the web site. This radio with its amazing receiver and digital filtering, also includes auto ATU and real-time spectrum scope. A great DX rig.

YAESU FT- 920AF
HF 160m-6m-100w SAVE

£1099
Plus £7.50 Carr.

Includes full DSP and internal ATU. High tech receiver with dual tuning controls. Uses many of the FT1000 MP features but at a more attractive price. Full break-in on CW and includes a data port for TNC.

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SCOOP!

Still a firm favorite with mobile operators and those who want a compact all-mode, all-band station. Phone for latest leaflet.

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IC-910 VHF/UHF Transceiver - Coming Soon

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.

TS-2000 Multi Band/Mode Transceiver - Coming Soon!

Kenwood promise a top performance 160m - 23cms transceiver. Full details are in our latest catalogue and product release is expected fairly shortly.

KENWOOD TM-D700E 2m / 70cm Data Mobile

£429 Plus £7.50 Carr.

SAVE

Just arriving, this new model has built-in TNC, port for GPS, Data connector for SSTV, RTTY etc., CTCSS/DCS, Switchable TX/RX deviation, Dual receive, Wide receive option, Detachable head unit, 50 Watts on 2m, 35 Watts on 70cm, 200 memories, Alpha tag memo capability and a lot more. And who has the best price? - look no further!

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Demo in Stock!

FT-817 QRP Transceiver - Demo model in our showroom
Arriving shortly, the diminutive size of this 5W 160m to 70cms radio will enable you to operate anywhere. All-modes and a very advanced specification are housed in a compact enclosure. Come and see it or send for colour leaflet.

YAESU FT-11R 2-Metre Handheld

SCOOP!

Another find in a warehouse! Brand new, boxed with AC chargers and ni-cad packs. 75 Alphanumeric memories, AM airband rx mod possible. Last selling price £249! Very limited stocks.

£119 Plus £6.00 Carr.

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Reads Frequency & Codes

Range: 10MHz -1GHz
Memory: 100 Channels
Decode: CTCSS, DCS, DTMF, LTR.
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KENWOOD TH-D7E

£259 Plus £6.00 Carr.

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* CTCSS & 1750Hz Tone
* Built-in Packet Modem
* 200 Alphanumeric Memories
* DTMF Keypad & AM Airband
* Ni-cads & AC charger

YAESU FT-90R Can you believe the size? 2m/70cm Dual Band

£269 Plus £6.00 Carr.

SAVE £309 Plus £7.50 Carr.

The tiny dimensions of the FT-90R from Yaesu, are hard to believe. Yet it produces 50W on 2m and 35W on 70cm. Auto repeater shift on UK channels and switched 12.5 / 25kHz deviation, make this a number one choice.

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* 6m / 2m / 70cm Handheld
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* CTCSS Encode / Decode
* 25 / 12.5kHz Steps
* Auto Repeater Shift
* AM Airband Receive
* Lithium Cells & Charger

YAESU FT-50R

* 2m / 70cm Handheld
* 5W Output on 13.8V DC
* CTCSS Encode / 1750Hz tone
* 25 / 12.5kHz Steps
* 30 Memory Channels
* AM Airband Receive
* Ni-cad Cells & Charger

£199 Plus £6.00 Carr.

ADI AR-147

AM Airband Receive

£199 Plus £6.00 Carr.

* 2m 50 Watt Mobile Airband Receive
* Full CTCSS Encode / Decode
* 81 Memories 25 / 12.5kHz Steps
* Keypad microphone & Mounting Kit

C-150 144MHz (2m)FM Handheld Transceiver

Scoop Purchase!

The C-150 offers full coverage of 2m with up to 5W output when used with 13.8V supply. Supplied with a 6 x AA battery box, it can be used with dry or ni-cad cells. 20 memories and tone burst, plus extended receive coverage, make this an ideal radio to have in the car or brief case. And at our new low price it represents amazing value. Price includes carry strap and antenna plus instruction manual and 12 months warranty.

£69.95 Plus £6.00 Carr.

ICOM IC-2800H In Full Colour!

£310 Plus £7.50 Carr.

* 2m & 70cm Mobile
* Colour TV Screen
* Full CTCSS and 1750Hz Tone
* 50W 2m 35W 70cm

Includes FREE Remote head cable.

ICOM IC-207H

£245 Plus £7.50 Carr.

* 2m / 70cm
* 50W / 35W
* 180 Memories and 7 Tuning Steps
* Detachable Head Unit / Clear Display
* Microphone, Mounting Bracket etc.

KENWOOD TM-G707E

£259 Plus £7.50 Carr.

* 2m and 70cm
* 50W and 35W
* Full CTCSS
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* Detachable Head with Amber Display

YAESU FT-8100R

£349 Plus £7.50 Carr.

* 2m and 70cm
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* Wideband RX AM & FM 208 Memories
* 7 Tuning Steps DTMF Remote Front panel
* Very compact, supplied with all hardware.

KENWOOD TM-V7E

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* 2m / 70cm Mobile
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* CTCSS & DTMF
* 8 Frequency Steps & 280 Memories
* Includes Microphone & Mounting Bracket

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£369
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carriage £6.

SG-230 Auto ATU

1.6 - 30MHz
3- 150 Watts
Tune time: 10ms
Input: SO-239
Output: High voltage terminal
Supply: 12 - 14V 750mA approx.
Fully weatherproof
Size: 406 x 305 x 76mm

SG-231 Auto ATU

1.0 - 60MHz
3- 100 Watts
Tune time: 10ms
Input: SO-239
Output: Terminal post
Supply: 12 - 14V 750mA approx.
Fully weatherproof
Size: 292 x 242 x 43mm

SG-237 Auto ATU

1.8 - 60MHz
3- 100 Watts
Tune time: 10ms
Input: SO-239
Output: High Voltage terminal
Supply: 12 - 14V 300mA approx.
Fully weatherproof
Size: 178 x 229 x 38mm

SG-2020 Compact HF Transceiver

1.8 - 29.7MHz Transceiver
0.5 - 20W SSB & CW
Tx 3 Amps average
Rx 300mA approx.
RF clipping with VOGAD
100Hz display resolution
10Hz tuning steps
Wide selectivity range
Size: 150 x 65 x 177mm
Weight 1800gr.

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Cover Subject.

Even Santa enjoys playing with radio! We couldn't miss the opportunity to wish you all a very Merry Christmas and a Happy radio filled New Year. Can you guess who is in the Santa suit? - Answers to the Editorial offices on a postcard and we'll see what's left in Santa's sack as a prize.

Photograph by: **Tex Swann G1TEX**

Design by: **John Kitching**

January features

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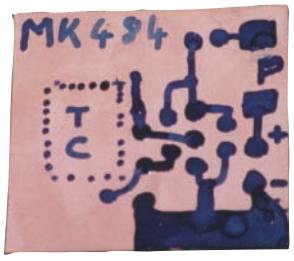

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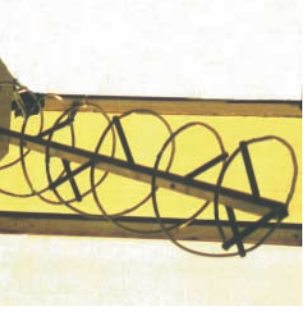

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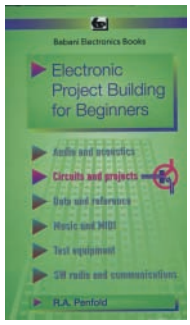
January regulars



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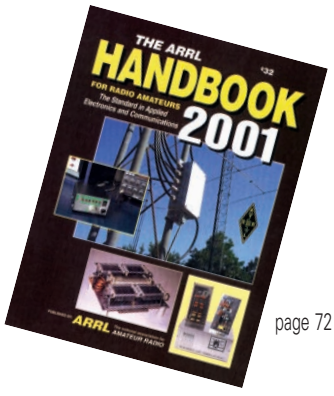

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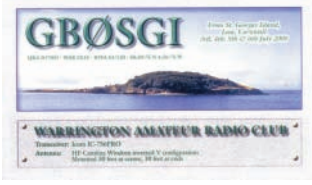

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OUR ROB ASKS FOR YOUR HELP THIS MONTH – AS WE NEED MORE ARTICLES

rob mannion's keylines

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

The debate for the future of the structure of Amateur Radio licensing within the United Kingdom has really started! **What's more you can join in, make your voice heard, and help influence the direction in which it eventually goes**.

Readers in various part of England (I've not heard from elsewhere yet) have been in contact with me to ask if we've heard about and seen copies of the Radiocommunications Agency's 'Proposed Future Structure of Amateur Radio Licensing' document (We have, **and thank you all** for making sure we did know about them!). These have been made available at some of the rallies attended by the RA's 'Mobile Team' who've become such a welcome sight during the 'Rally Season' in recent years.

The RA want your input to the discussions - if you've not seen a copy it's on their website **www.radio.gov.uk** or you can obtain one by telephoning **0207 2110 160.** I won't go into the proposals here because I think it's important you see, digest and comment on the ideas without any (conscious or otherwise!) prompting from me! You can E-mail your comments to the RA at **amcb@ra.gsi.gov.uk**

"There's always something interesting in old pre-1939 *PW* magazines". Scene during the annual *'PW* Talk' at the G-QRP Club's Rochdale Convention on Saturday 28 October 2000. Rob jokingly warns *PW* friends that they'll probably find the 'travelling archives' more interesting than his talk. And they usually do! (**Clandestine Photo by G1TEX).**

As *PW* strives to be 'Practical' we're always pleased to hear from readers with ideas - so how about it?

I strongly advise that RSGB members and non-members alike also to look at the RSGB's website **www.rsgb.org** to see their version of proposals (presented by **Richard Horton G3XWH**). If you don't have access to the Internet - please don't 'lose out' - write in requesting a copy. The national society needs our 'feedback' on this important discussion document. It's your chance -don't miss out!

Supportive Readers

It's good to know that we have so many supportive readers. On behalf of the (very small) *PW* Editorial Team I say "Thank you" for all the helpful comments and support we've had recently following the publication of a letter criticising *PW*, the editorial approach and the Amateur Radio hobby.

It's good to know readers appreciate that we do try our best on your behalf. Not good enough yet perhaps - but we're improving all the time. Without your support it would all be in vain - so thanks again ... you're a great bunch of people!

Articles Required!

Last month I briefly mentioned that we need more articles from you for publication in *PW*. **In particularly we are very short of constructional projects**. As *PW* strives to be 'Practical' we're always pleased to hear from readers with ideas - so how about it?

There's always plenty of 'Look What I did On Holiday' articles to be had, and 'Historical' type subjects abound. However, although our readers do like to see articles (such as that in this issue from **Brian Kendal G3GDU**, entitled 'Prelude To Radar' - which I found absolutely fascinating to read and sub-edit for publication) we do need more 'doing' articles!

I use the clumsy description 'Doing' because there are plenty of writers who can describe **what to do** - but who (unfortunately) are transparently not active on the 'home brewing' side of our hobby. To combat this, if you're keen on building things for yourself and would like to share the enthusiasm - we need your input!

Don't worry, as you know - *PW* is **not an academic publication ... it's a hobby magazine**. We don't pretend to be anything else other than a magazine where you can enjoy the fun of a fascinating hobby. Even if you have doubts on your writing skills - again I say don't worry - we can help you prepare your idea or project for publication.

Got an idea or suggestion? If you have - write, telephone or E-mail us and we'll be in contact. We look forward to hearing from you very soon.

Increased Price & Value

As you will have probably noticed by now, the cover price of *PW* has risen with this issue. And although, with ever-increasing production costs, such increases are inevitable, they are not taken lightly. In return we'll continue our promise: to bring you the best value *PW* we can, both now and into the future.

Rob G3XFD

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**.

The E-mail address is **bookstore@pwpublishing.ltd.uk**

Technical Help

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

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.

Hints & Tips

Dear Sir
In talking over the air and at the local radio club there are occasions when a technical point is giving someone a problem. This is usually overcome by someone else offering a tip to solve it.

I'm sure that there are many readers who have come across or worked out a simple idea or tip which enabled them to achieve what they wanted to do. These tips or ideas may be constructional, adapting tools, circuit design points or making tests using standard instruments differently.

In spite of Rob Mannion G3XFD's excellent 'Radio Basics' article on soldering in the November 2000 issue, I'm sure someone can still come up with a tip for that awkward soldering job. Can *PW* have a 'Readers Tips' page? This could also include the odd circuit idea similar to 'Circuit Ideas', which was published in *PW* November 1982 for example. I have used several of these suggested circuits over the years.

The suggested idea could be a monthly or three monthly feature. A small payment could be made with perhaps a slightly larger amount for the 'Top Tip' in that issue. This I am sure will prompt readers to help keep *Practical Wireless* truly 'Practical'.
Jim Brett G0TFP
Tyldesley
West Manchester

Editor's comment: Excellent idea Jim! Coincidentally we were already working on a similar idea - to be hosted by Tex Swann G1TEX now that 'Electronics In Action' has finished. So, please send your 'Hints & Tips' and problem questions to Tex at the Broadstone office and we'll have the column up and running very soon.

Errors & Tolerance

Dear Sir
I am not usually given to writing to reader's columns but I feel I must respond to the carping letter from B.C.N. Ward published in the December issue.

Firstly, in replying to B.C.N. Ward I would point out that authors of constructional articles in *PW*, in common with all other members of the species homo-sapien, are capable of errors and indeed on occasions do make them, In common with most other Radio Amateurs I know, I am tolerant of these mistakes and they do not take on the proportions of a world crisis.

I also have better things to do with my time than count the number of pictures printed of any one individual or look for so called 'discrepancies' in any given monthly issue, perhaps B.C.N. Ward would be better suited proof reading a *Find Wally* book!

I do not collect callsigns nor do I have to resort to screaming CQ into my microphone as I can speak at a normal level and overdrive the rig quite nicely using excessive microphone gain! Now before I write to the 'Lonely Hearts Column' I must go and put on my cardigan as it is getting a little chilly.

Thank you *PW* for a great publication, I enjoy each issue as much as I did the first copy I bought 25 years ago. Keep up the good work.
Mike Swift G4MJA
Co. Durham

Too Many Mistakes

Dear Sir
In your response to Mr (or maybe Mrs Ward's?) letter in the December *PW* the Editor said: "The above is extracted from a longer letter.......". Well to be honest I don't know why you bothered, I'm sure the space could have been taken up with something interesting!

We do not live in a perfect world and mistakes are made, it's just that your magazine owns up and prints corrections, which puts it apart from some of the other magazines on the market. If B.C.N. Ward is unable to cope with this may I suggest that he should have kept his money in his pocket last June and done us all a favour.
J. Parkins G8KVP
Teddington
Middlesex

Jaundiced View

Dear Sir
Just to let you know that unlike the "Very disillusioned reader" B.C.N. Ward, I enjoy (like most other readers) everything about our beloved *Practical Wireless* magazine. The 'jaundiced' view that this reader takes of our magazine, is I am sure, not held by 99% of Radio Amateurs eagerly waiting for their next copy to arrive.

I suggest that your magazine 'proof reader' Mr. Ward, takes an overall view of *PW* as we all should of life in general, warts and all. The only thing about that annoys me about his moaning and groaning, is the fact that *PW*, will probably send him a £5 voucer for his trouble, I wonder how many more magazines he has complained to?

All the very best to you on the *PW* team, have a happy Christmas and a healthy New year.
Jack Nelson G0DNC
Stockport
Cheshire

Editor's comment: Thank you Jack, and the many others who've written in with their support in our efforts to publish 'warts and all'. Letter writer B. C. N. Ward has a right to an opinion and had some valid points - regarding the mistakes, etc., and as promised, we will continue to do our best in keeping mistakes to a minimum. And yes, the writer did get a voucher for the letter. I feel sure that everyone would agree that it would be totally wrong to withhold the usual token for a published letter just because the content does not carry a favourable comment or opinion. That's not how it's done in *PW*. But it's nice to know you're out there readers - everyone on the team was reassured by your reactions.

Disillusioned Reader

Dear Sir
After Reading the December issue of *PW* I felt that I must write concerning the letter from B. C. N. Ward which was published in the magazine. I wonder if Mr Ward has ever taken it upon himself to attempt to publish an ongoing magazine with the competition from other radio magazines? I think not.

If he had, he would perhaps realise just how difficult it can be to obtain material of interest to a wide variety of people and their interests. I'm an independent reader and have no dealings with *PW* and its day-to-day management but I do object to reading letters of this kind in the magazine .

Now, I know we all have our opinions but I felt the letter was a little over the top. The person concerned has the right to cancel his subscription at any time rather than attempt to pull the magazine and its staff to pieces.

I find the magazine very interesting indeed and it has a lot of very useful information unlike some magazines I have read. Mr Ward quoted that the readers must be very easy to satisfy. In reply I must say that if a magazine publishes articles of interest to satisfy most people (rather than just what one individual wants) then it works. Additionally, Mr Ward is being unfair by suggesting that the average Radio Amateur has probably never read another magazine. The average Radio Amateur **actually realises** how much time and effort is put into a magazine such as *PW* each and every month. We therefore appreciate having a specialist magazine for the hobby. My personal point of view is that the *PW* Team do a marvellous job and I hope it continues with the format that it already has. Carry on team, you really do a great job! From a totally satisfied Radio Amateur.
Graham Barlow M5AKU
Poole
Dorset

Operating In Gibraltar

● **Dear Sir**
I have just got the November Issue of *PW* and read **Tony Jaques G3PTD's** letter and would like to inform readers of how to obtain a reciprocal licence in Gibraltar.

On arrival at Gibraltar, visit the office of the Wireless Officer and produce your UK licence and on the spot will be issued with a Gibraltar licence. You will not be issued with a full callsign but depending on your UK Class, it will be either ZB2\xxxxxx for an 'A' Class or ZB0\xxxxx for a 'B' class. It will be valid only for the period of your stay in Gibraltar and there's no charge for the licence.

Applications can also be made via post, you need to send your UK Licence, dates as to your stay, and where you will be staying in Gibraltar. Both your Gibraltar and UK Licence will then be posted back to you. Please apply about four weeks before your visit.

To-date no visiting Radio Amateur has had any trouble with Customs at Gibraltar, nor can I foresee any. However if your visit to Gibraltar is via the land frontier with Spain, I cannot give you the same guarantee with Spanish Customs. The Wireless Officer can be contacted at: **Government of Gibraltar, Department of Trade & Industry, Telecommunication Division, Suite 631, Europort, Gibraltar. Tel: 00 350 52052, FAX: 00 350 72166. E-mail: telecoms@gibnet.gi**

Please feel free to contact GARS or myself for any help, advice , etc at the **Gibraltar Amateur Radio Society, PO Box 292, 30 Coaling Island, Gibraltar. Tel/FAX: 00 350 75452.** E-mail: zb2ib@gibnet.gi

Wilfred Guerrero ZB2IB
Secretary
Gibraltar Amateur Radio Society.

Editor's comment: Thank you Wilfred, and with fond memories of 'Gib' from my Navy days I'm sure visiting Amateurs will experience a wonderful welcome.

Excellent Article

● **Dear Sir**
What a pleasure it was to read the excellent article in November *PW* entitled 'Ground That Wire Antenna' by **John Heys G3BDQ**. I have read many of John's articles over the years and he demonstrates once again a mastery of his subject, and a striving for genuine innovation and experimentation in the true tradition of Amateur Radio.

Readers might like to know that I constructed a 'steeple' antenna some 15 years ago after John first published two articles on his original ideas. My version had only four 40ft high vertical wires but it worked superbly on all bands and especially 1.8 and 3.5MHz.

I remember tuning around one winter evening on a fairly quiet top band and deciding to call CQ. Imagine my shock when I was called by a station in New Zealand! We exchanged 559 reports and had a solid QSO. And all on just 10W. Before the 'steeple' I had never even heard ZL on top band!

Incidentally, I knew John many years ago when I was a young teenager and we were both members of the **Hastings & District Amateur Radio and Electronics Society**. Along with another gentleman of Amateur Radio - the late **'Tommy' Thomas G6QB** - John was probably the most influential role model in my young life.

I often visited John's shack and marvelled at the wonderful equipment he used to build (and probably still does). His designs were always original and at the cutting edge of Amateur technology at the time. This was when s.s.b. was first becoming established on the Amateur bands!

I'm now 54 years old and still as enthusiastic as ever. Amateur Radio has given me lifelong pleasure and it also opened the door for me to develop a long and successful career in telecommunications.

Without the help and encouragement of John and Tommy in those early days I might never have made it. May I take this opportunity to thank John for his considerable help and guidance and I look forward to reading many future articles from him in *PW*.

Allan Wood G3RDC
Rugby
Warwickshire

Editor's comments: Thank you Alan our hobby is so very enjoyable isn't it? Additionally John will be pleased to know how much enjoyment and help you've had from his articles over the years. Incidentally, the mention in your letter of the late 'Tommy Thomas' G6QB brought back some memories for me, as it would have done for other readers of *Short Wave Magazine*. Although I never met him - G6QB was a prolific writer for *SWM* and very much respected columnist. Even now, 35 years later, I still enjoy reading his articles (his 'No Space Six Band' antenna article published in 1964 still helps me today).

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

Letters Received Via E-mail

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

amateur radio rallies

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

2001

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

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

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

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

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

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

amateur radio **news**

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

Chris G4VJI remembers G4XGC

Les Ward G4XGC - A Tribute

Chris Lindsay G4VJI pays tribute to Les Ward G4XGC who died on Thursday 9 November 2000 at the age of 80. Les was renowned for his generosity of spirit - in the true traditions of Amateur Radio.

Chris G4VJI writes: "Les was one of those special people who with Barbara his wife gave so much to others in an effort to make their lives more bearable and made many friends here in Blandford, Dorset, and much farther afield. And one of the best examples of their kind actions was when Les and Barbara came to hear of another couple who needed a holiday but could not afford one.

Learning that the couple needing the holiday liked camping, Les and Barbara bought a trailer tent. They then bought the necessary equipment and gave it to the family. If this wasn't enough they then went on to build another seven camping trailers and gave them away to deserving people. Can you imagine the work and cost involved in such generosity?

Les was a delightful man - always quick to recount a story or anecdote. Just how he remembered all those stories was always beyond me! However, many Amateur Radio friends have truly remarkable tangible memories of Les - in the shape of his justly famous Morse keys. Each one was exceptionally finally made entirely by hand and then - true to form - given away. I've got one and it's one of my most treasured possessions.

I could fill a book with stories of how Les and Barbara helped other people, but I think the best example I can pass on involves me. I'd only just got out of hospital after having a triple coronary bypass operation when Les turned up with a Sony 2001D "Just something for you to listen to the Amateur bands" he said. It was typical of the man. We'll always have fond memories of you Les, as someone who always acted in the true spirit of Amateur Radio.

Chris Lindsay G4VJI

Rob Mannion G3XFD comments: I cannot add anything else (because Chris has said it all of this marvellous man) other than to say that within a few week's of the death of my Labrador dog 'Mandy' in 1999 - Les had made a beautiful miniature picture frame (complete with a photograph of my late four-legged companion) and a pair of wonderfully hand-crafted pens, inkwells and accompanying wooden desk-set. Such a man was Les Ward G4XGC. My sympathies go to his family.

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

73KHz For Three More Years

Allocation of 73kHz Extended

The Radiocommunications Agency announced on 23 November 2000 there's to be a three-year extension to the 73kHz Amateur Radio Allocation.

The allocation of the 73kHz band has been available to Radio Amateurs within the UK since April 1996 and was due to be withdrawn completely on 30 June 2000. However, this has now been extended until 30 June 2003

Until 30 June 2003, existing Notice of Variation (NoV) holders will now be allowed to continue conducting their experiments. Radio Amateurs without such an NoV, but who wish to investigate Low Frequency propagation characteristics within this band are invited to write to the Amateur & CB Radio Services Section within the Radiocommunications Agency to apply for a NoV to their Amateur Radio licence. Once this is granted, the NoV permits you to operate in the UK at 73kHz.

The reasoning behind the Agency acceding to this request from the Radio Society of Great Britain (RSGB) is as follows:

- Experimentation on 73kHz has been slower than anticipated due to the high-noise floor towards the top end of the allocation.
- There have been recent developments within Europe to allow reception on 73kHz and transmission on 136kHz
- Additional work is being undertaken on how propagation is affected by the current enhanced solar flare activity and an opportunity to experiment with large antennas has been provided by the de-commissioning of the Decca Navigation System.

Please note that there will be no further extensions to this date – with no exceptions, all experimentation and operation within this band will cease at midnight on 30 June 2003. Only Amateurs holding a Class A or A/B licences are permitted to operate at frequencies below 30MHz. Therefore, this NoV is only available to holders of a full Class A or A/B Amateur Radio Licence.

Radiocommunications Agency,
Wyndham House,
189 Marsh Wall,
London
E14 9SX.
Tel: 0207 2110 211
FAX: 0207 2110 507
Website: www.radio.gov.uk

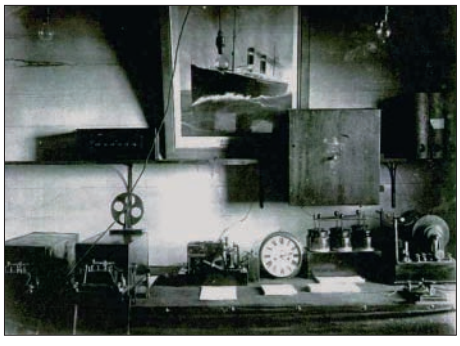
Celebrate in Style

On Location at the Lizard

The year 2001 is a Centenary year for radio with events taking place throughout the year to commemorate radio achievements.

Starting on January 23, the date when the distance record of 180 miles was achieved between St. Catherines Point on the Isle of Wight and Bass Point on the Lizard peninsular, through to the summer when this was extended to 225 miles between Poldhu and Crookhaven in the Irish Republic. It rounds off on December 12 with the famous transatlantic signal letter 'S' from Poldhu to St. Johns in Newfoundland.

In commemoration of these events The Lizard Wireless Station at Bass Point has been re-built by the National Trust using the original fabric. The equipment in use in 1910 has been recreated and placed in situ. The Grand Opening will coincide with the centenary. Using the call sign **GB100LD**, signals will be received from GB100GLD from the original Isle of Wight location.



The station is a museum site and will be open to the public. Using the call sign **GB2LD** Radio Amateurs will be able to operate from the station. Originally built both as a maritime coast station and as a test station for Poldhu this site is steeped in history.

Further details can be found on the Trevithick Trust Website at **www.trevithicktrust.com**

An Aussie in need

amateur radio **help**

Help out your fellow Amateurs

Dan Bedford has contacted the Newsdesk all the way from Australia with the following request:

"I am looking for Denco DP and T coils. Also IFT 18 (465kHz) as well as coils by Wearite, Teletron and Osmor to complete old projects. I am looking to build some projects from old English books such as *Fun With Radio* and *The Boys Book Of Crystal Sets"*.

Dan Bedford
E-mail: coilstoadhall@silchip.com.au

All at sea

Get afloat with Icom

The London International Boat Show is not a place you would necessarily expect to find Icom (UK) Ltd but this year that's all set to change!

On Monday 8 January Icom (UK) Ltd are hosting a Radio Amateur Day at the 47th London International Boat Show at Earls Court between 10am and 8pm. The day has been organised in response to the interest received at previous shows.

The Icom stand will concentrate on displaying its marine product range and a strong emphasis will be placed on Digital Selective Calling (DSC). Special permission has been granted by the RA for Icom to hold DSC communications on their stand.

Also on show will be a wide range of Amateur, commercial and Avionics equipment and one of the first opportunities to see the new IC-910H all-mode transceiver.

Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD.
Tel: (01227) 741741
Fax: (0122&) 741742
E-mail: info@icomuk.co.uk
Website: www.icomuk.co.uk

● Tony Soper getting afloat with his Icom IC-M1 Euro.

More Winners!

Well Done Ballymena!

On behalf of the PW team Terry Barnes GI3USS recently presented the last of the 144MHz QRP Contest trophies.

Terry Barnes GI3USS, former President of the Radio Society of Great Britain, and stalwart of the Bangor & District Amateur Radio Society in Northern Ireland is shown (far right) presenting the *Practical Wireless* EI/GI Trophy to representatives of the Ballymena ARC, whose entry won the 144MHz QRP Contest 2000 trophy. Terry - a great supporter of *PW* - kindly agreed to present the trophy on behalf of G3XFD/EI5IW who sponsors the award. Pictured (left to right) receiving the trophy on the 1 November 2000, are **Ricky Bamber MI5DAW**, **John McPeake GI0SRM** and **Paul Alexander MI0CUN**.

Well done Ballymena and thanks also to **Stewart Mackay GI4OCK**, the man behind the camera lens!

It's all on the Web

World Wide Lake

For all you 'surfers' out there here's something to get your browsers navigating.

Lake Electronics, suppliers of 'The Kits with all the Bits' have recently updated their website. It now includes a listing of vintage radio items, books, magazines, valves and components.

You will also find on the site the full Lake range of Amateur and s.w.l. kits and equipment including QRP transceivers, tuners and Novice kits. So go on point that mouse at **http://ourworld.compuserve.com/homepages/radkit**

An ideal introduction to the hobby of Amateur Radio

amateur radio books

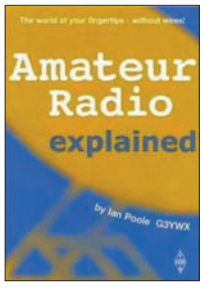
New titles for you to add to your bookshelf

Amateur Radio Explained

Here's a ideal book for anyone interested in starting out in Amateur Radio or anyone looking for a general overview.

Amateur Radio Explained by **Ian Poole G3WYX** provides an ideal introduction to the hobby of Amateur Radio. Priced at £9.99 it covers the basic concepts to get you started and make the most of the hobby.

Information contained within its pages includes the practical aspects of how to set up a station, techniques to use to hear stations from far away, the codes and jargon that are used, frequencies and frequency bands, receivers, and much, much more.



Published in paperback form *Amateur Radio Explained* contains 146 pages and will be available from January 2001. To order your copy contact the PW Book Store.

PW Book Store,
Arrowsmith Court,
Station Approach,
Broadstone, Dorset
BH18 8PW, Tel: (01202) 659930
FAX: (01202) 659950

amateur radio clubs

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

MIDDLESEX

Radio Society of Harrow
Contact: Jim Ballard G0AOT
Telephone: (01895) 476933 or 0207 2786 421
E-mail: 0aot@thersgb.net
Club meetings are held every Friday from 8pm at The Harrow Arts Centre, Uxbridge Road, Hatch End, Mddlesex. Make a date in your diary for the meeting on Friday 19 January 2001 when John Brown G4UBB will be talking on the subject of 'One-valve regenerative receivers'.

Edgware & District Radio Society
Contact: Bill G0STR, QTHR. or David G5HY, QTHR
Tel: 0208 9581 255 or (01923) 655284 days or 0208 9549 180 eves (respectively)
Visit the Edgware club this month - Thursday 11 Jan - Annual General Meeting and 25th Jan - Informal meeting & 'Pay your subs' night. All meetings commence 8pm and take place at The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. All visitors welcome.

WALES

Cleddau Amateur Radio Society
Contact: Trevor Perry GW4XQK
Telephone: (01646) 600725

Website: www.cleddau-ars.co.uk
The Cleddau club meets every Monday except at The Community Education Centre, St Clements Road, Neyland, Pembs. Club events coming up include: Christmas draw to be held at Tenby Conservative Club on 27 December and a Talk on New Zealand by **John GW0JRF** on 8 January 2001.

WILTSHIRE

Trowbridge & District Amateur Radio Club
Telephone: (01225) 864698
Website: www.gertdarc.plus.com/

The club meets at the Southwick Village Hall, Southwick. Main meetings commence at 8pm unless otherwise stated. All main meetings may be subject to change depending on availability of guest speaker please watch for updates via this web site. Visitors are always welcome to all meetings. Jan 3 - Natter night, Jan 17 - 17th Annual General Meeting, Feb 7 - Digital Mode Demonstration PSK31 & SSTV by club members.

Keep those details coming in!

amateur radio **trade**

Behind the Scenes

Yaesu UK Ltd

Donna G7TZB was recently treated to a behind the scenes look at Yaesu UK in Winchester, as well as getting a sneak preview of new radios to look out for in the coming months.

Yaesu UK have been involved in radio communications since the 1950s and over the years have supplied literally thousands of radios to the Amateur, commercial and listening markets. Their current UK base in Winchester, Hampshire supplies trade customers and is a hive of activity.

Spares galore! - If your Yaesu develops a problem or needs a replacement part the service department have plenty of bits and pieces.

The set-up at Yaesu UK consists of smart offices, a large warehouse and a service & despatch department dealing with radio requests and repairs from all walks of life. **Sam Ruddy**, Service Manager, **John James** - Despatch/Warehouse Manager, **Woody** and **Bobbo Oosterhuizen** - Engineers are all kept very busy on a daily basis.

Did you know that Yaesu supplied FT-290s to Cambridge University's Department of Zoology for use in their research projects in the kalahari desert for tracking elephants and Meerkats? I was told it's not unusual for the rigs to come back for servicing with half the desert inside - and that's if they aren't squashed by the elephants first!

There's no shortage of kit here! - The warehouse stocks in excess of one million pounds worth of gear.

We can't wait to get our hands on the latest Yaesu multi-mode transceiver - the FT-817!

While there I tried desperately to get my hands on the new FT-817 multi-mode transceiver but alas the production models are not available for sale yet, but will be very soon. However, it will be worth the wait as this h.f 50, 144, 430MHz backpack transceiver has some great features. These include:

- 5W power output s.s.b./c.w./f.m with 13.8V external DC
- 1.5W a.m. carrier 2.5W s.s.b./c.w./f.m with 9.6V NiCad or 8 AA batteries
- Two colour l.c.d. multi-function display (Blue/Amber).
- Optional narrow c.w. and s.s.b. filters
- AM Aircraft reception.
- Dedicated s.s.b. based digital mode for PSK31 on u.s.b./l.s.b., AFSK RTTY etc.
- Built in VOX, CTCSS and DCS.
- Smart search (automatic memory loading system).
- 200 regular memories, plus Home Channels and Band Limit (PMS) Memories.

Thanks to **Bob Ives** General Manager, **Ailsa Turbett** and the team for sparing the time to show me around and providing an insight into the Yaesu UK operation. I look forward to returning soon to collect an FT-817 for *PW* to review.

Donna G7TZB

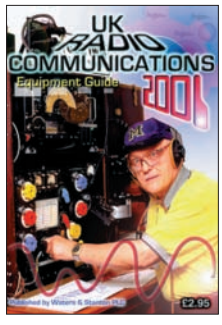
Woody & Sam are kept busy with repairs and servicing requests - the stories they can tell about the fate that befalls some equipment are very entertaining!

New 2001 Catalogue

Let's Go Shopping!

Looking for that certain something? - Look no further there's thousands of radio and related products in the new W&S catalogue.

Choose and select your next radio purchase from the comfort of your own home by browsing through the pages of the 2001 edition of the Waters & Stanton *UK Radio Communication Equipment Guide*. With over 300 colour A4 sized pages over 2500 products are listed, together with technical specifications and accompanying photographs.



Products from all the major manufacturers are included as well as every conceivable accessory. There's even some additional articles, providing some useful back-up information.

The Waters & Stanton 2001*UK Radio Communication Equipment Guide* costs just **£2.95 plus £1.25 P&P** and can be ordered direct.

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

Book Profiles

This month Rob Mannion G3XFD takes a look at some books he's considering for his own library and also thinks will interest readers. First in the selection is something he's been delighted to find for 'Radio Basics' readers!

£4.95

Electronic Project Building For Beginners

R. A. Penfold

Robert Penfold -who I understand is a very experienced TV and Radio Service Engineer - is also a prolific author of electronic books aimed at the home-constructional fraternity. And although most of his books are of great interest to myself and many of our readers - *Electronic Project Building For Beginners* - is absolutely ideal for anyone who is following 'Radio Basics' in *PW*. I wish I'd written it myself!

However, despite my recommendations I must comment about the title: **It understates the coverage area of a book** which (to be fair to the author) **is in fact a miniature manual** in which the author provides an excellent introduction to the components we use, techniques, soldering, construction in general and working on 'home brewed' printed circuit boards, plain matrix board and Veroboard. Worth buying just for what I've described ...but you can also practice what you've learned by building a useful audio project.

Very highly recommended - especially for 'Radio Basics' readers.

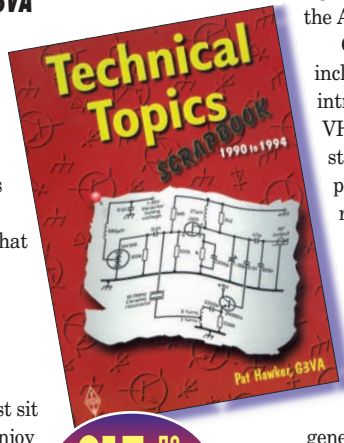
Technical Topics Scrapbook 1990 to 1994

Pat Hawker G3VA

In my opinion 'Technical Topics' is unique - there just isn't another column like it in the world. Others might try to emulate Pat in what he produces - but he's the original!

There aren't many technical articles produced which you can just sit down, read and enjoy such as those here. The nearest equivalent (and it wasn't Amateur Radio of course) was 'In Your Workshop' in the now closed (and much missed) *Radio Constructor* magazine. Extracted from 'TT' between 1990 and 1994 this book covers literally all topics from Antennas to amplifiers and traps to transceivers. There's something for everyone in a convenient , well presented and well printed softback book. There are 306 pages of excellent text with an index.

Very highly recommend - a must for keen *PW* readers!



£13.50

VHF/UHF Handbook

Edited by Dick Biddulph G8DS

This edition of the *VHF/UHF Handbook* was first published in 1997 and was reprinted in 1998. Very 'British' in outlook and styled it does an excellent job in promoting the world of Amateur Radio above 30MHz. Well designed, laid out, and printed it comes with excellent (very clear diagrams and photographs) and in presentation begins to outshine the ARRL version.

£22.00

Chapters include: introduction to VHF/UHF, getting started, propagation, receivers, transmitters, and transceivers, antennas, EMC, data modes, TV, satellites, repeaters, test equipment, and general data. There's also a short index. This is the book for you, especially if you want to look further into v.h.f./u.h.f. working than is possible with just a hand-held transceiver and 'rubber duck 'antenna.

Highly recommended.

Passport to World Band Radio 2001

Editor in Chief Lawrence Magne

Keen on radio listening? New to the listening hobby or want a change from listening to those long QSOs on the h.f. bands? Well why don't you join myself and the many others in the hobby who like listening to broadcasts from all over the world - via short wave radio, medium wave and now (for me anyway) via satellite!

However, *'Passport'* as its universally known is the book to have if you concentrate on short wave listening. All the information needed for finding your favourite broadcaster is to hand - plus the very special 'extras' such as the famous 'Shop Window' of radios designed for world band listening. And although the author's don't pretend that every single radio available in the world is show - they've certainly not far off from publishing details on most of them.

Even if you don't buy this book every year you should have a copy to hand. If you like listening to short wave broadcasters you'll enjoy *Passport*.

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KENWOOD

Radio Basics

This month Rob Mannion G3XFD looks at some of the problems that 'first time' constructors can discover when building projects. Rob's advice is - don't give up - you'll learn much from your mistakes!

My late Father often said to me (as I made one youthful mistake after another: "Rob, if you learn only a few things from your mistakes as you go through life - you'll be a wise man"! Well, Dad was right - and I'm still learning.

Mistakes in *PW*, other magazines, our own and just how easy it is to misinterpret a circuit - not spotting the problem for days - is often a hot topic during the 'Question & Answer' sessions that follow the club visits I do each year. And I can say that it's gratifying to hear from others how they've learnt more from getting a faulty project to work - than they would have done if the project had worked first time!

So, for those of you who've lost heart when a project you've built doesn't work and have written to me for help, I ask you not to give up. To help you I'll describe some of the problems and how you can overcome them.

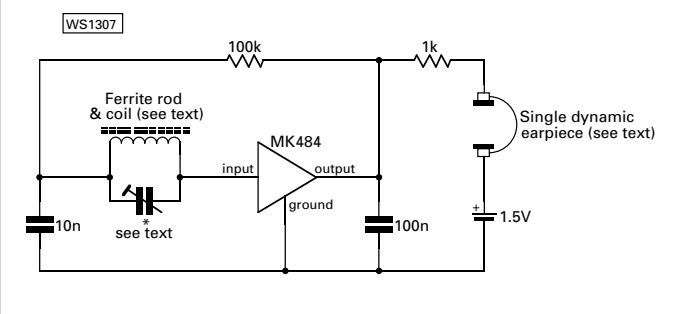
Last month I looked at one of the biggest sources of trouble for constructors: coils. Incidentally, on this point I'd like to thank all the readers who took the trouble to send me their comments on the subject of coils and coil winding for projects. At times it's difficult for me to judge just what's required by readers of this column and your feedback is extremely helpful - indeed it's essential. **So, please keep it coming to help me prepare what's needed to help you.**

This month we take an 'active' stride forward and look at the transistor and ubiquitous integrated circuit, which can provide gateways and pitfalls at the same time!

Advantages & Disadvantages

Nowadays many of the projects featured in *PW* will use integrated circuits (i.c.s) as the prime mover.

Fig. 1: Circuit of the MK484/ZN414 t.r.f. radio project published in the January 200 'Radio Basics'. In the article G3XFD explains how this very simple circuit belies the extremely high gain provided, which in turn can lead to problems for the inexperienced constructor.



unfortunately, although i.c.s can be of immense benefit - occasionally the unwitting constructor can get caught out and the circuit, **Fig. 1**, first published in the January 2000 'Radio Basics' (RB) column, is a case in point.

The circuit is of the remarkably successful MK484 single 'radio on a chip' project, derived from the famous original Ferranti ZN414 i.c. which is now not generally available. (However, in practice the only difference between the original ZN414 and the MK484 is that the latter has a slightly different 'pin out' for its three wires - **the pin-out shown is for the MK484**).

Although, as I've mentioned, the MK484/ZN414 tuned radio frequency (t.r.f.) radio i.c. is remarkably successful - they can fail to work, and if you're a beginner it can turn out to be a real mystery. Why do they fail? - The answer's simple - it's all down to how well the devices work!

A conundrum? Not really - I'll explain: The ZN414/MK484 packs an enormous amount of effort into a very small package and it's a design that goes right back to the 1960s, appearing for sale in the early 1970s.

Simply stated, the i.c. package contains an almost-complete radio receiver, suitable for use from 180kHz to approximately 1.8MHz, with the minimum of extra components needed. It's remarkably sensitive and also selective bearing in mind it is only a tuned radio frequency (t.r.f.) design rather than a superhet receiver.

However, the very high signal gain provided by the circuit - in the order of 70dB - can lead to the circuit becoming unstable and to start oscillating. And in case you've not come across oscillating circuits before, there's a suitable analogy which I often use, and is ideal for the purpose!

We've all been in the situation where either ourselves (or some other poor sucker) has been in the embarrassing situation of handling a microphone which is too near the amplifier's loudspeaker. The whistling and shrieking has to be heard to be believed - as all sufferers know!

Exactly the same thing can happen with high gain integrated circuits - both audio and radio frequency types. However, for the moment I'll concentrate on describing the problems some readers seem to have discovered when using the MK484 radio, as featured in Fig. 1.

From the letters and the various 'SOS' messages I've received, it appears that some constructors have run into trouble by not following the lay-out design, **Fig. 2**, which I provided for you. The lay-outs* as published were 'tried and tested' and - **as far as it's possible to be with such projects** - were designed to be trouble free.

**These include the free lay-out sheets sent to readers who responded to the offer ('RB' August 2000 issue).*

The most common reported difficulty came from readers who **did not follow my layout**. Some chose to use a layout of their own, or used Veroboard type of copper strip laminate matrix board - with disastrous results!

To be honest, even a very experienced constructed would be **unlikely to achieve first time success** with a MK484/ZN414 radio using Veroboard. And, to be quite honest, many years ago when the original ZN414 came out I bought several and tried building the circuit on Veroboard - which led me to believe that the ZN414 was a failure whereas it's nothing of the sort!

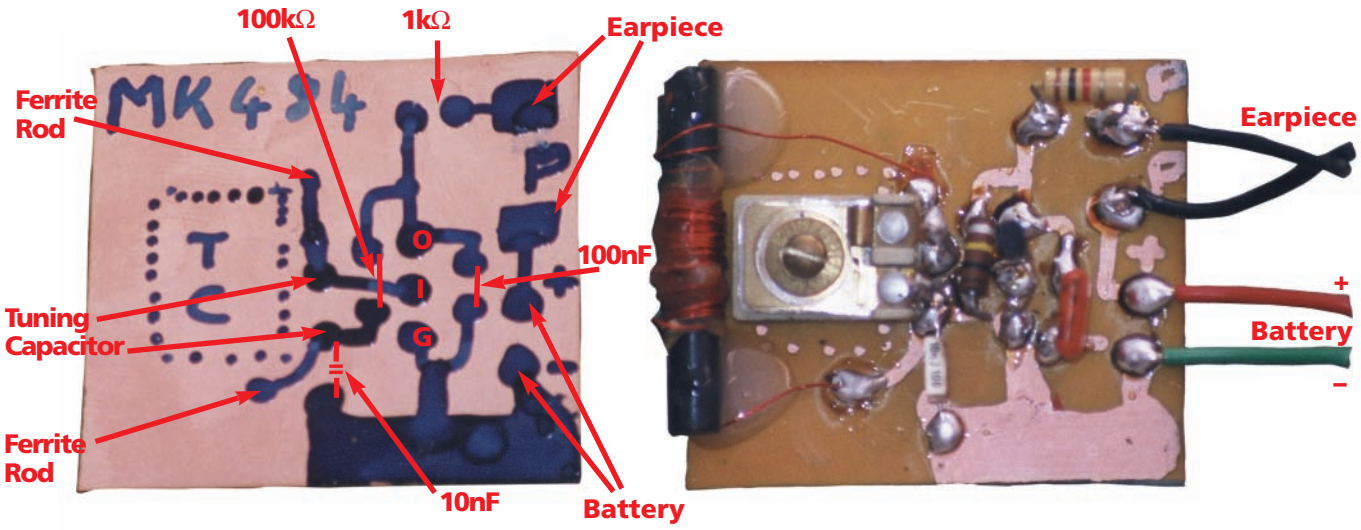
Generally speaking Veroboard, although ideal for electronic and digital projects - is less suitable for radio frequency circuitry unless great care is taken. The problem? - it's the fact that the copper laminate strip tracks run extremely close and parallel to each other.

By being so close the laminate strips provide good 'coupling' between each other along their length - and if you use a high gain device (Which the MK484 is) it's very easy indeed to end up with a situation where the 'microphone sees the loudspeaker (i.e. input sees the output in the case of the radio i.c.).

The results? Instead of a nicely working radio receiver you'll probably have a radio frequency oscillator working on the frequencies you hoped to listen in to!

If you suspect that your MK484 radio project is oscillating there's a simple, sure-fire way of proving the problem. All you need to do is to place a known-to-be-working radio (switched to the band your project is designed to work on) within a hand's breadth of the MK484 radio and tune it slowly over the band.

If the MK484 radio is



● Fig. 2: The annotated photograph of the MK484 radio project. Although simple (even crude) the lay-out shown is proven and works well. Any deviation from the lay-out shown can lead to instability and the circuit not working correctly or failing altogether (see text).

oscillating you'll hear whistles (known as heterodynes) as you tune the second radio over the band. However, final proof can be provided by leaving the second receiver tuned to a station, whilst the MK484 radio is itself tuned across the band. An unmistakable heterodyne (just like listening to an a.m. transmission with a receiver beat frequency oscillator switched in) should then be heard as the MK484 radio is tuned across the station you've chosen.

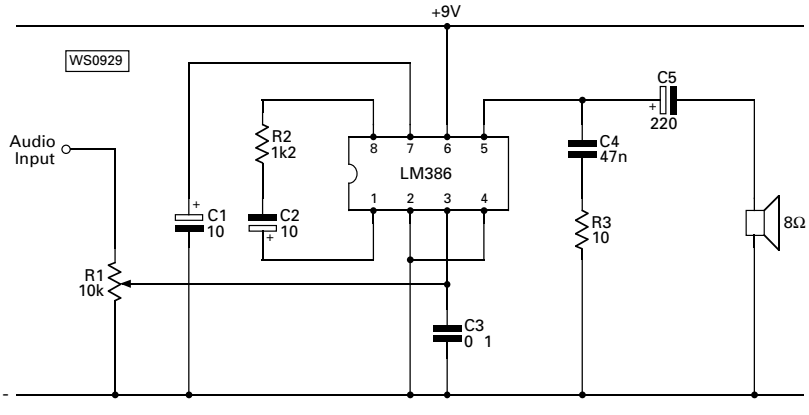
Simple Solution

Fortunately, there's a very simple solution which will enable you to cure an oscillating MK484 radio - and the technique will stand you in good stead for all future radio frequency (and audio to a lesser extent) projects you build in the future). The solution? Layout wiring and connections so that input and output wiring (or copper laminate tracks) 'see' as little of each other as possible (That's why the ferrite rod antenna is located as shown in Fig. 2).

And whenever they do 'see' each other try to ensure that they do so at right angles, to limit 'coupling' by not running parallel. You'll soon learn the techniques involved and automatically do the right thing. It's all part of the learning process!

On the main circuitry of Fig. 1, remember that the 10nF and 100nF capacitor values are chosen very carefully. For best results use the correct values, any deviation will spoil the results and will almost certainly stop the receiver from working.

● Fig. 3: The simple i.c. audio amplifier which has featured in several 'Radio Basics' projects. Although considered to be a virtually 'trouble free' circuit, the inclusion and careful positioning of the 'by-pass' capacitor C3 is essential (see text).



Important Earpiece

Good audio results **really do depend on the all important earpiece**. Some readers told me they had 'disappointing results' using very small 8Ω loudspeakers. From their letters it seems that they thought that the smaller the loudspeaker 'the more sensitive' it would be. Unfortunately, the reverse is generally true and some of the really small loudspeaskers can take a fair bit of power to make them work!

By sheer coincidence - and good luck for the thrifty radio constructor - the ubiquitous telephone earpiece insert is ideal for use in Fig 1. If you had to buy new balanced armature headphone inserts they'd be very expensive - but the telephone types are available for around 50p from many different sources.

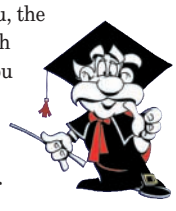
Amplifier Problems

A number of adventurous MK484 radio constructors tell me that they went on to build the LM386 i.c. audio amplifier (Fig. 6 in the February 2000 issue of *PW*) shown in **Fig. 3**. Several reported they were delighted at the resultant volume provided by the amplifier - but not the 'whistling' and 'shrieks' which sometimes accompanied reception (not present in their receiver project as originally built).

In several cases I discovered that C3, the all-important 'decoupling' or 'by-pass' capacitor had not been incorporated. This had then allowed r.f. and 'feedback' signals to get into the input, making it an efficient oscillator. However, several readers then told me that even when C3 was included, 'in the background' of the wanted audio from the loudspeaker a 'rushing' sound could be heard (sometimes even accompanied by short wave radio stations).

The problem was soon cured by placing C3 - with the leads as short as can be physically achieved). One or two readers still found that there was an occasional problem - but that was also soon silenced by the use of a tiny ferrite bead slipped over the pin 3 end of C3's connecting lead. Such beads are available from suppliers such as Sycom for around 4p each and can fit easily on transistor leads most successfully, and again they're ideal for the thrifty radio constrcutor!

For future projects in this series I've decided the best approach will be to provide description stages, and building information in one article. This will be followed by setting-up and possible problem solving in a separate article - I've come to the conclusion it's the only fair way to provide you, the reader, with the help you need. I hope you agree! Cheerio for now. *PW*



THE DIRECT-CONVERSION RECEIVER

Gordon King G4VFV has a look at the direct conversion receiver - an excellent introduction to the art of home construction.

The superhet receiver neatly converts the tuned antenna signal to a fixed intermediate frequency (i.f.) signal, as I have mentioned previously. After amplification this is demodulated, and the resulting audio frequency (a.f.) signal is amplified to operate a pair of headphones or a loudspeaker.

There's also a type of receiver which converts the required incoming antenna signal directly to a.f. This type of receiver is not new, but it is still used by Amateur Radio buffs the world over, especially those interested in home construction and low power (QRP) operation. It was originally called the **homodyne** or **sychrodyne**; but nowadays more commonly goes under the title of the **direct-conversion** (d.c.) receiver.

Simplified Superhet

The direct-conversion receiver is a simplified superhet and represents a method of reception of amplitude modulated waves, where a local oscillator (l.o.) is synchronised with the carrier frequency. Since it incorporates a mixer and a l.o., with the mixer having inputs from both the antenna and l.o, it is something like a superhet, but whose relative simplicity places it within the scope of most enthusiastic home constructors.

The d.c. receiver differs from the ordinary superhet, of course, because the l.o. operates on the same frequency as the wanted incoming single-sideband (s.s.b.) signal. The mixer has the features of a product detector, which I looked at in the November issue. This can be either passive using diodes, or active using a transistor or an integrated circuit (i.c.).

The essential characteristic is that the mixer yields an output which corresponds **directly** to the audio content of the tuned s.s.b. (J3E) signal. With c.w. (A1A) reception the l.o. is adjusted for a suitable beat-frequency note. For **double-sideband** (A3E) reception the correct phase relationship between the antenna and l.o. signals needs to be observed.

Even though there are no radio frequency i.f. stages, and despite its relatively simple configuration, the direct-conversion receiver is capable of remarkably encouraging results up to at least 14MHz, being limited mainly by the stability of the l.o. Of course, you cannot expect the performance to approach that of a significantly more expensive superhet!

Extremely high-gain a.f. preamplification is necessary to compensate for the lack of i.f. and (possibly) r.f. amplification. Like any other receiver the output audio is provided by either a simple low power a.f. amplifier for headphone working, or by a more robust power amplifier when loudspeaker operation is required.

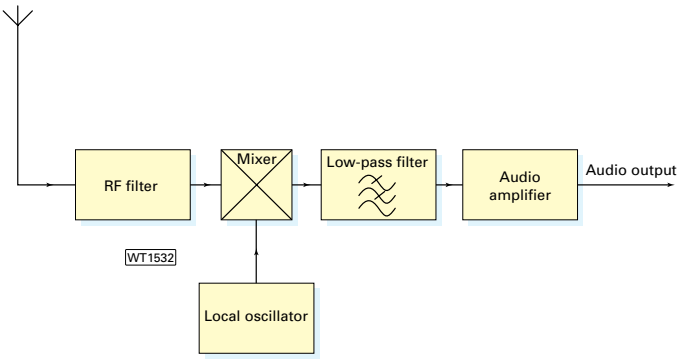


Fig. 1: Block diagram of a direct-conversion receiver.

Owing to the general electrical and static background noises which commonly accompany signals at the longer wavelengths, r.f. amplification might not be justified on the lower frequency Amateur bands. In this case the antenna would be coupled to the mixer,

Continued on page 22...

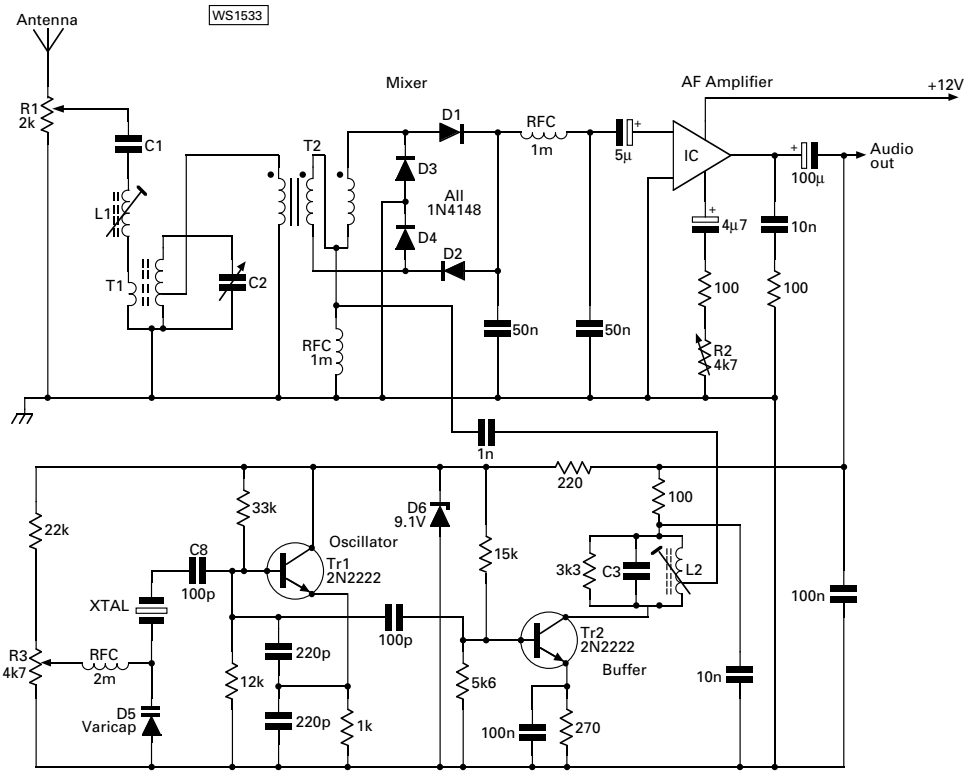


Fig. 2: Circuit diagram showing the detail of an experimental direct-conversion receiver, along with suggested component values for the 7MHz Amateur band.

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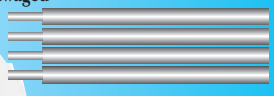

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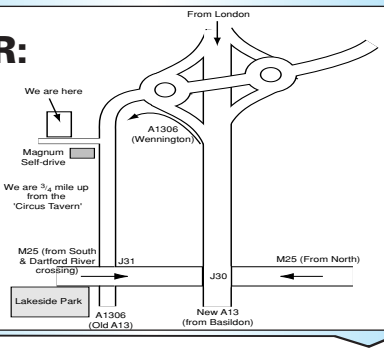

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...continued from page 18

preferably through a tuned coupling with r.f. filtering to attenuate out-of-band signals. On the higher frequency Amateur bands, however, where the background noise is lower the addition of a tuned r.f. amplifier could well be warranted.

Interesting Design

Many interesting and simple-to-build direct-conversion receiver designs for the Amateur bands have been published over the years, and particularly in *Sprat*, the journal of the G-QRP club. Direct-conversion receivers and QRP transceivers are also available in kit or made up form.

In transmit mode a QRP transceiver utilises the l.o. (usually through a buffer stage) to drive a power amplifier (p.a.) whose output is matched to the switched-over antenna for transmission. The application of appropriate l.o. frequency offset between transmit and receive avoids the need to retune between J3E and A1A modes.

The block diagram of a direct-conversion receiver in **Fig. 1**. is reflected in circuit form in **Fig. 2**. **This circuit should be regarded purely as experimental, including the component values**, which relate essentially to the 3.5MHz Amateur band. Nevertheless, the circuit serves nicely to illustrate the functional detail.

The antenna is coupled to the r.f. transformer T1 and the required station tuned by the variable capacitor C2. The series combination of C1 and L1 acts as a rejector circuit whose values are chosen to resonate at the frequency of any powerful transmission that may be causing breakthrough problems. Potentiometer R1 merely adjusts the signal input level.

The tuned antenna signal is connected to the double-balanced passive mixer, comprising transformer T2 and diodes D1, D2, D3 and D4, from a suitable impedance point on T1 secondary, while the l.o. signal is applied through the 1nF capacitor from the l.o. buffer stage. Transformer T2 is a trifilar-wound toroidal, where the black dots signify the phasing of the windings.

Output a.f. signal from the mixer at D1/D2 junction passes through the r.f.c. to the input of the i.c. by way of the 5mF coupling capacitor. The r.f.c. in conjunction with the two 50nF shunt capacitors form a low-pass filter, which lets through the a.f. signal while severely attenuating unwanted signals of higher frequency.

Further filtering is provided by the 10nF capacitor and the 100Ω series resistor at the output of the i.c. The gain of the i.c. and hence the level of the a.f. output signal is adjustable by potentiometer R2. The output signal is then available for further amplification as required to operate a loudspeaker or headphones.

The variable-frequency oscillator (VXO) is based on a crystal-controlled Colpitts circuit formed around the *npn* transistor Tr1. Frequency is variable over several kHz by the 4.7kΩ tuning potentiometer R3, which adjusts the reverse-bias across the varicap diode D5.

Feedback is provided in true Colpitts style by the two 220pF capacitors linking between the base and emitter. Supply voltage for the oscillator is stabilised by the 9.1V Zener diode D6.

The l.o. signal developed across the 1kΩ resistor at Tr1 emitter is coupled to the base of the buffer amplifier n.p.n. transistor Tr2 through the 47pF capacitor. Amplified l.o.signal at Tr2 collector is tuned by L2/C3 and then fed to the passive mixer through the 1nF capacitor, as already noted. The 3.3kΩ resistor shunting L2 provides a degree of damping.

Well, that's about all there is to it really. The direct conversion receiver makes an excellent introduction to the art of home construction. Even a simple circuit offers interesting scope for experimentation. PW

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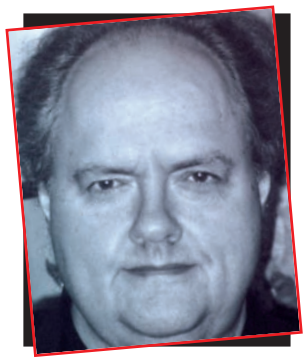
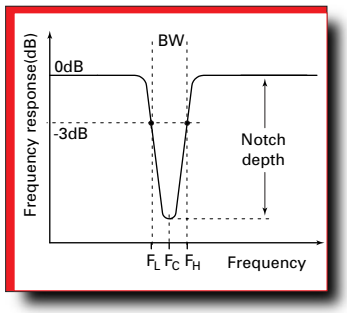


Joe Carr K4IPV looks into notch and band-pass amplifiers, the circuits to be found at the heart of filtering for wanted or unwanted signals.

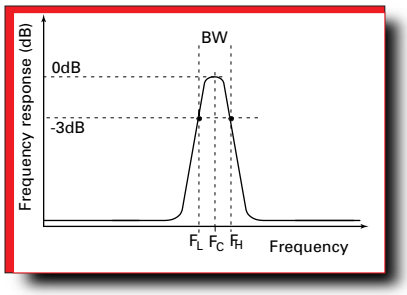
Notch and band-pass amplifiers share certain attributes because they're both resistor-capacitor (RC) circuits that have a very narrow band-width. A notch filter blocks a narrow range of frequencies, while the band-pass allows only a narrow range of frequencies through. There are various ways of generating these circuits, and that is the topic of this article.

The illustration of **Fig. 1** shows the notch characteristic. It attenuates only those frequencies between upper and lower –3dB points ($F_H - F_L$). Most notch filters are centred around one frequency (F_C) and are symmetrical about that point. The notch characteristic is used to 'take out' interfering signals (such as mains hum or a heterodyne whistle), without attenuating the rest of the signals.

The band-pass characteristic is shown in the drawing of **Fig. 2**, which is just the opposite of the notch characteristic. In the band-pass case it passes only a narrow band of frequencies between the –3dB points, attenuating all other frequency signals. Band-pass filters are used to eliminate unwanted noise when the wanted signals fall within a very narrow band.



● Fig. 1: The general frequency response of a notch filter.



● Fig. 2: A band-pass filter has exactly the opposite response to a notch filter.

Active Filters

Active filters are circuits where the RC network is cascaded with an input buffer amplifier (optional) and/or an output buffer amplifier (required). These amplifiers tend to be non-inverting operational amplifier (op-amp) voltage follower circuits. The purpose of these buffer amplifiers is to isolate the network from the outside world.

For low frequency applications, the op-amp used in the buffering circuits can be the ubiquitous '741, 1458 or similar device. For higher frequency applications, i.e. those with an upper cut-off frequency above 3kHz, a non-frequency compensated device such as the CA3130 or CA3140 devices would be better suited.

Wien Bridge

The RC network known as the Wien bridge circuit is shown in **Fig. 3**. This circuit consists of four arms, two of which are frequency selective and two of which are resistive, with the conditions R1 = R2 = R, C1 = C2 = C, and R3 = 2R4. When the output through the frequency selective arms at the resonance point is one-third, the same as the non-frequency selective attenuation, the bridge is balanced and the attenuation is high

The characteristics of notch filter of Fig. 3 is rather poor. The notch although deep, is wide. By using an instrumentation amplifier or operational amplifier, to 'aid' the notch filter, the circuit becomes an active notch filter. When using the units F (Hz), C (farads) and resistor values in ohms, the notch frequency will be:

$$F_c = \frac{1}{2\pi R C} \qquad (i)$$

The Wien bridge can also be used as an analogue means to measure frequency, by varying either R1 and R2, or C1 and C2 values until a null is noted. The frequency can be calculated from the above notch frequency formula.

The Wien bridge can also be used to create a band-pass amplifier as shown in **Fig. 4**. The band-pass characteristic occurs at the frequency determined by the equation *(i)*, provided that C1 = C2, R1 = R2 and R3 < 2R4.

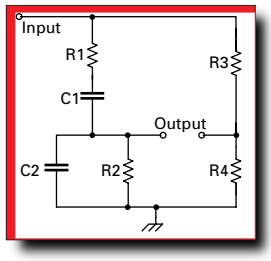
Note that this circuit is arranged to have positive feedback using the R3/R4 network. As along as R3 < 2R4 the circuit is stable because Barkhausen's criteria for oscillation are not met. But if R3 is 2R4, those criteria are met and the circuit becomes an oscillator.

Twin-Tee Filters

Perhaps the most common form of notch filter is the twin-tee filter of **Fig. 5**. Point 'C' is the common point in the circuit, and either 'A' or 'B' can be an input, provided that the other is the output. Unfortunately, this circuit is even 'lazier' than the Wien bridge. The band-width is wider than that of the Wien bridge!

The problem is that the loaded *Q* of the circuit of Fig. 5 is poor. But it can be 'bootstrapped' with an op-amp, to a higher impedance as shown in the circuit of **Fig. 6** shows the twin-tee filter buffered by the high impedance of the non-inverting input on an op-amp or instrumentation amplifier.

The buffer amplifier limits the loading of filter, making it possible to build a higher-*Q* filter, when R2



● Fig. 3: The Wien Bridge circuit has an output that is balanced.

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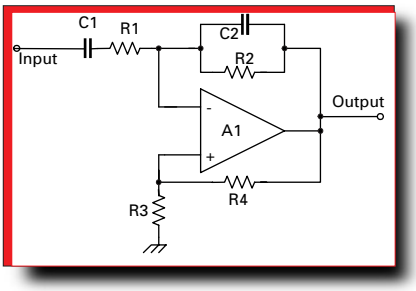


Fig. 4: Implementation of a filter using the Wien Bridge circuit. (See text for more detail).

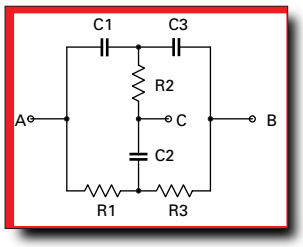


Fig. 5: The 'Twin-Tee' filter has a common point 'C' and either 'A' or 'B' may be output or input.

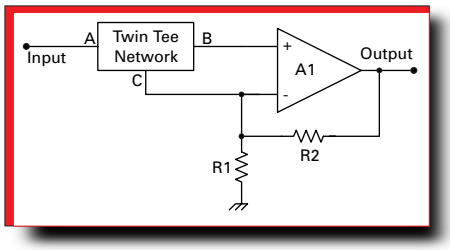


Fig. 6: Adding a buffer amplifier to the Twin Tee network. (See text for more detail).

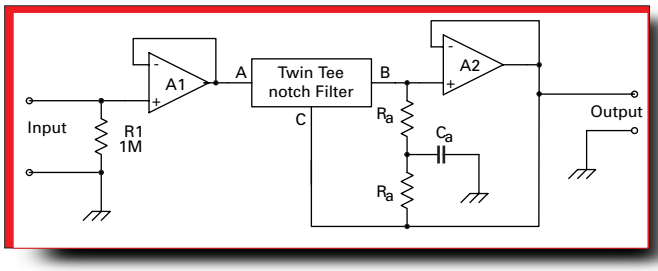


Fig. 7: This circuit is superior to that shown in Fig. 6.

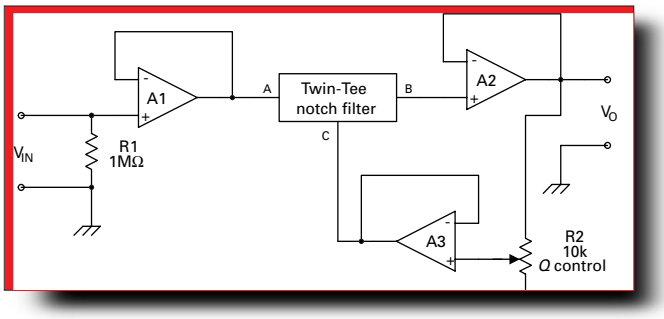


Fig. 8: Adding a variable Q control to the Twin-Tee circuit of Fig. 7.

= 22×R1 in this application. Unfortunately, the higher Q is obtained by the use of positive feedback in the circuit, and leads to distortion, noise and gain variation with component tolerances. As a result, in the application of this circuit, high tolerance (0.1 or 1.0%) components are recommended.

A superior circuit is shown in **Fig. 7**. In this circuit, point 'C' of the twin-tee network is connected to the output terminal of the output buffer amplifier. There is also a feedback network consisting of two resistors (R_a) and a capacitor (C_a). The values components in the twin-tee network are found from the equation above, while the values of R_a and C_a are found from:

$$R_a = 2RQ \quad (ii)$$

$$C_a = \frac{C}{Q} \quad (iii)$$

Example

As an example, let's design a 60Hz notch filter with a Q of 8.

The steps are:

1) Select a trial value for C: 0.01µF.
2) Calculate the value of R from the equation: 265,390Ω
3) Calculate R/2: = 132,695Ω
4) C2 = 2C = 2×0.01µ = 0.02µF
5) Select R_a: = 2QR = 2×8×265390 = 4.246MΩ
6) Select C_a = C/Q = 0.01µ /8 = 0.0013µF.

When the circuit of Fig. 6 was built, in my basement 'laboratory', using the above values the null was close to -48dB deep using components matched using a low-cost multimeter.

A notch filter with a variable Q control is shown in **Fig. 8**. In this circuit, a non-inverting follower (A3) is connected in the feedback loop in place of R_a and C_a. The variation in Q is achieved by tapping the feedback point down on the potentiometer (R2). Values of Q from 1 to 50 are available from this circuit.

Bridged-Tee

Bridged-Tee circuits are useful for making notch filters, and they have two fewer components than twin-tee filters (two resistors and two capacitors). There are two versions of the bridged-tee network, the circuit of **Fig. 9** bridges a capacitor across the tee network, and twin resistors forms the tee.

The circuit of **Fig. 10** uses a resistor to form the bridge, and twin capacitors to form the tee. The notch in these circuits can never be infinite, or even deep, with these circuits, where a notch of about 20dB is usual.

As you might expect, the bridged-tee circuit's notch can be deepened by using an op-amp with a degree of positive feedback, as shown in **Fig. 11**. With values of C1 = 0.1µF, C2 = 0.01µF, R1 = 100kΩ and R2 = 5.6MΩ, the notch frequency will be 60Hz. The frequency can trimmed

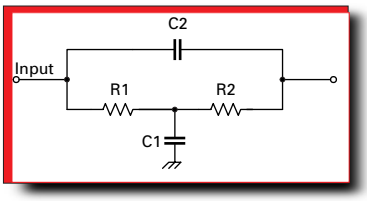


Fig. 9: One variation of a 'Bridged-Tee' network, using a capacitor to bypass the 'tee'.

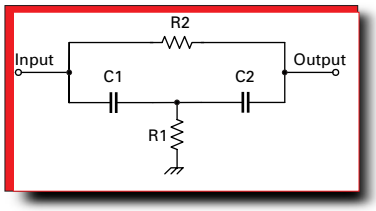


Fig. 10: Another 'Bridged-Tee' network, this time using a resistor to bypass the 'tee'.

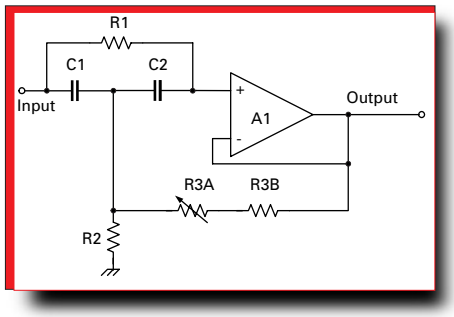


Fig. 11: Adding a buffer amplifier to the resistive bypass Bridged Tee circuit to produce a notch filter.

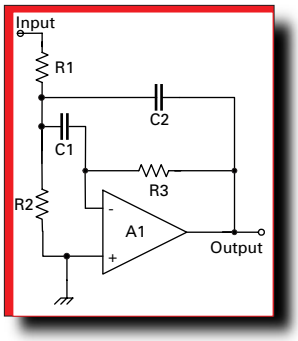
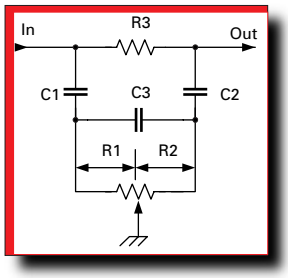


Fig. 12: A bandpass filter using few components. See text for more detail.



● Fig. 13: A passive notch filter circuit which is 'tuneable' by varying the R1/R2 ratio.

slightly by varying R3a, provided that R2 = 100kΩ and R3A+R3B is approximately 470kΩ.

Passband Amplifier

The circuit of **Fig. 12** shows a neat application of the resistive bridged-tee concept, but in a pass-band amplifier. The centre frequency gain is given by:

$$A_v = \frac{R3}{2\,R1} \qquad (iv)$$

If C1 = C2 = C, the centre frequency is found by:

$$F_c = \frac{1}{2\pi C\sqrt{\frac{R1\,R2}{R1+R2}\times R3}} \qquad (v)$$

The band-width of this circuit is found from:

$$BW = \frac{1}{\pi CR3} \qquad (vi)$$

Adjustable Notch

A variant of the bridged-tee notch filter is shown in **Fig. 13,** and is frequency adjustable. This circuit is often used in cases where the notch frequency is either variable or not known with great precision. One popular use for this filter is on radio receivers where it is used to notch unwanted audio tones in the output. The notch frequency is given by:

$$F = \frac{1}{2\pi C\sqrt{3R1\,R2}} \qquad (vii)$$

Assuming:
C1 = C2 = C3 = C
R1 and R2 are the wiper-to-end-terminal resistances of the potentiometer

A sample circuit based on Fig. 13 is shown in **Fig. 14**, showing a circuit that will produce a notch variable between about 1.8-8kHz, depending on the setting of R1-2. A representative frequency response for this circuit is shown in **Fig. 15**.

Gyrator Circuits

Now I'll consider the 'Gyrator' circuit. The term gyrator is one that you might not have heard of, but it's applied to a circuit known as a 'virtual inductor'. This is an RC circuit, using op-amps to synthesise an almost perfect inductor that offers another approach to notch filter design as shown in **Fig. 16**.

This circuit is also sometimes called the virtual inductor notch filter, and its notch frequency is calculated from:

$$F_c = \frac{1}{2\pi\sqrt{R_a\,R_b\,C_a\,C_b}} \qquad (viii)$$

Which may be simplified to

$$F_c = \frac{1}{2\pi R\sqrt{C_a\,C_b}} \qquad (ix)$$

If the following conditions are met:

$$\frac{R3}{R1} = \frac{R2}{R_a + R_b} = \frac{R2}{2R} \qquad (x)$$

The band-width of the circuit is given by:

$$BW = \sqrt{R_a\,R_b\,\frac{C_b}{C_a}} \qquad (xi)$$

It's possible to use any one of the elements, C_a, C_b, R_a, or R_b, to tune the filter. But in most cases, C_a is made variable and C_b is a large value fixed capacitor. The 1.5nF variable capacitor can be made by paralleling all sections of a three-section broadcast variable, with a single small fixed or trimmer capacitor. Alternatively, since most applications will require a trimmer rather than a large variable capacitor, it is also possible to parallel one or more small capacitor and a trimmer.

For example, a 100pF trimmer can be parallel connected with a 1nF and 470pF to form the 1.5nF capacitance required. Make sure that low drift, precision capacitors. Or you can match them using a digital capacitance meter.

Canonical Circuit

The circuit of **Fig. 17** shows the circuit for the canonical notch filter. This circuit is a little different from the others. It consists of two RC networks connected such that R1C1 forms a low-pass filter, and R2C2 forms a high-pass filter. Provided that C1 = C2 = C, R1 = R2 = R, and R3 = R4, the notch frequency of this circuit is given by:

$$F_c = \frac{1}{2\pi R\,C} \qquad (i)$$

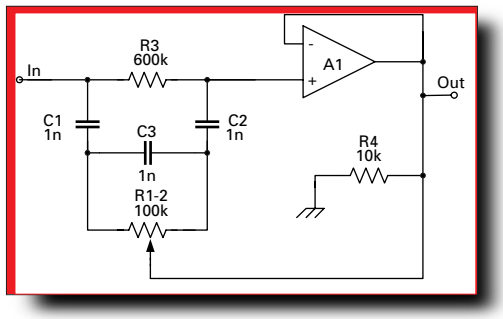
But the notch is very wide.

Cautionary Note

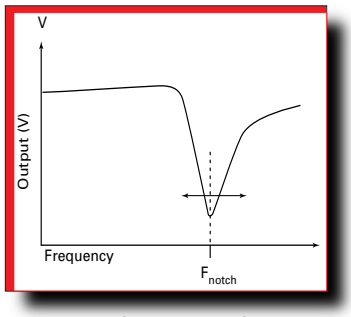
Now a cautionary note! Care must be exercised when using any filter to remove components from a waveform. If the filter is not an high *Q* type, then too much of the wanted signal might be removed. In medical electrocardiograph (ECG) systems the signal has components from 0.05 to 100Hz, so the mains frequency's right in the centre of the range! Imagine what happens with a large filter bandwidth - Oops!

To make matters worse, the leads have to be connected to the human body, so are unshielded at their very ends. Interference from the mains is almost guaranteed unless care is taken. On medical ECG amplifiers the filter is usually switchable so, being either in or out of the circuit.

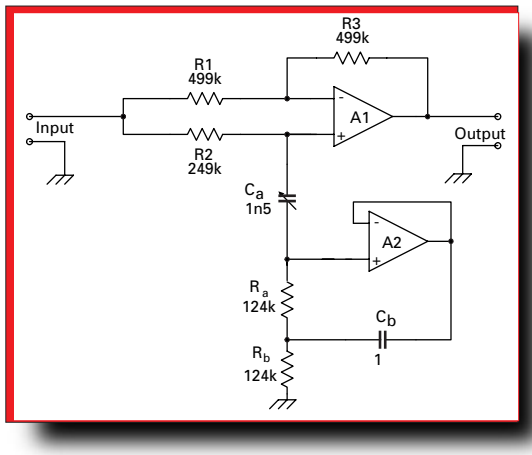
Now you have a collection of circuits that will do notch and pass-band work for you. The circuits are easily built, and will work nicely. PW



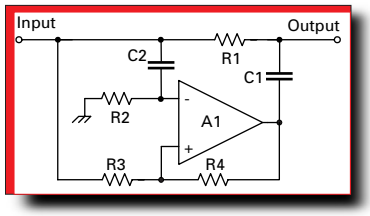
● Fig. 14: Adding a buffer amplifier improves the working of the tuneable notch filter.



● Fig. 15: The frequency plot for the circuit of Fig. 14.



● Fig. 16: The 'Gyrator' circuit uses a an op-amp and capacitor to act like a large virtual inductor.



● Fig. 17: A 'canonical' filter in which R1/C1 form a low-pass circuit and R2/C2 form a high-pass circuit. The centre frequency is set as in Formula (i), but beware - the bandwidth is somewhat wide.

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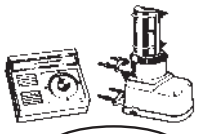

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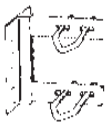

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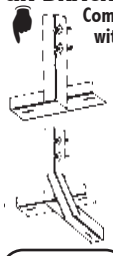

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(Stainless Steel)
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Freq. Range 0-2000 MHz. Length 1500mm.
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MULTISCAN STICK

Freq. Range Receive - 0-2000 MHz. Transmit 144 - 146 MHz gain 2.5 DBd 420 - 430 MHz gain 4.5 DBd Length 1000 mm.
Although marginally compromising sensitivity the multi scan stick has within its transmitting capabilities plus gain makes it an excellent antenna for the amateur and expert alike.
Comes complete with mounting hardware and brackets.
(Ideal for the amateurs ham radio - user).

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IVX 2000

Freq. Range Receive - 0-2000 MHz. Transmit 50 - 52 MHz gain 2.00DBd 144 - 146 MHz gain 4.00 DBh 420 - 430 MHz gain 6.00 DBd Length 2.5 m.
For external use, but at a pinch can be used in the loft. It has been finely tuned to make this Antenna the best there is. It has stainless steel radials and hardware. *(THE BEST)*

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MULTI SCAN STICK II

Freq. Range Receive (0-2000MHz) Transmit (144-146 MHz) Gain 4.00Dbd (420-430 MHz) Gain 6.00Dbd Length 1500mm
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SWP 2000 FREQ. 25 - 2000 MHz. Length 515mm.

Multiband good sensitivity for its small size. Fitted with two suction cups for ease of fitting to any smooth surface (i.e. inside of car window) comes with 5 metres of mini coax and BNC connector. *(Good for the car user who doesn't want an external antenna.)*

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SWP HF30

Freq. Range 0.05-30MHz Length 770mm
Although small, surprisingly sensitive for the H.F. user. Fitted with two suction cups for ease of fitting to any smooth surface (i.e. inside of car window) comes with 5 metres of mini coax and BNC connector. *(Good for the car user who doesn't want an external antenna.)*

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TRI SCAN III

Freq. Range 25-2000MHz Length 720mm
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(Stainless Steel)
Freq. Range Receive 25-2000MHz Transmit 50-52MHz 144-146MHz 430-440MHz 900-986MHz 1240-1325MHz Length 1540mm Connector-N TYPE
The Ultimate Discone Design. 4.5DB GAIN OVER STANDARD DISCONE! Highly sensitive, with an amazing range of transmitting frequences, comes complete with mounting hardware & brackets *(The Best There is).*

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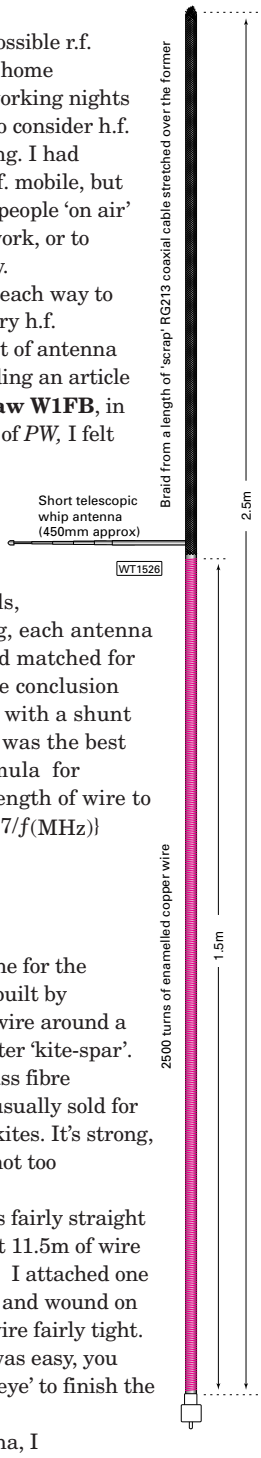
AN AFFORDABLE HELICAL ANTENNA FOR 'TOP BAND'

Flushed with the success of creating coil-loaded antennas for the 7 and 14MHz bands, Phil Selwood G0RKF set about winding one for the 1.8MHz band.

A seemingly impossible r.f. problem at my home location, and working nights prompted me to consider h.f. mobile operating. I had considered v.h.f. mobile, but had found few people 'on air' at the time I leave for work, or to return the following day.

A 45 minute journey, each way to work, convinced me to try h.f. operation. But what sort of antenna should I use? After reading an article by the late **Doug DeMaw W1FB**, in the August 1992§ issue of *PW,* I felt that it obviously had to be a helically wound type for each band of interest.

As I didn't want to be fiddling with controls, especially when driving, each antenna had to be resonated and matched for simplicity. I came to the conclusion that a wound antenna with a shunt capacitor for matching was the best option. I found the formula for working out the total length of wire to use for the coil {$L = 157/f(\text{MHz})$} works quite well.



● Fig. 1: The layout of the easily-made helically wound 1.8MHz antenna from Phil G0RKF. See Fig. 2 for more detail.

Plastic Coated

My first antenna was one for the 14MHz band, and was built by winding plastic coated wire around a 2.5m long 10mm diameter 'kite-spar'. This was a length of glass fibre reinforced (g.r.p.) tube usually sold for the purpose of making kites. It's strong, easily available and is not too expensive.

The first antenna was fairly straight forward and needed just 11.5m of wire wound around the spar. I attached one end to the garden fence and wound on the turns keeping the wire fairly tight. Although this method was easy, you need forearms like 'Popeye' to finish the job quickly.

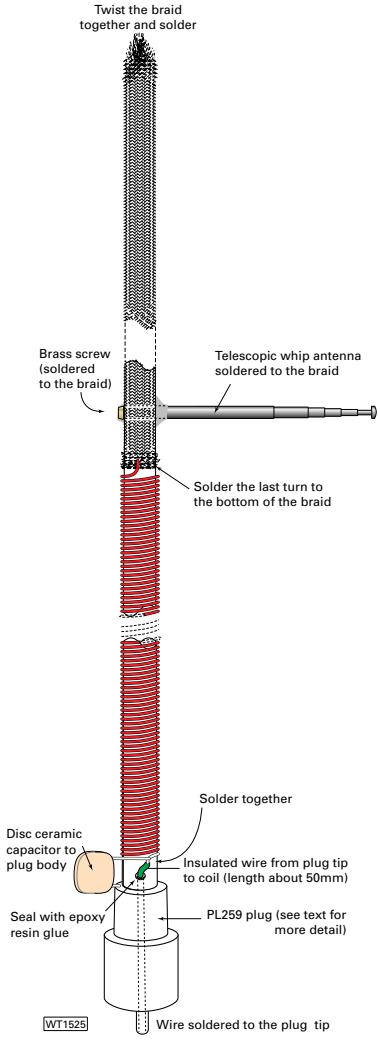
For my second antenna, I moved on to the 7MHz band and again wound the antenna manually. By the time I'd finished I felt as if I'd run Arnold Schwarzeneger's shoulders in for him!

Aching Muscles

With aching muscles and a desire to make a 'Top Band' antenna, I decided there had to be a better way. This was to be an ambitious design, calling for 2500 turns of 0.56mm (24s.w.g.) to be wound onto a similar 10mm diameter former. A new 'power-assisted' method had to be found, as I didn't want to find myself totally 'muscle-bound' by the experience.

The answer was a 'coil-winder' using my electric drill held in a small vice and controlled in speed by an electronic speed controller built as a college project many years ago. This combination was fed from a supply controlled by a heavy duty 'press-on/press-off' switch that I could press with a foot. Things were almost ready!

Rather than count the turns as they were wound on, I worked out that the 2500 turns would cover 1.5m (allowing for them not to be exactly 0.56mm between centres).



● Fig. 2: More details of Phil's antenna. After completion, but before final tuning, the joints and parts of the antenna should be weatherproofed (see text).

So, the only problem left to solve was how to keep 'whipping' of the former to a minimum. That was answered with several large staples and a length of scrap wood to act as the 'lathe-bed'.

A small hole was drilled in the former about 30mm from one end and the enamelled wire was put in to clamp it in place. I marked the 1.5m point on the former with a pencil mark and placed the g.r.p. tube in the jaws of the drill and lightly knocked several large staples into the lathe-bed to hold the tube in place.

Heavy Leather

For safety I had bought myself a pair of very heavy leather gardening gloves so that the moving wire would not cut into my hands. Fully 'gloved-up', I

Continued on page 30...

§ 'A Portable Vertical Antenna For HF Operation' by Doug DeMaw W1FB, p34 *PW*, August 1992.

December's *SWM* Is The 'Satellite TV' Special Issue

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Roy Carman offers us his wisdom and experience in an article on the general topic of 'Digital Satellite TV Reception' within the DXing environment.

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Roger Bunney guides us through the important issue surrounding the choice of the all important 'sharp end' of the Sat DX system.

This Is One 'L' Of A Dish
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...continued from page 28

gingerly started the drill. and as the the g.r.p. tube turned the wire was fed into the spiral nicely and evenly. The idea was working.

As I reached each large staple, I stopped the drill and keeping turns in place with a few turns of tape, I removed the staple and refitted it over the wound section. On reaching the marked 1.5m point I left a longer 'tail of wire and taped the turns securely in place. (It's important to get the winding uniform and this method works very well).

The upper part of the antenna is made from a length of braiding removed from a piece of 'scrap' RG213 coaxial cable. At the top of the top of the coil, carefully scrape the enamel covering off the wire and solder it firmly in place to the braid. Secure this point with more tape and wearing the gloves carefully pull the braid back up towards the top of the former, where it's twisted together and soldered.

Mounting Method

Now I had to make my choice of mounting method. I chose to fit a PL259/SO2239 as I did not have a tow-bar on the car at the time so, the SO239 socket was fitted to the lip of the tailgate*. In retrospect an 'N'-type plug and socket arrangement would have been better as they can (when fitted properly) can be waterproof. But I've managed with mine by periodically applying a petroleum jelly to the threads. (* *hatch-back door.* Ed.).

The tailgate lip bracket is a useful mounting method on many modern hatch-back cars, when any bumper or tow-bar mounted antenna would be fouled every time the hatch-back was raised. Another advantage is that the antenna is lowered for adjustment every time it's opened too!

Tuning Method

In order to tune the antenna, first, I determined the resonance point of the antenna without the telescopic whip fitted by using a gate dip oscillator (g.d.o.) coupled to the antenna with a small two-turn loop. The frequency turned out to be just 2MHz so, my calculations hadn't been too far out after all.

The second stage of the tuning procedure only requires the telescopic whip to be fitted and the 'new' resonance point to be found. Which in my case turned out to be 1.86MHz, which is almost perfect!

Now close the whip to about half-clength and fit the coaxial cable to the socket base. Now comes the rather more tricky part - selecting capacitors at the base of the antenna to give correct matching. The type of capacitors used must be high voltage (disc ceramic) types. I've found that capacitors in the range of 300-500pF work well.

The antenna has yielded many contacts to GM, GW, GD, EI, F5, ON and EA areas, as well as local nets. So, there you have it! A cheap antenna that gives good service - and it's cheap to make. The 14MHz version cost me about £4.50, the 'Top-Band' antenna cost the princely sum of around £12. *PW*

Errors & Updates

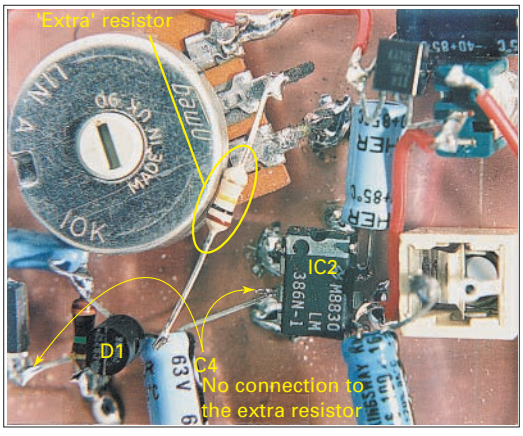
'Carrying On The Practical Way', by George Dobbs G3RJV pages 38/39 *PW* November 2000

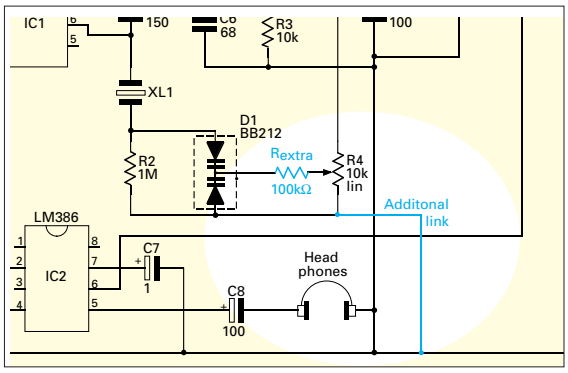
The component shown in the circuit diagram of Fig. 1 as XL1, as a 'Piezo Electric Crystal' is also the item designated as 'Y1' a 3.585MHz 'Ceramic Resonator'. The circuit symbol used is the correct one, as both are piezo electric devices.

Still on the circuit diagram, one component, a 100kΩ resistor was missed off, due to an oversight. The resistor helps to isolate the dual varicap diode (D1) controlling the frequency of the resonator from possible damping by R4 at the lower end of its travel.

Turn now to the photograph of George's prototype below. Although, in the photograph, it may look as if the extra 100kΩ resistor couples to the blue electrolytic capacitor (C4), it bypasses it. Also in this new photograph, you should be able to see that one 'leg' of the electrolytic capacitor couples to pin 3 of IC2, the other leg of the capacitor passes, under R2 (1MΩ) and the legs of the varicap, to connect to the output pin (pin 4) of IC1.

Also on the original circuit diagram of Fig. 1 (p38), there is a missing connection from the connection line, between the 'bottom end' of R4 and the lower anode of the varicap. This circuit connection should have been shown with a further connection to the 0V line (via the copper 'skin' of the p.c.b. material).





'The Simple Capacitance Meter' by James Brett G0TFP pages 16-18 *PW* November 2000.

The photographs of James Brett's prototype Capacitance Meter show that is it was built in a white plastic box as many of you may noticed. And although we did not point this fact out, it was suggested that "In keeping with current EMC practice, a metal box is recommended to prevent any possible radiation of interference".

The photographs were of James' prototype, and no doubt there will be a small amount of spurious radiation within a very short range of the project when it is in operation. We cannot say how much interference would be produced by any particular reader's version of the project, but it pays to be cautious!

We apologise to readers and authors for these errors.

Rob Mannion G3XFD.

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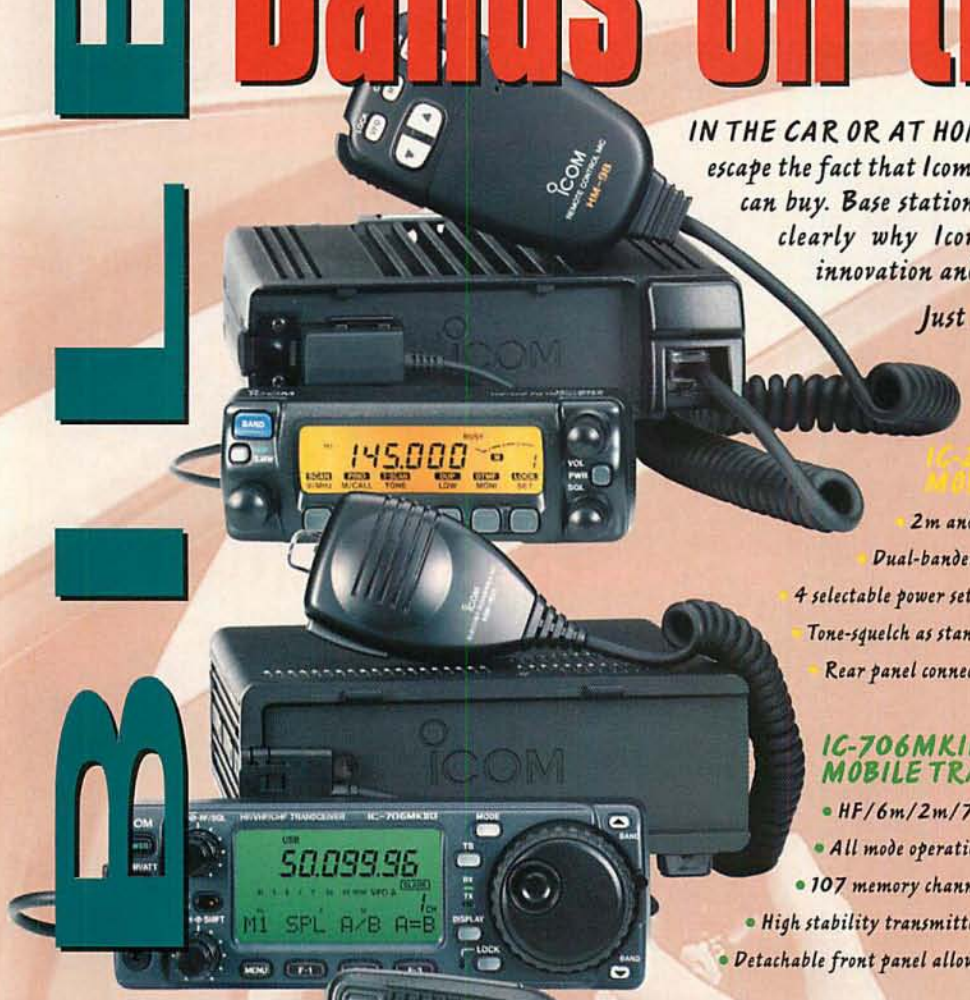

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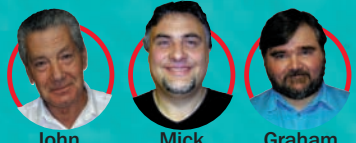

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You're In Control With Pronto!

Something Different - Remote Control -The Intelligent Way!

John Goodall G0SKR has been enjoying himself with an interesting concept: infra red and wireless remote control. Increasingly available ... could it be helpful around the house for disabled and 'able' Radio Amateurs? Read on and see for yourself...

● Time to automate - the intelligent way! Just come downstairs and heard someone on 144MHz and left the radio on upstairs? Don't worry -John Goodall G0SKR may have the answer for you!

How many Infra-Red (IR) remote controls do you have kicking around the home? Four – five – six – or even more? Television (TV), video cassette recorder (VCR), satellite box (Sat), hi-fi, FAX machine, and many more devices today are operated by IR remote controls.

That small table alongside your favourite armchair cluttered with 16 such controls for various items of electronic wizardry. The television channel needs changing – you grab a remote control and activate a channel number of your choice – only to find your hi-fi suddenly jumps into life at full volume!

Alternatively, it could be the microwave that starts overcooking your favourite TV dinner! By the time you have finished trying one after the other, you finally discover the one you need is under the cushion you are sat on.

You then change channels only to find – the programme you wanted to watch has finished! Does that sound a familiar scenario at your QTH? It certainly does at mine!

Many IR remote controls are available on the market that allow up to four or five items of equipment to be controlled. The biggest drawback of such items being that they invariably have insufficient operating buttons to compare with the original.

The lack of available 'channels' means quite simply, that certain functions of the original, cannot be controlled. So, wouldn't it be great to have **one control for all your equipment**? The 'Pronto Intelligent Remote Control could turn out to be the answer you've been waiting for!

Intelligent Remote Control

An 'Intelligent' Remote Control - what on earth has that got to do with Amateur Radio? Not a lot perhaps – but I just love gadgets and so do many other Radio Amateurs.

Basically, the 'Pronto' Intelligent Remote Control by Philips is a highly sophisticated IR device **that can be 'taught' to mimic any other device**. However, unlike any conventional replacement control for a piece of equipment operated by remote IR control, the 'Pronto' will duplicate every single function button on the original. That and much, much more!

Taking the unit from its box, the 'Pronto' gave me the impression of some hand-held game. It's about 90 wide x 138 long x 35mm deepd

On the face of the unit is a 78 x 58mm liquid crystal display (l.c.d.). But this is no ordinary l.c.d. screen – **it's touch sensitive**.

To the right of the screen are a row of five vertically placed marked buttons. On the left side of the unit can be found a small push button and a small rotary control. The button operates the backlight and the rotary control adjusts the contrast of the screen.

Below the screen are two large black push pads. To the front edge of the unit, is the covered infra-red sender cover. Towards the rear edge of the unit is a very small infra red detector, the use of which I shall describe later.

The 'Pronto' is supplied initially with four alkaline AA cell batteries. Placing the batteries in the rear compartment, the touch sensitive l.c.d. screen glows a soft shade of blue, identifies itself as the 'Pronto' then changes to the opening menu.

The screen gives you an option of ten items you may wish to control. (The number of remote controls the 'Pronto' will replace is only limited by the available memory). If the screen is not tapped, or side button operated, the unit switches itself off and the screen goes blank. However, before you can control anything with the 'Pronto', it must first be 'taught' how to do so (by being 'educated') by the original remote control. In practice **this is as easy as operating your h.f. or v.h.f. radio.**

System Set-Up

The system must first be set-up by placing the 'Pronto' into its 'Learn' mode. This is simply selected from a sub menu accessed from the screen. To programme the unit to control, lets say, a video cassette recorder (VCR).

To start the process, first take the original, remote control and place it facing the rear of the

'Pronto' so that the IR detector can 'see' the IR transmissions from the original control.

Next job is to tap the l.c.d. screen to turn on the 'Pronto', before tapping the **VCR** panel. The unit now opens up the first page of VCR.

Next, Tap the sub-menu icon at the lower edge of the screen. Then, from the sub-menu, tap **Learn**. Next, tap the **Play** panel on the 'Pronto' screen and immediately press and hold the **Play** button on the original control.

The 'Pronto' reads the IR signal from the original and responds with a tone and the message **OK** on its screen. Finally, release the **Play** button on the original and the 'Pronto' is now programmed for operating the **Play** mode of the VCR. Simply by repeating the process I've just described with all the buttons on the original control, the 'Pronto' will operated **all the remote control facilities** on the VCR.

Several pages for each unit are available within the 'Pronto'. (Many buttons on the unit are not labelled, but the system allows you to label all these buttons to suite your own demands).

Repeating the procedure for all other units, TV, hi-fi or whatever, soon has the 'Pronto' ready to control as many remote controlled units as you demand. So, now one control replaces all the others and does away with all the clutter on the chair side table.

Useful For Amateurs

As if the 'Pronto' doesn't already control enough, with the help of an additional unit, the X-10 becomes an exceptional useful unit - particularly for a Radio Amateur and especially for someone with 'gadgets' to control and perhaps suffering from limited mobility (Anyone who has seen me hurtling around on my crutches and is in the 'same boat' will know how helpful remote control can be!).

The X-10 is a simple mains operated unit for the IR control from the 'Pronto' of up to eight mains controlled modules. **These modules can be placed anywhere within the house, providing they are on the same ring main circuit**.

On the main menu of the 'Pronto', one panel has simply X-10. Tapping this panel moves the unit into the control panel for the X-10. The X-10 or to give it its correct title IR7243 Transmitter.

The IR7243 is a mains operated control unit. It simply converts the IR signal from the 'Pronto' into radio frequency, which it then superimposes on the house mains circuit. It controls up to eight individual mains operated switching modules.

Modules the X-10 communicates with via r.f. are simply of two types. The first is simply plugged into a mains outlet socket and an appliance or light to be controlled, in turn plugged into that module.

The second is a simple replacement for a standard light switch. Of the plug in modules, two types are available, one being for a standard or table type lamp and having a dimmer built into it. (The second being for a heavier current appliance, stereo, radio or TV, and switches simply on or off).

Similarly for the replacement light switches, two types are available. The first being a simple replacement, having only live switching terminals, intended for low load lighting, and having a built-in dimmer. The second, for heavier loads, of up to 10A, but needs a neutral line as well as the live switching pair.

Docking Station

I was also loaned for review the Docking Station. This is supplied together with a replacement Nickel Metal Hydride (NiMh) battery pack, and mains power supply. The NiMh battery pack simply replaces the standard AA size Alkaline batteries, and the Docking Station or 'drop on' charger, allowes for permanent float charging of the 'Pronto'.

Charging of the unit is automatic and charging is switched off as soon as the battery pack is fully charged. The unit can be removed from the charger and replaced at any point of discharge, due to the NiMh pack not having the memory effect common with NiCad batteries.

After locating the various modules in the best places to suit your own needs, the 'Pronto' is already programmed to control these via the X-10. Whatever needs to be switched on, dimmed or switched off, everything can be operated

If you're a disabled Radio Amateur - or like using 'gadgets' or have an application for remote control - John G0SKR may have the answer for you and it didn't react to transmisisons from his Amateur Radio equment!

from the comfort of your armchair. This, in my case, is particularly important.

Finally, if the simplicity of the 'Pronto' and its versatility is not enough, it can be programmed totally via a PC. The minimum requirements are *Windows 95/98* or *NT 4.0*; 16MB of RAM; 16MB of free hard disk space and a free serial port.

Minor Hiccups

The operation of the X-10 together with the 'Pronto', did at my location suffer some minor hiccups. However, with the instructions for the individual modules for operating with the X-10, it clearly states that some irregular operation can be found in certain environments.

I found that if my lap top PC or my main computer was left switched on, one or more of the modules suffered from interference and would not operate normally. Importantly though the modules were not affected however, in any way by the operation of my Amateur Radio equipment. **They were not affected in any way, by transmissions on h.f., v.h.f. or u.h.f.** Such re-assurance must be welcome news for anyone considering using this type of remote control.

In conjunction with the X-10 the 'Pronto' is indeed an essential accessory for those 'couch potatoes', or for those who are, like myself, disabled. It may at first seem a little on the expensive side, but its uses I think outweighs its cost. *PW*

Product

Pronto Intelligent Remote Control

Pros & Cons

Pros: *The modules were not affected in any way by the operation of my Amateur Radio equipment. (They were not affected in any way, by transmissions on h.f., v.h.f. or u.h.f.) Once in place the system, can be operated from the comfort of your armchair*

Cons: *I found that if my lap top PC or my main computer was left switched on, one or more of the modules suffered from interference and would not operate normally.*

Summary

My thanks to ***Peter Ward G4GYI*** *of* ***PTech, PO Box 8653, Alcester B49 5DG. Tel: (01789) 400004. E-mail: sales@ptech.org Website: www.ptech.org.uk*** *for the loan of the review equipment and I hope he doesn't check the empty boxes. I'll tell him I can't unscrew the units from my home – but somehow I don't think he would believe me! Good luck Peter with the Pronto ... it certainly is a gadget I could use in a big way, especially as it's not affected by my Amateur Radio transmissions!*

Prices

Philips 'Pronto' IRC	***£194.00***
Docking Station for 'Pronto'	***£ 44.00***
X-10 IR7243 Transmitter	***£ 40.00***
X-10 Plug in Appliance Module	***£ 23.50***
X-10 Plug in Lamp Module	***£ 23.50***
X-10 Wall Light Switch Replacement	***£ 30.00***
X-10 Appliance Wall Light Switch 10A	***£ 31.00***

As a special offer to *PW* Readers Peter Ward is offering the Pronto for £175 and the Docking Station for £40 for a limited time. Please mention this review when ordering.

A Fascinating History

THE PRELUDE TO RADAR

Brian Kendal G3GDU says that modern Radar has an eventful history. Looking back he describes the fascinating 'technology' that provided the prelude to the advanced systems used today.

Many readers will remember the summer and autumn of 1940, when the might of the Luftwaffe fell upon Britain, first in the day and later in the night. This is known to all of us as 'The Battle of Britain'. What is not generally realised is that the event was really the **second** Battle of Britain. **The first had taken place 24 years earlier**.

The first enemy bomb to fall on British soil was on the 24 December 1914 when a lone German aircraft dropped a 10kg bomb on Dover. No damage was done, but there was no warning and the aircraft returned to its base unharmed.

Such raids continued for several years and, in general, little damage was done. However, it did alert the British public, and more important, the authorities to the possibilities of the greater menace posed by the Zeppelin airships.

● Fig. 1: Spherical sound 'mirror' listening detectors in Kent (See text).

First Zeppelin Raid

The first Zeppelin airship raid took place on the 19 January 1915 and they continued with increasing ferocity at irregular intervals for the next couple of years. By Second World War standards, casualties and damage were not severe, but they caused considerable disquiet among the population.

It was quickly realised that there was no way of knowing of the presence of Zeppelins until they were crossing the coast, and even then, due to their great height, if the weather was overcast, our first knowledge of their arrival was when the bombs began to fall.

The only means of detection were the eye and the ear, both of which were useless in the slightest trace of bad weather. Something had to be done!

There was one redeeming factor. The Admiralty had constructed a chain of extremely accurate Radio Direction Finding (RDF) stations along the East coast of the United Kingdom.

The RDF stations avidly listened to the meteorological and position reports transmitted by the German airships, and then passed this information to the home defence fighter squadrons. This situation continued more or less to the end of that war.

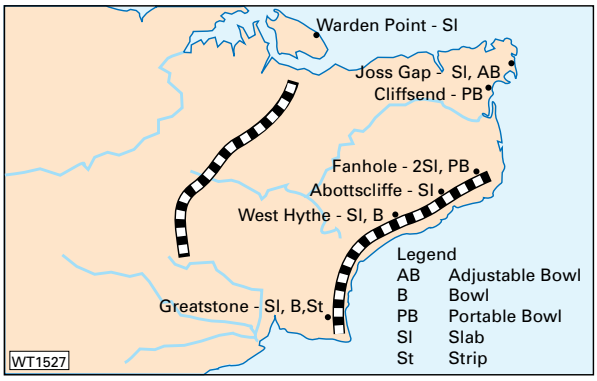
Interesting Developments

By 1917 bomber aircraft were replacing the Zeppelins, but interesting developments into possible detection were taking place. The new developments included two large concrete spherical listening 'dishes', **Fig. 1**, which were constructed up at Joss Gap on Thanet and at Fan Hole near Dover.

The Kent locations were selected as they lay on the bomber's course to London. So successful were they that on the night of 19/20th May 1918, the raiders were located and seven out of 22 enemy aircraft were destroyed.

After the war, in November 1918, another experimental sound mirror was set up at Joss Gap. This was rotatable and also capable of being varied in elevation. This proved to be able to pick up a normal conversation at about 200 yards and, obviously, aircraft at considerably greater distances.

With the help of some rudimentary sound amplification equipment, aircraft were being heard up to a distance of ten miles or more. On another occasion, ship's fog horns were also picked up at

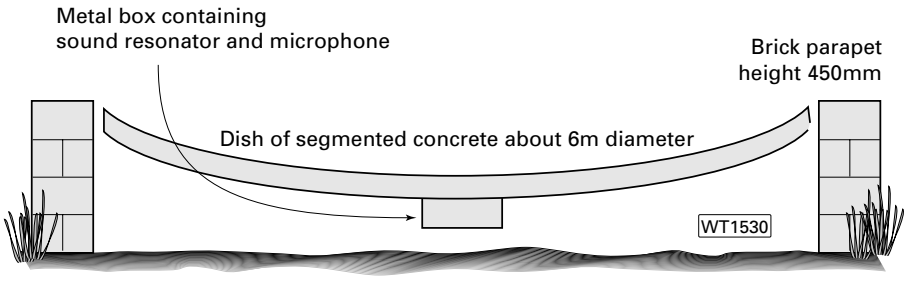


● Fig. 2: Successful experiments resulted in a suggestion that a chain of 'sound detector' listening stations should be constructed at 1.5 mile intervals along the coast of Kent and inland (see text).

well over a range of ten miles. Moving the dish on its mountings allowed the bearing of the sound to be determined within a few degrees.

The success of the experiments resulted a suggestion that a chain of listening stations should be constructed at 1.5 mile intervals along the coast of Kent, **Fig. 2**. Furthermore, in 1923, another proposal was made for a series of vertically pointing mirrors in lines across Kent to monitor the progress of aircraft across the county, **Fig. 3**. The output from a microphone at each mirror was taken via telephone wires to energise galvanometers at a central control point.

Eventually, 32 sound 'mirrors' were installed from 1924 onwards and these were used in defence exercises until the early 1930s. However, these mirrors could only to determine the location of the enemy aircraft when they were over this country.



● Fig. 3: A vertically pointing disc sound detector, as installed between 1923 and 1926 (see text).

Early Warning

Early warning was still needed, and the next series of 'mirrors' were mounted along the coast facing in a South East direction. The observers at the new installations were again linked by telephone to a central control point - a first stage towards the fighter control system which was to be so successful in 1940.

Three types of sound mirrors were proposed: a 30ft diameter bowl; a slab in which the main structure was a block of concrete with the 30ft. bowl indented in one side, and a strip mirror (**Fig. 4**) which was 200ft long!

In the first two cases the observer stood in front of the mirror, listening through a pair of stethoscope type headphones connected to a sound collector which could be moved about the focus of the bowl thus enabling the directivity to be varied by a few degrees.

The strip mirror had a number of observers along its length and due to the shape of the mirror, the bearing of the incoming sound could be determined over a far greater azimuth range. Furthermore, due to its far greater size, it had greater sensitivity and theoretically longer range. These were to be used for 'early warning' whilst the more accurate plotting would then be taken over by the smaller bowls,

The intention had been that the large strip mirrors, would be detect aircraft at 25 miles from the coast and their course, direction and speed could be determined by the smaller mirrors at 10 miles. However, when put to the test, this was not realised, for even under good conditions only ten to 15 miles were obtained and this was frequently reduced to seven.

By the time that the system was nearing completion in 1935, the most modern bomber speeds were approaching 300 m.p.h. This meant that at maximum range, the sound took half a minute to reach the mirror, by which time the aircraft had approached another two and a half miles!

Daventry Experiment

In early 1935, however, came the famous Daventry experiment* and within a few months, the research team at Orfordness had proved beyond all doubt the advantage of the system we now know as Radar. At that point all work on the sound mirrors ceased and they were left as a monument to a great experiment which failed.

* ***Note:*** *Brian's article entitled 'The Daventry Experiment' was published in the April 1998 issue of PW.* **Editor**.

There was, however, just one more moment of glory for the strip mirror at Dungeness. In 1943, fearing that the Radar system may be effectively jammed, as a possible back-up, a team was sent to assess the possibility of sound detection using the most advanced and sensitive microphones in front of the strip.

The experiment showed that with the better microphones it was possible to hear aircraft up to 60 miles. Despite the success nothing more came of it and the mirror was again abandoned.

Some of the sound mirrors still survive. And should you wish to see these concrete white elephants, take a drive down to Greatstone near Dungeness where the remains of a slab, a bowl and the great 200ft strip mirrors await your visit.

Radio Detection

For a practical Radar system, both direction and range need to be determined. This necessitates high power pulse transmission, direction finding and timing techniques for very short time intervals. Over a period of years, these were each developed for other purposes, but Radar as we now know it only arrived when all were combined into a single system.

For the first suggestion of modern Radar techniques it's necessary to go right back to 1904. This is when an engineer from Dusseldorf, Christian Hulsmeyer, patented the idea that if a beam of transmitted radio waves, **Fig. 5**, were transmitted towards a metallic object (such as a ship), with some being reflected back to a receiver adjacent to the transmitter, where they would reveal the presence of the reflecting object.

A prototype of Hulsmeyer's equipment - called the 'Telemobiloscope' was constructed, **Fig. 6**, and demonstrated from a Rhine bridge at Cologne, detecting an approaching barge. Later that year, Hulsmeyer's apparatus was installed in the tender *Columbus* which cruised up and down Rotterdam harbour detecting vessels up to 3 miles in range. Unfortunately even these demonstrations were insufficient to encourage any orders and Hulsmeyer eventually turned to other work.

The Hulsmeyer apparatus embodied many very advanced ideas. The operating wavelength was 50cm, with the receiving and transmitting antennas effectively screened from each other. The latter was a parabolic reflector with director elements, 25 years before Professor Yagi published his work on the

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

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

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

Estimated RRP: £1999

or without 23cm option: £1699

TS-2000 'The Millennium Communicator'

Yaesu FT-817 5-Watt Transportable Transceiver

HF ♦ 6m ♦ VHF ♦ UHF

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

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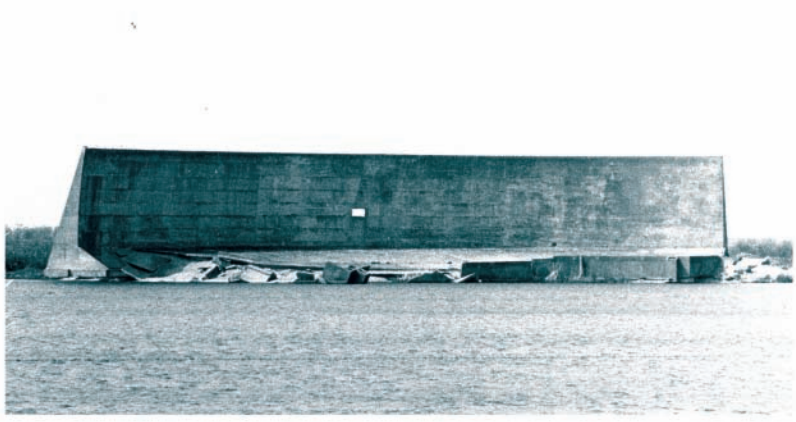


Fig. 4: A concrete giant! The 200ft long sound 'Strip' mirror at Greatstone near Dungeness, as photographed approximately eight years ago (see text).

antenna which bears his name.

The Telemobiloscope was only capable of determining the presence and bearing of the target. However, Hulsmeyer later worked on a ranging system using triangulation techniques.

Marconi's Observations

The next observations in the Radar context were made by Marconi in 1922. Marconi was speaking at a joint meeting of the Institute of Electrical Engineers and the Institute of Radio Engineers in New York where he said that "It should be possible to detect objects using the reflected ray principle".

Many, and particularly Marconi Co. engineers, cite Marconi's speech as proof that Marconi was the first to conceive the Radar principle. This totally ignores both the work of Hulsmeyer and of Heinrich Herz who had demonstrated both refraction and reflection of radio waves whilst Marconi was still a schoolboy.

Meanwhile, at the United States Naval Research Laboratory, A. Hoyt Taylor and Leo Clifford were performing an informal investigation of 5 metre waves. A receiver was installed in a car and a transmitter set up adjacent to their laboratory.

Interference effects were noticed almost at once, for as the car passed steel framed buildings, signal strengths fluctuated wildly. Additionally, networks of wires, such as those surrounding tennis courts caused pronounced shielding effects.

In the course of these investigations, the car containing the receiving equipment was driven to a site across the Potomac river. Once there, interference effects were immediately noticed emanating from clumps of trees.

When a small steamer passed, it was noticed that 50ft before the bow of the steamer intersected the line between transmitter and receiver, the signal strength jumped to nearly double the normal value. As the steamer passed the line the signal strength halved, but when the stern was 50ft past the line, the signal strength again doubled before returning to its normal value.

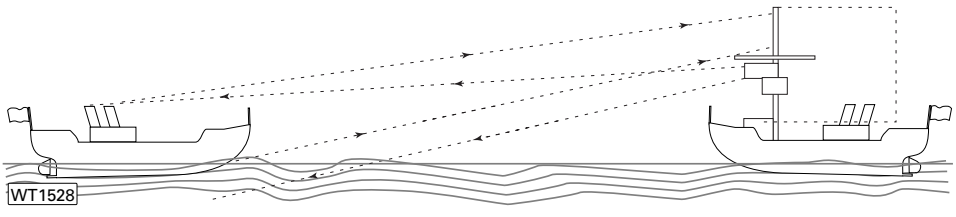


Fig. 5: Copy of the diagram for Hulsmeyer's 1904 patent indicating transmission form the lower aerial on the ship on the right, impinging on the left hand ship. The eventual reflected signal being received at the upper aerial on the ship on the right (see text).

Around 1930, Englund, Crawford and Munford, who were working on u.h.f. radio links at the Bell Telephone Laboratory, noticed that aircraft could be detected by signal strength fluctuations, even when beyond visual distance.

Pat Hyland of the United State's Naval Research Laboratory, then made identical observations to those discovered by Bell Laboratory's. As a result Hyland made a proposal for equipment which could be constructed for the detection of both aircraft and ships. This did not find favour by the Navy Department and was dropped.

All the suggestions up to this time, however, had concerned the detection of aircraft or ships. Detection in itself is valuable, but to be of real value to the military authorities, range also had to be determined.

Distance By Timing

Long before the advent of radio, efforts were being made to measure distance by the timing of reflected pulses of energy. This was first suggested by the French physicist Arago in 1807 for measuring the depths of the oceans by detonating a charge of gunpowder on the bottom of the sea and determining the interval before the sound was heard.

The British Admiralty developed an alternative application of this technique by using a steel hammer striking a steel plate in the bottom of the ship. This generated a highly damped compression wave which, after reflection from the sea bed, was received by hydrophones. A similar principle was used by Fessendon, who used a transmitter which emitted a short pulse of energy of a few thousand cycles per second.

Lewis Richardson proposed that high frequency beams could be used for both depth measurement and obstacle detection at sea. The suggestion became practical after Langevin and Chilowski produced beams at 30 - 40kHz.

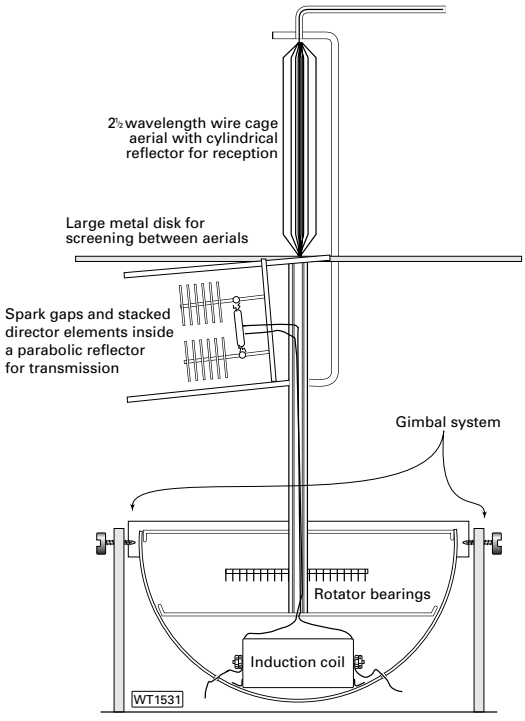
Before the end of the First World War, the United States had developed a system which would detect a submarine at a distance of half a mile. Succeeding developments of this became the Sonar equipment used in the Second World War.

The Mechanism?

After Marconi's success in receiving signals across the Atlantic in 1901, several people put forward theories as to the mechanism which made such communication possible. Working independently on opposite sides of the Atlantic, both Kennelly in America and Heaviside in the United Kingdom postulated that signals were propagated around the earth with the assistance of a conducting layer in the upper atmosphere.

In 1912, Eccles suggested that radio waves were reflected by ions in the layer. In succeeding years evidence of various kinds accumulated in support of the theory of an ionised layer, but it was not until 1924 that its existence was systematically verified.

Early in that year, John Reinartz, a well known American Radio Amateur, began a series of tests on wavelengths of 20 and 60



● Fig. 6: Details of Christian Hulsmeyer's 'Telemobiliscope' dating from 1904 (see text).

metres. He noticed that the signals, in contrast to those on longer wavelengths, became weaker after sunset, but nevertheless were audible at great distances.

The ground wave petered out after a few miles, but after a 'dead belt' the signals were again audible. This phenomenon was confirmed by A. Hoyt Taylor who called it the "skip" or "miss" region.

Appleton & Barnett

The scene now moves to England, where E. V. Appleton and M. A. F. Barnett believed that for wavelengths of 300 - 500 metres, there would be a point about 100 miles from the transmitter where the ground and sky waves would be of comparable strength.

The Appleton and Barnett prediction was confirmed experimentally on the nights of 11 December 1924 and 17 February 1925. This was achieved by using the British Broadcasting Company's* transmitter at Bournemouth when they obtained interference effects (the first direct evidence of the reflecting layer) which they estimated to be at a height of about 80km.

***Note:** The original British Broadcasting **Company** eventually became the British Broadcasting **Corporation** in 1927.

Unaware of the Appleton & Barnett work, and at about the same time, two American investigators, Tuve and Breit, developed a simpler technique using transmitted pulses. These were of 1/1000 second duration on 71.3 metres wavelength from the US Naval Research Laboratory transmitter and measuring the time for the echo to return to the receiver.

The received pulses were recorded by an oil immersed mechanical oscillograph and observed by means of a rotating mirror. Using this, the height of the ionosphere was estimated between 50 and 130 miles.

The methods of Tuve and Breit were widely adopted in succeeding years by investigators all over the world. They found that the ionosphere was not a single layer as at first thought, but of two or three layers, depending on whether it was day or night time.

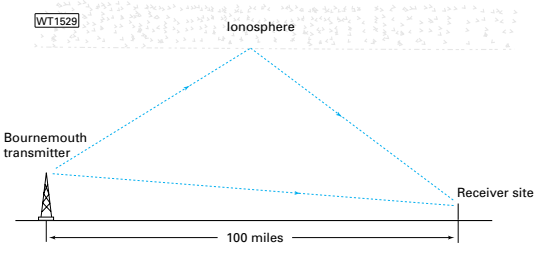
Cathode Ray Tube

Technique was markedly improved by the introduction of the cathode ray tube. This was used in 1930 by Georg Goubau who used a circular trace, and a year later Appleton adopted a system using a linear trace for his ionospheric experiments.

At this point, all the techniques necessary for a successful Radar system had been developed. Several workers had noticed the reflection of radio signals from aircraft and ships and the basic principles of pulse transmission and timing of reflected signals had been achieved in ionospheric research. It only remained therefore for some person to put the techniques together to construct a working system.

In January 1931, Butement and Pollard of the Signals Experimental Establishment at Woolwich developed a system using continuous wave transmission on 50 centimetres and even succeeded in receiving returns from short distances. Details of the scheme were passed on to the War Office and the Admiralty, but neither were sufficiently interested to either support the work or even inform the Air Ministry.

"At this point, all the techniques necessary for a successful Radar system had been developed. It only remained therefore for some person to put the techniques together to construct a working system".



● Fig. 7: Diagram showing the technique behind the Appleton-Barnett ionospheric experiment involving the British Broadcasting Company's Bournemouth transmitter in December 1924 and February 1925 (see text).

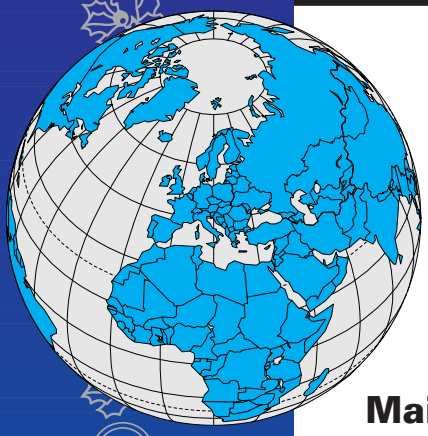
Death Ray Story

By the early 1930s, stories were circulating in the popular press regarding the existence of a 'Death Ray'. Although this concept seemed far fetched, it had to be investigated.

The then Director of Scientific Research at the Air Ministry Dr. H. E. Wimperis felt that, for safety's sake, it was necessary to assess the feasibility of a possible 'Death Ray'. He therefore approached Robert Watson-Watt who at that time was Director of the Radio Research Station at Slough.

A few calculations by a member of Watson-Watt's staff, Arnold Wilkins, provided enough proof that such a ray was impractical using the technology available at that time. **However, Wilkins suggested that radio reflection might be used as a basis for aircraft detection**.

In consequence, the Air Ministry requested a trial. This was held on the 25 February 1935 and became known as 'The Daventry Experiment'. The success of this triggered the research which culminated in the Radar systems, which combined with the reporting system originally developed for the sound mirrors proved vital during the Battle of Britain in 1940. PW



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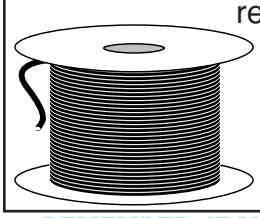

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TIMEWAVE	DSP-59+ DSP FILTER	£150.00
TOKYO	HT 180 80m HF SSB TRANSCEIVER	£200.00
TOKYO	HY-POWER HL 166V 6m 180w	£195.00
TRIO	TR-9130 25 Multi-mode 2m	£225.00
WATSON	DPS 2012 PSU	£70.00
YAESU	SP-6 SPEAKER	£85.00
YAESU	FL-110 AMP 100w HF	£120.00
YAESU	FL-2025 25AMP FOR FT-290R MK11	£100.00
YAESU	FP-107 PSU	£120.00
YAESU	FP-757GX Power Supply (Heavy Duty)	£140.00
YAESU	FP-757GX SWITCH MODE	£95.00
YAESU	FRG-100	£295.00
YAESU	FRG-7700 RECEIVER	£250.00
YAESU	FRG-9600	£199.00
YAESU	FT-100 HF/6M/2M/70CM MOBILE DSP	£675.00
YAESU	FT-1000 D 200watt TRANSCEIVER	£1,499.00
YAESU	FT-1000MP AC LATEST SERIAL No. !	£1,399.00
YAESU	FT-101ZD HF TRANSCEIVER	£275.00
YAESU	FT-101ZD MK111 FM HF TRANSCEIVER	£325.00
YAESU	FT-225RD 2M BASE MULTIMODE	£325.00
YAESU	FT-2500M 50w 2m MOBILE	£200.00
YAESU	FT-290MK1 2M Multi-mode	£195.00
YAESU	FT-290R MK11	£275.00
YAESU	FT-3000M 70w 2m MOBILE TRANS	£225.00
YAESU	FT-480R 2M MULTIMODE	£220.00
YAESU	FT-530 2/70cm HANDY	£175.00
YAESU	FT-690MK11 6M MULTI-MODE TRANSCEIVER	£295.00
YAESU	FT-726R 2/70/6M TRANSCEIVER	£599.00
YAESU	FT-736R AC 2M/6M/70CM BASE	£799.00
YAESU	FT-736R AC 2M/70CM BASE	£599.00
YAESU	FT-757GX	£395.00
YAESU	FT-757GX11	£425.00
YAESU	FT-840 HF MOBILE-BASE TRANSCEIVER	£450.00
YAESU	FT-847 HF/6M/2M/70cm/4m	£999.00
YAESU	FT-8500 DUAL BAND MOBILE TRANS 50w	£295.00
YAESU	FT-900 HF MOBILE/BASE FACE OFF	£525.00
YAESU	FT-900AT BOXED	£695.00
YAESU	FT-901 Delux model Transceiver	£300.00
YAESU	FT-902 Delux model Transceiver	£300.00
YAESU	FT-920 AF HF- 50 MHz BASE TRANSCEIVER	£899.00
YAESU	FT-990 TRANSCEIVER AC HF BASE	£795.00
YAESU	FT-990 TRANSCEIVER DC HF BASE	£695.00
YAESU	FT-ONE BASE HF	£425.00
YAESU	FV-707DM DIGITAL VFO + MEMORIES	£99.00
YAESU	MD-1 DESK MICROPHONE (MINT!)	£80.00
YAESU	MD-100 DESK MICROPHONE	£70.00
YAESU	QUADRA AMPLIFIER HF/6M 1KW	£2,999.00
YAESU	SP-980 EXT SPEAKER	£75.00
YAESU	VX-1R MICRO 2/70 WIDE RECEIVER	£109.00
YUPITERU	MVT-125MK11 AIRBAND SCANNER	£125.00
YUPITERU	MVT-8000 BASE	£240.00

Cost:	£199.95
Company:	Waters & Stanton PLC
Contact:	Sales
Tel:	(01702) 206835
Website:	www.wsplc.com

The SGC-237 PCB Automatic Antenna Tuner Unit

Rob Mannion G3XFD suggests you may like to consider the 'add on' a.a.t.u. printed circuit board unit from SGC

Rob Mannion G3XFD asks "Considering adding an automatic antenna tuning to your favourite older rig"? If you are, Rob suggests you may like to consider the 'add on' a.a.t.u. printed circuit board unit from SGC which he's been evaluating.

Nowadays, many medium-to-higher priced Amateur Radio transceivers come already fitted with automatic antenna tuning units (a.a.t.u.s) and from personal experience I can tell you that they work very well. Indeed, I feel that - for safety's sake - the manufacturers often tend to play down the wide range of impedances the a.a.t.u. can match. But as I've been told on many an occasion ... better safe than sorry!

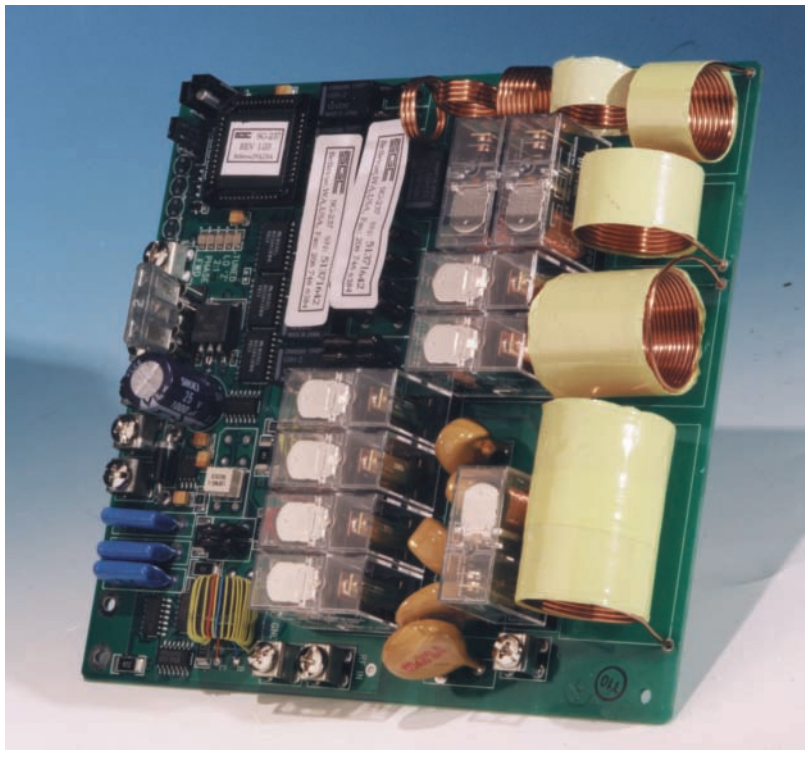
And when it comes to older transceivers it's become increasingly evident that many of you still cherish older non a.a.t.u fitted equipment. So, with that in mind I thought it would be an excellent time to look at a possible a.a.t.u. suitable for older rigs, which at the same time could be classed as an investment for newer equipment later on.

I mention 'investment' **because it's inevitable** that 'add-ons' can appear to be quite expensive - especially when you consider the 'trade in' price (compared to the value given to the equipment by the proud owner). My own recently acquired Digital Signal Processing (DSP) unit - the W9GR DSP III is just such an example.

Reviewed by yours truly in 1999, a new DSP III was not available after I wrote a good review because too many readers had bought them! However, 'Bargain Basement' came to my rescue and **Arthur Tait GM3LBE** sold me his unit. However, although working well, the DSP III is probably worth half the value of some of my older transceivers.

Rob Mannion G3XFD has been the Editor of *PW* for over 11 years. He's a keen 'portable' operator on both the h.f. and v.h.f. bands

Despite the apparent expense, once you have got a non type specific 'add-on' - with careful planning it can be used with whatever transceiver you have in your shack. So, I ask you to take my advice seriously -forget the 'commercial' value of your older rig if you still enjoy using it and want to add even more to your enjoyment by purchasing or building (via kits) a modern 'add on' unit - do so. I have ...and I'm not regretting my decision.



The SG-237 automatic antenna tuning unit is small enough to be fitted inside many transceivers. It could prove to be useful if you're considering installing an 'add on' a.a.t.u.

What's On Offer?

So, if you are considering some form of 'add-on' a.a.t.u. what does the SGC-237 PCB Coupler have to offer us? Well in answer the '237 s a complete a.a.t.u., ready built on a printed circuit board (p.c.b.) and ready to go - minus the case.

Assembled on a p.c.b. measuring only 5 x 5.3in, the unit provides a completely automatic tuning process for a variety of antennas. These include the following: Whips, Backstay (marine, sail) centre fed dipole, dipole with line feed, Loop (small 2 x 2 turns), loop (large) 10ft and upwards, single turn, long wire and 'ladder' (open feeder'.

Product

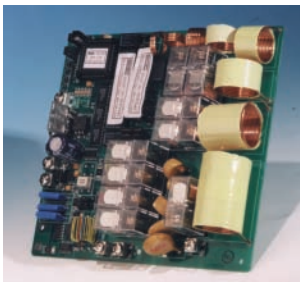
The SGC-237 PCB Automatic Antenna Tuner Unit

Pros & Cons

Pros: *The SG-237 is very convenient to mount on a board and I found the unit to be extremely effective and very quick when in use.*

Cons: *I must again be honest and say that by no stretch of the imagination could the SG-237 be described as 'silent' in operation. It certainly isn't - the click-clack of the relays see to that!*

My thanks for the loan of the SG-237 unit go to Waters & Stanton, of 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843.



Summary

So, would I consider buying a SG-237 to use with my portable operating station? The answer is 'Yes' - and it would be very convenient to mount on the board I've got my exisiting transceiver set-up fixed onto, with no bother at all. Finally, for wheelchair bound (and those like me who aren't able to get in and out of the car/caravan very easily) the SG-237 would be extremely useful. I think it's really is worth considering the idea.

RRP: £199.95

The frequency coverage of the SG-237 ranges from 1.8 to 60MHz. The quoted input impedance range is from 45 to 55Ω.

In use the a.a.t.u. requires a minimum r.f. input of 3W (p.e.p.) and can handle up to 100W p.e.p. However, on c.w. there's a power input limit of 40W (although the SGC manual does not state whether this is 40W d.c. input or 40W p.e.p.).

Usefully, the SG-237 can be operated directly from the now standard 13.8V d.c. supplies found on Amateur Radio equipment. Average current requirements are 300mA and the unit will operate on voltages between 10.5 and 18V d.c.

In use the SG-237 has an unlimited number of 'memory' channels although in practice the manual states that there are: 168 'revolving' memories' available. In practice, from my experience of using these units this means that the a.a.t.u. will 'remember' the tuning combinations required for up to 168 'spot frequencies' before it has to work out the requirements again, with the minimum time being taken to do so on number '169'.

The SGC manual states that the 'random' (frequency) set time is typically "less than two seconds", with "re-current set time" (in other words - back to a frequency which has been used beforehand) as less than 10 milliseconds.

The SG-237 p.c.b. unit only weighs around 570gm (approximately 1.25lbs) and can be operated in any position. Operating temperatures are quoted as being within the range of -35° to +75°C.

Practical Experience

The only really valid method to evaluate this sort of 'add-on' unit is to try it out 'in the field' gaining practical experience. Well, although I did venture outside ...I didn't literally end up in the field - I just parked next to one in my car!

To be honest, I did use the SG-237 at home, operating it in conjunction with a selection of transceivers, and the very low mounted single wire antenna I have to use at my temporary home. This, in effect, can just be called a 'long wire' for the 7MHz band. Despite this I've had some good contacts using it, even though it's only 4m above the ground.

At home I found the unit to be extremely effective and very quick. I didn't time it in operation but I think it's very unlikely indeed that the SG-237 took more than two seconds to tune the antenna - it seemed much less!

However, operating as a 'bare 'chassis' p.c.b. unit (as supplied) I must again be honest and say that by no stretch of the imagination could the SG-237 be described as 'silent' in operation. It certainly isn't - the click-clack of the relays see to that!

Sound level comparison: I was rather stuck for a suitable comparison regarding the sound level of the relays on the a.a.t.u. After a great deal of thought I consider that the noise level can be compared to half a dozen small coins in a trouser pocket 'clicking' and jingling together. But bear in mind that whereas coins jingle every time you walk - the a.a.t.u. soon stops clicking.

Despite the clicking of the relays as the a.a.t.u. works to find the best combination of L and C to match the antenna -it's fascinating to watch and it's also quick. Additionally, once mounted in a suitable metal case I don't think much, if any, sound would escape.

Personally, I feel that a larger die-cast aluminium case (similar in fashion to the well known 'Eddystone' boxes) would be ideal to house the SG-237. In fact, apart from screening the mechanical sounds - if buying one of these units for myself - I would invest in a die-cast box to provide radio frequency (r.f.) screening.

I suggest using the SG-237 unit mounted in a screened metal box because on several occasions I found that r.f. was affecting the switching on the a.a.t.u. The problem was only intermittent, and then it was only a fleeting hesitancy on the '237 which drew my attention to the fact that r.f. (mostly s.s.b.) was getting into the operating side of the unit.

The problem only occurred on 3.5 and 7MHz, and then only on speech peaks. It lead the SG-237 to momentarily re-tune the antenna. This only took a second or so but was disconcerting.

However, when you consider that for most of the time the SG-237 will be operating long wire or end-fed antennas - it's not unreasonable to expect a certain amount of r.f. at the operating end. Even with a good r.f. 'ground' I thought it best to place the SG-237 in an old Eddystone aluminium box.

As an inveterate buyer of die-cast enclosures 'just in case' at rallies and junk sales - I had one which was just right! Once installed in a box the unit was well and truly screened, but even in a small biscuit tin it received enough r.f. screening!

On The Air

Operating 'portable' from my car I used a selection of antennas, including a random long wire of around 20 metres in length, in association with a ground stake which I now carry. I also used something new - one of the increasingly popular fibreglass telescopic fishing rod antennas (used with a wire to provide a vertical antenna) which extend out to 10 metres and this proved **outstandingly successful**. Using the portable equipment set-up which is well known to *PW* readers - minus my manual antenna tuning unit - I was soon working all over Europe on s.s.b. and c.w. Sitting in its temporary screened aluminium alloy box the SG-237 worked exceptionally well and very quickly indeed (I could just about hear the relays ticking away as it worked). It soon provided a good match on all the frequencies I tried on 3.5, 7, 10, 14, 18, 21 and 28MHz. (No activity heard on 1.8MHz or 24MHz).

Intrigued, I also tried to load one of my mobile whips (my 18MHz whip) onto 50MHz. It worked! - and although I didn't get a QSO I heard a repeater and was able to access it okay. Quite a surprise too!

However, the outstanding success proved to be when I used the SG-237 with my new fishing rod antenna. It was a joy to use and I had long QSOs with Canada, West Coast USA and South Africa. Not bad for 50W (s.s.b.) and 10W on c.w. eh? *PW*

Carrying On The Practical Way

This month, the Rev. George Dobbs G3RJV is sitting cross-legged on his workbench! Why?...It's because this month's topic involves a little 'audio tailoring', after you've read the appropriate quotation!

"The man that.... is not moved with concord of sweet sounds, let no such man be trusted"

The Merchant of Venice, William Shakespeare

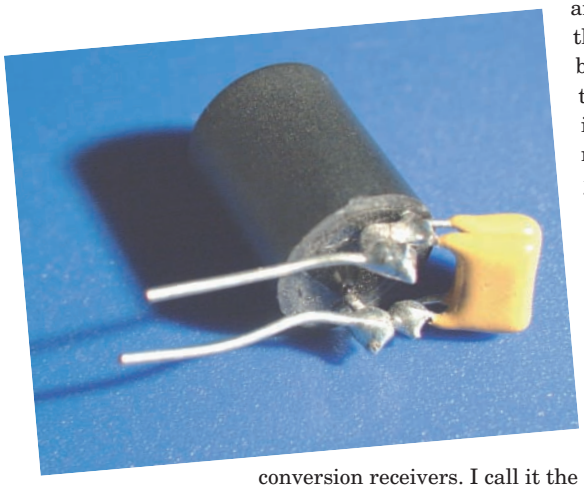
Despite this month's appropriate quotation from 'The Merchant of Venice' the h.f. bands are rarely a concord of sweet sounds! The busier periods on the c.w. portions of the bands are often a cacophony of sound. For the novice, or new operator it can be a daunting task to listen for individual stations, let alone maintain contact with one of them.

Thankfully technology has come to our aid. For example, narrow i.f. filtering can allow us that limited access to the r.f. spectrum, which makes the copy of individual stations possible.

Another approach is audio filtering to limit the bandwidth of the receivable audio spectrum and to this end I have sometimes used up to six op-amps in home-brewed active audio filters. More recently, digital audio processing (DSP) has revolutionised radio reception in difficult conditions. I'm amazed at what some of the DSP Filters can do to an unruly mass of audio signals.

The problem still remains for those who use simple, or modest home-brewed receivers. Adding a commercial DSP filter is a nice thought...but it would probably cost several times more than the entire receiver.

But for the basic 'this is all I have' type receiver, there are several simple circuits that can help the assault on the operator's ears. None of the circuits are amazing, but they are worth building ... and they are all inexpensive to make so I urge you to have a go!

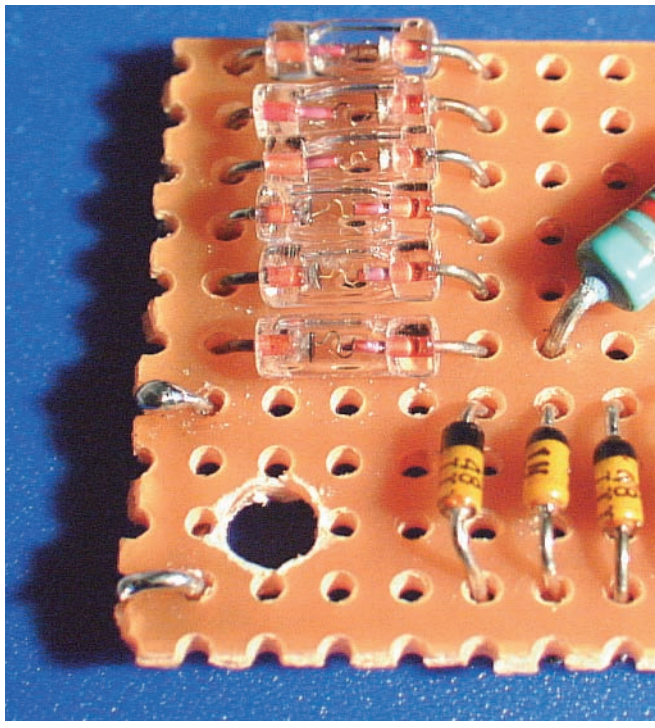


The Crud Filter.

The Circuit

The diagram, **Fig. 1**., shows a little add-on circuit that I have often used in simple direct conversion receivers. I call it the 'Crud Filter' because it cleans up the signal and allows more acceptable reception of both c.w. and s.s.b. signals. It also has the distinct advantage of using only three components.

Essentially, the filter is a tuned circuit set at a frequency around the centre of the desired audio pass-band. My version uses a moulded inductor of 82mH tuned with two parallel capacitors of 0.22µF. This gives a resonant circuit of around 800Hz. The tuned circuit accepts audio signals close to 800Hz and rejects signals far away from this frequency.



One question is – **where should you insert such a tuned circuit in the audio stages of a receiver**? To keep matters simple, I have usually just connected the tuned circuit across the audio gain potentiometer (volume control) of the receiver.

Obviously, the resistance of the potentiometer in Fig. 1 damps the tuned circuit. This is not a major problem because the resistance will probably be quite high and the damping effect allows audio tailoring suitable for both c.w. and s.s.b. reception.

Note that the tuned circuit is connected across the entire track of the potentiometer and not to the wiper.

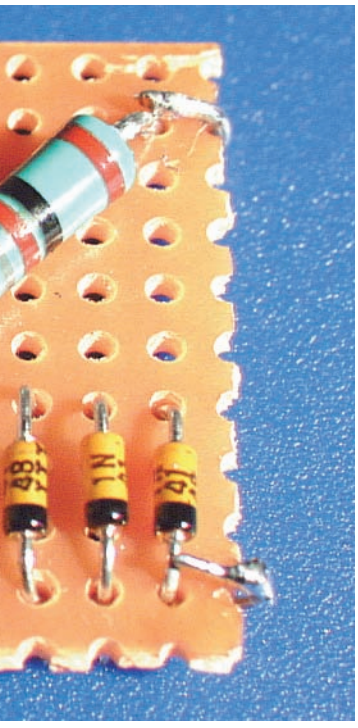
I used a Toko moulded choke for the inductor. If such a component is not available try using audio chokes or transformers from the junk box and experiment with the value of the capacitance. Simply try capacitance values until you get the most pleasing effect.

The addition of this little circuit to a simple receiver does make the audio signal more pleasant. It reduces the high frequency hiss often associated with simple receivers using cheap audio amplifiers and "rounds" the sound of the required signals. Not much of a circuit – but worth trying.

Audio Limiter

The diagram, **Fig. 2,** shows a simple audio limiter circuit. In this circuit two diodes are connected in alternate polarity across the headphone or speaker output terminals of the receiver.

The two diodes act as voltage clamps. The diodes are between the signal line and ground to prevent the signal voltage from exceeding the barrier-voltage level of the diodes. Clamping diodes are also called



George G3RJV's audio limiter.

'clippers', 'limiters' or 'squarers'.

The 'squarer' term gives away one problem of this type of circuit. The diodes clip off the top of a sine wave signal and cause it to be a square wave. This may result in some distortion of the audio signal.

When silicon diodes are used in this circuit, the positive and negative peaks of the audio signal will not exceed around 0.6 to 0.7V. If a higher clamping voltage is required, two diodes in series can replace both D1 and D2 or a low voltage zener diode can be used for D1 and D2.

Where this circuit has some real value is in receivers that do not have an a.g.c. (automatic gain control). This is because Amateur bands contain signals of very diverse strengths and a casual tune across a band can yield an ear-splitting signal in the middle of many other low level signals. It can be a good eardrum protector!

More Sophisticated

The diagram, **Fig. 3**, is a more sophisticated diode circuit sometimes called the 'Threshold Gate Noise Limiter'. The circuit here is a version of one offered by **L. F. Irvin G5IC** some years ago to the readers of *Sprat*, the **G -QRP Club journal**. The circuit uses diodes as a 'gate' as well as a 'clamp.

The barrier-voltage of a diode is the voltage at which it begins to conduct current. For a germanium diode this is about 0.3V and for a silicon diode it is about 0.6V.

The Threshold Gate Noise Limiter places germanium diodes in series with the audio signal path and silicon diodes across the audio signal path. Diodes D1 – D6 acts as 'gate' diodes and diodes D7 – D12 act as limiter diodes.

In Fig. 3 the 'gate' diodes (D1 – D6) **must be germanium types** and the 'limiting diodes' (D7 – D12) **must be silicon types**. I used OA91 diodes for D1 – D6 and 1N4148 diodes for D7 – D12. Any similar small signal diodes, germanium and silicon respectively, will do the job.

Single diodes **can be used** but better results are achieved with several in parallel. (In the original G5IC circuit germanium transistors were used for D1 – D6).

The value of the series resistance 'R' varies according to the impedance of the headphones. For typical 8Ω headphones a resistor of 82Ω works well.

The gate opens at 0.3V and the limiter clips the signal at 0.6V, so only signals in the 0.3 to 0.6V 'window' pass through the circuit. The resultant signal should be somewhat cleaner.

In practice the G5IC circuit certainly cleans up receiver 'hash' very well. And although the limiter clipping action does have a squaring action on the signals (which tend to make them sound a little hollow) this is not an unpleasant sound.

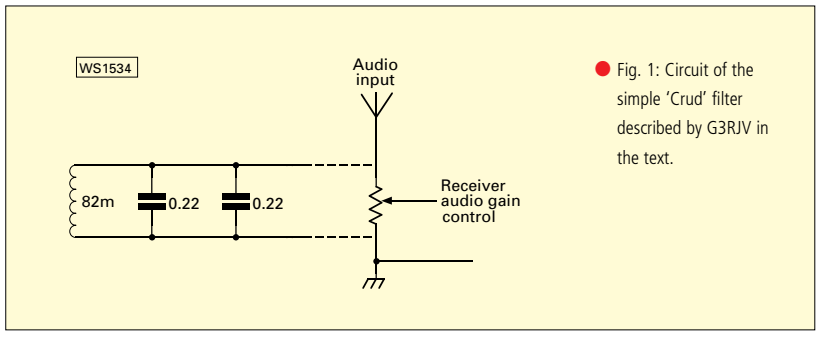


Fig. 1: Circuit of the simple 'Crud' filter described by G3RJV in the text.

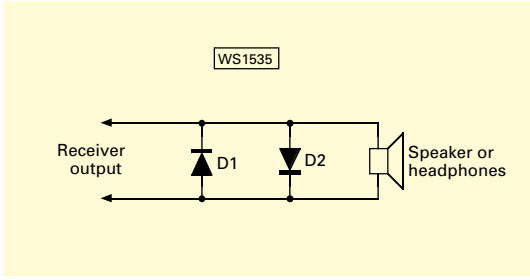


Fig. 2: A simple audio limiter circuit using diodes (see text).

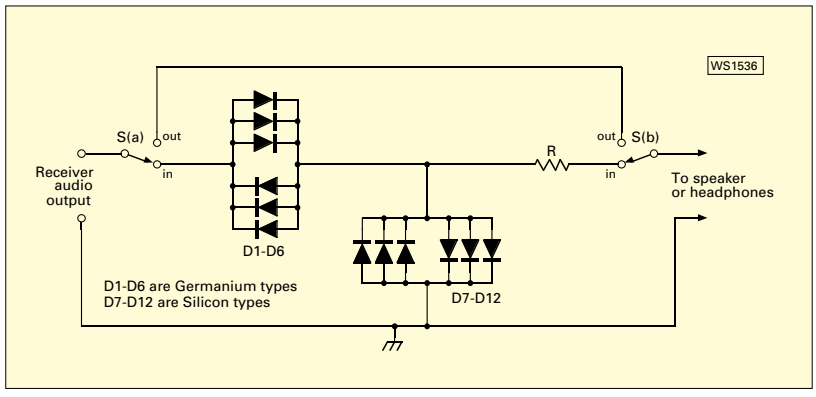


Fig. 3: Circuit of a simple 'Threshold Gate' noise limiter using diodes. Note that there are important considerations regarding the choice of diodes (see text).

Ideally Matched

To build the circuit I just pulled by diodes out of the junk box but, ideally, the paralleled diodes should be matched. To this end the circuit shown in **Fig. 4**, is a simple method of matching diodes.

All the matching, circuit Fig. 4 requires is a variable supply and two meters to measure voltage and current. A meter of with a full-scale deflection of 1 or 5mA is ideal to measure the current and the voltage can be measured with a low voltage range on a multimeter.

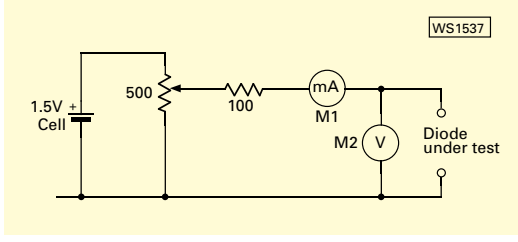


Fig. 4: Diode 'matching' circuit suitable for choosing diodes to se in Fig. 3 (See text).

The operation is easy: To start it's helpful to use a couple of clip leads to attach the diode being tested. Clip the diode in place and slowly increase the voltage with the potentiometer and read the voltage at the point when the diode begins to conduct. Sets of diodes can then be chosen for the paralleled diodes.

None of these circuits can match up to modern audio signal processing **but they all do work and they are all helpful**. Above all – they all cost next to nothing to try so have a go yourself and find out to your own great satisfaction! PW

Valve&Vintage

The dim glow of vintage 1930s valves, the warm dusty smell of pre-Second World War polished cabinets and wry humour remind us that Charles Miller is on duty in the *PW* vintage 'Wireless shop' this month.

You might well have thought that spending all my working days on repairing radio sets might have blunted my enthusiasm for constructional projects. But, the answer is "No - it didn't"! If anything I was spurred on. I've already mentioned in a previous column how I converted my father's pre-Second World War HMV battery 3-valve tuned radio frequency receiver (t.r.f.) to a.c./d.c. mains operation. I also described how gratified I was to find that it carried on working without a hitch when our mains supply was changed from 210V d.c. to 230V a.c., and now that we had a.c. the scope for making things was widened enormously.

Talking of scope, one of the projects that was pretty well de rigeur for any young engineer was to construct an oscilloscope. According to the magazine articles and technical booklets of the day a 'scope was one of the most useful pieces of equipment for a radio service workshop that could be imagined, and being taken in by these calumnies we all duly had a go at some time or another.

Indicator Type 62

First choice as a basis for a home-made 'scope was the Indicator Type 62, an airborne radar unit. These must have been grossly over-produced during the Second World War and was available at low cost from the ex-Government stores.

Apart from any other merits, the Type 62 was a very picturesque unit, with numerous multi-coloured control knobs. Its companion unit, the Receiver Type 1355 also was obtainable for a few shillings and if you were really ambitious you could construct a television receiver from these two devices plus a plug-in tuner unit for the 1355 and, last but certainly not least, a suitable power supply unit.

The 1355 did, in fact, have a built-in p.s.u. but no one told us that it was intended to be operated on an aircraft supply of 80V, 500Hz (**yes 500 'cycles per second'**). I can't remember ever having seen official credit given to anyone for proposing this arrangement, but it was one of those very simple ideas which are at the same time highly effective.

Raising the periodicity to 500 cycles (nowadays 'Hertz)' meant that the amount of iron needed for any particular power transformer was reduced to a fraction of that required for 50 cycles (Hz) operation, thus saving both space and weight - vital for airborne equipment.

By the same token, less mass was required for the rotary converters used to step up the nominal 24V of the aircraft electrical system. Understandably 500 cycle transformers do not like 230V, 50 cycle mains and they express their displeasure, as I found out the hard way, by burning out in about three seconds flat and emitting a noxious vapour that would fell a water-buffalo at 80 paces.

My spare bedroom workshop filled with black smoke and I had to grope my way through it to the window. This overlooked an outhouse roof and onto this I pitched the smouldering 1355, careless of any broken tiles that might ensue.

In the event the roof suffered no damage, which is more than can be said for my throat. It felt as though someone had given it a brisk once-over with a bottle brush and I had the most abominable head cold for a week afterwards.

Even the smoke event did not deter me, however, and I eventually solved the problem of obtaining extra high tension (e.h.t.) for the VCR97 cathode ray tube (c.r.t.) in the 62 unit by buying a genuine 50 cycle mains transformer with a 1.5kV secondary.

The transformer came from Premier Radio in London and was described as being "ex-radar equipment". A year or two later I was to discover the truth of this statement!

In due course the 'scope was completed and proved to able to do everything that good 'scopes should, such as produce Lissajous' figures on the screen. With all respect to the deceased scientist, I could find no practical application

● "I wonder what would have happened if I'd had the idea of obtaining one of those inflatable dinghies and rowing it up the canal into International waters behind the gasworks"?

for his figures, and come to that for the 'scope as a whole.

Still, if nothing else, building it did at least teach me to handle "lethal" e.h.t. with the greatest respect. It also prepared me for the early post-war television receivers which I would later be repairing.

Another Good Idea?

Another project which seemed to be a good idea at the time was to obtain ex-Government NiFe (Nickel Iron) cells, for what particular reason now escapes me although presumably it must have been pretty compelling at the time. These cells were about an inch and a quarter square and six inches tall, the case being made of steel.

The cells arrived 'dry' so to make an electrolyte I dissolved permanganate of potash (KmNO4) in tapwater until the brew looked about strong enough and poured it into them. To do this I had to unscrew from each a little steel bung at the top, by the terminals, and after filling I screwed the bungs back down again. This was a mistake!

There were six cells in all which I optimistically figured

would not be averse to being connected to a 12V car battery charger. This also was a mistake!

Delbert happened to be visiting me that night and after we had connected up the charger we went downstairs to have a cup of tea with my parents. This proved to be a leisurely interlude and it doubtless would have last longer than it did had it not been interrupted by a powerful noise which gave the impression of a railway engine blowing off steam coupled with the expressive wail of a banshee who had happened to have backed into a red-hot stove.

When Delbert and I pounded upstairs to the workshop we found that the NiFe cells had blown their steel cases into cylindrical form before finally blasting out their bungs and distributing KmNO4 liberally about the workshop. Well, it could have been worse - we might have been dyed bright purple as well as the ceiling and nearby wall-paper!

Rubber Dinghies

The next project again involved ex-Government equipment (would I never learn?), this time one of those little transmitters used in the rubber inflatable dinghies carried by sea-patrol aircraft in case of emergency landings. They were known colloquially as 'Gibson Girls'.

The name was given to the transmitters because they were 'waisted' as were the bathing beauties drawn by William Dana Gibson for magazines in the early years of the 20th century. This shape being adopted to make them fit conveniently between the knees of an airman squatting in a rubber dinghy. (The transmitters, that is, not the bathing beauties), although individual preference may have been otherwise.

Inside the waterproof case was a two-valved modulated continuous wave (m.c.w.) transmitter employing a 6J7G oscillator and a 6V6G power amplifier. The h.t. and l.t. supplies were provided by a hand-cranked generator.

Geared to the armature of the generator was a Bakelite disc carrying a series of notches which interrupted a set of contacts and automatically keyed out SOS in Morse. If desired this facility could be disabled and manual keying employed via a small push button.

The output was crystal controlled on 500kHz, the International distress frequency. On the front of the transmitter was a six-inch diameter winch on which was wound a few hundred yards of very flexible copper wire sheathed in nylon braiding for strength.

The wire was supposed to be attached to either a kite or a small balloon which would be flown above the dinghy to make a reasonably effective aerial (**NB to Sub-editor: not an 'antenna' ...change this at your peril!***).

Editorial note: The word 'Aerial' has been left in as you requested Charles - plus your 'threat' to the Sub-editor - to show readers how difficult life is for the poor old editorial staff!* ***Editor*.

Successful Cranking?

How successful the 'Gibson Girl' transmitters were in dinghies I do not know, but I do know that the very first time I tried to crank mine into life the handle sheared straight off. This was frustrating enough for me on dry land, so what the effect would have been on a hapless airman 'in the drink' doesn't bear thinking about.

On the other hand, perhaps it was providential that my 'Gibson Girl' failed to work. I say this because had I cranked it long enough a Short Sunderland or Consolidated Catalina might have appeared about our house looking for me.

As it was, the 'Gibson Girl' was not a total loss because from its metaphorical ashes arose what I can confidently claim to be the first 'pop pirate' radio station to he heard in our locality. Suitably modified and mains powered, it was capable of putting out several watts of illegal r.f. somewhere in or around the 49 metre band.

The music was taken from 78 r.p.m. records played on a 1934-vintage EMI auto-changer unit, with announcements made through a carbon microphone (also ex-Government, of course). The transmissions lasted for several weeks before I was given a very gentlemanly warning that I really ought not to do this.

The warning was so nicely put that I couldn't find it in my heart to refuse. I wonder what would have happened if I'd had the idea of obtaining one of those inflatable dinghies and rowing it up the canal into International waters behind the gasworks? PW

"How successful the 'Gibson Girl' transmitters were in dinghies I do not know, but I do know that the very first time I tried to crank mine into life the handle sheared straight off".

Antenna Workshop

TWISTS AND TURNS - TO GETTING A SIGNAL

David Butler G4ASR takes his turn in the 'Antenna Workshop' presenting the helical antenna, which is useful from v.h.f. to microwaves. He also shows you how to build one for the 430MHz band into the bargain!

Antennas such as Yagi beams or a vertical whip antenna have either horizontal or vertical polarisation. This is when the electric vector lies wholly in a single plane. In this mode the wave is said to be linearly polarised. However, there is another polarisation mode, termed circular polarisation, which has unique characteristics that may be useful for certain applications.

During local v.h.f. and u.h.f. communication (especially over 'line of sight' paths) the received signal polarisation is pretty much that propagated by the transmitting station. However, on many 'over the horizon' pathways it's possible that the polarisation of the transmitted signal can rotate or shift by many degrees by the time it reaches the receiving antenna.

Polarisation rotation may be caused by the signals bouncing off large objects, hills, etc. or even by tropospheric or ionospheric effects. The consequence of this polarisation shift will be to reduce the received signal strength. In practice these transitory 'cross-polarisation' losses can be as much as 30dB and that's a lot of signal attenuation!

Circularly Polarised

A circularly polarised antenna will receive any linearly polarised wave, whether it be horizontal, vertical or slant polarisation. Similarly a circularly polarised wave will be received on a linearly polarised antenna regardless of the polarisation (horizontal or vertical) of the latter. There is a 3dB loss associated with contacts between antennas type, but the normal reflection and diffraction losses that occurs to most v.h.f. and u.h.f. signals, will tend to mask out this difference.

Circular polarisation may be used advantageously for communication between a base station and a mobile station. The 'flutter' caused by the polarisation shift due to the motion of the mobile station being greatly reduced when circular polarisation is used at the base station.

The advantages of circular polarisation are more obvious when the communication is with an Orbital Satellite Carrying Amateur Radio (OSCAR). The random tumbling motion of the low earth orbiting satellite provides an ever changing signal of random polarisation at the receive station. Circular polarisation will provide a much more uniform coverage under these circumstances.

Agreed Convention

The agreed convention for the sense of rotation (of the electric vector) is defined in terms of: the direction of rotation 'seen' by an observer looking in the direction of propagation (looking from the transmitter towards the receiver). A circularly polarised wave may be said to be either clockwise or counter clockwise. Clockwise rotation is also called right-hand circular (r.h.c.) and conversely counter clockwise is left-hand circular (l.h.c.) polarisation.

Although a circularly polarised antenna will receive linearly polarised waves (with a 3dB loss), it is essential that if circularly polarised antennas are used at **both ends** of the path, **both must be 'left-handed' or** both must be '**right-handed**'. Opposite circular polarisations will cause a large loss of signal strength. Exactly the same loss as you would encounter if using a horizontal antenna at one end and a vertical one at the other end of a path.

So be aware, don't make the same mistake that some professionals did when trying to receive the initial signals from the Telstar (Intelsat-1) satellite! Unfortunately however, there's no convention for polarisation rotation within Amateur Radio, either for conventional terrestrial usage or for satellite use. This is most noticeable when using OSCAR satellites capable of microwave operation as both clockwise (r.h.c.) and anti-clockwise (l.h.c.) polarisations are currently to be found.

Number Of Ways

There are a number of ways in which to achieve circular polarisation. One common Amateur Radio practice is to use carefully dimensioned phasing lines to couple up two or more dipoles or Yagis so that the individual units fire signals which add in phase in a circulating pattern. The simplest form of this type of antenna uses two antennas set on a common boom with their elements at 90° to each other (often called an 'XY' Yagi).

However, the simplest antenna configuration for a directional beam having circular polarisation, is the helical antenna. This simply consists of a corkscrew-like spiral conductor, working against a reflector plate and fed with coaxial cable as shown in the diagram, **Fig. 1**.

The helix is a very simple means of obtaining high gain and wide-band characteristics (although less gain than a Yagi array of the same boom length). At the design frequency, a six-turn helix will give a power gain (referred to a non-directional circularly polarised antenna) of 12dB and a beam-width of about 50°. An antenna with 20 turns in the helix will give a power gain of 17dB with a beam-width of 24°. It possesses an excellent performance over a frequency range of around ±20% of the design frequency.

Therefore a helix designed for 145MHz will retain its effectiveness over the band 115-175MHz. One designed for

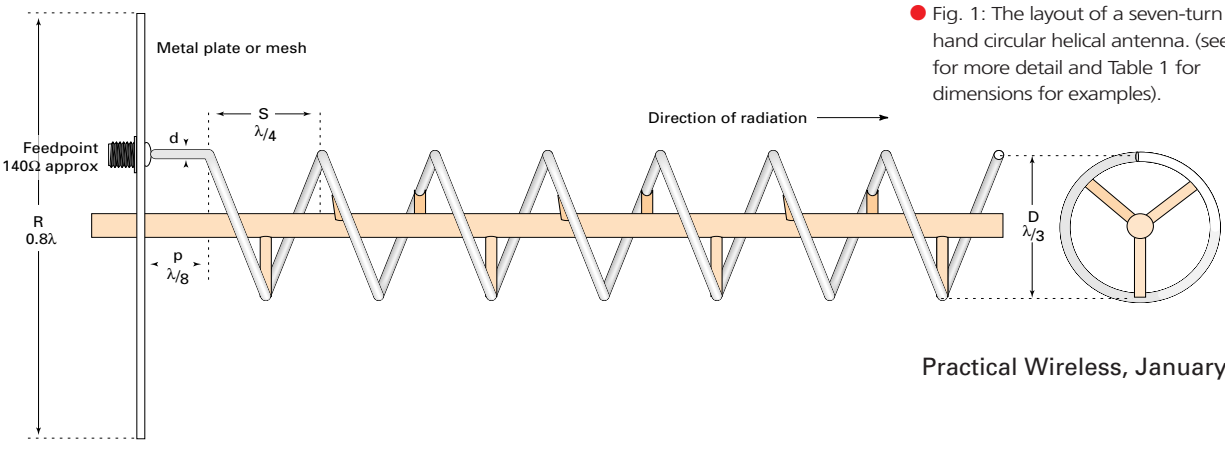
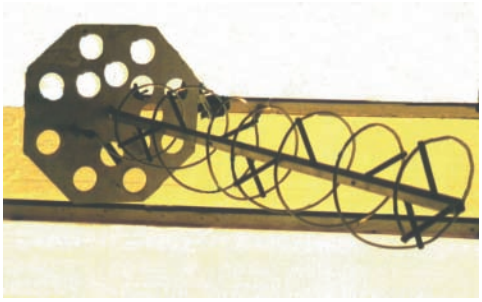


Fig. 1: The layout of a seven-turn right hand circular helical antenna. (see text for more detail and Table 1 for dimensions for examples).



● Fig. 2 A completed helical antenna.

435MHz, will work over the band 350-520MHz. Such a wide coverage means dimensions are less critical when the antenna is to be used over a narrow band of frequencies such as an Amateur band. The standing wave ratio (s.w.r.) will also be low over the complete frequency range.

Some Disadvantages

There are some disadvantages with using an helical antenna though, the major one is that it's not omni-directional so, you will need to arrange some method of rotating it.

And as mentioned earlier, there is no convention for polarisation twist. So, if you need to receive both left-hand and right-hand polarisations you will need to construct two antennas. However, if you are only receiving signals from linearly polarised sources then only one helix will be required.

Designing The Helix

Designing the helical antenna is simplicity itself and the most comforting part is, that because of the inherent broadband nature of the helix the dimensions are not at all critical. I've shown the dimensions in **Table 1** for three popular v.h.f. and u.h.f. bands and I'll describe an example for a 433MHz helix antenna.

Now you can 'roll your own' for any frequency band of your choice.

First calculate the free-space wavelength
(300/frequency in MHz)
300/433 = 0.69m

The reflector (R) is 0.8λ or greater.
0.69m * 0.8 = 0.55m (550mm).

The helix diameter (D) is 0.33λ
0.69m * 0.33 = 0.23m (230mm).

The turns spacing (S) is 0.25λ.
0.69m * 0.25 = 0.173m (173mm)

The space from the reflector to the first helix turn (p) is 0.125λ.
0.69m * 0.125 = 0.086m (86mm)

Building The Helix

Now let's turn to building your helix, and a good starting point is the reflector plate. For frequencies up to 600MHz or so a suitable ground screen can be made from small-mesh 'chicken' wire, fastened to a round or square frame of either metal or wood. A small metal ground plate (diameter equal to approximately D/2) should be soldered to the centre of the screen.

You could use a solid disc with holes cut into it as shown in the photograph of **Fig. 2**, to reduce the wind loading. A solid disc should be used for frequencies above 1GHz. The central boom support can be made from wood or square section metal tube as shown in the photograph.

Non-Metallic

However, it is important that the helix supports are non-metallic such as wood or plastic. The supports are fixed to the central boom with self-tapping screws and spaced at suitable intervals to support the helix turns at the correct spacing. If you are using a square section boom, the supports should be fitted with alternate 90° spacing. Helix antennas for use above 1GHz can be conveniently wound directly onto a non-metallic central tube. For the 1.3GHz band a three inch (76mm) plastic pipe is ideal.

A helix array on a short boom can conveniently be supported from behind the reflector plate by an extension of the main boom. If you want to support the helix in the centre of the array the stub-mast must be sufficiently rigid and should at the same time be of a non-metallic material such as wood, thick-wall plastic tube or glass-fibre. Ensure that the clamping mechanism is also non-metallic.

Band (MHz)	R (0.8λ) (mm)	D(λ/3) (mm)	S(λ/4) (mm)	P(λ/8) (mm)	MS (mm)
145	1650	680	520	260	340
433	550	230	170	85	115
1300	180	75	55	30	35
2350	102	42	32	16	21

● Table 1: Dimensions for some popular bands. The dimension 'MS' is the theoretical length of a λ/4 matching section of 75Ω coaxial cable (see text for more detail).

Suitable Materials

The helix can be made from thick wire, copper, brass, aluminium tube or rod. Suitable materials can include small-bore central heating piping or car brake piping. The conductor diameter 'd' is not particularly critical. Suggested diameters might be 6mm below 1GHz and 3mm above this frequency.

Surplus coaxial cable may also be used. It's readily available, inexpensive, light in weight and easy to shape into the coils required. Hard-line feeder with a solid copper outer conductor such as Andrews LDF4-50 or LDF2-50 cable is ideal in this application. But if you decide to use coaxial cable - solder the centre and outer conductor together at both ends.

A minimum of about five turns are necessary for reasonably 'round' circular polarisation and the polarisation twist is determined by the direction in which the helix is wound. The helix wiring can be close-wound on a suitable former and then fixed onto the insulated supports to give the specified pitch.

The first turn of the helix is started at a point 'p' in front of the reflector and is supported by crossed supports from the central boom. A chassis mounting antenna connector (SO-239 or N-type) should be located on the periphery of the reflector plate, not exactly in the centre as this is where the support boom passes through the ground plane. Connect the end of the helix conductor to the centre pin of the antenna connector.

Feed Impedance

The feed impedance of the helix antenna is about 140Ω and you cannot directly connect it to 50Ω coaxial feeder. Impedance matching is important but not difficult to achieve. It may simply be transformed to the feeder impedance by means of a quarter-wave transformer. This is a quarter-wave length of 75Ω coaxial cable connected in series with the feed line right at the chassis mounting antenna connector.

The formula for calculating the length of the λ/4 impedance transformer is (300*0.25* V_f) / f (MHz), where V_f is the velocity factor of the cable used (typically 0.66). At 433MHz the length will therefore be 114mm.

That's it for this time. Now get building! PW

Trader's Table

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Datong RFA 5-200MHz Low Noise Pre-amp RF switched £35
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Kantronics KPC-3+ x2 Packet TNC + WEFAX £109
Kenwood PS-53 x2 13.8V 22.5A Matching PSU £129
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MFJ MFJ-941E 1.8-30MHz 300W ATU with Dummy Load £59
MFJ MFJ-1020B 0-30MHz Indoor Active SWL Antenna £65
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MFJ MFJ-1610 Theory Tutor (Novice) £4
Microset PT-105A 12V Stabilized 5A PSU £25
Opto 2600HA x2 1MHz-2.6GHz Frequency Counter £79
Opto Linx RS-232 interface and software for CI-C, AOR £75
Opto Model 40 Scout 10MHz-1.4GHz Feq Counter £225
Ramsey W9GR DSP Audio Filter £119
Watson W-3A 12V 3A PSU £15

VHF DXER

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

Two months ago I suggested that you pay special attention to the 50MHz band during October for trans-equatorial propagation (t.e.p.) to southern Africa. Trans-equatorial propagation involves reflection from two ionospheric F-layer belts located north and south of the geomagnetic equator.

Although the position of the ionised belts are independent of the time of year they are normally unbalanced in intensity as the Sun will favour either one or other region. However, when the Sun crosses the equator during the spring and autumn equinox the intensity of the two regions are at their greatest because the length of day and night everywhere are of equal duration and the two belts of ionisation are balanced.

In practice although the Sun crosses the equator on September 23 and March 21 it appears that the belts require a few days for the balancing effect to take place. Therefore the best period for t.e.p. is probably in the months of October and April.

Trans-equatorial propagation is, as the name suggests, propagation across the equator. Note that this is not the geographical equator at 0° latitude but the magnetic equator which meanders close to this.

Contacts via t.e.p. are confined to paths at 90° to the magnetic equator and extends to approximately 4000km north and south of it. In this part of the world the northern limit is generally accepted to be in the Mediterranean area.

The UK is situated much too far to the north for most t.e.p. events (except perhaps at solar maximum) and access to the ionised zones will normally be made with the help of another propagation mode such as Sporadic-E. This is not unusual and has occurred many times in the past.

From the UK it's possible to make contacts on the 50MHz band with stations located in countries such as Botswana (A2), Madagascar (5R), Malawi (7Q), Namibia (V5), South Africa (ZS), Zambia (9J) and Zimbabwe (Z2). It's also possible to make contacts into South America typically with stations in Argentina (LU), Brazil (PY) and Uruguay (CX). The reason that this is feasible is because of a considerable kink in the geomagnetic equator over South America and the Atlantic Ocean.

Contacts on the 70MHz band, either direct to South Africa (ZS) or cross-band to other suitable countries, are possible but as far as I'm aware no one has made a t.e.p. contact on this band yet. At this frequency any possible contact will only be made during exceptional conditions.

Contacts on the 144 and 430MHz bands are possible but as the frequency is increased, propagation becomes rarer and geographically more restricted. The best location in the northern hemisphere for reliable t.e.p. contacts will be in the Mediterranean area (Cyprus, Greece, Italy, Malta). Given that the best months for t.e.p. are around October and April and the best months for a Sporadic-E (Sp-E) link are June/July it is very unlikely that contacts will ever be made from the UK to southern Africa on the 144MHz band.

A small number of t.e.p. openings were reported on September 1, 2, 10, 16 and 22. Some of the DX stations worked on the 50MHz band from the UK during this period included V51KC, ZS6AXT, Z22JE, 7Q7RM and 9J2BO. The CX1CCC (50.019MHz) and ZD8VHF (50.032MHz) beacons were also heard in central England.

Chris Young MW1TYO has informed me that he has recently passed his Morse test and now holds the call sign **MW0KRS.** He is active on the 50MHz band and reports working the station of ZD8KW on Ascension Island at 2217UTC on September 1. On the following day he called CQ and received a reply from HB9COH (JN47) in Switzerland. This was followed by a 'pile-up' of Italian stations between 2014-2044UTC.

Conditions, as predicted, were much better during October with t.e.p. openings occurring on at least 16 days during the month. Some of the openings were very intense, the best of these being events on October 20 and 21. In addition to stations already mentioned were those of FR1AN, FR1GZ and FR5DN all operating from Reunion Island in the Indian Ocean. The PY0FF beacon on Fernando de Noronha, located off the coast of Brazil, was also heard on a few occasions in the time period between 1500-1600UTC.

PROPAGATION MODE

During October many c.w. and s.s.b. contacts were made on the 50MHz band with stations in Burkina Faso (XT2OW), Djibouti (J28FF), Eritrea (E30TA), Ethiopia (9E1S), Equatorial Guinea (3C5I), Gabon (TR8CA), Maldives (8Q7QQ), Morocco (5C8M), Nigeria (5N9EAM/8), Sudan (ST2TA), Togo (5V7VJ) and Uganda (5X1GS). Some operators have claimed that these African contacts were via trans-equatorial propagation but clearly these stations are north of the magnetic equator and cannot by definition be 'over the equator'.

So what could the propagation mode be? I wondered if the mode could be some form of a field-aligned spread or maybe some tenuous Sp-E link into the northern F-layer t.e.p. zone. One observation made was that there was no noticeable sign of Sp-E propagation during many, but not all, of these openings.

Geoff Grayer G3NAQ reports that this class of contact is a distinct group which he recognised during the last solar maximum. He believes it to be one-hop t.e.p. without being so! He explains that the key to understanding all 50MHz propagation is to realise that the highest F-region ionisation occurs in two belts, north and south of the magnetic equator.

The belts reach a maximum around the sub-solar point and are the only regions likely to propagate signals at 50MHz. 'Real' t.e.p. has been shown to be a chordal hop between these two belts crossing the equator.

Geoff believes that the type of contacts described is just a single-hop from the northern belt. One hop from a layer at say 350km effective height would produce a maximum range of about 4000km.

However, this does not take into account the refraction in the E-layer which will tend to extend the range at both ends. He would expect these contacts to occur only when the northern belt is at its maximum, that is to say around the middle of the day in the summer months and when there is Sp-E propagation around, perhaps only on the 28MHz band. I wonder if anyone has alternative views on the type of propagation mode that made these contacts possible?

WORLD-WIDE DX CONTACTS

It is the ionospheric F2-layer propagation that

THIS MONTH DAVID BUTLER G4ASR HAS NEWS OF WORLD-WIDE DX CONTACTS ON THE 50MHZ BAND.

● Australia on the 50MHz band.

is used by h.f. operators to contact stations around the world. When all the factors are favourable the maximum usable frequency (m.u.f.) extends up to the 50MHz band.

As we approach the peak of Solar Cycle-23 there will be an increase in F2 propagation which in turn will produce worldwide DX on the 50MHz band. The first signs of any significant DX at these frequencies occurred on September 23 when Australian television signals (46.171MHz) from the VK4 call area were received in south-east England.

The signals peaked on a beam-heading of 100°, some 40° further east than the true bearing. This is not unusual as 50MHz operators frequently observe that F2 signals do not arrive via the great-circle path. One of the reasons for this is that, except on direct north-south paths, there will be some sideways refraction through the equatorial F-layer belts which will affect the direction in which signals arrive.

The first two-way contacts between England (G) and Australia (VK) this solar cycle actually took place on Sunday October 15. The station of **Roger Horne G4HBA** (IO80) was one of the lucky ones to achieve this.

Roger mentions that working into VK on the 50MHz band was a bit of a surprise but it was not totally unexpected. At 0800UTC he heard stations from Italy (I), Romania (YO) and Yugoslavia (YU) coming through via Sp-E propagation.

On the previous day there had been a sharp rise in geomagnetic activity which Roger suggests can cause an increase in the m.u.f. in the following days. With this in mind he was hoping that the Sp-E would move more to the north and maybe link into the enhanced F2-layer to give propagation into Japan or Australia. At 0815UTC he heard some Danish stations to the north-east and at the same time the DX Cluster network showed that Italian and Polish operators were working into Australia.

Suddenly at 0840UTC Roger heard VK6JQ working **Ted Collins G4UPS** (IO80) on c.w. and the VK station was end-stopping at 599! Roger then tail-ended Ted and worked VK6JQ on 50.103MHz with 599 reports bothways.

Peter Taylor G8BCG (IO70) worked him next before signals quickly faded out. Roger reports hearing the stations of VK4FNQ and VK4ABW around the same time but was unable to break the huge European pile-up. He also listened for signs of VK video on 46.17178 (QG53), 46.24010 (QF35) and 46.26100MHz (QF58) but nothing was heard. He mentions that although this was the first time he had contacted VK6JQ he did make many VK contacts during the previous solar cycle.

The station at G4HBA consists of an Icom IC-746 transceiver driving a home-brew 400W amplifier using a pair of 4CX250B tetrodes. The antenna consists of a pair of home-made 6-element NBS Yagis at 18M above ground.

The beams are spaced 3.5M apart to ensure a very clean pattern with some additional forward gain. Details of his amplifier, antenna system and other 50MHz information can be found on his web site at **www.6mdx.eurobell.co.uk/index.html**

Later in the morning at 0941UTC Roger G4HBA worked the station of FR1GZ (LG79) for DXCC country No. 145 and grid square No. 700. He wasn't sure whether this contact was direct via F2-layer or Sp-E linked but he was not hearing anything else to the south-east of the UK at the time. The station on Reunion Island was audible for less than 10 minutes before fading out and no more DX was heard that day. All in all quite an exciting morning!

Peter Taylor G8BCG reports that he heard Bill VK6JQ rattling away on the key and then spent the next hour or so listening and calling him until finally making a c.w. contact at 0850UTC. He mentions that the last time he worked Bill was in April 2000 when Peter was operating with the call sign H44PT from the Solomon Islands.

Bill VK6JQ farms near Broome, Western Australia (PH12) and only runs 10W into a small beam antenna. Before contacting VK6JQ Peter was copying the VK4 video signal but it was very weak. There were also some weak and fluttery 48MHz t.v. offsets but no European or DX TV signals at 49MHz.

As the morning progressed some very loud European stations were heard on the 50MHz band via Sp-E but this spelled the end of the VK opening. Peter was convinced that the VK stations were copied via F2 propagation. The signals which he heard for nearly two hours exhibited slow deep fading but peaking to S9. Another opening to Australia occurred around 0940UTC on October 27.

Stations in southern England were reported to have worked VK4FNQ (QG39) on s.s.b. with signals peaking 55. **Jamie GW7SMV** mentions that the VK4 video signal on 46.171MHz was also peaking 55 at the same time.

In addition to the Australian contacts there have also been DX openings to Hong Kong (VR2), Cambodia (XU) and French Guiana (FY). At my QTH (IO81) I heard weak c.w. signals from VR2LC (OL72) at 0900UTC on October 18 but I wasn't unable to contact him. He was audible in the central UK from 0850-0930UTC and was believed to have made a number of c.w. contacts. Another Hong Kong Station VR2XMT was heard in Jersey at 0920UTC on October 20 but no contact appears to have been made.

The radio club FY5KE at Kourou, French Guiana was heard in southern England at 1256UTC on October 27. Interestingly this is the site where the Phase-3D satellite was scheduled to be launched from on November 14. A rare sighting of a station in Cambodia took place at 0900UTC on October 28.

The station of XU7ABF was heard on 50.126MHz by G4PCI (IO91). Later in the day, around midday on October 28, there was an excellent opening to South Africa with many stations in the ZS4 and ZS6 call areas being worked.

From 1145UTC stations in Canada (VE) and the USA (W) were putting in very good signals on c.w. and s.s.b. into much of England and Wales. It was a similar state of affairs on October 29 with another excellent opening into French Guiana (FY/W7XV), Puerto Rico (WP4N), Surinam (PZ5RA), Canada and the USA. Trust me - F2 propagation has returned to the 50MHz band. Get on there now!

DEADLINES

That's it again for another month. Thanks to everyone who's contributed to the column during the year and I'm particularly grateful to those who sent me their photographs. They are always welcome.

Please forward any news, views, comments or photographs to the address and by the date given at the top of the column. Have a very Happy Christmas and prosperous New Year!

73 David G4ASR

HF HIGHLIGHTS

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

I am writing this column in late October while most of the country is being lashed by torrential rain and experiencing the worst flooding for years. If ever you needed an excuse to go to your shack and operate this must be it.

I am pleased to say that h.f. band conditions have fared much better than the weather despite a few ups and downs. There has also been an increase in contest activity. This is always good news if you are looking for that all time 'new one' or just want to increase the number of countries you have worked on a particular band. Let me know how you are getting on!

SITTING ON A FORTUNE

News now of a very successful DXpedition by the **Warrington Amateur Radio Club** in August to St. Georges Island EU-120. This Island is also known as Looe Island and lies just one mile off the coast of Looe in Cornwall. Only three operations have ever taken place from this location and it was the club's second visit.

Some of you may recall that St. Georges hit the headlines in June when the owner Miss Babs Atkins was offered more than two million pounds for this 22 acre wildlife sanctuary to allow the building of a proposed helipad and holiday complex. This was rejected in favour of keeping the wildlife habitat under the auspices of the Cornwall Wildlife Trust.

The expedition operators were **Mike M0ACK**, **Bill G0PZP**, **Ron G0WJX**, **Albert G3ZHE** and **Maurice M0CMJ** who used an IC-756 PRO and **Carolina Windom** with the special callsign **GB0SGI.** The group operated for four days from a gazebo on the 7, 14 and 21MHz bands and they were more than pleased to make over 600 contacts world-wide. This was a reasonable total considering access to the island was by small open boat during daylight hours and when the tides were suitable.

The QSL cards have already have just been completed and have been sent out via the bureau. Further information on the Warrington Amateur Radio Club can be found on their web site **www.warc.org.uk**

CARL GW0VSW SAYS THE HF BANDS HAVE FARED WELL THIS MONTH.

DX NEWS

Hrane YT1AD is planning to activate Conway Reef (3D2) with a small group between 5-15th February 2001. They will depart from Fiji for the 40 hour voyage to the reef aboard the Pacific Harbour.

The plan is to set up three stations, each with amplifiers, to operate on all bands using c.w., s.s.b. RTTY, PSK31, f.m. and SSTV. The antenna farm will include two 3-element beams for h.f., a vertical and wire antennas for 'Top Band'. Their licence has already been issued but the callsign is not going to be announced until they start operating.

Patrick F5THR is now operating as **J28EX** (Djibouti) until May 2002. He is active on 14, 21, 28 and 50Mhz and QSLs should go to FB1BOM.

A new club station now active in Iran using the callsign **EP4PTT**. The operators are **Hamid EP3HR** and **Yar EP3SP**. All QSL requests should go via the bureau.

Those of you who need Namibia might try looking for **Frank V51AS** who has been very active lately using c.w. between 1930 and 2130UTC on the 10, 14, 18, and 21MHz bands. You can also try 28MHz after 1530UTC. QSL via POB 2516, Swakopumnd, Namibia.

PROPAGATION REPORT

The propagation this month does not appear to be "As good as expected" according to **Don McLean G3NOF** in Yeovil, Sommerset. "The 14–28MHz bands have all suffered fade outs and solar flares throughout the day. There were however long path openings to Australia (VK) and New Zealand (ZL) and on some days to Asia at 0700-0900UTC on the 14, 18 and 21MHz bands. Signals were also good to north and south America around 2100-2300UTC. The 28MHz band also opened up occasionally between 1400 and 1700UTC to the USA and Africa".

YOUR REPORTS

Despite these varied conditions our reporters have once again managed to dig out some very good DX! **Robin Trebilcock GW3ZCF** from Bishopston near Swansea had a short break from PSK31 and worked EX7MJ (Kyrghyzstan) at 2237UTC with 100W of c.w. on 7MHz using his IC-775 and 40m horizontal loop.

Also active on the 7MHz band was **Ted Trowell G2HKU** on the Isle of Sheppy. Ted used his Ten-Tec OMNI 5 and 75W of c.w. into a G5RV at 2100UTC to work TF3GB (Iceland) and TA5/KU0J (Turkey). His 10MHz log shows a single QSO with EU1FY (Belarus) for a 2xQRP using 5W from an IC-721.

On to the log of **Sean**

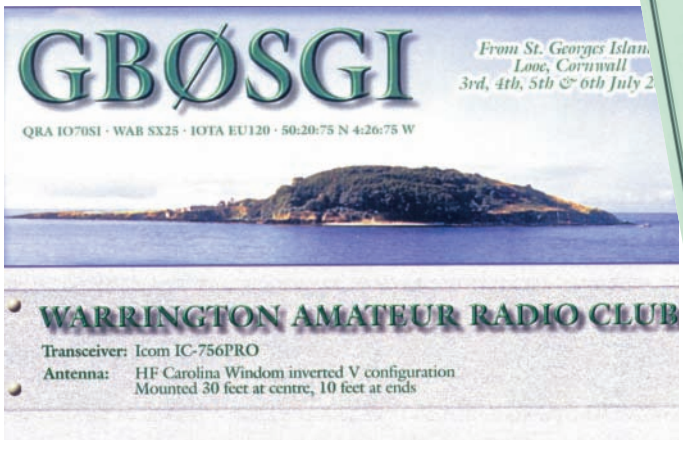
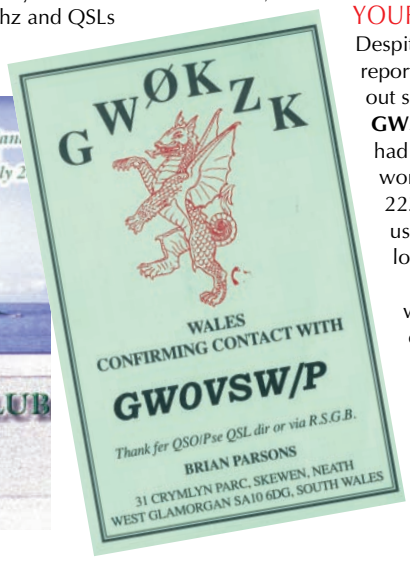


Fig. 1: Warrington Amateur Radio Club successfully staged a DXpedition in August to St. Georges Island EU-120 in August.



Brian Parsons GW0KZK used a FT-1000MP and 4-element beam with 100W of s.s.b. to work 9K2ZZ and 5C8DM.

● Bob G3ZEM operated as ZD9ZM on a trip to the South Atlantic in August 2000.

Gilbert G4UCJ now in Milton Keynes who has just exchanged his trusty Alinco DX-70 for a new IC-746 complete with 250Hz c.w. filter. Using c.w. and 30W into a half-size G5RV mounted in his loft, Sean worked EP2MKO (Iran) at 2140 followed by R1ANZ (Antartica) at 2359UTC.

THE 14 & 18MHZ BANDS

On 14MHz Sean worked VK5GZ (Australia) at 0737 followed later in the evening by JH3EUJ (Japan), 5X1P (Uganda) and TI3TLS (Costa Rica) between 2100 and 2240UTC.

Here in Skewen **Brian Parsons GW0KZK** used a FT-1000MP and 4-element beam with 100W of s.s.b. to find 9K2ZZ (Kuwait) and 5C8DM (Morocco). Both contacts made around 1700UTC. Meanwhile, also using s.s.b. at 1700UTC, was Don G3NOF who reached 4F3CV (Phillipines) and VU3SCK (India).

Also active on this band was Robin GW3ZCF who used c.w. to work EZ8CQ (Turkmenistan) at 0911, JA6ZPR (Japan) at 2112 using s.s.b and PSK31 for ZD7MY (St. Helena), HO1A (Panama), KP2D (U.S. Virgin Islands) and CE3WR (Chile) around 2300UTC. On to 18MHz now and the c.w. of Ted G2HKU who enjoyed a good spell at 1500UTC working BV3/DJ3KR (Taiwan), 5V7VJ (Togo) and VQ9QM (Chagos). Slightly later at 2100UTC came E4/JA8RUZ (Palestine). The c.w. of Sean G4UCJ reached 5H3RK (Tanzania), HQ0R (Honduras) and FJ/AA6YQ (St. Martin). All these contacts were made between 1940 and 2100UTC.

THE 21, 24 AND 28MHZ BANDS

The 21MHz band is where Don G3NOF appears to have spent most of his time this month. His large s.s.b. log lists contacts between 1500 and 1830UTC with CO8OTA (Cuba), DU1IVT (Philippines), HS1NGR (Thailand), TI4HWF (Costa Rica), VP5/K4ISV (Turks & Caicos Islands), 4S7DA (Sri Lanka) and 9J2BO (Zambia).

The chosen mode for Robin GW3ZCF was PSK31 who enjoyed an afternoon session, 1615 to 2010UTC, working YB5QZ (Indonesia), V31DE (Belize), 9V1GA (Ghana), ZP6GBA (Paraguay), J28NH (Djibouti), HC8N (Ecuador) and BX4AF (China) to name a few. During this period Robin also found time to operate s.s.b. working AX8NSB (Australia), 4X0B (Israel) and JY4NE (Jordon).

On to 24MHz and KH6CC (Hawaii) at 1900UTC was the only contact for Ted G2HKU using c.w. and 75W to a HF6 vertical, while Sean G4UCJ used 10 watts of s.s.b. to make a QRP contact with ZD9ZM (Tristan da Cunha) at 1050UTC.

Now it's time to move onto 28MHz where, despite the generally poor conditions, most of our reporters found time to operate. Sean G4UCJ managed c.w. contacts with D2BB (Angola) at 0929 and a little later at 1451UTC E4/G3WQU (Palestine).

Ted G2HKU worked 7Q7LA (Malawi), PZ5RA (Suriname), 5B4/YL2RR (Cyprus), LU4FC (Argentina), CX4GL (Uruguay), XE/NR7O (Mexico) and CE3WD (Chile) between 1430 and 2000UTC.

Finally, the log of Don G3NOF lists s.s.b. QSO's with 5Z4IC (Kenya) at 0922, 3B8GL (Mauritius) 1524, TA4/DH6MBW (Turkey)1546, FR5FD (Reunion) 1616 and 5R8FU (Madagascar) at 1642UTC.

QSL CORNER

On now to some more QSL information that I hope you are all finding useful. Contact 3B8GL via 3B8CF, 4F3CV via HB9CXZ, 5V7VJ via G4ZVJ, 7Q7HB via G0IAS, 9K2ZZ via W8CNL, 9M2XA via JF4WPF, 9V1GA via JA4BJO, AX8NSB via VK8HA, CO0OTA via CO2FRC, HQ0R via EA4URE, J28NH via F5IPW, JY4NE via KB6NAM, JY8NJ via EA5BYP, VP5/K4ISV via N2AU and ZD9ZM via K4CIA.

PW LISTENING & OPERATING WATCH LIST. (ALL TIMES UTC)

Sean Gilbert G4UJC operates: around 0700-1100 and 2100-0000 seven days a week on all bands using an FT-307 and Alinco DX-70 tranceivers at 3/30W into a loft mounted G5RV dipole antenna.

Rob Mannion G3XFD listens and operates: weekdays and weekends, 1800-1830 on 3.7MHz with 100W s.s.b. and 3.530 or 3.560MHz and 18.105MHz QRP c.w. using an Alinco DX-70 transceiver and a long wire or mobile whips.

Carl Mason GW0VSW listens and operates: on 14060 most mornings at 0630UTC with a Ten Tec Argonaut and half-size inverted G5RV.

Don McLean G3NOF operates: 1030 Saturdays on 3.685MHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net on 3.665MHz using a Kenwood TS-950 and trapped dipole antenna.

George Woods G3LPT operates: an open net on 29.630 n.b.f.m. 0830 Tuesday to Friday.

John Wheeler G0IUE monitors: 28.600 n.b.f.m. every evening between 1730 and 2230 regardless of conditions using a Yaesu FT-920 transceiver running 100W and 2-element tri-band beam.

Brian Parsons GW0KZK listens and operates: on 14.250MHz 1000-12000 and 1400-1600 most days using an Yeasu FT-1000MP and 100W into a 4-element Mosely beam

SIGNING-OFF

Well that's about it for this month. It's signing-off time. Special thanks to all our reporters for their logs and for your letters and E-mails. It's always good to hear from you. I'm sure that all our readers are interested in what is being worked on the h.f. bands.

Thanks must also go to **Tedd Mirglotta (OPDX bulletin)** and **Bob Nadolny (599 DX Report)** for the DX information. See you again next month. Until then have great Christmas and very Happy New Year.

73. Carl GW0VSW

KEYBOARD COMMS

BY ROGER COOKE G3LDI

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ROGER COOKE G3LDI DELIVERS HIS MONTHLY 'DATA BURST' OF WHAT'S HOT THIS MONTH IN THE WORLD OF DATA COMMS.

The new Pentium 4 chip, the x86 processor, is the next evolution from Intel. **It will have a record clock rate of 2GHz** and will be the fastest desktop processor in the world. Several demonstrations have already taken place, including one of an air-cooled Pentium version.

According to Intel, the chips new 'rapid execution engine' will execute frequently-used instructions at twice the clock speed of the rest of the micro-processor. Additionally a new 400MHz system bus will allow it to input and output data three times faster than Intels' Pentium 3 processor.

Attention is being focused on Internet, imaging, streaming video, speech, 3D, multi-media and multi-tasking applications. The new chip will provide higher video frame rates and more realistic three-dimensional graphics.

PERSONAL DIGITAL ASSISTANT

Psion has unveiled a new keyboard-based personal digital assistant (PDA), designed for information management and the first keyboard-based mobile WAP viewer suitable for e-commerce applications. The Revo+ is an upgraded version of the original of the popular Psion 5 organiser, featuring a similarly styled touch-type keyboard, but without the expansion ports, memory slots and replaceable battery.

The new device is based on the ARM 710 36MHz processor and carries 16Mb of RAM and a 10-hour rechargeable battery. The pre-installed software suite includes the WAP browser, and a conventional web browser as well as the usual office and diary applications. To access WAP services, users will need to combine the Revo+ with either a conventional data-compatible mobile 'phone or an external land line modem.

Unlike WAP 'phones, the Revo+ is not restricted to using the WAP services of a specific provider, and can be configured to work with the WAP gateways of all the UK mobile networks. It also boasts a new web browser from Opera, featuring 128-bit SSL encryption, allowing it to be used for conventional Internet-based secure transactions as well as WAP services. The browser is a fully functional application with support for most common standards and conventions, and occupies about 2Mb of space on the device. The Revo+ used the Epoc operating system from Symbian, the joint venture between Psion, Motorola, Panasonic and Ericsson.

KEEPING TIME

Recently I mentioned the problem of keeping the time correct on three networked computers and needed an automatic control system. I received a letter from **Arthur Lawrence G3RZV**, suggesting that a program called *NetDate* might be used. Apparently it was listed on the Tucows site, but has been recently removed. However, no doubt a search will find it.

Arthur says that once running, various time servers are available. These are sites on the Internet however, and I already have such a server running on one machine. This is *Dimension 4*, a program I reviewed some months ago. It's free, runs minimised, and works very well. However, it does not update the rest of the network.

Arthur suggested that I run a line in the Autoexec.bat of the other machines to update. This would not work in my case as the other machines are left on 24 hours a day!

The final prompt came from Andrew, with his usual lateral thinking! He suggested that as my Satgate machine updated from UO-22, which in turn updates from a very reliable Earth source, then why not update the BBS machine from the Satgate. This I opted to do, by running a BAT file from the FBB BBS system file CRON.SYS. This automatically updates every hour from the Satgate.

The BAT file is a simple one-liner, the same as suggested by Arthur. This is C:\windows\net.exe time \\satgate /set /yes Satgate should be the name given to the machine that you are updating from; this can be found by right-clicking the Network Neighbourhood icon and selecting the Identification tab. You can then see the 'computer name' box.

Note the use of / and \ in the correct places of the BAT file and also the spaces. Net.exe is a little known command but can be very useful. It might be a little pedantic, but it's essential to have correct time.

Arthur's friend, **Ian G1SMD**, who suggested some of the help. Ian wrote some articles on the date problem with computers before we changed from 1999 to 2000. I also received a letter from **G6JAK** regarding time-setting and he does it with BAT files run from Windows Scheduling (Thank you).

THE NETWORK, SPEED ET AL

The terrestrial network in the UK seems to be in stagnation. In East Anglia, we have lost GB7TLH. This will make the transition of mail into and out of East Anglia even more difficult than it already is. Couple this news to the doom and gloom that I see on the network (when mail **does** arrive!) and it really does beg the question 'Is it time to terminate?'

Occasionally I do see a little light at the end of a very long tunnel however, and I view it from a longer-term point of view. Even the ubiquitous Norfolk AX25 Group BBQ fell in attendance this year! It was not the beef-burgers either, as we used pork and apple burgers. See **Fig. 1.**

● Fig. 1: Having a good time at the Norfolk AX25 Group BBQ.

The nine day wonder of the Internet might appeal to some, might even attract the youngster. But even the Internet is not all it's cracked up to be - the electronic graffiti artists are having a field day.

Of course, used intelligently, the Internet can be one vast encyclopaedia. Although

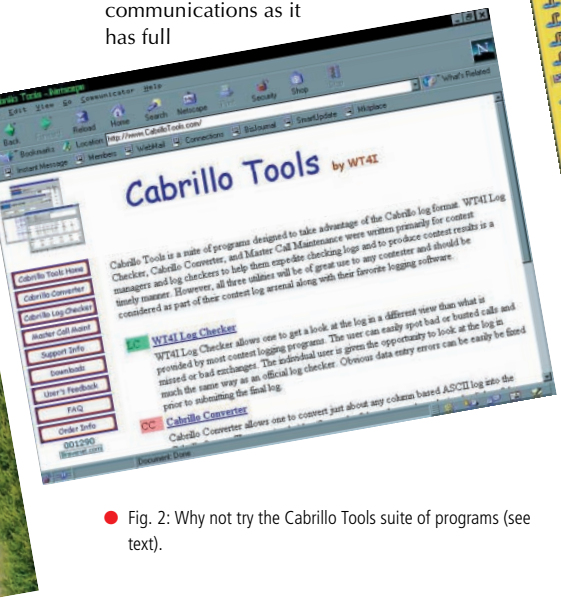
youngsters very rarely read encyclopaedias anyway!

Getting back to the Packet Network, this week has seen an application for a BBS to replace GB7TLH, refreshing news! I had a message from the **East Suffolk Data Group** to say that they are embarking on some high-speed tests soon, so hopefully this will attract some more interest.

High speed has been difficult in the past due to lack of r.f. equipment, or lack of experience in using/building for those frequencies. However, there are kits available, and these can be used for speeds up to 115kB and full duplex.

I recently read the following and if you are interested you can follow it up on the web-site: "The New 23cm Data Transceiver is now ready. This is a new modified version with only easy to get parts A kit will be available On the Launch Day at Elvaston Castle rally, Derby on the 13th June (2000). However. the p.c.b.s and a Programmed Pic Chip are now available we have just got to finalise the price. "

The transceiver is designed for high speed Packet and can transfer data at a lightning rate of 115k and in full duplex mode (cheap Modem required but details will be given) also...an excellent improvement to the Packet network, but can also be used for voice communications as it has full



● Fig. 2: Why not try the Cabrillo Tools suite of programs (see text).

23cms band tuning range plus an l.c.d. frequency readout for TX and RX

For more info Keep a eye out on the Website at: **http://www.gb7dip.freeserve.co.uk/dipg/index.htm** or show your interest by allowing us to send you a zip file containing the full description and set-up details at: **sales@gb7dip.freeserve.co.uk'**

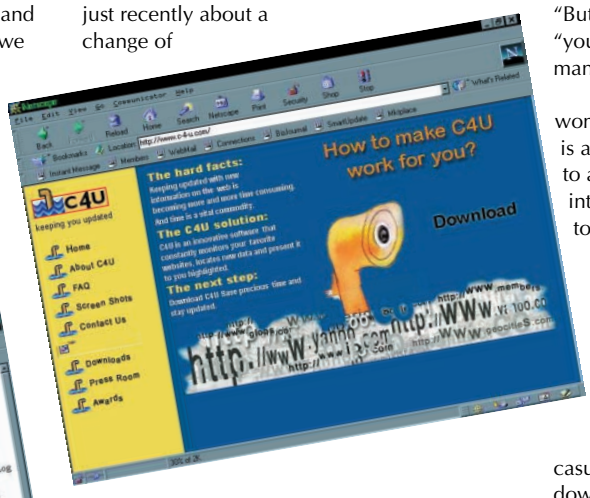
Having also seen the following, I think the system is the same in both cases, but at least somebody is making some progress somewhere! "For the first time in France **F1BIU** and **F6FBB** succeeded in transmitting digital information between two stations via Packet radio with 76800 bauds on 1.2GHz. Success was not guaranteed insofar as they developed their systems separately".

Briefly, the configuration was as follows: Jean-Paul F6FBB had prepared two computers, Pentium 100MHz with 16Mb of memory RAM, disk 200Mb, equip with HDLC SCC4 ATEPRA cards and G3RUH FSK modem with the addition of an adapter card by F1TE. Jean-Paul has already given on the 'frpacket-sys diffusion list' the modifications necessary for the SCC4 card (for the use of modems providing RX and TX clocks).

The operating system was Linux 2.0.36 (SuSE 6.0) on each PC (memory 16Mb) with modules AX25, ROSE and FPAC. Parameters EAX25 were MAXFRAME 63 and paclen 256. The packages were 16128 bytes.

For the radio part, Victor F1BIU had assembled two 1.2GHz kits for transmit and receive. If you are interested in finding out more, look on the following URL: **http://www.ccr.jussieu.fr/physio/f6bvp/thd2.html**

There have also been several bulletins just recently about a change of



● Fig. 3: Save time - look at www.c-4-u.com for some useful hints.

protocol for the UK Network. Again, trying to rejuvenate the network is an uphill struggle, but one that is worth while. A text-based system is not all bad, and in fact there is still a lot to be said in favour of our own 'mail' and information service, so don't desert the ship yet!

CONTEST RTTY

Listening to a RTTY event over a recent weekend, I realised that this mode is still extremely popular. There are several software programs to allow the user to organise such a contest, from log keeping, 'duping' through to producing the logs in the required format and sending them via E-mail.

One suite of programs for you to try is *Cabrillo Tools*, by WT4I. See **www.CabrilloTools.com (Fig 2).** Converting the logs from your favourite program can be a laborious task and this makes it easier for you. Unfortunately they are not free, but you can look for the details and decide for yourself.

Another utility you might find useful and timesaving it C4U. Take a look at **www.c-4-u.com (Fig 3).** You can download this program free, and it will save you looking at your favourite web sites. It will prompt you every time they have changed, which I think is really neat!

AND FINALLY....

An ambitious yuppie took a Caribbean cruise and had the time of his life until the boat sank. He was swept up on the shore of an island with no people or supplies. Nothing...only bananas and coconuts.

Four months later he was lying on the beach when the most beautiful woman rowed up to him. In disbelief, he asked her: "Where did you come from? How did you get here?"

"I rowed from the other side of the island," she said, "I landed here when my cruise ship sank".

"Amazing," he said, "You were really lucky to have a rowing boat wash up with you".

"Oh, this?" replied the woman "I made the rowing boat out of raw material that I found on the island, the oars were whittled from Gumtree branches, I wove the bottom from Palm branches, and the sides and stern came from a Eucalyptus tree".

"But that's impossible," stuttered the man, "you had no tools or hardware, how did you manage"?

"Oh, that was no problem," replied the woman, "on the south side of the island there is a very unusual exposed strata of rock. Fired to a certain temperature in my kiln, it melted into forgeable ductile iron, which I used for tools".

The man was stunned.

"Let's row over to my place" she said.

After a few minutes of rowing, she docked the boat at a small wharf. Before him was a stone walk leading to an exquisite bungalow painted in blue and white.

As they walked into the house, she said casually "It's not much, but I call it home. Sit down please, would you like to have a drink"?

"No, thank you" he said, still dazed, "I can't take any more coconut juice".

"It's not coconut juice," the woman replied. "I have a still. How about a Pina Colada"?

They then sat down to talk. After they had exchanged stories, the woman announced, "I'm going to slip into something more comfortable. Would you like a shower and shave? There's a razor upstairs in the cabinet in the bathroom".

When he returned, she greeted him wearing nothing but vines strategically positioned and smelling faintly of gardenias. She beckoned for him to sit down next to her. "Tell me," she began, suggestively, we've been out here for a very long time. You've been lonely. There's something I'm sure you really feel like doing right now, something you've been longing for all these months? You know... " She stared deeply into his eyes.

He couldn't believe what he was hearing: "You mean", he replied....."I can check my E-mail from here?"

Keep your news and views coming to me, address at the top of the column.

See you next month.

Roger G3LDI

SCENE USA

BY ED TAYLOR N0ED

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I'll be moving back across the Atlantic soon, resuming life as a *G* station. But it won't be the last article you see of me in *PW*! More about that later. I've covered plenty of ground in the five years since I first started writing about Amateur Radio in the USA, and much has changed. I'd like to compare these changes to those experienced in the UK: there are similarities, but also many differences.

MAINLY MORSE

A world-wide phenomenon has been the revision of licensing arrangements, particularly in connection with Morse testing. Let's summarise what has happened in the USA, and remind ourselves about the UK.

In April 2000, a new American scheme was introduced. Its characteristics are that the Morse requirement for h.f. is reduced to a single test of 5w.p.m. and instead of six licence classes, there are only three: Technician, General, and Amateur Extra. In a strange anomaly, the old licences, Novice and Advanced, remain (but can no longer be obtained), with the same band allocation as before.

The new examinations are not really different. Instead, questions have been combined and eliminated. In fact, things are harder, since the new exams cover more ground, and so additional topics are tested in each exam session. But, as before, there is no practical element, and a candidate could obtain a licence without ever having heard a QSO or seen an Amateur Radio antenna. This is something which many in the US would like to rectify the next time changes are made.

In the UK a major restructuring has not yet taken place. Recently we've had the A/B licence, allowing h.f. access with a Morse test at 5w.p.m. Curiously, the lower Morse speed means lower power output only on h.f., where the new M5 stations can use 100W.

The Novice licence remains, with recently enhanced privileges, but is not needed to reach the higher level. As in America, no practical radio experience is required for the highest class of licence.

Even this cursory look at the two systems shows a pattern. There are still inconsistencies in both and we are clearly in a transitional period. Everyone seems to be waiting for the time when **the Morse test is no longer needed for h.f. access!**

Yes, I've dared to say it! A day will come when the Morse test is no more, and the licensing system will change again. I expect that in the USA, the three levels will be retained, perhaps with some adjustment to the syllabus. It would be a pity if the exams remained theoretical only. Advocates of the Morse test are quick to point out that at least a Morse exam is a practical test of **some** sort.

What will happen in the UK? A two or three tier structure has been proposed, with a probable incentive scheme based on practical and theoretical testing. This will lead to increasing allowable power, from 10 to 400W. For more information on various ideas, see the RSGB website at:
www.rsgb.org/lic/raefut2.htm

By the way, everyone is invited to contribute to the discussion in the UK (I already have), and the RSGB has an E-mail address for comments. Even if it wasn't the case in the past, I can vouch for the fact that the RSGB is now taking careful note of all constructive suggestions. It's likely that the licensing authorities will give a lot of weight to what the RSGB has to say.

My own thoughts are that the Morse test was **never** much of a filter, ensuring that h.f. operators were 'worthy' of the privilege. It's now considerably more important to expose potential Amateurs to Amateur Radio in operation, and then to make sure they won't electrocute themselves, interfere with aircraft, and so on.

I'm very glad that Morse code is likely to be an optional part of the new regime. My US experience also suggests that examination by selected volunteer amateurs, under strict control, would be very successful.

ON HOLIDAY

You may be surprised to hear that you can now take your radio gear ob holiday and operate in dozens of countries around the world, without the need for a separate licence. In places where you do need a reciprocal licence, the procedure is usually very straightforward.

The growth of this idea has been gradual, and is interesting because America and Canada have participated only in the last few years. Both countries are in the CEPT agreement, which relates to temporary European operation.

Of course, the USA is not part of Europe, but participates as a sort of 'associate' member. This was an uncomplicated way for the USA to take part in a growing venture, and is probably no stranger than Israel being in the Eurovision Song Contest!

So you can go to North America and become W2/G9QRM or VE3/G9QRM without any formality whatsoever. The same applies, reciprocally, to an American visiting Europe. Given the free flow of portable computers and other smaller electronic equipment through customs halls generally, coming and going with

IN HIS LAST 'SCENE USA' COLUMN, ED N0ED COMPARES THE CHANGES IN AMATEUR RADIO HE'S SEEN IN AMERICA AND IN THE UK.

● Look out for Ed N0ED's reports in 2001 from some exotic DX locations.

your radio equipment is usually a simple matter.

The CEPT participation will undoubtedly increase, so we can look forward to travelling widely and setting-up rigs and antennas during holidays or business trips. This is a particular interest of mine, and I will explain later how this relates to my next contribution to *PW*.

OUTSIDER'S PERSPECTIVE

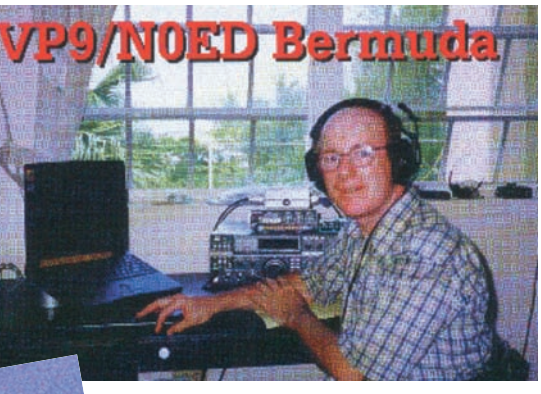
Let's step outside our roles as Radio Amateurs, and look at our hobby from an outsider's perspective. What is the public perception of Amateur radio?

On the American side of the Atlantic, frequent press reports show groups of people having fun with something they are interested in, but who also feed something back into the community. For example, I've written before about a radio club which does marvellous work in getting youngsters interested in electronics, and about the valuable work Amateurs do in helping emergency services.

On the British side, Radio Amateurs hardly impinge on the public consciousness. Few have any knowledge of what Amateur Radio is, and how it differs from Citizens' Band.

General understanding is still based on a 40 year old Tony Hancock sketch, and media coverage is minimal. Unfortunately, the good work of organizations such as RAYNET is not well known.

Perhaps I'm exaggerating, but it's instructive to compare the US and the UK. I



really **do** think that the British can learn something from Americans.

The national society in the USA, the American Radio Relay League (ARRL), puts great emphasis on good publicity, locally and nationally. In their monthly magazine, they list newspaper articles and radio/TV programmes which have featured Amateur Radio.

Does it really matter? I would say, **emphatically**, yes. We need the goodwill of the government, which means we have to earn the goodwill of the general public.

Several initiatives have been started in the UK, but much more needs to be done. I was impressed, for instance, by the excellent publicity achieved from the M2000A millennium station a year ago. This sort of public relations activity perhaps comes more naturally to Americans, but Brits need to learn.

GOOD AND BAD

Not surprisingly, the good and bad aspects of Amateur Radio in the USA mirror the American character and way of life. You might think that in a country which occupies a large part of a North America, and which contains a quarter of a billion people, generalisations could be inaccurate. Nonetheless, there are shared attitudes which any visitor will discover pretty quickly on a journey around the US.

● The world is your oyster with radio operation.

Personally, I like the general air of optimism which pervades most activities. There is an idea that if you put enough work into a job, you will achieve your goals, and this also applies to Amateur Radio as well as life in general.

For example stations are operated in difficult circumstances, antennas are erected where they won't really fit, and the authorities are badgered until they allow Morse-free licences and vanity callsigns. Nothing is thought to be impossible, and if it is, a committee is formed! The British-style grumble is not unknown, but is usually followed by activity to rectify the situation.

The USA is also a place where hard work and a competitive spirit are considered virtues. This has helped to create the wealthiest nation in the world, with a strong economy.

In Amateur Radio, among other things, competitive spirit has led to an incentive licensing scheme, where increasing privileges are earned by passing exams and learning more. As a result, the inevitable changes in licensing structure may have a harder passage in the USA than in the UK, because the 'old guard' considers that newcomers are getting something for nothing. My sense is that American Amateurs will eventually understand that a different standard is not necessarily a worse standard, but you might expect some turbulence while changes take place.

American approval of the idea of striving to be at the forefront means that the USA is the home of the 'super station'. Because land is generally cheaper, it's possible to put up huge antenna farms.

Many of the world's top DXers and contesters are in the US, with stations that are unimaginable in Europe. Having more disposable income helps, but most have been created by people who have spent much time and energy on their projects. It's the American way!

In some respects, the emphasis on being demonstrably the best does not sit well with all aspects of Amateur Radio. There is no real status in building fine QRP equipment or contacting 200 countries from an apartment, for instance. Personally, I would give equal kudos to an attitude that says everyone's approach to the hobby is different, and you can contribute in small ways as well as those that are more obvious and dramatic.

FUN TO WRITE

Over the time that I have been writing 'Scene USA' it has been fun to write. Thank you to everyone who has commented. I've enjoyed living in America, and I'll try to help anyone who has a question about Amateur Radio (or anything else) in the USA.

Starting in April 2001, I'll be writing a new quarterly column, called 'DX Destination'. Its purpose will be to look at some of the places that are available for Amateur Radio operation without too much preparation or formality. I have in mind the 'DX Holiday' approach where a few days (perhaps a week or two) of operating can be combined with a family holiday.

I'm not really thinking of a full-blown DXpedition, where a large team of operators takes a huge amount of equipment to an exotic location, and operates 24 hours a day. I will be looking at small-scale operations, using equipment that can easily be carried on a plane, or in the boot of a car. This will include the 'backpacker' style expedition to high points in the UK for v.h.f/u.h.f activity.

I'll also be covering topics like finding somewhere to operate, getting any licensing and other paperwork, explaining what to take, and showing how to set-up antennas and other gear. Naturally, I'll also suggest operating strategies, particularly as some Amateurs are not used to the inevitable 'pile-ups'.

It's practicable these days to carry '100W and a dipole' almost anywhere in the world. Rigs are smaller, and licensing is easier. Please let me know what you would like to see in the new columns and tell me about any of your own 'DX Destination' holidays.

73, Ed NOED

TUNE-IN

BY TOM WALTERS

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WALTON ESSEX CO14 8BX

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

RADIO PRAHA
ČESKÝ ROZHLAS 7

Check out Radio Prague's website **www.radio.cz** and once you get past the strangely antiquated radio on the opening page, you'll find a really lively fund of information - as you do from listening via radio. For instance, there's everything you need to know about beer, with links to beer-related sites world-wide. Beer has been brewed in that part of the world for over a thousand years - and you found that out through international radio!

There's also some good news - **Radio Prague** (RP) have that they're expanding, not getting smaller, like some other international stations. The station had recently added Russian language broadcasts and director **Miroslav Krupicka** said the decision to add Russian reflected "a renaissance in relations between the Czech Republic and Russia". There are three half-hour Russian transmissions each day.

If you want to try and pick-up the Russian transmissions, the schedule is: 0500-0527 on 5.915, 6.055, 11.600; 1230-1257 on 6.055, 17.495, 21.745 and 1530-1557 on 5.915, 11.990, 13.580MHz. Radio Prague's winter schedule for English to Europe is: 0800-0827 1160mw, 15255; 1130-1157 21745 (northern Europe); 1700-1727 5.930, 17.485; 1800-1827 on 5.930, 7.315 and 2100-2127 on 5.930, 9.430. Radio Prague can also be heard on satellite and Internet via World Radio Network. Full information for web-users on **www.radio.cz/english**

● Something bright and cheerful - A foaming litre of Czech beer on tap.

PORTUGUESE PRACTICE

If you'd like to practice your Portuguese, and conjure up thoughts of the sunny summer to come, then check out **RDP Internacional**'s winter short wave schedule: Listen at 0600-0900 on 9795; 0600-1300 on 11.960; 0745-0900 on 11.660; 0900-1300 on 15.140; 1700-2000. If you've got satellite equipment, RDP Internacional is also on *Hot Bird 2* (13° east) Transponder 50 (11.72748GHz) subcarrier 7.02MHz.

Those two schedules are part of the overall B-2000 schedule (winter in the northern hemisphere), where we will be looking for low or very low short wave frequencies during the hours of darkness and sometimes there will be remarkable transmission on m.w. frequencies over much greater distances than usual - reception over 2,000 miles or more is not uncommon.

Talking of things beginning with B, B-92 is back - that's the internal radio of Serbia that gave Mr Milosevic so much bother he closed it down! Well, he's gone, and B-92 is back and so too, probably, by the time you read this, will be **Radio Yugoslavia**.

Information at the time of writing in mid-autumn is very sparse. Keep your radio ear to the ground as it were as there will no doubt be plenty of radio activity coming out of the area as Yugoslavia gets into its post-Milosevic stride.

AS WE MOVE INTO A NEW YEAR TOM WALTERS HAS GOOD AND BAD NEWS ON THE BROADCAST BANDS FRONT.

It's getting ever more difficult to keep broadcasters' minds firmly on short wave, as they get lured by the latest techno advances. On the menu now is radio via the Internet via mobile phones. The BBC can already be heard in Poland and Zimbabwe by this means.

It's very important for international broadcasters to reach the elite, but the huge majority will need short wave for many years to come, and we have to keep telling the broadcasters not to get carried away on dreams of the Internet - which is so cheap compared to short (and medium and long) wave, but cuts out so many potential listeners.

There's a rumour about Nigeria getting back onto the short wave scene, after a long absence. Nigerian TV reported that the **Voice of Nigeria**, first established in 1961, has recently been relaunched from studios in the country's capital Abuja.

Libyan radio is reported to have boosted the power of its medium wave transmitters on 675, 972, and 1125kHz. Transmissions are in Arabic, and just might be heard in northern Europe during the hours of darkness.

BUDGET CUTS

It seems that the severe budget cuts in store for **Radio Austria International** announced as being nearly 50% will be nearer to 60%. So ROI can probably keep its Arabic, Spanish, and Esperanto services, although the airtime for each will be cut in half.

But ROI will no longer be heard on satellite via WRN. Shortwave transmission from Moosbrun will be reduced, but the transmitters will still be busy. Leading transmission provider Merlin Communications is to act as broker for anyone who would like some short wave output from Austria.

Meanwhile, the advertised schedule for ROI in English to Europe is: 0400-2400 on 6.155, 0400-1800 on 13.730, 1800-2300 on 5.945MHz. To North America: 0200-0300 on 7.325, 1600-1700 17.685MHz. To Latin America: 0100-0200 on 9.870, 13.730 and 2200-2300 1.3730. To North Africa/Middle East: 2100-2200 on 5.945, 6155 (Fri-Sun). Asia/Australasia: 1400-1500 on 1.7855. There's a helpful web site at **http://roi.orf.at/english**

The news from Switzerland doesn't bode too well, either. Two years ago, the Schwarzenburg transmitter near Berne - used by **Swiss Radio International** - was dismantled after local opposition to it on health grounds, and all the heavy equipment was removed.

The building was then taken over by the Museum of Communication in Berne to store some 10,000 items such as old letter boxes, parcel delivery vans, post buses and telephone exchanges, as well as television equipment dating back to the 1950s, which had previously been kept in depots scattered around the country. "It took three months to transport 3,500 square metres of postal and telecommunications history to Schwarzenburg," said the museum's operations manager, Thomas Zumbrunn, "and we are delighted with the result".

Although the depot is not open to the public, occasional guided tours can be arranged. Most of the equipment is restored and maintained by retired people who used to work for the postal and telecommunications sectors. Items from the museum will be displayed in exhibitions. But it's a sad end for a historic transmission site.

That's all for this month so until next time keep those dials tuned and those ears to the ground.

Tom

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Everyone at Armscroft Communications would like to wish our valued customers, old and new, a very Merry Christmas and a happy and peaceful 2001. May your log books overfloweth!!

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Icom IC725	Transceiver. Choice of two	From £400
Kenwood TS940S	Transceiver. Good condition	£740
Kenwood TS850S	Transceiver. Narrow CW filter fitted plus narrow SSB filter	£675
Yaesu FT901DE	Transceiver. In excellent condition	£300
Trio TS500	Transceiver plus PSU and external VFO Collectors item?	£90
Drake R8e	Receiver with VHF board. Was £650, now	£550
Hammarlund HQ170	Receiver. New valves and recently re-aligned	£150
Hammarlund HQ170A	Receiver. Works great!	£170
Hammarlund HX 50	Transmitter. Nice condition	£250
RCA AR88LF	Receiver. New valves and recently re-aligned	£100
Kenwood TL922	Amplifier. In good condition	£950
Heathkit SB220	Amplifier. In good condition. Up to 1.2kW output	£550
Yaesu FLDX2000	Amplifier. In great shape! 400-600W output	£275

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Kenwood VFO240	External analogue VFO	£95
Yaesu SP901	Speaker	£30
Yaesu FV101Z	External analogue VFO	£90
MFJ 250	1kW, 50 Ohm, oil filled dummy load	£30
AEA PK232	TNC/digital mode decoder. Was 100	now £85
Astatic D104	Desk mic. Was £70	now £50

VHF/UHF EQUIPMENT

Plessey repeaters	Easy to modify for 23cms. Last few so be quick!	£250
Motorola repeaters	OK for 2m. No modification details. Only 3 left!	£50
PG Electronics 1512	10 to 15V, 5A metered PSU	£30
Icom H10	Ex-PMR, 10 channel 2m EPROM programmable handheld	£50
Tait T500	Ex-PMR, 2 channel mobile radio. Good condition.	£00

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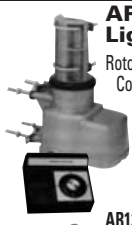

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3 THREE NEW KITS for Novices!

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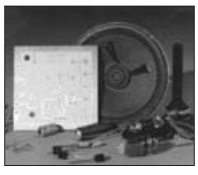

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Please help us to help you by preparing your advert carefully. Any advert on these pages which contains bold **??** marks indicates that the Editorial staff could not read/interpret the wording.

Some reader's adverts are becoming very long! To be fair to **all** readers, so that everyone has a fair chance, we must limit the **words** to 30 - please try to keep to this length. If you have an advert of 50 words or more please submit two adverts (the current month and a previous month's 'corner flash' will be accepted) and - space permitting - we will include the second advert the same month. In future, any advert that's considered to be too long will be edited to suit or 'held over'.
Thank you for your co-operation. Editor.

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ADI AR 147 2m (144MHz) mobile TX/RX in good order and condition complete, would prefer buyer to inspect and collect. £120. Tel: (01670) 760511.

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Amplifier Heathkit 220, good condition, all manuals, big and heavy hence buyer collects, £520 o.n.o. Yaesu FT-790 70cm (430MHz) all-mode, £170 o.n.o. Can all be seen working. Jason, Yeovil, Somerset. Tel: (01935) 421983 or E-mail gowrb@wrb.org.uk

AR88D complete re-sprayed cabinet nice front panel, with S-meter overhauled and aligned nice receiver, £195. Also HRO, CR100, 1155, all in nice condition. Tel: (08172) 862291.

Clarke portable pneumatic 10mtr mast base accessories, £300. Oscilloscopes advance OS2200A. HP120A, £75 each. HP Barcode pens, £100. Bench p.s.u.s Thurlby PL320, Weir 403, Weir 400, £75 each. Mike on (01827) 872959 or E-mail: mikehiam@bun.com

Collectors Telefunken 1345 GWK commercial portable receiver. Early equipment, not known if working. Buyer collects. G3LZM, Hereford. Tel: (01432) 271162 evenings.

Dansette 1950/60s valve portable record player radio. Automatice record player changer, 4 speeds 78/45/33/16 records. Good condition, working order, £55. Jim Walshaw, Dagenham,Essex. Tel: 0208 592 4206.

Eddystone 830/7 just re-valved and serviced c/w Eddystone plinth speaker v.g.c. best offer or £200 or over. Prefer buyer inspect and collects by arrangement due to weight. Jim McGowan M5AIP, Essex. Tel: (01708) 340304.

Eddystone EC10 MkII receiver, £75. Hallicrafters S120 receiver needs attention, £25. Yaesu FT-107M 9-band transceiver with optional power supply and c.w. filter, boxed £300/ John G4XYY, West Yorks. Tel: (01937) 844197.

Eddystone S640 receiver g.w.o., £60. S640 needs dial string, £40. S659 g.w.o., £60. Wanted Eddystone model 504, 680. 740, 730/4 or similar also wanted R1155 and PCR RX. Pete G4IXY, St. Albans. Tel: (01727) 839908.

Epson VGA14 monitor. Moretec orange monitor. RadioSpares 1950s components, most boxed £offers. Bob Allen, 11 Ledalle House, Forbers Close, Cricklewood. Tel: 0208 457 3119.

ERA MkII Microreader and ERA RS232 display, plus p/supply, instructions for reader and dispaly, perfect working order, £90, includes carriage/insurance. Bill, Morecambe. Tel: (01524) 833748

FR100B RX v.g.c., £60. Collect or carriage extra inc handbook. Marconi CR1000 working, handbook, £20 collect only. Tel: (01246) 566040.

FRG-7 comm receiver and digital read-out counter, instruction book, circuit diagream, a.t.u. noise reduction filter, *Radio Handbook 2000* PW order, £150, includes carriage/insurance. Bill, Morecambe. Tel: (01524) 833748

FT-101E Yaesu working order, clean good RX, buyer collects, cash only, manual + data circuit diagram, mic. £150 o.n.o. Nigel G7LPY, Wolverhampton. Te: (01902) 566193.

FT-102 g.w.o., £300 buyer to collect. Tel: Brian on (01332) 883035 after 5pm.

FV101DM good condition £60 o.n.o. KW-107 good condition, £70 o.n.o. MD1B8 base mic like new, £60 o.n.o. Tel: Newbury. (01635) 550573.

Geloso TX/RX p.s.u. army R216 RX p.s.u. Quantity domestic valve, transistor radios, various related parts include. valves etc. Offers or swap for modern quality h.f./v.h.f receiver. Roy, Saffron Walden, Essex. Tel: (01799) 500412.

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Icom 2100H 2m (144MHz) mobile boxed, mic, manua, d.c. lead, extra mic, plug socket. warranty until 21/11/2001, as new £180. SM8 mic, boxed, circuit diagram, £70 as new. Ray G0WWU. Tel: (01553) 761309.

Icom com receiver IC-R7000 with remote option, manual, nice condition and working well, £200. Len, Plymouth. Tel: (01752) 261269.

Icom IC-736 built-in a.s.t.u., p.s.u.. 28VPA h.f. +6m (50MHz) complete with mic, boxed, inspection welcome, as new 1996. Little use, £575 was £1600. G3GYE, 'Westmoors', Trezela, Gulval, Penzance, Cornwall TR20 8XD.

Icom IC-Q7E hand-held dual-band transceiver with 30-1300 receiver as new condition with box and instruction manual a very neat little radio £100. Tel: Northants (01536) 711107.

Icom IC-R70 RX, working, £225. 3xWWII multiminor forerunners, £50 each. Revox reel-to-reel working on headphones only, £50. 600W transistor amplifier, works, £50. RFG-7 working, £100. Stanley, Crickelwood, London. Tel: 0208 4504 045.

Icom R71E, excellent conditionwith manual. Original box plus Kenwood extension speaker, £300. Philip, Welling, Kent. Tel: 0208 855 3652.

JRC NRD 345 receiver 0.1-30MHz excellent condition, £300. Tel: Gloucester (01452) 612234 evenings and weekends.

Kenwood 711E m/mode 2m (144MHz) base station model, superb condition, £350. Contact Jack on (01306) 887057.

Kenwood R-1000 h.f. receiver and manual, bargain, £230. Global AT-1000 h.f., a.t.u., £40. ERA Microreader , £70. BNOS 432Mhz, 50W linear, £180, Navico AMR1000s 2m (144MHz), f.m. mobile with a.t.u. plus manual, bargain, £120. Alan, Royston, Herts. Tel: (01763) 262443 50 miles will deliver.

Kenwood TH-25E 2m (144MHz) hand-held, boxed, small fault, three battery packs, charger, d.c. adaptor, speaker mic, stand, s.case, manaul £25 o.n.o. Buyer must collect at this price, bargain. George G4XSM, Suffolk. Tel: (01284) 768084.

Kenwood TM-241E 2m (144MHz) f.m. 50W mobile, boxed v.g.o., £100. IC-2E 2m (144MHz) hand-held, leather case, car adapter, charger, £60. Yaesu FT-780R 70cm (430MHz) all-mode, £150. Buyer collects or pays postage. Tel: 0239 226 4587.

Kenwood TM-V7E 2m(144MHz)/70cm (430MHz) CTCSS DTMF 280 mem. Watson 10A power supply. Both new July 2000. Radio Shack PRO28 scanner v.h.f/u.h.f. plus cash. All in mint condition. Part ex for TS-940SAT. Tel: (01228) 520840 or E-mail k.d.wilson@ntlworld.com

Kenwood TM441E 70cms (430MHz) f.m. mobile XCVR + H?B, £170. Yaesu FRG-9600 multi-mode RX, 60-90MHz + p.s.u. + H/B, £170. HP deskjet 510 printer, £40 P&P at cost. Peter G3UXH. Tel: (01634) 250562.

Kenwood TS-440 extra filters voice synth £330. Service manuals Ts50, AT50, £20 each, £35 the two. Power supplies Manson FP925, £60. Altai 5A regulated Ditto 10A, £15.You collect or pay carriage. Douglas, Cromer, Norfolk. Ytel: (01263) 512664.

Kenwood TS-570DG h.f. TX/RX, mint condition, £700 o.n.o. Cushcraft R7000 vertical, £150. Cushcraft R5 vertical for spares, £50. KW107 a.t.u., £100 (z-match). Pete, Bristol. Tel: (01454) 882465.

Kenwood TS-850S, new internal a.t.u., audible frequency read-out, boxed, sbsolutely showroom condition, virtually unused due to military service commitments, absolute bargain for this classic rig, £750. Tel: Mick on (01752) 766373 or (01752) 294357.

Kenwood TS-850SAT, £600. Yaesu FRG-7700 with FRT-7700 a.t.u.FRV770 v.h.f. converter, £200. Kenwood TM441E u.h.f. 5/10/30 Watts , £120. Diamond X50 antenna, £30. F/glass 50MHz vertical, £15 all in perfect order. Don GW0PLP. Cardigan. Tel: (01239) 811157 after 6pm.

Kenwood TS-870 mint, boxed, £950 o.n.o. Kenwood SP940, £35. Trio TS-870 v.h.f/u.h.f., £350. Kenwood AT-230 a.t.u., £50. Icom R72 h.f. RX, Icom R7100 all-band RX both £700. Yaesu SP767, £35. Tel: 0161-4271 809.

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Lowe HF-150 with NiCads and telescopic antenna, immaculate, £140 o.n.o. Colin Grove, Worcs. Tel: (01299) 400472.

MFJ Econo Keyer, £30. Nissei desk mic wired for Alinco DX-70, £30. Both items hardly used and in good condition. Tel: Terry on (01924) 822796 or E-mail: Ibbitson@kpgraphics.com

MFJ-9020 20m, c.w. QRP rig. MFJ 4114+ p.s.u.. MFJ-971 a.t.u., £175 o.n.o.. AKD 7003 70cm (430MHz) rig, £40. Tel: 0115-914 3125.

NRD JRC 525HF general coverage, mint, no box, with manual* also NRD JST 135HF T/X receiver 150W, mint, boxed with manual, £400 o.n.o. (Receiver price) £375 o.n.o.*. Tel: G1PVU on (01458) 447019.

PacComm Tiny 2 TNC, £75. Tel: Chris on (01766) 522744.

Philips AE3750 digital world radio l.w., m.w., f.m. stereo s.w. 1.7-30MHz used for one month so as new, £70 including postage. Tel: Nottingham 0115-973 2608.

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PYE Transistor Ranger in good working order, £25. Tel: Bury St Edmund 705030.

Pye Ex PMR v.h.f. low-band a.m. radios, (currently 86.375 and 86.3625MHz) No.2 Model M-293, No.1 model W15AM Westminster with speaker and connecting cable for mounting in boot. £offers. Arnold, Cheltenham. Tel: (01242) 235426 or G7MWY@GB7GLO.

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SG2000, 150W h.f., manuals, £500. Icom 735 h.f. PS55, p.s.u, At-150 auto a.t.u., fist mic, manuals, boxed, first class condition, £450. Yaessu FC-102 a.t.u., manual £145. John G4WVP (not QTHR), Manchester. Tel: 0161 284 1402.

Signal R5353 civil/military dedicated airband receiver, p/pack, manual, boxed, v.g.c., £225. PRO2026 base/mobile scanner, 100 memories, 66-956MHz, manual, boxed, absolutely as new, £85 o.n.o. Tel: (01926) 854556.

Silent Key Sale. TS-430S fitted with a.m. & 270Hz c.w. filters complete with PS430 DC power supply, £420. FT-990 fitted with 500Hz & 270Hz c.w. filters complete with EP900 DC power supply, £650. G3PVG, Leicester area. Tel: (01455) 888201 or E-mail: j.bennett@lboro.ac.uk or G3PVG@GB7AYI.

Silent key sale on behalf of G1VJH. 2m (144MHz)/70cm (430MHz) CB equipment and Practika camera (working) send s.a.e. for list to: J. G. Dowse, 5 Tennyson Close, Sutton-on-Sea, Lincolnshire LN12 2TL.

Silent key sale. Receiver Yaesu FRG-8800. Sensible offers considered. Mrs J James, Hatfield. Tel: (01707) 269380.

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888A, HQ170A will collect. Brian, 66 Hursley Road, Kilburn, Derbys DE56 0NE. Tel: (01332) 883035.

Any information on Eddystone twin and single valve wireless, researchng on Chakophone wireless sets1923 to 1936 seek any details. Andrew Humphriss, Leamington Spa. Tel; (01926) 423120 or E-mail:andrewhumphriss@tinyworld.co.uk

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Manual for Realistic DX-200 comms receiver, any other info, date or manufacture etc. Also advice on renewing dial cords (or borrow for copying). John Evans, Isle of Wight. Tel: (01983) 730944.

Marconi CR100/B28 receiver. Daniel Atkinson, Derby. Tel: (01332) 792515.

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NEC CQ110E transceiver must be in good condition Xtal filter for Hallicrafter SX146 receiver 5kHz bandwidth. E-mail: tonyfsuby@compuserve.com

Old radio books, radio mags, *Supa Coils handbook*, No *1 Practical Wireless*. RODing laboratory handbook etc.. John Savage, 13 Kennerton Walk, Swindon, Wiltshire.

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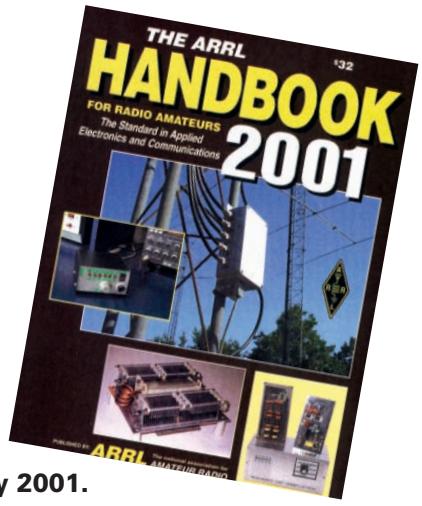

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Our Rob is never lost for words, this time he has information on a new column

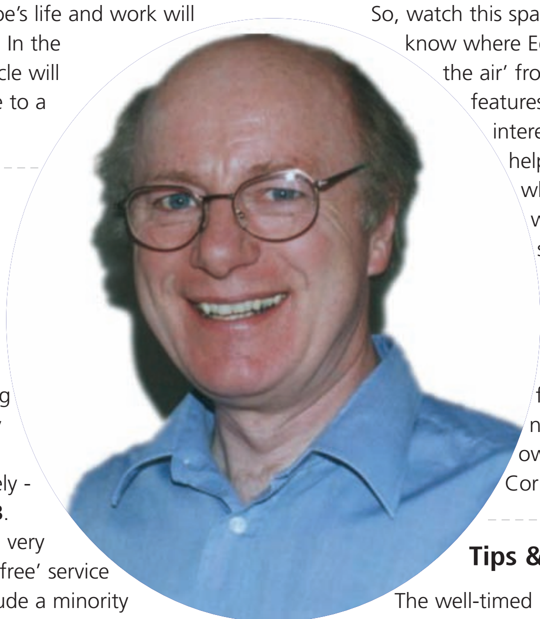
rob mannion signs-off

Rob G3XFD rounds off this month's issue and provides a sneak preview of what's in store and coming soon!

Just as we were completing this issue of *PW*, I received the very sad news that our American author **Joe Carr K4IPV** has died. The news awaited me on Monday morning 27th November when I received an E-mail from Joe's wife Bonnie.

In her E-mail Bonnie told me that Joe had died in his sleep overnight on Friday night 24th November. Obviously, we'd been in frequent contact with Joe - his 'Wanted Or Unwanted' filtering article appears in this issue - right up to a day or so before he died.

It seems ironic timing, because Joe was planning his next visit to the UK and he'd invited **Kevin Nice G7TZC**, Editor of *Short Wave Magazine,* and I to meet him in Bristol (We were both looking forward to the event). A full obituary reflecting on Joe's life and work will appear in the next *PW*. In the meantime his latest article will stand as a fitting tribute to a good friend



Bargain Basement

The ever increasing popularity of the 'Bargain Basement' section of *PW* has, by its very success, led to a corresponding increasing workload for an already very busy 'one third' of the Editorial team namely - **Donna Vincent G7TZB**. Unfortunately, there are very many problems with a 'free' service such as 'BB'. These include a minority of readers who seem almost to verge on becoming 'traders' (I've had to ban two such people following a series of complaints from other readers) with long lists of 'Wants' and numerous 'For Sale' adverts.

Other problems include badly written and prepared adverts which can be almost impossible to decipher. These can sometimes lead to the advertiser complaining to us - when we've done the best we can to provide a good 'free' service!

So, with this in mind I have, in conjunction with Donna and **Tex Swann G1TEX**, decided to institute - from the March 2001 issue - a nominal £4 charge for each 30 word (plus name and address) 'BB' advert. (**Please note this takes effect from Dec 18 2000**).

Please note that 'BB' adverts will continue to be free for subscribers. (This is our way of saying 'thank you' to subscribers for paying 'up front' in advance for their magazines).

So, from the March 2001 issue of *PW* (I ask you to use and send the form (or a photocopy), the relevant corner flash, and a cheque for £4 payable to **PW Publishing Ltd**. with each advert. Subscribers please note all you have to provide is your Subscription Number).

Ed's Exile Ended!

Now that his exile (only joking!) has finished - **Ed Taylor N0ED/G3SQX** is returning to the UK. However, Ed's return does not mean that we'll not be hearing from him in future. Obviously, his popular 'Scene USA' (A feature unique in European Amateur Radio magazines) ceases - but as he's always had 'itchy feet' he'll be reporting from some interesting locations in the future.

So, watch this space - you'll never know where Ed is likely to be 'on the air' from. His future features will make interesting reading and help you find out what's needed if you want to go to the same places yourself. Thanks for making 'Scene USA' so interesting Ed - we look forward to more news from our very own 'Foreign Correspondent'!

Tips & Topics

The well-timed letter from **Jim Brett G0TFP** under the heading 'Hints & Tips' enabled me to mention a new series in *PW* which is to be 'hosted' by **Tex Swann G1TEX**. In fact, I think Jim G0TFP must have been looking over our shoulders when we were discussing the new series 'Tips & Topics' especially as his choice of title was so similar to that decided on by the Editorial team itself!

Appearing bi-monthly (taking the place of the now completed 'What Is A?' series) the new column will share ideas, hints and tips that you the reader send in. In return you'll receive a prize voucher (full details when the column appears).

The *PW* team are hoping that the 'Tips & Topics' column will soon be 'fizzing' with ideas and suggestions. So get busy and write in and help us provide you with a magazine which is increasingly active and 'alive' - to take us forward into the future.

Rob G3XFD

next month

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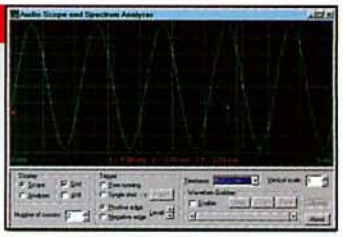

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IF bandwidths	6 kHz (AM/SSB), 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
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Visitune	yes	yes	yes
Published 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 vat when bought with 'e' series unit (otherwise: £99 inc vat)
PPS NiMH 12v Battery Pack & Chrgr:	£99 inc vat when purchased with 'e' series unit (otherwise: £139 inc vat)
The WiNRADiO Digital Suite:	£74.99 inc vat when purchased with a WiNRADiO receiver (otherwise: £81.05 inc vat)

For your free (no obligation) info pack & WiNRADiO demo disk go to: http://www.broadercasting.com. If you don't have access to the internet then by all means feel free to phone/fax us. *Trunked radio transmissions should only be received & decoded with permission of the originator of the transmission.

Please send all your enquiries to: info@broadercasting.com or Telephone: 0800 0746 263 or +44 (0)1245 348000 - Fax: +44 (0)1245 287057
Broadercasting Communication Systems, Unit B, Chelford Court, Robjohns Road, Chelmsford, Essex, CM1 3AG, United Kingdom

"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

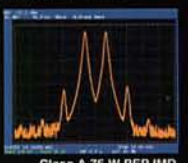
Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.


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!

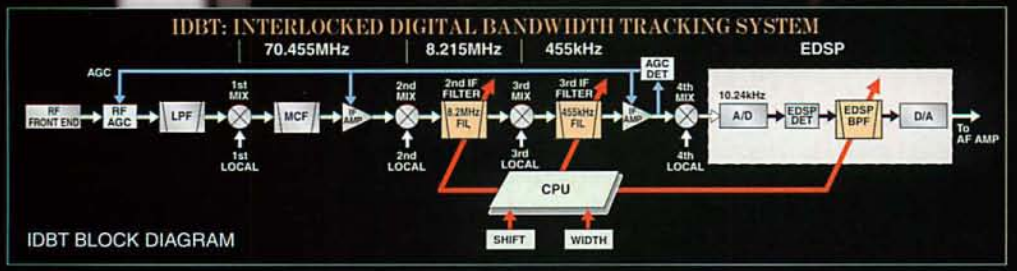

Access VRF and IDBT Features via Shuttle Jog Dial

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

YAESU
Choice of the World's top DX'ers

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