practical Wireless

SEPTEMBER 1996 £2.20

THE UK'S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

BUILD

The PW Rugby 7MHz SSB & CW Transmitter

The Suspend-A-Loop 144MHz Antenna

The QUIPP 3.5MHz Antenna

REVIEWED

Cushcraft R7000 Vertical Antenna

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The Low Down On 73kHz

Plus Carrying On The Practical Way & Antenna Workshop

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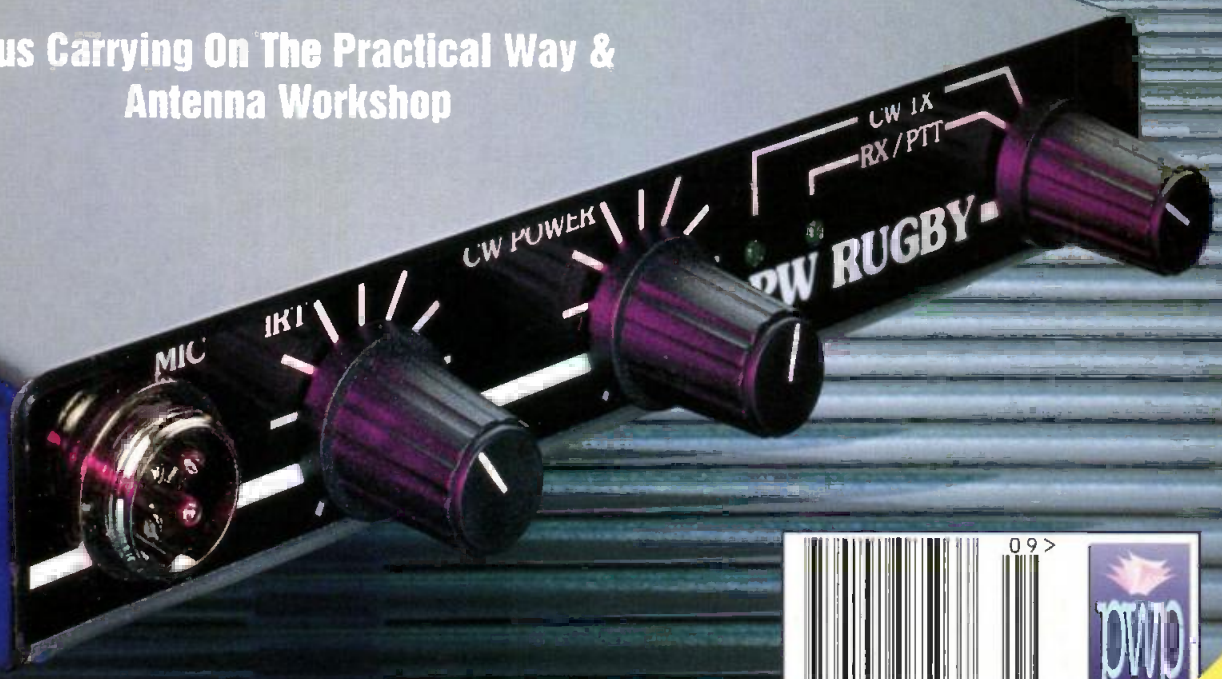
Save Money & Buy Your Own Cushcraft R7000



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YAESU, Principal Sponsor of the IOTA Programme

EDSP RX/TX

All-Mode HF Transceiver FT-1000MP

The year was 1956. Electronic communication throughout the world was on the threshold of significant and remarkable change. Intrigued by the development of single-sideband radio theory, a young engineer and amateur radio experimenter painstakingly assembled an SSB transmitter. Word of his successful efforts spread quickly among his friends, and soon radio amateurs from all over the country were requesting transmitters just like it. Thus was born the first invention of JA1MP, founder of Yaesu. Though his key is now silent, in tribute to his leadership and exceptional contributions to the radio art, the FT-1000MP carries the memory of his call sign.

An HF Masterpiece, Combining the Best of Digital and RF design technology. The FT-1000MP.

Specifications

- EDSP (Enhanced Digital Signal Processing)
- Shuttle-jog Rapid Tuning Enhancement
- Directional Tuning Scale for CW/Digital mode and clarifier offset display
- Dual In-Band Receive w/ Separate S-Meters
- Selectable Antenna Jacks
- Collins SSB Mechanical Filter built-in, 500 Hz CW Collins filter plug-In, optional
- Selectable Cascaded Crystal and Mechanical IF Filtering (2nd and 3rd IF Filters)
- User-programmable Tuning Steps w/0.625 Hz High Resolution Low-Noise DDS Circuit
- Custom Feature Set-up via New Menu System
- Adjustable TX Output Power: 5-100W (5-25W AM)
- True Base Station: Both 100-117 or 200-234± VAC 10%, 50/60 Hz and 13.5 VDC Power Inputs

Blending digital and RF technology, the FT-1000MP features a Yaesu exclusive: Enhanced Digital Signal Processing (EDSP). Beginning on the receive side with Yaesu's industry-standard high-intercept front end design, the RF signal is then fed to the IF stages, where an impressive array of 8.2 MHz and 455 kHz IF filters (including a built-in Collins SSB Mechanical Filter) establish the tight shape factor so important in obtaining high dynamic range and low noise figure. Finally, the EDSP system provides specially-designed filter selections and response contours for maximum intelligence recovery.

Only with this combination of EDSP, independently selectable 8.2 MHz and 455 kHz IF filters, and a low-noise DDS local oscillator system can receiver performance without compromise be obtained. You can customize your FT-1000MP by choosing from 2.0 kHz, 500 Hz, and 250 Hz optional, cascaded IF filters, then zero in on weak signals using Yaesu's exclusive Shuttle-jog Rapid Tuning Enhancement and high-resolution (0.625 Hz) DDS VFO. Without question, the FT-1000MP is the most technologically advanced HF rig today.

EDSP operates in both transmit *and* receive modes. On receive, the EDSP produces enhanced signal-to-noise ratio and significantly improved intelligence recovery during difficult situations involving noise and/or interference. The result of hundreds of hours of laboratory and real-world experimentation, EDSP's 4 preset random noise reduction protocols and 4 digital filtering selections are controlled by easy-to-use concentric controls on the front panel of the transceiver. High, low, and mid-range cuts for voice work are teamed with razor-sharp CW bandpass filters and an automatic notch filter which identifies and attenuates undesired carriers or heterodynes. Also operational in the transmit mode, EDSP provides 4 performance-enhancement pattern selections for different operating circumstances, ensuring best readability of *your* signal on the other end of the path.

Once again, Yaesu's engineers have reaffirmed the vision and dedication of JA1MP which began nearly 40 years ago. See the incomparable FT-1000MP today.

The FT-1000D continues to offer unsurpassed performance for the serious Dx'er who requires a full 200 Watt Power output packaged with full Cross-Band Dual Receiver Capability.

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

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

Advert Sales and Production (Broadstone Office)
Lynn Smith (Sales),
Carol Trevarton (Production)
Paul Orchard (Administration)
☎ (01202) 659920 - 9.30am - 5.30pm
FAX (01202) 659950

CREDIT CARD ORDERS
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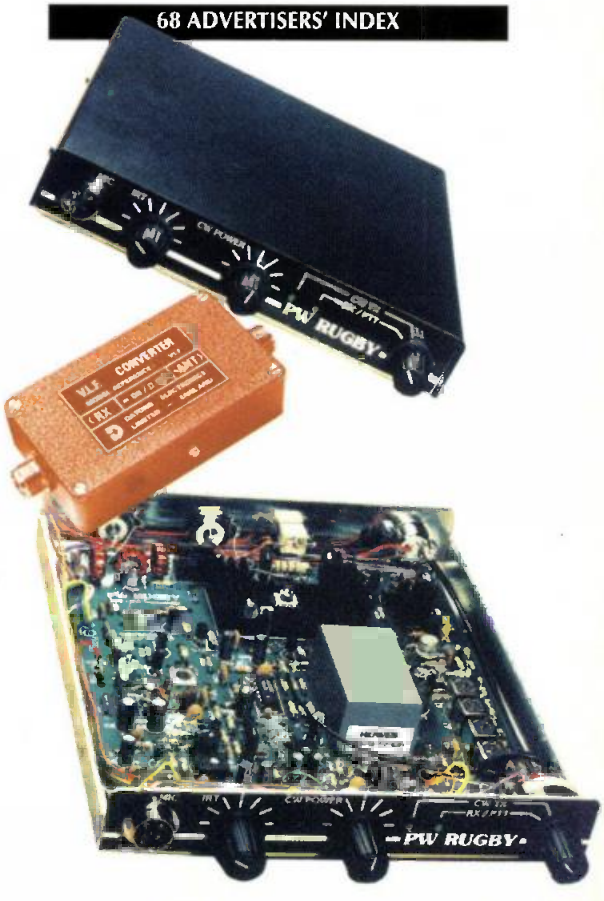

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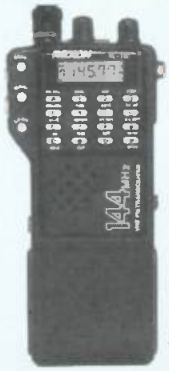

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FT-41R	list £369	our price £319
FT-290R2	list £599	our price £519
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ICOM

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IC-Z1E	list £529	our price £459
IC-2GXE	list £255	our price £225
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IC-T42E	list £269	our price £269
IC-W31E	list £469	our price £419

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TH-42E	list £289	our price £249
TH-28E	list £319	our price £279
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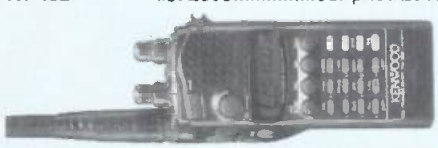

VHF TRANSCEIVERS

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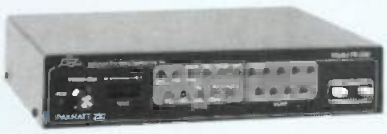

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PicoPacket	12 baud portable TNC	£119
Spirit 2	9600 baud TNC	£199

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Modems

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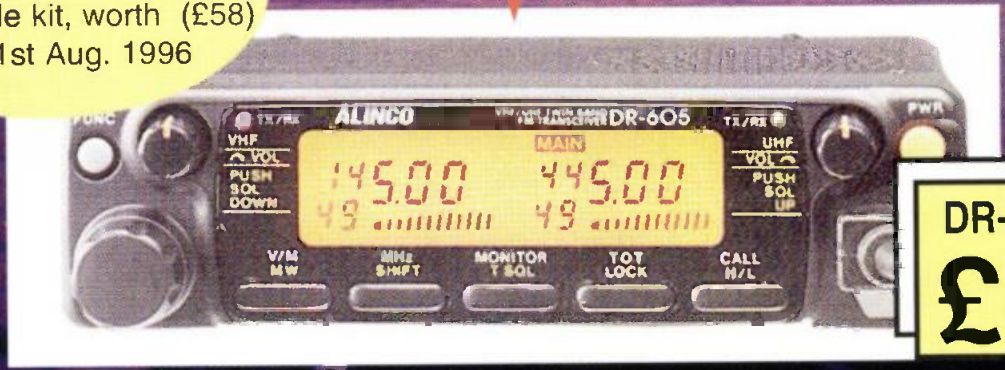

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HAYDON COMMUNICATIONS

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ICOM IC-2350 RRP £499 ..... Our price £449.95
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A.E.A. PRODUCTS

DSP-232	OUR PRICE £479.95	free p&p
PK-232MBX	OUR PRICE £319.95	free p&p
PK-96	OUR PRICE £219.95	free p&p
PK-12	OUR PRICE £129.95	free p&p

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IC-706 HF transceiver with 6M + 2m. Give us a call for the best part-ex deal or lowest UK price.

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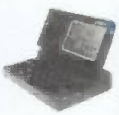

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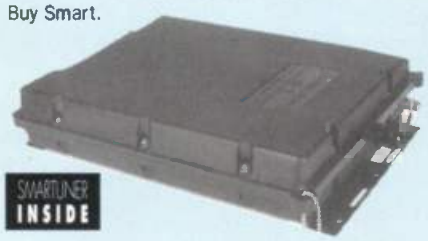

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EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio

Like many other Radio Amateurs, I've been very concerned with the continuing (often very ill-informed) media coverage regarding car 'radio keys' operating on the shared 430MHz band. The British 'tabloid' press and other aspects of the media have carried many stories on how amateur radio operators have 'jammed locks' and 'locked drivers out' of their cars.

Most of the stories are based on reports that the low power u.h.f. transmitters used to de-activate car alarm systems and unlock the vehicle as the driver approaches it are suffering from 'interference'. They have (so it's alleged) been overwhelmed by another transmitter operating on nearby frequencies. Unfortunately for Amateur Radio, the fact that we are **ONE** of the users of the band has been 'latched onto' by the media and we've often been blamed, (whether justly or unjustly I can't confirm).

Personally speaking, I've yet to witness any problem with a u.h.f. 'radio key'. However, it does appear to be (from 'reliable sources') that there can be a problem. So, with this in mind (and in response to readers who've written to me on the subject), I wrote to **Barry Maxwell**, the Director of the Radiocommunications Agency's Radio Investigation Service. Barry's reply follows:

Barry Maxwell Replies

Barry Maxwell replies: "Thank you for your letter of 3 July on the subject of interference to the operation of u.h.f. 'radio keys'.

The Agency's position is that the industry was consulted when the 433MHz frequency band was introduced for vehicle security systems some years ago and they were fully aware at the time of other services using these frequencies.

Vehicle security systems currently use the frequency band in the United Kingdom on a secondary basis. The 433MHz band is a harmonised European frequency which was introduced to cater for the specific needs of vehicles travelling through Europe.

The Agency recognises that interference may be caused to vehicle security systems by Amateur Radio beacons or repeaters, especially in remote areas. The Agency is working through the European routes available to try to find an alternative frequency on which vehicle security systems can operate. Until then, it is the responsibility of the manufacturers to develop equipment that is able to operate on a frequency band shared with other users".

So, it appears from what Barry Maxwell has told us....that it's up to the manufacturers to solve the problem. Let's hope they do so soon!

Trafficmate On The Move

Another problem area for Amateur Radio operators (particularly u.h.f. mobile enthusiasts) - the 'Trafficmate' system is literally 'on the move'. This welcome news comes from a separate statement (from that of the 'radio keys') from the RA, received by *PW* in early July.

The 'Trafficmate' system (it uses roadside transmitters operating on 433.920MHz to provide up-to-date traffic information for 'in car use' from specialised receivers) is to be moved from our 'shared' band within the next few years where it's been causing interference to other services, not just Amateur Radio (Don't forget...we're an 'unprotected' service). The RA's statement makes interesting reading, especially if you've read any of the press stories regarding the system!

The statement from the RA says: "Trafficmaster are operating the 'Trafficmate' system on 433.920MHz at present and the system is required to comply with the spectrum management parameters of MPT1340. This is a **temporary frequency allocation** and an alternative frequency has now been found for the 'Trafficmaster' network. All 'Trafficmaster' transmitters and receivers will be required to operate on the new alternative frequency after the 31st of December 1998".

From my point of view it seems that several mistakes have been made by 'other users' and those responsible for allocating frequencies for systems such as u.h.f. car 'radio keys' and equipment such as 'Trafficmate'. The first could be that blame could be laid at the door of the RA, but in fairness I don't think they have any choice! (It's an EEC matter and Barry Maxwell's statement makes it clear where they think the responsibility lays).

Secondly, I think that the biggest mistake has been made by the manufacturers of the equipment involved. They must surely realise that (in the case of the 'radio keys') a very low power transmitter with the necessary sensitive receiver can lead to problems with strong signals on adjacent channels?

But of course, I think the real difficulty is money...because in reality it's most likely the equipment is built to a price and not a specification. Let's hope everyone involved has learned a lesson!

Zoë Needs Your Help!

Our 'new' **Mrs Zoë Crabb** who compiles the *PW* 'Bargain Basement' section....needs **YOUR** help! The problem is that now the reader's advertisement section is free, many hundreds are arriving in the office and we're very busy preparing them for publication. Unfortunately though we're having a problem....in that many of the adverts can't be read or understood.

Unfortunately, an advert that cannot be understood by Zoë or any of the team who are radio amateurs, will be delayed in publication. There's absolutely no point whatsoever in *PW* publishing your advert if we can't decipher the details, telephone number or address!

Personally I think that many of the advert writers would be surprised to find that they've left out their name and details...so that even if we did have time to check them (bear in mind that it's a free service) we couldn't do so anyway. Another fact is that an increasing number of radio amateurs are 'Particulars Withheld' in the *RSGB Callbook*, so that in many cases another avenue of rescue is blocked.

So, to help you get the best out of the *PW* 'Bargain Basement' service, Zoë and the rest of the team (we all check and proof read the section) ask that you please ensure the following procedure has been carried out when you send an advert in.

Please type or write your advert in **BLOCK capitals only**. Ensure that your address (Block capitals!) is supplied in full, with street number, postal town, county (and country if appropriate) and post code (for UK), postal numbering (Europe) and Zip code (for the USA). **Please check your telephone number is correct** (a surprising number of numbers supplied are incorrect) and lastly that we can understand your advert.

Ensure that you make it **VERY** clear whether your advert is a '**For Sale**', '**Exchange**' or a '**Wanted**'. To be safe, it's best to send in adverts separately and make these categories error free. (Don't forget Zoë is dealing with hundreds at a time).

Although I'm sorry to stress this point again (it is the biggest cause of problems) please make sure you've made it very clear what it is you have for sale (whether home-brewed or professionally built) or what you want. If we can't understand your advert, I'm certain that other readers won't either!

You can also help everyone involved by using recognised abbreviations (such as v.g.c. for 'very good condition') and avoiding confusion by saying (for example) For Sale '144MHz folding cubical-quad antenna with 10m of low loss coaxial cable. (The use of frequency terms rather than wavelength avoids confusion).

We're pleased *PW* readers are enjoying the 'Bargain Basement' service. But, to make sure you get the best results...please help us to help you!

Rob Mannion
G3XFD

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

RECEIVING You

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

Letters Received Via The 'Internet'

Many letters intended for 'Receiving You' now arrive via the 'Internet'. And although there's no problem in general with E-Mail, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please don't forget to include your full postal address and callsign along with your E-Mail hieroglyphics! **Editor**

Invisible Antennas

Dear Sir

I'm writing you a few lines about 'Flying the Flag' on invisible antennas, which I saw in *PW* July. I have a small garden and have been an s.w.l. for a few years.

I'm 72 and own an Eddystone 730/4 and a 62B receiver and I can pick-up Australia and all over the world using my wife's clothes line which is plastic coated steel wire, so I've no need for any flag poles! My garden is only 19 foot long so I have put up a double clothes line across the garden to keep my neighbours quiet - and it doubles as my antenna!

R. Worledge
Coventry

Morse Methods

Dear Sir

John Goodall is to be congratulated on his excellent article 'Morse Methods' in the July issue of *PW*. From practical experience I can fully endorse all he has written, having taught Morse for most of my life, first as an RAF instructor at No 1 Radio School, Cranwell, then in a Technical College and radio club and now to friends, although I suppose I should not do so as I am an RAE examiner!

One very good idea for increasing speed is to always practice at a little faster than you can read, so that you are having to strain to write down 80 or 90% of the copy. This may well be tiring, but it really works, much quicker than if you only receive at a speed with which you are capable of writing 100% perfect copy! The exact opposite of when learning to play a musical instrument, do touch typing or write shorthand, where a slow and careful approach, aiming for 100% accuracy, is the ideal method. Strange but true!

Douglas Byrne G3KPO
Isle of Wight

Memories

Dear Sir

Your invitation, following **Peter Reading**'s interesting letter (*PW* June), for memories of that period, has prompted this letter. I make no apologies for name dropping!

As one of Maurice Child's students attending The London Telegraph Training College, Earls Court, I was an avid reader of *Practical Wireless* and also *Popular Wireless*. Both magazines were featuring the work of Baird and his TV developments. Details for the construction of the 30-line discs receiver was described, and kits for parts were advertised by Peto-Scott.

Having already built the Scott-Taggart ST 600, (kit supplied by Peto-Scott) I built up the disc receiver. I was able to receive a picture about the size of a large postage stamp, though it was difficult to keep in 'sync' with the transmitter.

At this time, a friend of my parents knew a man 'high up' at the BBC. An invitation was obtained to visit the BBC studio which was just up the road from Broadcasting House, to watch a live experimental transmission taking place. There I saw John Roake, Tessa Dean and Bertha Wilmot doing their stuff in a darkened studio, being scanned by a 30-line beam of light.

These experimental transmissions were put out by the BBC late at night, and I remember writing to *PW* suggesting that these transmissions could be recorded onto gramophone disc, so that we experimenters could play with our new toy during the day. My letter was published!

At the same time, I attended a short course on High Definition TV at the London Polytechnic and actually saw High Definition TV (120 lines, I think) being beamed by Baird from Crystal Palace to the Poly in Regent Street. About a couple of years later the BBC started its 405-line transmissions from Alexander Palace. Then the war started!

Thomas D. Crosland G4PNK
Bedford

Editor's comment: Fascinating Thomas, thank you!

Dear Sir

With reference to your 'Reader's Memories' (June *PW*), Radio first came into my life as a lad of 13 years, befriended by an ex-tin miner living in St Just, Cornwall. He introduced me to the world of short waves. His home-built set needed an eliminator and an accumulator (to be recharged once a week).

Years later at call-up, in 1949, I opted for radio as a trade. The RAF put me into radar and sent me on a six month course. In 1950, at Leuchars, I was given a 'Megger' and ordered to check the circuits of a Dakota. It was then that the RAF realised I was colour-blind, but still put me on a charge, of indiscipline (later dismissed).

Clearly a world of colour-coded components was not for me and by then, self-build became DIY and I was able to bend my energies into plumbing and central heating, building and even house electrics, where the three to four wiring colours were no problem. Then, approaching 65 years old, I picked up a copy of *PW* in the local library, scanning its pages looking for familiar names.

Where was Eddystone, Cossor, Ecko, Radio Shack? Instead, esoteric names like Yaesu. I thought Kenwood was a food mixer! What on earth is a scanner? What happened to Premier Radio and its kits for self-build radios at 55/-? (£2.75) And, Morse seemed on the way out, if not already obsolete.

Short waves had given way to satellites. But what I missed most (who, I should say) was the editorial by **F. J. Camm**. Somewhat depressing also is the perception that the hobby seemed to have become one for the well-heeled. Or is there a branch of wireless that someone of modest means can enjoy?

Ron Pearse
Watford

Editor's comment: You can still enjoy home-brewing Ron, even though F. J. Camm's Editorials are features of the past!

Tall Trees

Dear Sir

At the end of page 31, *PW* July 1996, **G3XJZ** says that 'Tall trees are not always just where you want them'! Personally, I'm eyeing up the sycamore shoots in my garden hedge with a view to moving them somewhere more in line with the G5RV....I'm a patient chap and happy to wait for them to grow up and become useful antenna supports.

Rather conveniently, one shoot chose a location, without any help from me, that is just where it will be able, in a year or so, to give valuable help in supporting the G5RV. Of course, sycamores tend to whip around in the breeze so I'll have to take precautions lest the G5RV be torn apart.... Good fun, eh?

Ian Brothwell G4EAN

Parle Vouse Morse?

Dear Sir

Firstly may I congratulate you and your staff on production of such an entertaining and informative and sometimes amusing magazine. I never fail to collect it on the day of issue at the newsagents.

However, the one article that seems to be repeated often is the whinge on Morse test or no Morse test for the RAE Class A and entry into the h.f. band of communication. In the July issue the whinge was taken up by **Steve G7POT** from Castleford.

This whinge was much the same as most of the others and basically, after something for nothing. However, one of the main points of the Morse argument is regularly ignored, being that Morse is a language and an international language to boot.

I do not speak any foreign language, but I have been able to speak to Spanish, French, German, Dutch, Italian, Russian, Japanese and Arabic amateurs, need I go on? Morse is truly an international means of communication.

I would also say to Steve, doing a test is a small price to pay for entry to a language that allows contact with radio amateurs throughout the world. I was able to walk through my test in 1992 and owed this to the fact that I was RN trained.

I have trained others to get through their test and have been more than satisfied at the pleasure they have gained through being able to communicate in Morse code. The effort is well worth the pleasure gained from being a truly world wide communicator. After all, we are in the business of communicating.

Jim Breingan G0RRO
Northants

Is There 6MHz 'CB'?

Dear Sir

Is there 45 Metre Band (6.5MHz) - CB In Some Countries? Having recently brought an FRG-100 receiver, I now spend more time listening away from the amateur bands than transmitting on them! There seems to be a 'Citizens Band' of some sort between 6.500 and 6.700MHz, which I thought was officially allocated to air radio.

You can hear many stations there on s.s.b./l.s.b. in French, German, Dutch, Italian and English. Many have Irish accents and give their QTH in the Republic.

Techniques seem to vary, some using amateur language and procedures, such as calling 'CQ 45 metres'. Some sound like radio professionals, but others seem ignorant both of radio technology and procedures. One oddity was reports given as '7 and 9'. Some rigs used have switched channels.

Is this band legal for CB or something like it in some countries, or are all the stations there pirates?

David H. Wright
Dorset

Editor's reply: Some users are legitimate. The Radiocommunications Agency are aware of the illegal activity and (as many readers already know from previous mentions in *PW*) the frequencies mentioned have attracted 'pirates' for many years, literally ever since surplus military (6 to 9MHz) equipment first became available.

Vintage Problems

Dear Sir

I was very interested to read the comments of Steve Pendlebury in the July 1996 issue of *Practical Wireless* with reference to vintage radio problems in 'Receiving You'.

One of the problems a restorer has with vintage valved equipment, both military and civilian types, is the important thing of trying to keep a near original appearance, faced with having to replace original, faulty components with brand new types which can spoil its original appearance.

I remember seeing a No. 19 Set, its outer appearance original, but the inside gutted and was fitted with a CB rig, fitted on the back of a private military collector's vehicle. Some people, well experienced in the art of restoration, have in some cases opened up the component, removing its faulty innards and fitting a smaller, modern, components - re-sealing the ends (the component that comes to mind is the condenser). This, giving an original appearance, might be bordering on deception! (Only joking!).

I think there are two points that should be kept in mind when restoring/repairing vintage equipment, where possible, equipment, in my view, should be kept working, if components are replaced it is up the individual keeper/restorer, to decide on how to replace faulty components. It's not always essential to replace all of one type of component just because one is found faulty, but might save future problems.

It's also a good idea to keep a diary of what repairs, etc. have been done, this adds to its history and may help future keepers. I am sure (if we are honest) we've all fallen into the same trap experienced by the lad: spending a small fortune on replacing components, all of which were found later not to be faulty, to find out that it was a simple component, costing a few pence!

I believe it's important to keep, where possible, the equipment in working order. But it is very difficult now to find any vintage valved equipment, etc., of any age, which has not had some of its components replaced with modern types of the day - the alternative is to leave well alone and use for display purpose for others to enjoy at a museum.

I will let readers decide for themselves which path they will follow, but myself, I enjoy the thought of vintage equipment working and restoring in my case military radio equipment to where possible, near to its original condition.

Andrew Humphriss
Warwick

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

STAR LETTER

HRH King Hussein

Dear Sir

In July 1995 I was listening on 14.195 u.s.b. 1625UTC and was thrilled to bits that I heard JY1 his Royal Highness King Hussien working DX, this prompted me to send him a QSL card to the address in the callbook. After a few months I sent another plus IRC without any success.

Early part of the year 1996, I was reading *PW* and came across the information that WA3HUP is the JY1 QSL Manager. So I decided why not, 3rd time lucky and on the 2nd of June 1996 the postman delivered an envelope which contained muy JY1 QSL card via WA3HUP.

I am a very proud owner of this special card and its standing on the shelf of my shack. Confirmation of the JY1 QSL card can be confirmed by your Editor, Rob Mannion G3XFD. Rob saw the card on Thursday evening 11th June at the Cornish Radio Amateur Club meeting, when he gave a very interesting talk on the life and history of *Practical Wireless*.

On behalf of the club, I'd like to thank Rob Mannion for the kind words of encouragement he passed on to me during the evening. And thank you *Practical Wireless*!

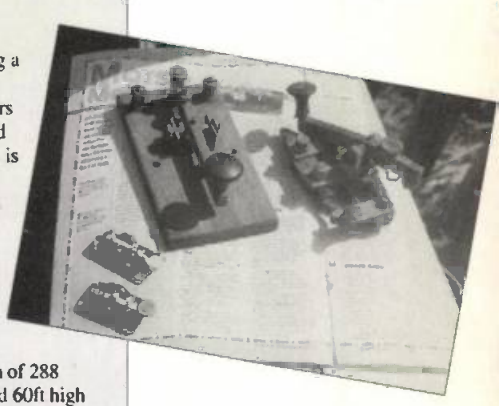
Robert Guscott G20417 s.w.l.
Cornwall

Editor's reply: As well as being the proud holder of the JY1 QSL card, Robert (like many others!) is waiting the results of the May RAE. Best of luck to him and you all. I hope to be working some new callsigns soon!

Key 'Treasure'?

Dear Sir

Maybe the enclosed photographs will bring a smile to your face. The Morse key that is rather tatty I dug up in the garden, it appears to have been one of my late father's, buried for how long I have no idea. The other one is a 1920s vintage and was used regularly to contact another operator, somewhere is the Bassett area.

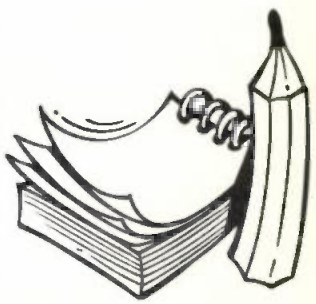


If by any reason the operator could transmit on the given day (Wed) he would drop the other person a card to say so, maybe this was how QSL cards came about.

I remember well the shack in the garden of 288 Priory Road and the antenna 100ft long and 60ft high mast and was warned not to touch anything or else, of else what I often wondered. They were the good old days when a search around the bands might produce a signal of some sorts.

Keep up the good work, a wonderful magazine and I still like to browse through the 1945 and 1950s vintage mags, some of the prices of radio make me wish that I had hung onto those sets that had passed through my hands, 1155, AR88, CR100, Hammarlund, BC348. I could go on, but I want to cry....

Percy Robins G8BSK
Southampton



Send your letters to the *PW* Offices, marking it clearly for 'Receiving You'

NEWS 1996

Compiled by Donna Vincent G7TZB

Trafficmate On The Move

'Trafficmate', the u.h.f. based 'in car' traffic information system, which uses the 430MHz shared band and has been causing interference with the Amateur Radio Service, is on the move to a new frequency. The Radiocommunication's Agency has announced that an alternative new frequency has been allocated and that 'Trafficmate' is to be moved by 1998.

In a separate statement, and in reply to questions addressed to him directly by *Practical Wireless* Editor **Rob Mannion G3XFD** on the continuing problems with u.h.f. car 'radio keys' being 'blocked' by other services (also on the 430MHz band), **Barry Maxwell** the Director of the RA's Radio Investigation Service has drawn attention to the Agency's policy. In his reply, Barry Maxwell clearly states that the RA's opinion that it's the motor industry's responsibility to produce equipment which will work to the appropriate MPT conditions. **(See full story and comment on 'Keylines' page this issue).**

Can You Help?

Jacques Cornet is looking for documentation on a CT554 quartz crystal unit test set. If you can help Jacques please contact him at **Eikenlaan, 22, B1640 Sint Genesius Rode, Belgium.**

Do you have a copy of the schematic diagram for the **Cambridge Audio Model P50 stereo amplifier** or know of a shop or company that could supply one? If so **C. S. Ventour of 26 Hillcrest Drive, Battoo Lands, Marabella, Trinidad, West Indies** would be pleased to hear from you.

National Novice Contest

Poole Radio Society will be holding their **Second National Novice Contest** on **Sunday 22 September** 1996 from 1400-1600UTC. The contest is designed to give Novices an introduction to contests and the rules have been designed to be simple and easy to comply with and therefore encourage more people to have a go.

The general rules for the contest are as follows:

Bands/Power: Contestants can use the 50 and 430MHz bands and therefore use only those sections of the bands, modes and powers permitted by the Novice Licence and in accordance with the band plans. Those working c.w. operators are asked to ensure that they don't send faster than the Novice Station.

Sections: There will be a single section for all Novices. Help and encouragement in setting-up stations is welcomed, subject to licence conditions and the same basic callsign should be used throughout the contest.

Locations: Stations can operate from up to two locations and may switch between locations as they wish. A location is defined as an area of land within a circle of 10 metres diameter.

Exchange: Each station may be contacted for points once on each band. Some indication of locations must be exchanged and usual reports should be exchanged for the mode being used (e.g. 57 on 'phone). Serial numbers are not necessary but the time of each QSO must be logged accurately.

Scoring: Novices score 3 points per QSO. No points will be avaialable for duplicate contacts, even a location change. No points will be available for QSOs through repeaters and there are no multipliers.

Logs: Completed logs should be sent to **Colin Redwood G6MXL, 45A Lulworth Avenue, Poole, Dorset BH15 4DH** and should arrive over the first weekend in **October**. Any recognisable paper log sheet will be accepted as long as it contains the time, band used, callsign of station worked, reports exchanged and location of station worked and points claimed for each QSO. Make sure you include your name, address, callsign and location details and that you add up your score for each band and in total. Check logs from listeners and transmitting stations are also welcome.

Winners: A small cup will be presented to the winning station on each band and overall. All entrants will receive an A4 certifcate and a results summary. Make sure the names of each operator who requires a certificate. A special certificate will be also be awarded to the Novice station who submits the neatest hand written log.

So, what are you waiting for? Dust off that rig, find a location and get 'contesting'!

Citizens Band Versus Mobile 'Phones

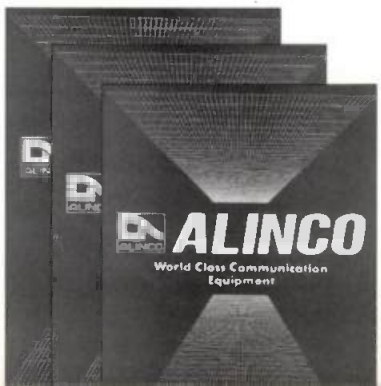
The **Radiocommunications Agency** recently announced that the 934MHz Citizens' Band (CB) Radio service will be withdrawn on 31 December 1998. The Performance Specification to which all 934MHz CB transceivers were manufacturer certified, was withdrawn in 1988 and the fact that to date no new sets have been manufactured or imported, the RA has allowed 934MHz users to continue using their equipment but has always made it clear that it would be for a limited period.

Because of of the continuing growth in the demand for mobile 'phones the RA has given permission to Cellnet and Vodafone to operate analogue mobile services in the 934-935MHz band on a temporary basis. This is the first part of a reorganisation plan of the 934 spectrum with the intention of increasing capacity for digital GSM telephones in the upper part of the 900MHz band.

Owing to the fact that 934MHz CB equipment would be incompatible with the new developments has lead to the RA's decision to withdraw the 934MHz CB service. From 1 January 1999 use of 934MHz CB equipment in the UK will no longer be permitted however, the CEPT and UK only 27/81 services will continue to be available for CB licence holders.

New Catalogue

Waters & Stanton Electronics now have available copies of the new Alinco catalogue. The A4 colour catalogue brings together the complete range of Alinco products. To get your free catalogue contact Waters & Stanton at **22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835.**



Telecommunications Exhibition

The Kerry County Museum in Ireland is currently running an exhibition on the development of telecommunications and broadcasting, tracing the history of telegraphy, telephone, radio astronomy and information transmission systems. The exhibition, entitled Marconi to the Music of the Stars, has been put together with assistance from the Marconi Foundation, Radio Telifis Eireann, Telecom Eireann, The Science Museum, The National Museum of Film & Photography, The Museum for Technology & Work, Radio Kerry, Radio na Gáeltachta and The Irish Radio Transmitters Society.

On display at the Marconi exhibition are some early pieces of experimental equipment used by Marconi, early telephone sets, the first radio sets, television equipment and much more. Many of the great scientists such as Morse, Hertz, Bell, Baird and Edison are also featured within the exhibition displays.

An amateur radio station will be in operation throughout the duration of the exhibition and any licensed radio amateur who wishes to operate the station should contact **Tom EI3HH** on **010-35368 31967**. The exhibition is open until the end of October.

Naughty Nought!

Last month we reported that Yaesu had launched a new dual-band mobile transceiver, unfortunately those editorial gremlins got in, sabotaged the story and pinched a nought! This resulted in us incorrectly labelling the new Yaesu rig as the FT-800R when it should have in fact been the **FT-8000R!** Apologies go to Yaesu UK and to all who may have been inconvenienced by the error.

May RAE Results - Could Do Better?

Did you take the RAE in May? If you did, you'll be interested to hear what the **City & Guilds** examiners thought of candidates efforts. But there's no need to worry because on the whole...your report is not too bad according to the statement issued by the C&G for the May 1996 examination!

General comments from the C&G for the May RAE are "Although some candidates found the paper difficult, generally candidates were well prepared. Again there was some evidence that benefit would be gained by greater use of practical demonstrations in courses of study for the examination. Knowledge of some of the fundamental measurements in an amateur station were lacking: for example, only 39% of the candidates knew how to measure the d.c. power input of a transmitter".

The C&G statement also reported that "Out of a total of 1378 candidates taking the paper, 1009 (73.2%) were successful". For further information and copies of the full detailed report on multiple choice Question Paper 7650-001, Radio Amateur's Examination May 1996, Contact **Roger Bone** at City & Guilds on **0171-294 2468 (Ext. 2766)**.

Radio In Newbury

For the past two years **Axon Systems** have traded as the Newbury branch of Lowe Electronics however, in late June the shop opened its doors to radio enthusiasts with its own name above the door. Axon Systems specialise in mobile communications and stock a wide range of radio equipment from manufacturers such as Icom, Kenwood, Yaesu and AOR.

Julian Swift-Hook G1DFI, Director of Axon has been involved in radio for over 25 years and is keen to ensure that amateurs and short wave listeners have access to a radio outlet in Newbury. Axon also stock components, offer a kit service for those with a 'shopping list' for particular projects and deal in GPS receivers, and marine and air band radios.

Axon Systems Radio Electronics can be contacted at **108 Bartholomew Street, Newbury, Berks RG14 5DT. Tel: (01635) 522122.**

Holiday Receiver Kit

The latest offering to come off the Howes production line is the DC2000 Receiver kit. The DC2000 has been designed to meet the needs of the Novice constructor and those seeking an effective, but low cost receiver suitable for portable and holiday use.

The receiver is a direct conversion type with integrated circuits for the double balanced mixer, audio preamplifier and loudspeaker driver stages. It's claimed to have a high sensitivity (typically -118dBm, 0.3µV for 10dB signal to noise ratio in an SSB bandwidth). Band changing is done by means of plug-in band modules.

One band module is provided with each kit (3.5MHz is the standard, or to customers choice). Optional modules are available to cover all the h.f. amateur bands, 1.8 to 28MHz. Modules for other h.f. frequencies can also be used.

The DC2000 kit comes complete with a p.c.b. and all board mounted components to build the receiver mother board, plus the circuit board and components for one band module. Full instructions and technical support are included.

An optional hardware pack (HA22R) is also available to case the project. The DC2000 is interlinkable with other kits in the Howes range, including digital frequency display, 'S meter', narrow audio filter, transmitters, etc.

Both the DC2000 kit and the HA22R hardware are available from **C.M. Howes Communications, Eydon, Daventry, Northants NN11 3PT. Tel: (01327) 260178**. The DC2000 kit costs **£22.90** and the HA22R, **£18.90**. Optional band module kits are **£7.90 each**. Postage & packing is £1.50 for kits, or £4.00 if hardware is ordered.

Web Site

MuTek Limited of PO Box 24, Long Eaton, Nottingham NG10 4QN have recently launched their very own World Wide Web site. So, if you'd like to contact them using the Internet the address is: **http://ourworld.compuserve.com/homepages.mutek** Of course, if you don't have access to the Internet you can still contact MuTek by post or alternatively by calling **0115-972 9467**.

To Change Or Not To Change?

As previously reported on these pages (May 1996 *PW*) the **Radio Amateurs Examination (RAE) was due** to take on a new format as from May 1997. However, following receipt of a letter from the **City & Guilds** stating that the changes had been postponed, the Newsdesk Editor **Donna Vincent G7TZB** contacted the **Radio Society of Great Britain** (RSGB) to find out exactly what decisions had been taken.

The official report from the RSGB is that although the Society supported the proposed revisions and supported the move in principle to modernise, reduce the cost to candidates and improve the RAE there were several aspects of the changes that they were concerned about. Therefore after consultation with the Radiocommuncations Agency (RA) it was agreed that the changes should be put on hold and that further discussions between the RA, RSGB and City & Guilds be held.

Therefore the RAE will now continue in its current two paper multiple choice style until any changes are agreed. Candidates can rest assured that they will be given plenty of time to prepare for any changes which are introduced in the future.

The *PW* Newsdesk will bring you more news as soon as it's available.

NOVICE Natter

For Radio Beginners Of All Ages

Elaine Richards G4LFM's news includes details of a summer party, seasonal jobs and the 'Rag Chewers Delight' - read on to find out more.

Summer Jobs

Hopefully, now August has arrived some more steady seasonal weather will have arrived too. The summer is an ideal time for doing all those outdoor jobs that you've been putting off and I don't mean mowing lawns, painting houses and the like!

If you have an outdoor antenna then the fixings and any ropes used to keep it in place should be checked for signs of wear and tear. It's all too easy to find your antenna in a heap during a winter gale otherwise.

Even something like a simple wire dipole can come to grief if the ropes holding it in place are perished. I know it can be difficult to think about winter when you are barbecuing and sunbathing, but the seasons do turn and now is the time to get on with the work.

Antenna connectors should be checked for signs of corrosion, you can re-waterproof all the joints during the warm dry weather with ease. Things like self-amalgamating tape are much easier to use in warm weather, as it is more pliable and adheres better to the connections.

Any external terminal blocks should be sprayed with silicone waterproof spray, even those that are inside plastic boxes. Obviously, if your antennas are mounted on the roof you need to take care that you do the job safely.

Don't tackle repairs to roof mounted antennas on your own unless you are sure you can complete the task without endangering life and limb. In any case it's often wise to have someone else around, just in case of accidents.

Other jobs that can be tackled at this time of year is a bit of antenna experimentation. Changing antennas around in the wet and dark can't be much fun, so make the most of the fine weather.

Along with summer inevitably comes the odd thunderstorm and it's really important to ensure you're adequately prepared. Whilst there's very little you can do to protect your station against a direct hit, there are a number of precautions you can take to minimise damage.

The first and most basic precaution against lightning strikes is to completely disconnect your antenna when there's a storm about. As well as disconnecting the antenna it's also wise to ground it to a good external earth.

In addition to protecting against near misses antenna disconnection this can prevent static build-up from damaging your equipment. If you're unfortunate enough to live in one of the country's lightning belts you would be well advised to stick with antenna systems that maintain all elements at ground potential. If you don't, you could end-up with static damage as the storm builds-up.

It's not often I try and plug another magazine in the pages of *Practical Wireless*, but I'm sure the Editor won't mind (after all he's a very nice man!). The magazine *D-i-Y Radio* is produced by the Radio Society of Great Britain (RSGB) for amateur radio beginners of all ages.

D-i-Y Radio is only about 22 pages but contains just one and a half a page of advertising, so you get plenty of articles for your money! It will provide you with a very interesting and understandable read.

Let's be honest, not everyone who is interested in radio has arrived at the interest through various qualifications or their job. There are a large number of people who are interested in radio without being very technically minded.

The trouble is that sometimes the less (or non) technical people get overlooked when it's time to print magazines and articles for the hobby as a whole. This is where *D-i-Y Radio* wins, as it also provides good (and simple) projects to build, if the mood takes you.

In the issue I was reading this morning, there was a lovely project for a Delta Loop Antenna and a very useful article on static electricity. The latter article reminded me of several things I had not paid any attention to recently - whoops! The antenna article would be great for those with a bit of time over the summer holidays to do some experimentation.

It won't break the bank to subscribe to *D-i-Y Radio* magazine, just £9 a year, although if you are under 18 and pay £10 you can enjoy all the benefits of the RSGB as well! The magazine appears bi-monthly and you can get all the details you need to subscribe by contacting the RSGB. Their address is **Lambda House, Cranborne Road, Potters Bar, Herts. Tel: (01707) 659015.**

Causing Trouble

No doubt I am going to get into terrible trouble from both sides of the argument over this next item. But as I will be in trouble either way I may as well share it with you!

Michael Shread represents a group called ORACLE in the UK. Now ORACLE stands for Organisation Requesting Alternative licensing Through Code-Free Examinations. By now you are either tearing the pages out in disgust or cheering.

Anyway, the ORACLE group is a world-wide organisation that was formed in 1994 in New Zealand. They say that membership is open to all with an interest in Amateur Radio whether licensed or otherwise, who wish to open up the debate on Morse Code testing issues.

The ORACLE list fourteen reasons why they feel that countries should be allowed to choose how radio amateurs may qualify for an amateur radio licence. Having read though the list I can actually see what they mean in several cases, although that doesn't mean to say I am anti-Morse!

The Morse issue is a prickly subject and one that bothers many newcomers coming into the hobby. Quite often the thought of having to learn Morse puts people off from even trying. And I can quite understand, I would hate to have to try and learn a new 'language' these days.

Anyway, if you think you would agree with their sentiment, you may like to find out more about ORACLE by writing to **15 Hardie Court, Aberchirder, Huntly AB54 5TG.** I'm not opening up the Morse-or-not-Morse debate, so please don't send me hundreds of outraged letter for or against!

Summer Party

If you are spending all or part of your summer holidays at home then you might like to have a go at joining in the 70MHz 40th Anniversary QSO Party. It doesn't finish until September 30, so there should be enough time left to join in.

The whole aim of the Party is to increase the activity on the 70MHz band. So, even if you aren't able to transmit, you can still listen and see how many stations you can log.

The rules for the awards are quite involved. So, I would advise you to contact **Derek Thom at Southern House, 9 Southern Road, Cheltenham GL53 9AW** for a full set of the scoring and rules.

Hopefully during the time the 40th Anniversary QSO Party event is taking place a few of the more rare and unusual locations will be activated on 70MHz. This could also help those going for other awards too. Let me know if you have any success logging things in the 70MHz band.

Rag Chewers Delight - 3.5MHz!

Perhaps 'Rag Chewers Delight' is a rather unfair tag for the popular 3.5MHz or 80m band, but there is an element of truth. I have fond memories of my early radio days with hours spent listening to pearls of wisdom from old-times on my ex-MOD receiver. Still, enough reminiscing, let's take a more detailed look at this band and how to get the best from it.

The precise frequency allocation for the band is 3.5 to 3.8MHz however, in the US and some other countries, the band extends right up to 40MHz. One of the main reasons for the band's undoubted popularity is the reliable daytime national coverage.

Propagation during the day is primarily via the ground-wave as most of the higher angle propagation is absorbed by the D-layer. This provides a reliable communication range of around 250 miles - just right for UK national coverage.

At night-time the situation changes dramatically as the D layer fades and long distance communications becomes possible via the consolidated F layer. In good conditions at night the range extends a good way around the globe.

Rather like 'Top Band' (1.8MHz), this band suffers rather badly from atmospheric noise, which tends to restrict long distance night-time operation to the winter evenings. The amateur band-plan shows the range 3.5-3.6MHz as reserved for c.w. use, while RTTY and other data modes use 3.6MHz ±20kHz with Packet using 3.59-3.6MHz.

You will also find SSTV and FAX signals at 3.735MHz ±5kHz. The remaining band up to 3.8MHz is used almost exclusively for 'phone operation.

To help those wanting to try DX operation the band-plan advises that 3.5 to 3.510MHz and 3.79-3.8MHz should be reserved for intercontinental working. You will also find that 3.635-3.65MHz is used by stations in the old Soviet republics for long-range contacts.

Another classic feature of the 3.5MHz band are the regular Nets which are operated by a wide variety of special interest groups. Here's a few examples:

AMSAT-UK: 3.78MHz - Monday and Wednesday at 1900 plus Sunday at 1015; British Young Ladies Amateur Radio Association: 3.688 or 3.703MHz on Mondays at 1915 local time; Royal Naval Amateur Radio Society: c.w. Net 3.575MHz Monday-Friday at 1400 local time.

If you're learning Morse there's help at hand through the RSGB's GB2CW Morse practice sessions. These operate on 3.55MHz at 1830hrs Monday to Friday, 1200 and 1930 on Saturday plus 1000, 1200, 1400 and 1930hrs on Sundays.

So, you can see that 80 metres is a truely versatile and interesting band. It's certainly a good place to start if you're contemplating a single band rig as it's used by a large number of people over a wide range.

There are a variety of special interest Nets on 3.5MHz, AMSAT UK is just one of the them (see text).

Fun-Phones In The Garden

By the time 'Novice Natter' appears it will be well into the long school holidays. So how about some summer fun in the garden with a bit of science thrown in?

All you need are two old dynamic earphone inserts (from old telephones or surplus stalls at rallies) and some twin lead wire and you've got a really simple fun-phone. If you're still young enough to have a 'den' in the garden (when you grow up you have a shed or a garage to 'play' in!) you'll be able to use the fun-phone to speak from the house to the 'den'.

All you do is link the earpieces together with the twin wire to provide very basic telephones. In effect you use them in the same fashion as the 'tin and & string' telephones. There's no bell...you just whistle or 'whoop' to call the other end.

You speak into the earphone and then listen through it in turn. Your voice causes the sound pressure waves to vibrate the diaphragm in the earpieces which then in conjunction with a magnet and coil (just like a very simple electrical generator) develops a current which flows to the other earpiece.

At the other end the varying current (representing your voices) is then turned back in to (faint) sounds and you can talk for free! No batteries are needed, you don't have to turn it off and you've played with science!

Try it out and next time I'll describe how your fun-phone can work with one wire. And you may even hear radio on it!

Elaine G4LFM

Charity Is RARE

Many radio amateurs get involved with charity work and raise funds in all kinds of ways for various good causes. The trouble is the rest of us rarely get to hear about it as these good people don't go around shouting about their good deeds.

I have recently heard about a group that are looking for new members to help with their work, they are called **Radio Amateur Relief Expeditions** (RARE). Back in 1991 a group of radio amateurs were asked to provide the communications for some 200 volunteers renovating different projects in Romania such as hospitals and orphanages.

Since 1991, the RARE group has been involved in renovating medical centres in remote villages in Romania. They have also escorted a relief convoy to Split in Yugoslavia and have been involved in a number of relief projects in Africa and Bangladesh. Other work done by RARE includes setting up camps for students in disadvantaged countries such as Africa and Bangladesh.

In January 1995 a small group from RARE went to Turnu Severin and met with local teachers. With local support they set-up a camp in the area and 13 radio amateurs left the UK in two vehicles kindly loaned by The Rover Company. The 80 students in the camp were keen to learn about life in the UK and enjoyed the amateur radio workshop.

The project was so successful they have decided to repeat the event again this year. Even more venues are planned for 1997 and obviously they need people to staff each camp.

They RARE group need people who can organise sports, arts, walks or anything else that will interest young people between the ages of 10 and 18. These young people will be orphans, disabled or disadvantaged and therefore the camps give them something to look forward to.

Membership of RARE is £7.50 a year, but they'll accept all the donations they can get. They are also looking for people who can spare the time (about two weeks a year) to help out at these camps. If you are interested in finding out more or would like to get involved contact: **RARE at 1 Allfield Cottages, Condover, Shrewsbury SY5 7AP. Tel: (01743) 873815.**

That's all for this month, please keep your letters coming to me at PO Box 1863, Ringwood, Hants BH24 3XD.

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

CLUB Spotlight

Compiled by Zoë Crabb

As most of you will now know, I am no longer a Miss, but a Mrs! Yes, I tied the knot with my husband Ian back on the 1st June 1996. It seems like a lifetime ago already!

Through the pages of 'Club Spotlight', I'd just like to say a big thank you all for your congratulations, whether by letter (accompanied with your club programme) or by 'phone. Thanks very much indeed.

All that's left for me to say is keep the news and those club magazines coming!

Special Event Station GB5CR Rolls Again

Remember the Church's sponsored Cycle, Ride or Walk (CROW) from September '95? Well, on Saturday 14 September '96, it happens again all across England in around 25 counties, with cyclists riding from church-to-church to raise sponsorship money from their friends and colleagues. This will be collected together by the County Historic Churches Trust for restoration of endangered, but beautiful old buildings.

In 1995, **Harry Hogg G3NGX** set-up **GB5CR** with **G3SLI** and **G0OIW** at Greyfriars Church in the centre of Reading, Berkshire, and managed 135 QSOs, including GB2HCR at Harpsden Church, GB0SBF, GB5WSL, GB2RSN, G6UXM/P and GB5SH, which were all at churches with cyclists visiting/checking in. There were some interesting QSPs between friends in some of the QSOs with these stations. Most of the contacts were on 80m (3.5MHz) with the local area covered on 2m (144MHz). Each contact was worth £1.11 in sponsorship, so you can calculate the cash raised by the station.

Operating from a tent in the churchyard can be draughty. It can be sunny, like National Field Day, but you also get questions from the uninitiated about cycles and Hertz, visits from the local press and people sheltering from the rain. All in all, quite good fun. Come September 14th this year, there will be another Cycle Ride in most of the counties of England and there will be opportunity to put you local church on the air, in the knowledge that there will be others doing the same. On the day GB5CR will be on 3.5 and 144MHz and G3NGX is seeking to expand the number of active churches hopefully with local sponsorship for contacts by the station.

If 10 or 12 special event stations take part on the day, it will be worth running an award for multi-church contacts. The Association of Christian Radio Amateurs and Listeners (WACRAL) has been of great assistance in previous years and many members will be on the bands that day.

If you'd like to know a bit more, then write to **Harry Hogg G3NGX, QTHR** or 'phone him on **(01491) 872919**

Lighthouse Special Event

Back on May 3, the **Banff & District Amateur Radio Club** held its Annual General Meeting, at which it was recognised that the club had been extremely active in the last 12 months. This is despite the fact that the club is quite small, existing in a sparsely populated area of the UK, where potential new members are few and far between. However, the commitment and enthusiasm of the existing club members ensured a successful year.

In the last year, the club competed in three h.f. contests, National Field Day, Single Side Band Field Day and The Affiliated Societies Team Contest. In addition, this year the club intends to compete in the VHF Field Day as well.

The club operated four special event stations and perhaps the highlight of the year was the operation of the special event station located at Kinnaird Lighthouse, Fraserbugh. The argument still rages today on whether it was 50 or 51 steps to the radio shack from the ground floor, however, Mark McDermott, Club Secretary of the club, reckons that while carrying a table on your back and a reel of coaxial cable gripped between your teeth, it felt like 151 steps!

The station operated over a three day period and celebrated the 208th anniversary of the establishment of the light at Kinnaird Head, which was the first lighthouse in Scotland. On the second day of operation, the Young Lighthouse Keepers Club joined and exchanged greetings with other radio operators. They also had the opportunity to practice c.w. and examine the large collection of vintage radios which the club exhibited. As a result of the operation of the four special event stations, the other three included Banff Academy School, The 1st Banff Scouts and The Robertson Road Resource Centre, the club gained nine new Novice trainees. Well done!

Preparations have now started on next year's list of events and on Saturday 17 August the club will be holding its annual Super Surplus Sale. This event generates a great deal of interest in the North of Scotland, because of the lack of radio and equipment dealerships in the area.
Last year, people from the Orkneys, John O'Groats and Aberdeen attended the sale. This year the club intends to make a day of it and, after the sale, hold a BBQ and social get-together.

The Banff & District Amateur Radio Club meet every first and third Friday of the month at Banff Castle Community Centre, Castle Street, Banff at 7.30pm. Further information can be obtained from **Mark McDermott GM0WIB** on **(01346) 561432**.

Kinnaird Head Lighthouse, Fraserburgh.

Two members of the Young Lighthouse Keepers Club get the feel of radio equipment, circa 1940s at the GB0KHL Special Event Station, Kinnaird Head Lighthouse.

Club On Net

The **Bristol Amateur Radio Club** have news that they think they are the first UK radio club to have a page on the Internet. If not the first, then they certainly claim to be the first to have a page of such quality! You can access it at the following address: **http: //www.gifford.co.uk/-passim/barc.html**

Anniversary Special Event

(L to R) Brian Coyne G4ODV, Brian Stone G4BPS, Carolyn Rule M0ADA, Colin Kenyon M0ACJ and John Garner G3KEC

During 1995, the **Poldhu Amateur Radio Club** became the only club premises in the country to be listed as a registered Morse test centre for radio amateurs. The Cornwall Senior Examiner Test Examiner **John Garner G3KEC** was so impressed with the facilities available at Poldhu (GB2GM) that he invited the club to represent Cornwall for the RSGB Morse Test 10th Anniversary Special Event, which took place on Saturday & Sunday 11 & 12th May.

The club was issued with the unique callsign **GB10CNL** and test examiners from all over the county helped to operate the station. Over 200 Morse contacts were made.

The highlight of the weekend came when club member **Colin Kenyon** received his new 'A' licence through the post on Saturday, thus enabling him to use the callsign **M0ACJ** to contact GB10CNL. He later attended the club and made his debut at 'special eventing', in the presence of the County Senior Examiner and the West Cornwall Regional Examiner **Brian Stone G4BPJ** and his assistant **Brian Coyne G4ODV**.

Carolyn Rule M0ADA, who took her test at the same session as Colin and received her new callsign the following week, was also in attendance.

SARCon Is On Again

In 1995, the **Scottish Amateur Radio Convention** did not happen. The event, always regarded as a Scottish September land-mark, was blurred-over and left a gap in the trading and socialising scene for radio amateurs in the north.

The good news is that on 21 September 1996 the Scottish Amateur Radio Convention returns to its popular Glasgow venue at Cardonald College. Its sponsor, West of Scotland ARS, intends that it bounces back full of life, attracting exhibitors and visitors from all over Scotland as well as the north of England and from Ireland.

Traders have responded very well to the news that the convention is 'on' again. Likewise, the RSGB will be in attendance as well as other special interest groups with newcomer UKRS also taking space this year. A disappointment is that BYLARS is unable to take a table as, these days, they are too few in number.

As well as the trade stands, there will be Morse tests, radio/communication forum, Bring & Buy, raffle, v.h.f. talk-in, courtesy of Scottish RAYNET, and refreshment facilities provided by the college. All the ingredients are there for a good day at the convention.

For those wishing to stay overnight, Greater Glasgow and Clyde Valley Tourist Board has provided a list of hotels and guest houses near the college offering a wide range of facilities and prices. The Board's advance booking service on **0141-221 0049** is available to SARCon96 visitors.

For the list of accommodation and more details about SARCon96 please contact **Ron GM7BOW** on Tel/FAX: **0141-773 2882**.

General view of club stand, (L to R) Bill Rabbitt G0PZP, John Riley G0RPG, Norman Shelley G4JYP, Ken Daniels G7UKD, Guy Wood G8NRF, Chris Davies G7GZB, Brian Helsdon G6XRE and Paul Mackie 2E1EDQ.

Saltash Special Event

A group of stalwarts from the **Saltash and District Amateur Radio Club** have been busy preparing antennas and portable masts for the special event station being organised by the club. This will operate over the weekend 31 August to 2 September 1996. The station will mark the centenary of Captain Henry Jackson pioneering radio experiments in 1895/96 between Naval ships at Devonport Naval Base.

Thee experiments were conducted from HMS *Defiance* which was formed by a number of old wooden hulks permanently moored in the Lynher estuary near Saltash. HMS *Defiance* was the early RN Torpedo training school. The site of the special event station (Saltash Community School, Weard) overlooks the river Lynher and Devonport Naval base.

Over the last few weekends, club members have been at Geoff's QTH cutting a set of nested dipoles to cover the h.f. amateur bands. Kevin, the club chairman, brought along his antenna analyser to check the s.w.r.s and resonant frequencies. This was an invaluable aid in tuning the antenna.

It is hoped to cover all the h.f. bands, except 'Top Band' (1.8MHz) and also to run a v.h.f. station for local contacts. There will be a special QSL card for all contacts made with GB0HJC. These are being sponsored by the RNARS Capt. Jackson later became Admiral Sir Henry Jackson and was one time present of the RSGB.

New Premises

The **West Kent Amateur Radio Club** have recently suffered a serious set-back in so much as having its meeting venue completely gutted by fire. Unfortunately a great deal of equipment was lost in the blaze, which also made the building unsafe, so it has since been demolished.

However, the club has now moved to new premises in the Church Hall in North Street (off Prospect Road) Tunbridge Wells. Club meetings are as before, on the 1st and 3rd Friday of each month with the possible exception of August.

Any visitors or potential new members will be most welcome to any of the meetings and coffee or tea with biscuits are always available. Find out more from **R. J. Taylor G3OHV** on **(01892) 664960**.

Best Stand Award

At the **Norbreck Amateur Radio, Electronics & Computing Exhibition**, which was held in Blackpool, the **Warrington Amateur Radio Club** won the best stand award. The cup was presented to Novice club member **Paul Mackie 2E1EDQ** by RSGB President **Peter Sheppard G4EJP**.

The photograph displays the new club sweatshirts which, after vetting and approval by the Warrington Borough Council, incorporate the Warrington crest with the club's name and members' callsigns.

The club meets at Grappenhall Community Centre, where members have exclusive use of a shack and every effort is made to provide a talk or other organised activity every week. More information can be obtained from **Ron Davies G0WJX** (Club Chairman) on **(01925) 763447** or from **John Riley** (Secretary) on **(01925) 762722**.

Presentation of club stand trophy to Paul 2E1EDQ by RSGB President Peter Sheppard G4EJP.

Full Programme For Hoddesdon

Hoddesdon Radio Club has had a very full programme this year and a recent visit by Chris Taylor from Martin Lynch was very well supported. Six members visited the Dayton rally and followed this by attending the Grand Haven Club in Michigan and the Scarborough club in Toronto.

The club is twinned with the Indian Mound Radio Society in Volusia County - Florida - and about 50 copies of its magazine cross the Atlantic, courtesy of the Treasurer who has a house there. Future events include a visit by AKD Products, speakers on subjects include astronomy, beer and wine making and special events. An unusual feature is the amount of ladies who attend the club on a regular basis. For further details and a magazine, contact **Don G3JNJ** on **0181-292 3678**.

Send your club information to Zoë Crabb at the PW Offices.

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Rounding-Up To The RAE

It's the time of year when all budding Radio Amateurs should be thinking about enrolling on a Radio Amateurs Examination course. To help you find one in your area we've put together a list of all the RAE, Novice RAE and Morse courses that we've been told about. The list is laid out alphabetically by college or centre.

Of course, the *PW* list is not exhaustive and there are many courses that are not mentioned here. For details of other courses that are running this year contact the **City & Guilds** at **1 Giltspur Street, London EC1A 9DD. Tel: 0171-294 2468** or **FAX: 0171-294 2400.**

For more information on becoming a radio amateur contact the **Radio Society of Great Britain** on **(01707) 659015** or if you have a query regarding licencing then get in touch with the **Radiocommunications Agency** on **0171-215 2150.** Finally, don't forget that if you need text books to supplement your RAE learning the ***PW* Book Store** stocks a comprehesive range (see pages 63, 64, 65 & 66 of this issue). To order a book use the **Order Form** in this issue or call the **Credit Card Hotline** on **(01202) 659930**.

Don't forget if you're unable to get to a college or centre you can contact the **Rapid Results College** on **0181-947 2211** for details of correspondence courses.

Avondale Centre, Cheadle Heath, Stockport, Cheshire.
Morse classes commencing **early September**. For more information contact **the** Avondale Centre on **0161-427 7733** or from the course tutor **G3KAF** on **0161-439 4952.**

Bexley College, Tower Road, Belvedere, Kent DA1 6JA.
An **RAE** course will commence **September 1996** and will consist of evening classes made up of Morse Tuition, Transmitting Theory, Operational Procedures, License Regulations and Short Wave Receiving. The course will run until May 1997 in preparation for the May examinations, the cost of the course will be **£78** and will be tutored by **Colin Turner**. For more information please telephone the **Guidance & Admissions Centre** on **(01322) 442331 Ext. 3888** and leave your **name, address** and **telephone number** so an enrolment form can be sent to you.

Bradford College, Hanson School, Sutton Avenue, Five Lane Ends, Bradford 2, West Yorkshire.
A **Morse** course commences on **September 18** for a **30 week course** on **Wednesday evenings** from **7 - 9pm.** At the end of the course candidates will have reached the 12w.p.m. Morse Test standard. The tutor will be **Vicky Turner G0RJC** and beginners are welcome. For information on enrolling etc., call Vicky Turner on **(01274) 586882.**

Balwearie High School, Kirkcaldy, Scotland.
The **Glenrothes & District Amateur Radio Club** will be running an **RAE** class on **Monday evenings** starting at **7.30pm**. A **Morse class** will run on **Tuesday evenings** at **7pm**, both courses start **late September**. For more details on either course contact **Ken Horne GM3YBQ** on **(01592) 265789 (after 7pm).**

Henbury High School, Whirley Road, Macclesfield.
An **RAE** course in preparation for the May 1997 exam begins on **September 10** from **7 - 9pm**. Enrolment for the course takes place at the **Ryles Park campus** from **September 3**. **Gordon Adams G3LEQ** is the course tutor and more details can be obtained from him on **(01565) 652652.**

Keighley College, Cavendish Street, Keighley, West Yorkshire.
Commencing on **September 16** an **RAE course** will run on **Tuesday** evenings from **7 - 9pm.** Enrolment will be in the week commencing Wednesday **September 4**. The course tutor will be **Ralph Turner G3VRX**. More details are available by telephoning **(01535) 618555** or **(01274) 586882.**

Kingsland Community College, Houghton Regis, Dunstable, Bedfordshire.
On the **September 25** an **RAE** course will commence for those in the Luton, Bedfordshire area. The course tutor will be **G3WLM**. More details can be obtained by telephoning **The Manager** on **(01582) 868258.**

Morley Green Club, Mobberley Road, Wilmslow, Cheshire.
The **North Cheshire Radio Club** will be running **RAE** classes on **Sunday evenings** starting on **September 8.** The classes will run from **7 - 9pm** with enrolment taking place on **September 8** or any Sunday thereafter. Further details from **Gordon Adams G3LEQ** on **(01565) 652652.**

Murray Park Community School, Derby.
An **RAE** and **Novice RAE** course will be running during evenings starting in September. Enrolment takes palces on **September 18** & **19th** and more details can be obtained by calling the Murray Park Community School on **(01332) 515922** or **Frank Whitehead** on **(01332) 512080.**

Newbury Technical College, Wiltshire.
On **September 12** an **RAE** course starts and will run on subsequent Thursdays from **7 - 9pm.** A **Morse Code for Amateurs** course to reach 12w.p.m. starts on **Tuesday 7 January 1997** from **7 - 8.30pm**. Contact **Newbury College** on **(01635) 35353** or **Ray Oliver G3NDS** on **(01672) 870892** for more details.

Newstead Woods School, Avebury Road, Orpington, Kent.
An **RAE** course leading to the May 1997 examinations commences on **September 16** and will run on **Monday evenings** thereafter from **7.30 - 9.30pm.** Enrolment by post to **Bromley Adult Education College, Church Lane, Prince's Plain, Bromley, Kent BR2 8LD** or by calling **0181-462 9184.** Further details from **Alan Betts G0HIQ,** course tutor on **(01689) 831123.**

Ridge Danyers College, Marple, Stockport, Cheshire.
RAE classes commencing **early September.** For more information contact the college on **0161-427 2382** or from the course tutor **G3KAF** on **0161-439 4952.**

Swindon Technical College, Wiltshire.
On **September 16** an RAE course starts and will run on subsequent Mondays from **7 - 9pm.** Contact **Swindon College** on **(01793) 4983000** or **Ray Oliver G3NDS** on **(01672) 870892** for more details.

Tile Hill College, Tile Hill Lane, Coventry CV4 9SU.
Commencing **September, RAE, Novice RAE** and **Morse** courses. Contact **Mike Dixon G4GHJ** on **(01203) 694200 Ext. 221** for more details.

Warrington College Institute, Winwick Road Campus, Warrington.
An **RAE** course in preparation for the May 1997 exam begins on **September 12** from **7 - 9pm**. Enrolment for the course takes place from **September 3 - 6th**. **Gordon Adams G3LEQ** is the course tutor and more details can be obtained from him on **(01565) 652652.**

Weald College, Brookshill, Harrow.
An **RAE** course of 25 lectures starts on **September 25** at **7pm** and will run on **Wednesday** evenings thereafter. The lecturer for the course will be **John G4UBB**. All enquiries should be made to the college on **0181-420 8888.**

Wigan & Leigh College, School of Engineering & Applied Science, Parsons Walk, Wigan WN1 1RS.
An **RAE** course in preparation for the May 1997 examinations starts on **September 9.** Enrolment for the course is from **August 27** to **29th** inclusive between **6 - 8pm.** Contact **Janet Jolley** on **(01942) 501501 Ext. 2521** for further information.

So, what are you waiting for? Look at our list, pick a course and make sure your name is among the next batch of new licensees!

The PW Rugby 7MHz SSB & CW Transmitter

By Dave Howes G4KQH

Part 1

Dave Howes G4KQH describes the Rugby, his design for a companion s.s.b. and c.w. transmitter for the PW 'Daventry' receiver. Dave says you can build your own s.s.b. transmitter – it's easier than you think!

Photograph of interior of completed PW Rugby transmitter.

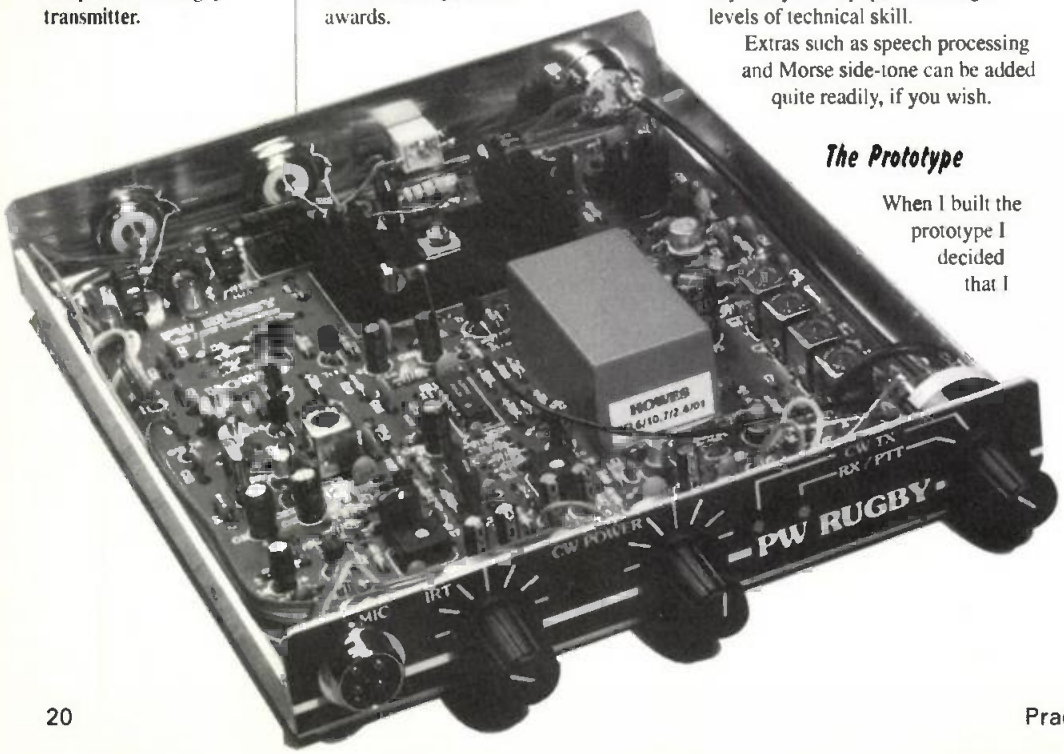
Have you ever felt that building a decent quality s.s.b. transmitter was probably rather difficult? Well the PW Rugby (named after the famous l.f. transmitter just up the A5 road from the old BBC short wave transmitter which has now closed down) sets out to dispel any such thoughts.

The PW Rugby is a straightforward transmitter and is constructed on a single printed circuit board (p.c.b.) and provides up to 10W p.e.p. output. You could get on the air with both s.s.b. and c.w. and enjoy the satisfaction of running home brewed equipment.

The Rugby has a front panel power control for c.w. So that you can run at true QRP levels, or a little higher for difficult conditions.

In use, the Rugby can be tuned either by a v.f.o. (not on the p.c.b.) or via a simple interface (to be described in a following issue) from the companion Daventry receiver. This gives transceive operation.

Altogether the Daventry receiver and Rugby transmitter provide a very fine rig for the serious QRP operator. Its 10W peak envelope power (p.e.p.) s.s.b. and 5W c.w. being the power limits for G-QRP club awards.



Mobile & Portable

Operation is from a nominal 13.8V d.c. supply, so the Rugby should be ideal for mobile and portable operation as well as the home station.

Good S9 signal reports can quite easily be achieved with 10W and a decent mobile whip antenna on 7MHz. This is true even if the mobile whip is just mounted on a ground post in a small garden – as I can verify from personal experience.

There's no large collection of 'bells and whistles' on the Rugby. But the circuitry is designed to provide a good quality, clean signal with repeatable results without the need for any fancy test equipment or high levels of technical skill.

Extras such as speech processing and Morse side-tone can be added quite readily, if you wish.

The Prototype

When I built the prototype I decided that I would like the Rugby to be housed in a slim case to sit underneath the Daventry receiver. It should therefore have the same 'footprint' as the Daventry and should bring its main tuning knob up to a more convenient height above the bench.

In effect, the transmitter unit 'doubles-up' as a stand for the receiver. This design requirement more or less determined the size of the Rugby p.c.b. The power level and the tuning arrangements were specified by the Editor, so all I had to do was come up with the circuitry!

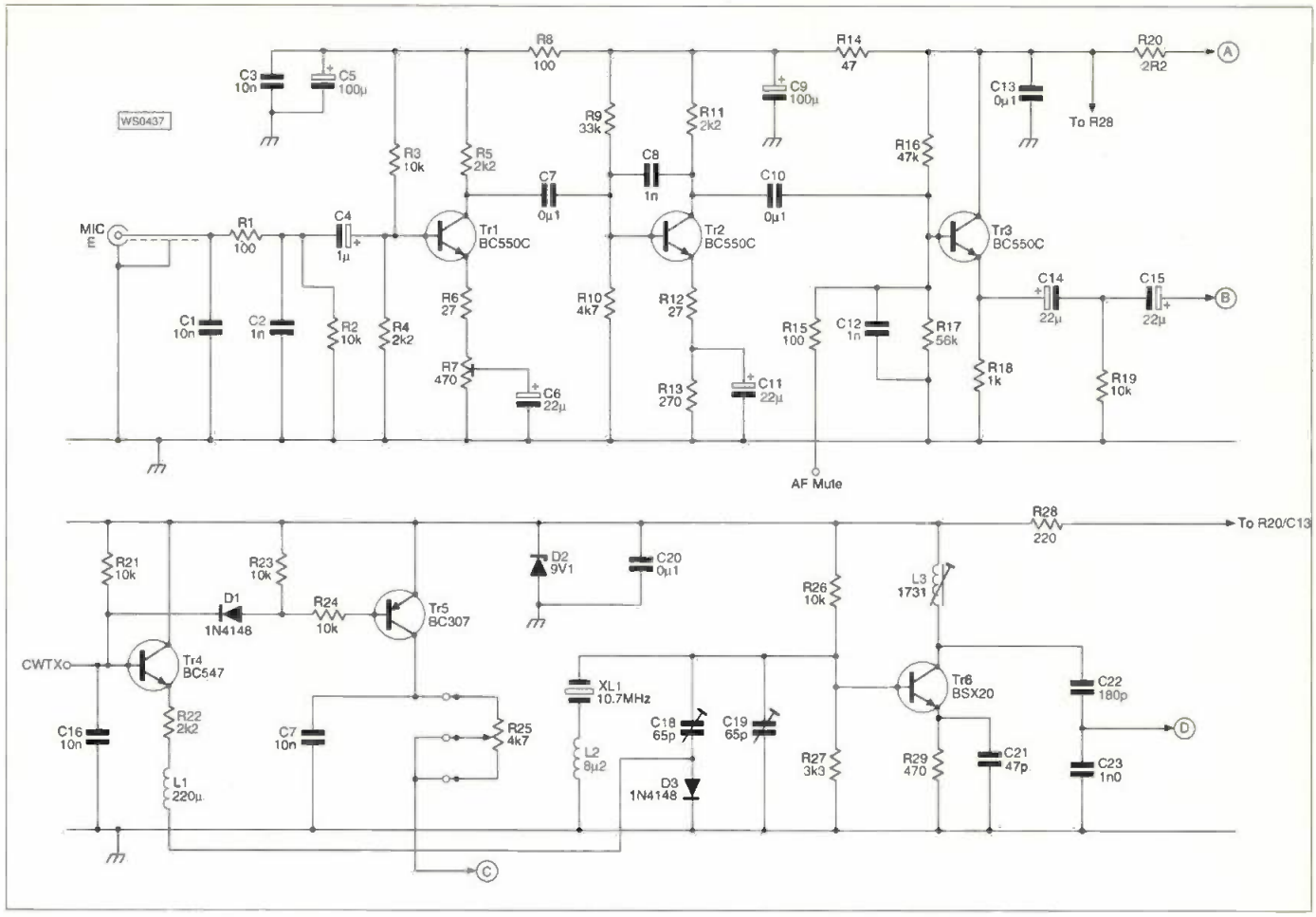
As the Daventry receiver has a fairly high standard of spurious signal rejection, I felt I should stick to good figures for the transmitter too. So, 60dB down for spurious mixing products and 50dB for harmonics seemed like sensible numbers to aim for. The finished prototype met these without any problem.

Slim & Compact

As you can see from the heading photograph, the Rugby is quite slim and compact, without the p.c.b. being too crowded. There are only two front panel controls for the transmitter, c.w. power level and a c.w. transmit switch.

To transmit on s.s.b. you simply push the push to talk (p.t.t.) button on the microphone. There are no controls for this mode, the microphone gain is a preset control on the board. The third control on the front panel is the Independent Receiver Tuning (IRT) control for the Daventry.

You may wonder why the IRT was not on the receiver – the answer is simple. I did not know that the



magazine was going to commission a companion transmitter when I was asked to do the Daventry design!

Anyway, there are fewer controls on the transmitter. So from this point of view it makes more sense to have the IRT on this unit.

A five pin DIN socket on the back of the case takes care of all transmitter/receiver interconnections apart from the antenna feed. This is handled by a couple of SO239 sockets on the back of the unit with a relay switching the antenna over on the Rugby board.

Standardising on SO239 r.f. connectors throughout a station has its benefits. But you must make sure you do not plug the receiver's input into the transmitter's output by mistake!

Circuit Description

The PW Rugby transmitter produces its s.s.b. signal by the 'filter method'. In effect it's virtually a mirror image of its companion ...the PW Daventry superhet receiver.

In the receiver, the 7MHz r.f. signal is filtered and converted to an intermediate frequency of 10.7MHz. It's then passed through an s.s.b. filter, amplified and then converted to audio and amplified to drive a loudspeaker.

In the transmitter, the audio signal from the microphone is filtered, amplified, and converted to an i.f. frequency of 10.7MHz. Then it's passed through an s.s.b. filter, converted to 7MHz and amplified and filtered to drive the antenna. (Well that's what happens in simple terms – the process probably warrants a little more detailed explanation!

There are also side issues. These include such as how to time the transmit/receive switching so that there's no momentary 'howl-round' on change-over.

Audio Stages

Let's now take a look at the audio stages. And I'll start with the microphone input which is designed to suit a typical low impedance fist microphone.

Audio input from the microphone is filtered to remove any r.f. that it may have picked up by C1, R1 and C2. The audio is then amplified by Tr1, Tr2 and Tr3 to a suitable level (this is adjustable by the **Mic gain** preset control, R7) to drive the MC1496 double balanced modulator (IC1).

The other input to the modulator is from the 10.7MHz crystal oscillator, Tr6. The output of IC1 is therefore a double sideband signal at 10.7MHz. The balanced nature of the modulator cancels out most of the signal's carrier (fine balance adjustment is provided by the preset, R32).

The signal is then passed through the crystal filter to remove one sideband (and a bit more of the carrier), leaving a proper s.s.b. signal on the filter's output. It's the **upper sideband** (u.s.b.) that's selected by the filter because the signal frequencies are inverted to lower sideband (l.s.b.) later in the circuit when they are mixed down to 7MHz.

Mixer & RF Stages

Now it's on to the mixer and r.f. stages. The u.s.b. signal is amplified by Tr7 and passed on to the mixer, Tr8 for conversion to the 7MHz band. (The other input to Tr8 is either derived from a separate v.f.o. or from the companion Daventry receiver for transceive operation).

The tuneable signal at about 17.7MHz mixes with the 10.7MHz signal to produce the 7MHz output (17.7 – 10.7 = 7). Unfortunately, mixing processes always produce many other spurious products in addition to the one you want.

However, a careful choice of i.f. and v.f.o. frequencies helps to minimise the 'sprogs'. In this respect the Rugby is pretty good. Good enough in fact, that a simple unbalanced mixer can be used, rather than a more complex double balanced device that would be needed with many other frequency schemes.

Despite what I've just said, the

Fig. 1: Circuit of the Rugby microphone amplifier, c.w. logic and carrier oscillator.

mixer output still needs to be cleaned up somewhat. And four parallel tuned circuits with just the right amount of intercoupling achieve this.

The signal is now on the frequency band we require, with a spectral purity we can be proud of! All that remains is to boost the signal to the desired level, but making sure we don't add too much distortion in the process!

Driver Stages

All the driver stages (Tr9 to Tr11) operate with plenty of r.f. negative feedback and standing current to ensure good linearity. The negative feedback also helps to reduce the gain variation between individual transistors.

The p.a. transistor, Tr12, operates with only a small quiescent current to keep the current consumption and heat dissipation reasonable. The bias current is stabilised for transistor temperature changes by the diode, D11, in thermal contact with the device.

Again, some r.f. negative feedback is employed to give some control over the p.a. stage's gain and to improve linearity. The gain of this stage, and hence the output power level, can be altered a little by changing the value of R70.

The 100Ω component listed in the circuit will probably give a little less than the maximum 10W r.f. output. A slightly higher resistance will reduce the feedback and increase the power. However, the output power should not be raised above 10W, as this would overrun the transistor.

Impedance matching to the p.a. stage is provided by transformers T1 and T2. These transformers are of far less critical design for this 7MHz application than they would be for broad-band or higher frequency use.

You should be able to use almost any type of ferrite cores designed for h.f. bands p.a. use without too much performance variation in this circuit. Out of interest I tried some single hole p.a. beads, and they worked quite well.

Note: You must be careful to get the direction (phase) of the windings correct though. Again the p.a. r.f. choke, L14 is not very critical. Various ferrite core types could be tried.

Cores used for the output filter coils, L15, 16 & 17 should be the specified type only. These need to have fairly exact inductance values, and be able to handle the transmitter's output power.

The output filter ensures that harmonics are kept at least 50dB below the carrier power – in other words, less than 0.1mW. You shouldn't hear that very far away!

Transmitting CW

When switching to transmitting on c.w., one of the two 10.7MHz carrier oscillator trimming capacitors, C18 is switched out of circuit. This is carried out by the action of D3 being turned off (via Tr4 from the c.w. TX terminal).

Switching off D3 brings the carrier frequency up by a nominal 800Hz. This provides the c.w. beat note and also brings it into the pass-band of the crystal filter.

Grounding of the c.w. TX terminal

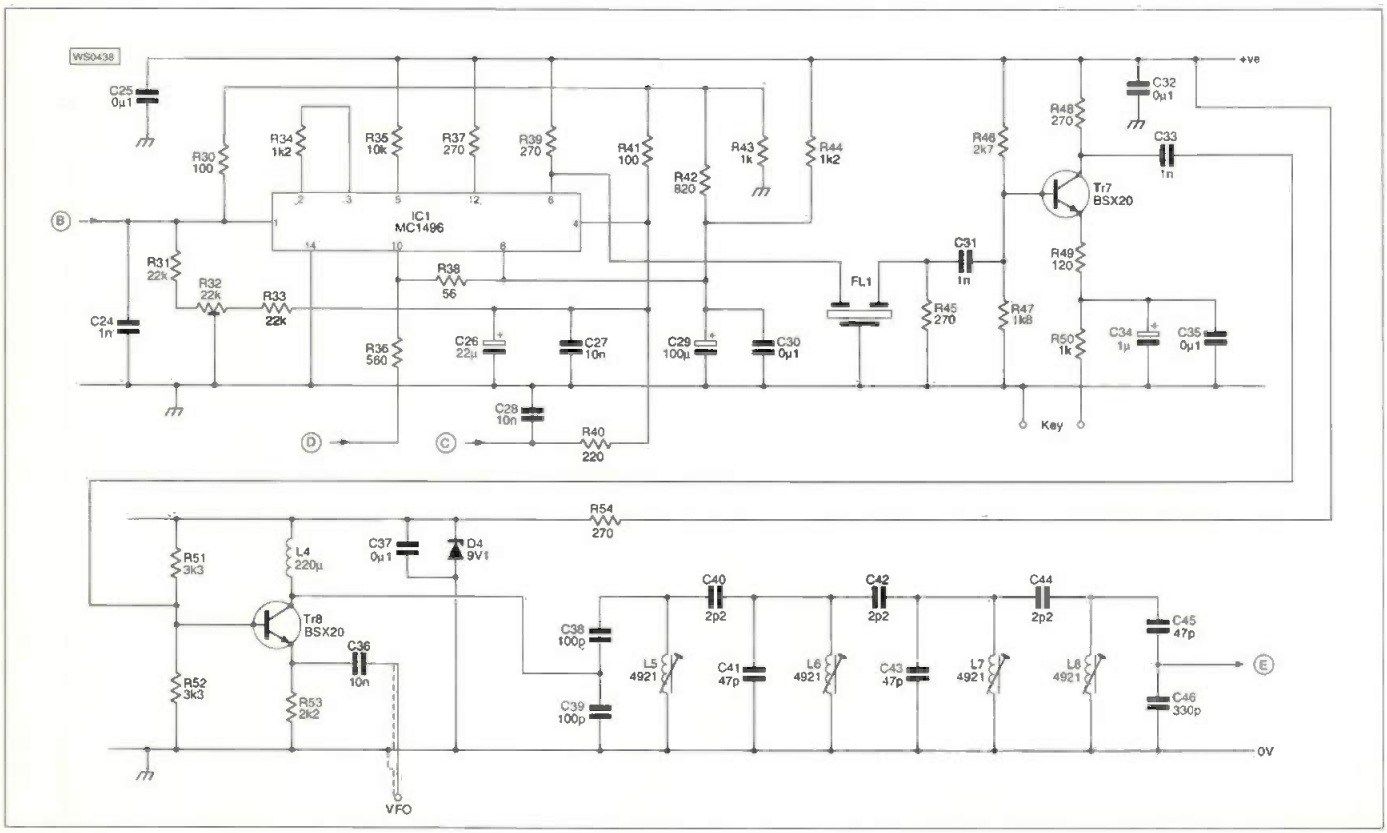


Fig. 2: Balanced modulator, c.w. keying, mixer and filter.

also turns on Tr5. This feeds current (the amount determined by the **CW Power** control, R25) through to unbalance the balanced mixer, IC1. This allows the carrier signal though, instead of suppressing it, as it does in s.s.b. transmission.

To prevent audio from the microphone modulating the transmitter whilst on c.w., the microphone amplifier is grounded. This is done at the **AF Mute** (Audio Frequency Mute) terminal by a set of contacts on the c.w. TX switch.

Crude but effective! It should save the embarrassment of being heard cursing your sending errors by anyone listening in a.m. mode!

Transmit & Receive Logic

Switching from receive to transmit and back again is not quite as simple as just pressing or releasing the button on a microphone may indicate. A number of technical things have to happen, and happen in the right sequence, if nasty noises are to be avoided!

If the transmission overlaps with the reception at all, you will certainly hear unwanted effects! It's also not a good idea for the transmission to either start or end with a momentary disconnection of the antenna. (p.a.) transistors tend to fail after a while if this happens.

The logic on the Rugby p.c.b. (Tr13 through Tr16) ensures that there's plenty of time for the receiver to mute, and that the antenna is switched to the transmitter's output before the transmission starts. It also ensures that the antenna is not switched away from the transmitter until the transmission is over.

You'll see from the circuit diagram that the antenna relay is fitted before the output filter so that the filter is also in circuit on receive. This adds to the front-end selectivity of the receiver (already very good if you're using the PW Daventry), but useful with many of today's wide-open receiver front ends.

If you find the transmit delay is a little long for your needs it can be adjusted. Reducing the capacitance of C68 will speed it up.

All in all, the Rugby is quite a straightforward transmitter, but it does have a reasonable level of technical sophistication. I hope its provision of s.s.b. as well as c.w. makes it a tempting enough project for you to think about clearing a small space on the bench, and getting the tools out!

So, get the tool box out and dust them off. Next month I'll describe the construction stages of the project and present the p.c.b. designs. **PW**

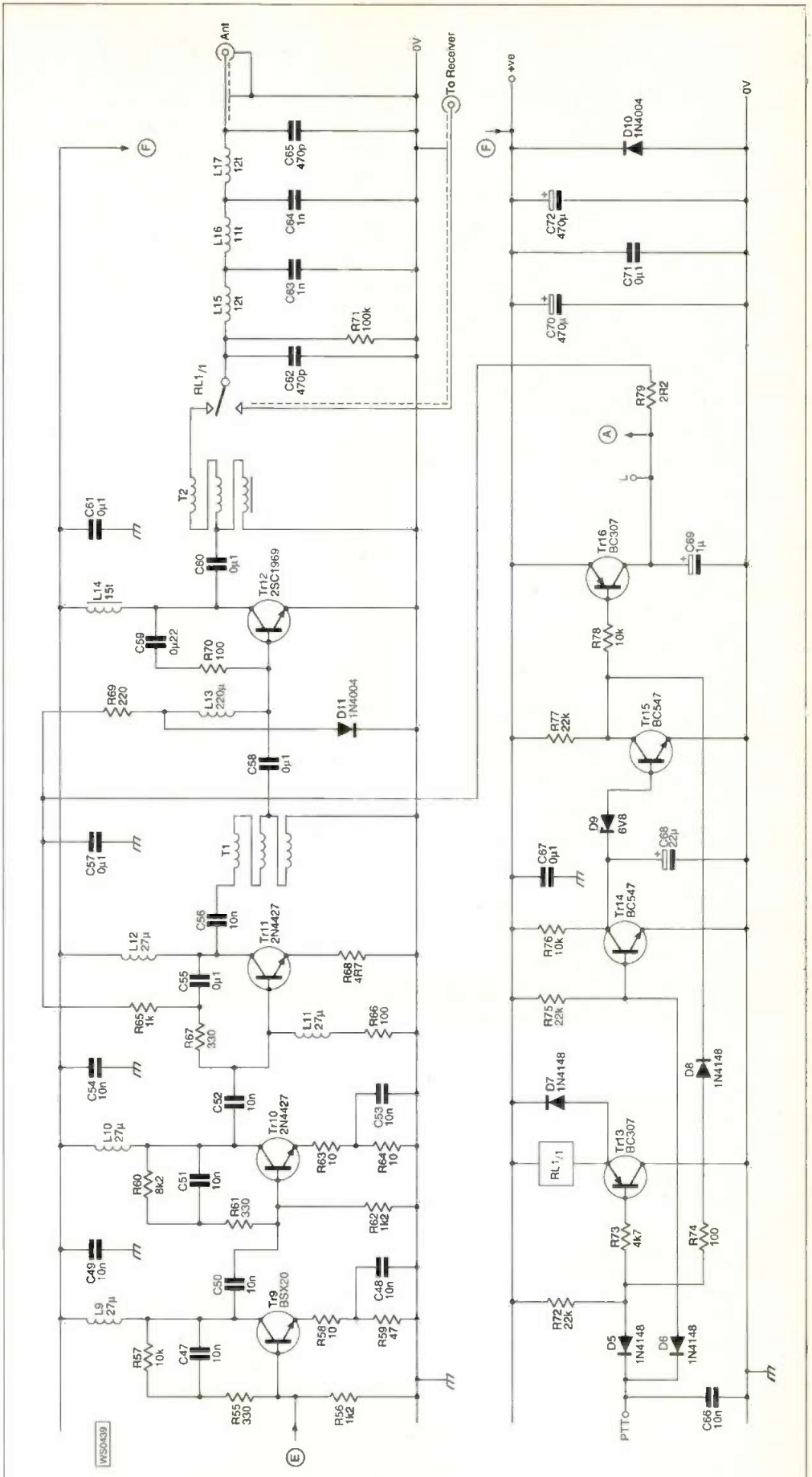


Fig. 3: Transmit amplifiers, p.a. output filter and p.t.t. logic.

PART 2 CONTINUES NEXT MONTH

The Low Down

By David Butler G4ASR

You can get going on l.f. with the Datong v.l.f. converter (see text) and explore the new 73kHz band.

Following several years of negotiation by the Radio Society of Great Britain (RSGB) the Radiocommunications Agency (RA) are now prepared to allow operation on a new low frequency (l.f.) amateur radio band.

The intention of this article is to make you aware of the terms and conditions under which the authorisation is issued. I'll also be covering the types of propagation modes and the typical communication distances that can be achieved.

And I'll also be giving you an introduction to the type of practices and techniques you will need to adopt for successful contacts on this new l.f. band.

Readers of my regular 'VHF Report' column may question why (and with what authority) I'm writing an article on the low frequency bands. But there's no need to worry!

Professionally, I was previously involved with low frequency r.f. engineering. Fortunately, I retained some of my previous links with engineers still working in this area of the spectrum and was able to quickly get back up to speed!

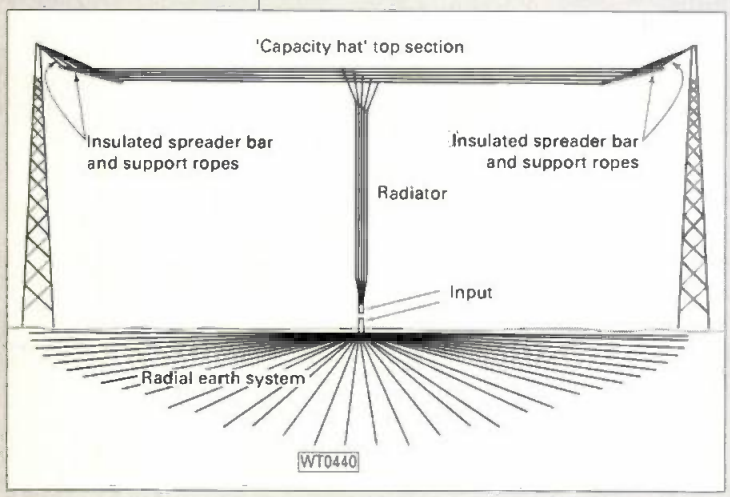


Fig. 1: A typical l.f. transmitting antenna (see text).

Allocation Identified

The l.f. allocation identified and cleared by the National Frequency Planning Group (NFPG) is 71.6-74.4kHz. That's 73kHz plus or minus 1.4kHz.

Authorisation to use the band is via a Notice of Variation (NoV) and will only be granted by the RA to Class A Amateur Radio licensees. Permit holders may use any mode of operation provided they stay strictly within the 2.8kHz wide band and do not cause interference to other users.

The NoV permits a maximum power level of 0dBW (1W) effective radiated power (e.r.p.) at the main address. Operation is allowed from a temporary location provided 7-days written notice is provided to the district Radio Investigation Service (RIS) Office. However, no mobile or maritime mobile operation is allowed.

Operational Problems

One of the operational problems that may be encountered on 73kHz is that there is, as yet, no harmonised l.f. amateur radio allocations. Two years ago an International Amateur Radio Union (IARU) paper suggested a shared allocation somewhere in the region of 190kHz.

In France, the national amateur radio society (REF) have recently been conducting experiments at 143kHz. They are proposing (as expected) a common European frequency around 143-144kHz.

Early this year there was a proposal to adopt a European Conference of Postal and Telecommunication (CEPT) administrations allocation around 140kHz. But this was rejected at a meeting in February.

However, it was agreed to consider (at its meeting in September) the possible use of either 132-140 or 148-149kHz. In the meantime the RA are issuing NoVs for the 73kHz band but there is a possibility that these may be withdrawn if a harmonised CEPT allocation is agreed in the future.

Process Applications

The RA have asked the RSGB to process and vet all applications for a 73kHz NoV. The appropriate form should be requested from: **The Chairman, HF Committee, RSGB, Lambda House, Cranborne Road, Potters Bar, Hertfordshire EN6 3JE.**

On receipt of the form, you need to provide details of name, callsign, main address and whether you intend to operate from a temporary location. You also need to give details of transmission modes you are going to use and background information explaining the reason for the application and the intended uses of it.

The application is then forwarded to the HF Committee (via RSGB HQ) who consider the application before passing it through to the RA to issue the NoV.

on 73

David Butler G4ASR leaves the v.h.f. bands (temporarily!) to provide the 'low down' on the recently allocated v.l.f. 73kHz Amateur Band.

What Use?

I guess one of the questions you may be asking yourself is "What use is there in having an l.f. allocation anyway"? And in my opinion there are many answers to that question!

All frequency bands have their own unique properties to which certain types of propagation are best suited. Basically this means using the band for what it's best suited to.

In the case of l.f. that could be taken to mean applications such as underground or underwater communication. One of the initial reasons for an allocation at these frequencies came from radio amateurs who wished to investigate propagation through the ground by transmission from underground caves.

Frankly I was surprised at the level of interest in the underground operation. But after a little investigation it does seem that a small, but significant, number of experimenters are interested in this technology.

Indeed, there is already one society (Ref.1), the Cave Radio and Electronics Group (CREG). It's been formed for these enthusiasts.

The society, associated with the British Cave Research Association (BCRA), publish a quarterly journal. This includes details of latest radio system developments, meetings and local contacts.

Communications Underground

The use of l.f. is uniquely appropriate to cavers and those that wish to experiment with communications underground through rock. The practices are very different from those associated with long distance propagation.

The antennas used are based on magnetic induction techniques. And although not suitable for long distance communication, this type of antenna is eminently suitable for transmission through solid rock. Underground communication is clearly an interesting and developing aspect of l.f. propagation.

Another area that will provide considerable interest will be that associated with propagation effects. The low frequency part of the spectrum has characteristics quite unlike those of higher frequencies.

Listening to other l.f. stations can be very rewarding. You'll find there's a remarkable correlation between the performance of these signals and propagation in the lower h.f. and v.h.f. range.

For example, stable amplitude and phase of signals (quiet conditions) are indicative of good transatlantic propagation on the 1.8 and 3.5MHz bands. Similarly, other known changes in the characteristics of l.f. signals will provide indications of auroral or Sp-E conditions on the v.h.f. bands.

Indeed one of the reasons I gave when applying for my NoV was to investigate propagation effects at l.f. and to make practical observations of D-layer enhancement following solar flare activity!

Earthquake Activity

It's interesting to note that in the United States some researchers use l.f. beacons (and other activity) as an aid to identifying precursors to earthquake activity.

The monitoring of radio stations have detected frequency deviations and other electromagnetic anomalies before such events. Now I'm not suggesting in any way that this will be of use in the UK but you never know!

Other fields of investigation will include antenna design, new transmission techniques and receiver and transmitter development. And of course there's also the challenge of achieving long distance communication using inefficient, physically small antennas.

The 'challenge' is similar to the 'Everest effect'. You do it, not because it's easy, but because it's there! So as I've just described, the 'use' of an l.f. allocation can indeed be as diverse as many of the facets of amateur radio itself.

Propagation Modes

Before I describe the propagation modes involved, it will be useful to ascertain exactly where in the spectrum the l.f. band is situated. I've shown this in **Table 1**.

Depending on the frequency band, radio waves may be propagated through or along the surface of the earth, through the atmosphere or by reflection or scattering from natural or artificial reflectors.

At e.l.f. and v.l.f., ground waves are propagated between the surface of the earth and the D-Layer for distances of several thousands of kilometres. This is often referred to as the earth-ionosphere waveguide mode.

At these very low frequencies the signals will penetrate into the ground, in some circumstances for hundreds of metres. At higher frequencies, the ground wave losses are so great that signals are generally propagated for only a few hundred kilometres.

Propagation at m.f., 1.8 or 3.5MHz consists of either ground wave or under certain conditions an ionospheric wave (sky wave) reflected from an ionised layer. The new 73kHz band lies in a 'no-mans-land' between v.l.f. and m.f. and will at times exhibit a mixture of propagation modes, both ground wave and sky wave.

Normally the only area of the ionosphere which will have any influence on propagation is the D-Layer. At 50-90 kilometres above the earth, this is the lowest of the ionospheric layers and exists only during daylight hours. The D-Layer

Description	Abbreviation	Frequency	Wavelength
Extremely Low Frequency	e.l.f.	3Hz-3kHz	100,000-100km
Very Low Frequency	v.l.f.	3-30kHz	100-10km
Low Frequency	l.f.	30-300kHz	10-1km
Medium Frequency	m.f.	300kHz-3MHz	1km-100m
High Frequency	h.f.	3-30MHz	100-10m
Very High Frequency	v.h.f.	30-300MHz	10-1m

Table 1: Showing bands, terminology and frequencies.

reflects v.l.f. and l.f. waves, absorbs m.f. waves and weakens h.f. waves through partial absorption.

Important Factor

Although the propagation mode is of course a very important parameter in the ability to work long distances, there is one other factor associated with l.f. working that has probably an even greater influence. This is associated with the reception of natural noise, consisting of thermal noise, atmospheric noise and cosmic noise.

Of the sources I've mentioned, it's atmospheric noise that has the greatest effect on the low frequency bands. In addition to this natural noise, consideration must also be made of man-made noise.

In general, man-made noise levels increase with decreasing frequency, although a specific source may not comply with this general rule. These noise sources usually determine the minimum detectable signal level in any receiver.

At v.h.f. and h.f., the ambient noise levels correspond to noise figures of typically 3-20dB. However, at l.f., atmospheric noise is dramatically higher, corresponding to noise figures of typically 90-150dB!

Hence, unlike v.h.f. operation, low noise amplifier performance is not usually a factor in the design of l.f. receivers. (Unless you live in the Arctic or Antarctic where atmospheric noise is extremely low).

The Antenna

It's conventional amateur radio practice to use the same antenna for both transmitting and receiving. However, for operation on the 73kHz band this is not necessarily correct.

In the case of a transmitting antenna it's true to say that a large, efficient antenna is always the best r.f. 'amplifier' you can get. On receive however, it's a completely different matter.

Because of the inherent background noise at l.f. the task of a receiving antenna is not to produce a large signal but to produce a signal that has the greatest possible separation from the interference.

Given the high noise levels a very inefficient antenna, of only a few metres in length, will let atmospheric noise limit the receive sensitivity. Indeed, one of the penalties of using a 'large' transmitting antenna on receive is that the combined signal plus noise level is often too high for the receiver. This can cause overload problems requiring the use of attenuation ahead of the receiver input.

A suitable choice of receive antennas could be a frame antenna loop antenna (20 turns of wire on a 1 x 1m frame tuned by a 1000pF variable capacitor) or even a length of wire a few metres above ground strung around a fence.

An active antenna using a short whip about 1m in length could also be used. This type of antenna incidentally consists of a short element with (normally wide-band) pre-amplification located in the base assembly. The advantage is that, being small, the antenna may be located in a preferred 'quiet' location away from interfering fields.

Operators who use the 1.8MHz band will need no reminding of the Beverage antenna which was originally designed for v.l.f. reception. In it's simplest form it consists of a very long straight wire, mounted between 1 to 4m above ground, and terminated at the far end.

The Beverage antennna is an excellent receiving antenna. But you do need some 'real estate' (a lot of space!) to take full advantage of its low-noise and directional characteristics.

Problem Wavelength

For transmission, an efficient antenna is essential, the only problem is that at a frequency of 73kHz, the wavelength is 4.1km! This means that (for those of you struggling with metrification) a half-wave dipole is well over a mile in length and will be impracticable.

The best type of antenna to employ will probably be a vertical radiator with a large 'capacity hat' assembly. These could be either an inverted L or T configuration.

The diagram, **Fig. 2**, shows a simple T-type antenna with a vertical radiator. This design has an overall capacitive characteristic which will require tuning out by inserting an inductor at the base of the antenna.

Very small antennas will need a very high *Q* matching circuit to achieve 'high' efficiencies. The *Q* factors could be at least 100, the penalty being that the bandwidth will be too narrow for s.s.b. use. Therefore low data rates (c.w.) may be the only viable option.

It's important to note that the radiation resistance of an antenna drops rapidly when the size is much less than half a wavelength. Most practical l.f. antennas will therefore have an extremely low radiation resistance, just fractions of an ohm.

Even if a large antenna is used, an extensive set of earth radials (although raised radials are better) would also be needed to achieve higher efficiencies. Indeed, it may be argued that an efficient, low loss, earth system is probably as important as the actual radiating portion of the antenna.

Effective Radiated Power

Earlier I mentioned that the power level allowed on the 73kHz band is 0dBW effective radiated power (e.r.p.). That doesn't mean that the transmitter power is limited to 0dBW (1W). Far from it!

The power level is quoted as being in e.r.p. which means it must be related to antenna gain. For example, let's suppose you were allowed to run 10dBW e.r.p. This could be achieved by running 10W into a dipole or 1W into an antenna with 10dB gain, or anything in between.

So what do the figures mean for you operating on the 73kHz band? As described earlier a practicable l.f. antenna will be very inefficient. Even if you could build one, a vertical radiator 300m high would probably have a 'gain' of -10dBd.

Suggested Reading

Antennas and Techniques for Low-Band DXing by John Devoldere ON4UN, Published by the ARRL.

VLF Radio Engineering by Arthur Watt. Published by Bell & Bain Ltd. 1967. (Out of print but highly recommended. Try your local library, they may well be able to get you a copy).

Continued on page 33

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The Cushcraft R7000 Vertical Antenna

By Steve Locke GW0SGL

Busy h.f. operator Steve Locke GW0SGL has been trying out a new version of a popular vertical antenna...very much to his advantage!

When I was asked by the Editor, Rob Mannion to review the new vertical antenna by Cushcraft, my initial thought was one of glee! I've never used a vertical antenna before, always using beams on the h.f. bands, and horizontal wires, dipoles, etc. on the l.f. bands.

Therefore, I looked upon the opportunity to operate on 7MHz in particular with a certain degree of enthusiasm!

Well Packaged

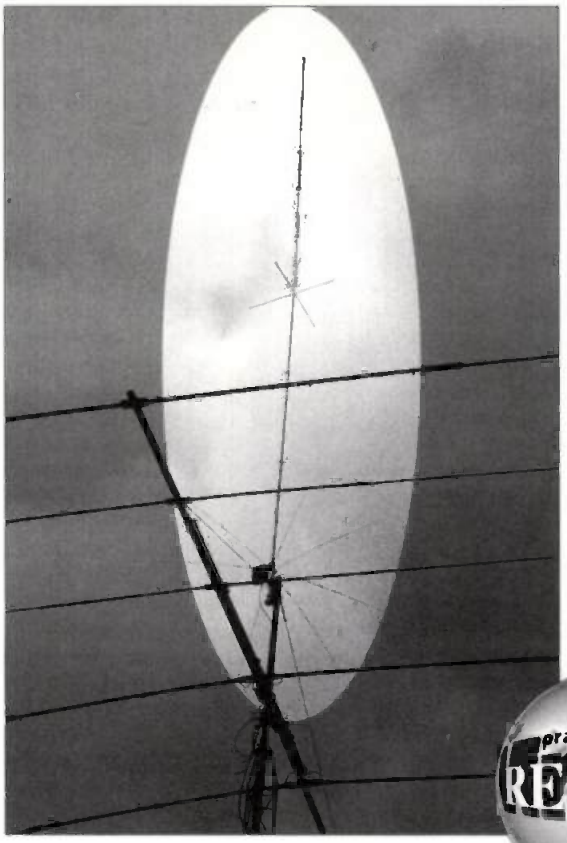
When it arrived, the first thing I noticed was that the antenna was well packaged. The entire contents were enclosed within air-spaced polythene wrapping, no doubt in order to protect the aluminium sections from the rigours of transportation!

I decided almost immediately to erect the antenna. Such was my impatience to 'get cracking' on 7MHz!

I found the antenna's double-paged instruction booklet easy to understand, with very detailed diagrams. **Everything** was described or shown in detail, right down to the last nut and bolt, which no doubt would be of great assistance to those who are not so good at reading diagrams, such as myself!

The antenna itself was even supplied with warning labels for overhead power lines. Also included was a small sachet of grease for sealing purposes, and even a small rubber seal to cover the PL259 where it connects to the antenna.

I was also supplied with a glossy-finish information sheet, which gave details of expected s.w.r. readings on all bands. It covered the 7 - 28MHz, (including WARC) bands, and included close up photographs of the R7000 matching network, and the specifications.



The Cushcraft R7000 mounted above Steve Locke GW0SGL's main h.f. beam antenna.

Assembling The Antenna

Although I've never assembled a vertical before, it took me just 40 minutes to finish assembling the antenna itself. This operation, thanks to the clear instructions, was quite straightforward.

All the traps were marked clearly, C1, C2, C3, etc., and were described as 'slim silhouette cylindrical type'. All materials used had that 'good quality' feel, even down to the stainless steel base screws.

The aluminium tubing used by Cushcraft has double walls for extra strength. Cushcraft also claim that the antenna 'can stand up to 80 mile - per - hour winds' (according to the glossy information sheet which was supplied). I must say that I found the antenna heavier than I had expected, (the weight was actually stated as 8.2kg).

I had also expected the antenna to lean one way or the other when erected. However, when I came to install the antenna, it sat at 90° dead atop my tower with help from my friend **Frank GW7TFO**, at about 18 metres above ground level. It held up to some pretty strong winds within the first few days, although it tended to sway quite a lot.

On The Air

After installing the R7000, I connected it to my main transceiver, a Kenwood TS-940S and was ready to go on air. Preliminary checks of the s.w.r. revealed that the standing wave ratio on the whole was excellent, and the highest reading I encountered was that of 2.5.1 on the 14MHz band.

On all other bands, the readings varied between 1.1:1 and 1.6:1, depending on what segment of the band I was on at the time. It was in fact, better than stated in Cushcraft's own information sheet!

The good results more than proved that the Pi-matching network does indeed work very well! In fact, the only band where I was required to use the tuner was on 14MHz, and then only if I ventured into the s.s.b. section!

At this point, it may be worth mentioning that I was initially very impressed with the drop in background noise level on the R7000 compared to my trap dipole on 7, 18,

and 24MHz. I have suffered to varying degrees with local background noise, sometimes up to S5, particularly on 7MHz.

Using the R7000, I discovered that the background noise had dropped significantly, to a mere S1! This of course, made operating on 7MHz much more pleasurable, and certainly easier on the brain!

Most Challenging

I first used the R7000 on the band which I consider to be the most challenging from my point of view - 7MHz. Not having been a great user of this band, but having heard so much about the DX possibilities here, I was looking forward to putting the R7000 through its paces, both on s.s.b. and c.w.

On 7MHz, after tuning up, the DX certainly started to flow the GW0SGL way, especially on c.w. It provided me with many new DXCC countries on this band.

My total score on 7MHz while using the R7000 was 102 countries. These included: Australia, Saint Pierre and Michelon Island, Guadeloupe, French Martinique, Brazil, Argentina, Azores Islands, Tanzania, Malaysia, Trinidad, South Africa, Mongolia, and numerous European countries, which gave me WAC (Worked All Continents) in about three days!

Operation during daylight hours on 7MHz showed that the R7000's low angle radiation was more suited to DX work than 'inter - UK'. These signals at this time of day were at higher levels on my dipole antenna, but nevertheless, the R7000 still performed adequately enough for lengthy short - haul ragchews.

All told, my view of the R7000 on 'forty' is that it is an excellent radiator, and I think it's well worth looking at if you are interested in working DX on the 7MHz band. I should add that I used a maximum of 100W on all bands while testing the antenna.

Countless Contacts

On 10MHz the antenna performed equally well, giving me contacts with no less than 32 countries, with countless contacts with north America. Additionally, I managed some very good QRPp (the little 'p' means less than 1W) contacts all over Europe during late afternoons and early evenings.

My 14MHz operation proved just as rewarding. Although I must admit, compared to my Hy-Gain TH7 7-element tribander it was approximately 3 to 5 S points lower on all contacts.

I know that my comparison is unfair, as most stations on the h.f. bands use horizontal polarisation and there being a resultant loss of signal between vertical and horizontal antennas. Despite this I still feel that my findings are worth mentioning.

Having compared the vertical and the beam, I should mention I still worked all continents on 14MHz. I also worked 79 DXCC countries on both c.w. and s.s.b., although to be fair, I didn't operate on this band a great deal.

Countries worked on 14MHz included South Africa, USA, Senegal, Taiwan, China, Sri Lanka, Nepal, Chad. I also worked all over Europe, Australia, Japan and many others, mostly with good copy depending on prevailing propagation conditions.

I feel that its also worth mentioning that the background noise level on the 14MHz band (I do unfortunately, live in a very noisy r.f. environment) was considerably lower than I find while using my beam antenna. A vertical such as the R7000 may be the answer for many amateurs who, like myself, find themselves in noisy areas as far as r.f. is concerned.

The 21MHz Band

On the 21MHz band, despite the current low sunspot count, I managed to work a total of 28 DXCC countries using the R7000. These included Tanzania, Ghana, Zimbabwe, Ceuta, Many EUs, the USA, and Anguilla amongst others.

Although signals on 21MHz were pretty mediocre most of the time, the R7000 coped very well. Even to the extent that American stations running up to 1kW who I received at S6, gave me reports of up to S4! I found this astounding, considering that when I operated on the band, openings of any significance were very few and far between!

On 18MHz

Along with 7MHz, another of the bands I looked forward to operating on was 18MHz. My TH7 beam antenna does not operate here, so reviewing the R7000 gave me a great opportunity to explore this band!

At first, I thought the band was dead. Very few signals were apparent, and those that I heard were very low in strength.

However, upon giving a long 'CQ' call, I was immediately answered by a station in Anguilla! This heralded the onset of a long period of operating on 18MHz, often burning the midnight oil, especially working north American stations well into the early hours!

My expectations of the R7000 were far exceeded on the 18MHz band (to say the least!). Total number of DXCC countries here, using the R7000, stood at 35.

On the two highest h.f. bands, 24 and 28MHz, the R7000 worked well. But I must say that conditions, particularly on 28MHz favoured only European contacts.

At the time of writing, it was the Sporadic 'E' season after all. And although I worked many EUs on both bands, I cannot at this stage give an opinion of the R7000's DX capabilities on 24 and 28MHz. That aside, if the antenna performs as well on these two bands as it does on the others I've described, it will surely be a good antenna for DX on both 24 and 28MHz.

Excellent DX Antenna

My overall view (as you've probably guessed from the nature of this article) of the R7000 is that it's an excellent DX antenna. It will, beyond the shadow of a doubt invariably suit the amateur who is restricted to a very small garden.

As a vertical, the antenna requires very little space. And you could, in effect, actually locate it in the corner of your back yard!

As a DX antenna, it has great potential. As one who has solely relied on horizontal antennas, be they beams, long wires, dipoles, etc., I'm personally extremely impressed with the R7000. Not only as a DX antenna, but also with the standard of workmanship, ease of assembly, and erection.

I would have no difficulty in recommending the antenna to anyone, after using it myself. Indeed, I intend to purchase an R7000 to compliment my existing array of antennas, particularly for use on 7 and 18MHz. My only regret is that I've got to send this one back!

My thanks go to Waters & Stanton Electronics of 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843 for the loan of the review antenna which costs £389, plus £7 P&P. There is also an 3.5MHz add-on kit available, the R80, for £129.

PW

Manufacturer's Specifications

Frequency of operation:
7, 10, 14, 18, 21, 24, 28MHz
Gain (dBi):
3
Wavelength on each band:
Half-wave
Power rating:
1.5kW
Radiation Angle:
16°
Horizontal Radiation:
360°
Height:
7.3m
Mast size:
44 - 54mm
Wind load: (m2)
0.2

Steve GW0SGL/P (stroke Parrot!). While the photographer (Leighton GW0LBI) was preparing the shot, 'Charles' the African Grey parrot decided to get in on the act, seemingly to offer advice! Steve reports that /P imitates Morse sounds, replies to other stations but has yet to take the RAE! Also in the photograph is the Kenwood TS-940S, his main rig, which Steve used for the review.

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73 from Dave G4KQH, Technical Manager.

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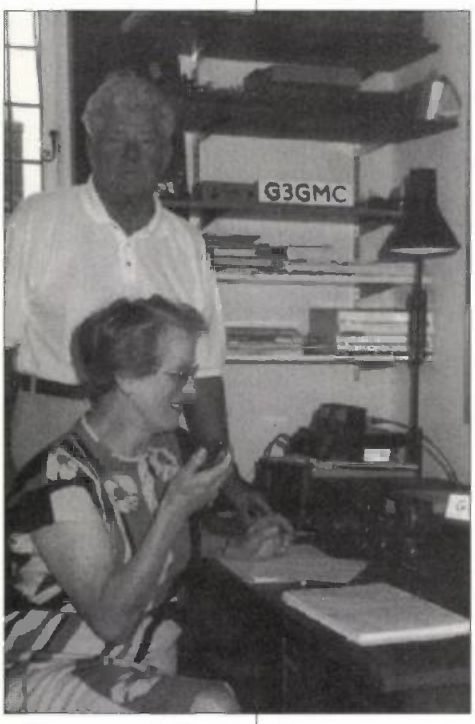
Trials & Tribulations Of The RAE

By Patricia McVey G0PXJ

Patricia McVey G0PXJ recalls her own efforts of getting to grips with the basics needed for passing the RAE.

The article 'Move Over Darling' which appeared in the November 1994 issue of *PW* caused a certain amount of amusement in our QTH. There are many memories of the trials and tribulations of trying to come to grips with the basics needed for the Radio Amateurs Examination. It's a wonder the OM has any hair left after some of the frustrating hours spent with me trying to sort out the various components and their uses, (easy for him who had been using the things for years!).

Some of the exasperated expressions on his face were a sight to behold. But not being able, over the years, to join some of the very interesting conversations I was hearing, it was a case of getting stuck in so that I could be a part of all that was going on. 'Weaned over' I wasn't, left out and nosey I am!



Looks like Pat G0PXJ was the first one to the shack this time! With her is husband Bob G3GMC.

Then came the c.w. which was definitely not fun, and trying to be dedicated and get the stuff under my belt I decided to take all the necessary gear on holiday one year. My advice is don't!

Have you tried explaining to the security staff at an airport what an electronic Morse processor is and why you are carrying it around along with blocks of paper, various tapes and assorted pens and pencils? If you weren't going increasingly mad before you got to the airport, you were certainly well on the way afterwards!

Make My Mark

Having, as I thought, got the difficult bit behind me and a place in the 'A' team, I was all set to make my mark on the h.f. bands. I was wrong!

No one told me that the RAE was the easy bit and there was a great deal more to learn. I had not taken into account my husband's many years of 'hamming' (some 40 something years) and his insistence that I should get it right and sound like a 'proper' operator.

There followed a good many hours of further instruction on how to use and make the best of his equipment. How to use the a.t.u., how to adjust the antenna (not an aerial as I thought!), how to tune the bands and home-in on other stations, how to use the transceiver facilities properly and how to make CQ calls on h.f. which, as we all know, are somewhat differently made to 144MHz CQs. All perfectly reasonable and proper, but frustrating when you're raring to go.

Right, he is now satisfied that I am coming to grips with all the knobs and levers and allows me to push the button. I am actually operating h.f. at last and having a great time. It really is a case of 'Move Over Darling'.

Change Transceiver

The first one in the shack gets to use the equipment. But then, (you've guessed it!) he changes the transceiver and I have another set of knobs and levers, bells and buttons to contend with!

One thing he didn't tell me, however, was how to locate the antenna to the DX station at the drop of a hat. Listening for the DX station to give their callsign sometimes takes a little while and that is when you can understand what is going on under the near hysterical calls from the pile-up.

Then a frantic look in the book to see 'which country', (assuming you hear a callsign), a further more frantic look at the great circle map for the best path, swing the beam and lo! he/she has gone. I haven't yet been able to home-in with the same speed and savoir-faire of which he is capable and have consequently often missed a 'good one'.

Never mind, they are coming gradually. I have managed enough QSOs to obtain various awards including DXCC. But I have to confess that the impetus for award collecting has somewhat diminished lately.

Costly Activity

I fully understand that QSLing is a costly activity and for each station I really want an s.a.e. complete with 'green stamps' (US Dollar Bills) and/or IRCs is always sent, but there are many instances when a reciprocal QSL card is not returned. What do these stations do with the IRCs and dollar bills I send?

Then there are the occasions when all the conditions for an award are fulfilled, application sent together with the required amount of payment and no award is forthcoming. Reminders are sent to no avail and the award issuing authority does not even have the courtesy to send a postcard advising non-receipt or that you are the 47000th in line!

One of these days I might consider applying for my DXCC certificate, but I need to be more hopeful of a reaction than I am at the moment. This is my gripe for 1996, annoying but not important.

Marvellous Hobby

Having overcome the frustrations of the RAE and ignoring those of QSLing, amateur radio is a marvellous hobby, it's a great leveller of people, from highest to lowest. You never really know who you are talking to and it's well worth all those headache pills I had to buy!

I hope all the newcomers to amateur radio have the same amount of fun as I do. And to anybody who is thinking about it, I would say take the plunge and 'go for it'.

PW

Carrying On - The Practical Way

By Rev. George Dobbs G3RJV

This month the Rev. George Dobbs G3RJV describes a variable crystal oscillator and a band-pass filter unit suitable for using with his 'Utility Receiver Board' and other applications.

It's amazing how many times the same circuit elements come up when I am testing new projects on my bench. To that end I keep a few utility circuit boards which can be quickly lashed into place until the final design takes shape. It saves a lot of time in the early stages of trying out new ideas.

Of their nature, these circuit boards are a simplification and compromise, but they can provide a rule of thumb guide before the tailored final circuits evolve. (Although it's not unknown for them to become the final circuit!).

Last month I described a 'Utility Receiver Board' designed to be an item of test equipment for monitoring signals. My version was driven by a signal generator to provide a simple monitor over a wide range of frequencies.

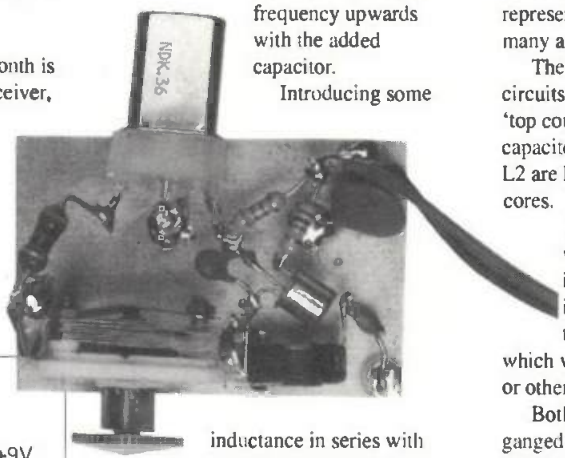
The board described last month is actually a direct conversion receiver, so it requires a local oscillator (l.o.) at the frequency to be monitored. My original use was monitoring signals from a single sideband (s.s.b.) generator at 9MHz. I found that the best way to provide a stable signal for the local oscillator was to build a simple variable frequency crystal oscillator (VXO).

Utility VXO

The circuit in **Fig. 1**, shows the 'Utility VXO', a variable frequency crystal oscillator built around a bipolar transistor. I used a BC108, but any similar transistor would serve the purpose.

A single feedback capacitor, 100pF, is used on the oscillator between the emitter and base. The output is taken from the base via a trim-pot to adjust the level.

The frequency is determined by the crystal. Placing a variable capacitor is series with the crystal will viarably shift the frequency upwards with the added capacitor.



Introducing some inductance in series with the coil and capacitor further increases the variable range. It can shift the frequency from slightly below to a little above the crystal frequency.

With a little care in choosing the variable capacitor and inductor a very useful swing of frequency can be attained. My variable capacitor was a scrap Polyvaricon which seemed to show a capacitance of something under 80pF on a capacitance meter

This version of the oscillator, when used with a 9MHz crystal produced a swing between 8.9959 and 9.0020MHz. Enough to monitor both sidebands from my s.s.b. generator.

I also tried the oscillator with crystals in the 7MHz amateur band and again a useful swing was available. A 7.025MHz crystal could be made to oscillate in the range 7.0237 to 7.0283MHz. Attaching this to the utility receiver board can make a simple receiver to monitor the 7MHz band.

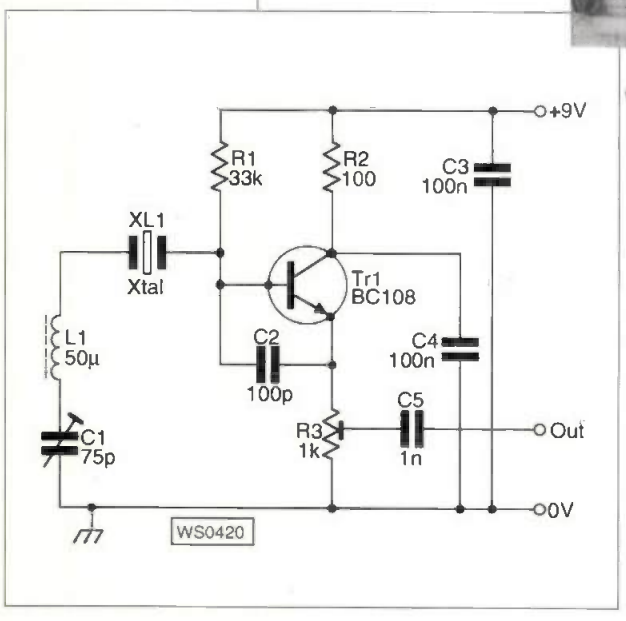


Fig. 1: Circuit of the 'Utility VXO' described by G3RJV.

Fig. 1a: Photograph showing the VXO unit built by using 'Ugly' style construction (see text).

Bandpass Filter

The utility receiver board described last month has no input tuning. An add-on bandpass filter would be very useful if it's to be used to listen to radio signals and would also be helpful in its test equipment role.

I've shown the circuit of a variable bandpass filter in **Fig. 2**. With the values shown this filter tunes from about 3 to 15MHz which represents quite a useful range for many applications.

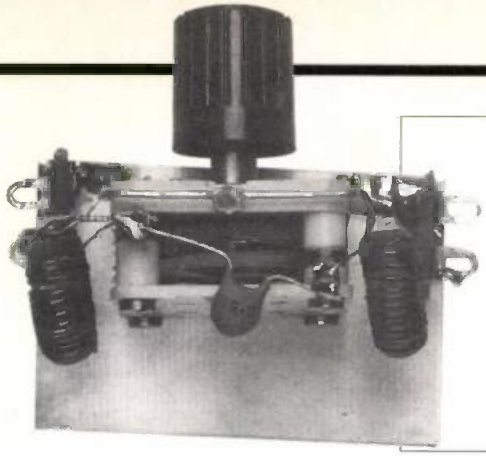
The filter consists of two tuned circuits (T1/C7a and L2/C7b) loosely 'top coupled' with a small value capacitor, C1. The inductors L1 and L2 are handwound on T50-2 toroid cores.

Inductor L1 has a link winding which offers a low impedance input. The other inductor, L2, offers a medium to high output impedance which will match the utility receiver or other input circuits.

Both tuned circuits are tuned by a ganged variable capacitor of the Polyvaricon type often found in scrap medium wave (often referred to as a.m.) transistor radios. These radios are readily available on the surplus market, from major component mail order houses or could be culled from junk boxes. The values of the larger ganged pair of capacitors, designed for medium and long wave tuning, are usually in the order of 200 to 250pF.

Although the filter is by no means the ultimate in bandpass selectivity, it's as good as many modern wide coverage synthesised receivers and transceivers!

Using the VXO above on 7MHz and the bandpass filter, I managed to achieve quite reasonable results with the utility receiver board. Both the



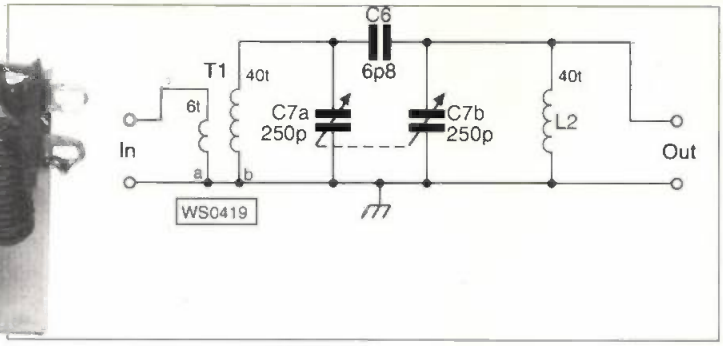


Fig. 2: Simple (but effective) 'Utility' band-pass filter (see text).

Fig. 2a: Photograph showing the band-pass filter assembled using the 'Ugly' style (see text).

VXO and the Bandpass Filter boards would make useful little circuits for other applications.

Ugly Style

I built the VXO and bandpass filter circuits using the 'ugly' style (as illustrated last month) on small pieces of blank printed circuit board material. This follows the usual convention of using the grounded components as anchor points for the other components in point to point construction.

'Ugly' construction calls upon a little ingenuity from the constructor. But the general idea is to follow the circuit connections. Have a go....it works!

Selection Of Crystals

I happen to have a selection of amateur band crystals which come of having built a whole range of simple QRP transmitters. I tried crystals for the 3.5, 7 and 10.1MHz amateur bands with the Bandpass Filter board and managed to produce an quite decent receiver with the Utility Receiver board.

What's more to the point, is that using a 9MHz crystal and the Bandpass Filter board, I was able to monitor my 9MHz s.s.b. signals very well with the receiver. I've also used the bandpass filter in conjunction with an r.f. signal generator to monitor signals from home built oscillators.

Put these little boards on the shelf and pull them down when you need them. You won't be disappointed you made them!

PW

Low Down on 73, continued from page 26

In the example I've quoted you would need to run 10W output to achieve 0dBW e.r.p. But there's no way you'll ever have an antenna that large!

A bit more practicable might be a 16m high tower but even so this would only have an efficiency of about -50dBd. (Now where can I find a 100kW amplifier to drive it!). Perhaps the BBC will let me use their Droitwich 198kHz transmitter?

In practice, the space limitations of most domestic situations will make it difficult to achieve as much as a few milliwatts of effective radiated power. Even when you're running many hundreds of watts input.

Mode of Operation

Virtually any mode of operation (except fast scan television) is allowed on the new frequency allocation. However, it's expected that narrow, low data rate modes will be used, both to allow many users to co-exist and to obtain useful ranges.

Wider modes, such as s.s.b., will need tighter filtering than normal. And interestingly I recall that the Datong r.f. speech clipper produces processed s.s.b. at a nominal carrier frequency of 60kHz. Perhaps this unit could be used as a basis for narrow-band s.s.b. experimentation? A transmitter output power of 400-500W would not be unreasonable and would be relatively easy to achieve using VMOS devices.

Navy Receivers

Surplus Royal Navy receivers, such as the B40, cover the l.f. bands and are readily available on the second-hand market. Additionally, a number of modern transceivers now include general coverage receive, many down as low as 30kHz.

The sensitivity of the receiver types I've mentioned may not be very high at the low frequencies. Fortunately though, the receiver only needs to be sensitive enough to hear the ambient noise level from the antenna.

Most communications receivers however have limited coverage of low frequencies. To overcome this a simple up-converter can be constructed which converts the l.f. band up to a higher frequency. This can then be tuned on a conventional communications receiver.

No matter which option you choose it will be essential to make use of narrow bandwidth, both i.f. and a.f. filters.

Distances Achieved

The distances achieved will be very much dependent on the system bandwidth. For example a very narrow-band 0.1Hz data system running 0dBW e.r.p. would probably have a range of about 1000km in daylight and up to 3000km at night.

However, 0.1Hz is barely communicating! Using an s.s.b. bandwidth you would be lucky to achieve 100km on the 73kHz band.

On a much higher frequency band, 160-190kHz, K1RGO claims to have made contacts over 400km. He was using a VN67AF v.m.o.s. amplifier running 1W into a 16m vertical antenna. This must be considered good when you realise that the radiation resistance of the antenna must be in the order of only 0.02 ohm so that the maximum effective radiation would not be more than a few milliwatts.

PW Lowfer Club

Obviously in this brief introduction to the l.f. bands I cannot cover all aspects and technicalities of l.f. operation. In further columns I intend to cover propagation, antennas, receivers and transmitters in greater depth.

One idea that I had was to form an informal group, the *PW* 'Lowfer' Club. It will have the aim of exchanging news, ideas or maybe just to put you in contact with similar experimenters in your area.

If you want more details of this or wish to pass on details of your l.f. activity please write to me at: **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP**. You can also contact me via packet radio @ **GB7MAD**, the DX Cluster @ **GB7DXC** or E-Mail via **davebu@mdlhr1.igw.bt.co.uk**

So come and join, and enjoy getting the 'low down' on 73!

PW

References

(1) Details of CREG can be obtained by sending a 9 x 4in s.a.e. to: **Mike Bedford G4AEE, 4 Holme House, Oakworth, Keighley, West Yorkshire BD22 0QY**. Alternatively you could try their Web site at **http://www.sat.dundee.ac.uk/~arb/creg/**

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Suspend-a-Loop

By Kevin James G6VNT

Kevin James G6VNT describes a suspendable cubical quad loop for 144MHz that can be stowed in a small space. It's just the thing for the holiday villa!

My project this time is an extremely simple and inexpensive wire beam antenna, with about 5dBd gain. Although it's twice the size of a normal cubical quad loop, it also collapses down to two one metre (or so) pieces of dowelling, and a few wires.

The antenna is a bi-directional loop and can be suspended from a light shade in a room. It's also horizontally polarised, which makes it suitable for sideband (s.s.b.) use. Apart from being inexpensive, it is also very easy to make.

Square Loop

Referring to the drawing, **Fig. 1**, the antenna consists of a 1068mm square loop of insulated wire. I actually used some ordinary 5A single core lighting flex wire for my prototype.

My antenna idea is based on the standard cubical quad loop, which has a gain of about 1.4dB over a dipole. Note that, unlike the basic cubical quad loop, mine isn't a complete loop. The 75mm gaps at the top of the elements, are to stop uneven currents flowing in each side of the loop.

The loop shape is maintained by two dowel rods, one at the top and the other at the bottom. The wire is taped to the dowel at 150mm intervals with insulating tape. When the loop is suspended from the centre of the top dowel, a cubical quad loop is formed.

The antenna is fed with a 500mm piece of 300Ω ribbon cable at the bottom centre of the loop. This length of twin feeder forms a quarter-wave transformer.

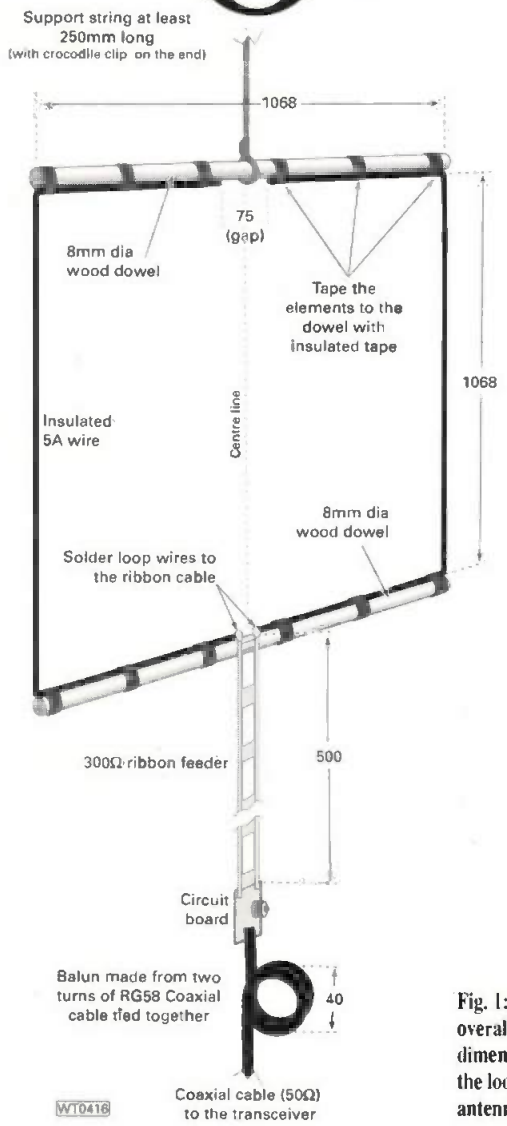

Fig. 1: The overall dimensions of the loop antenna.

Matching Problem

The two wavelength loop, unlike the standard (one wavelength) loop antenna, has a matching problem. Doubling the size has given a little extra gain, however it's done at the expense of increasing the feedpoint impedance.

At the feedpoint, the input impedance is several thousand ohms. It's obvious that we have to devise a matching arrangement to transform the high impedance to match the 50Ω output to be found on most transceivers.

I decided to carry out the matching transformation in two stages. First I used a 500mm length of 300Ω ribbon to act as a quarter-wave transformer, reducing the impedance down to about 65Ω or so. Then followed this by a trimmer capacitor.

The trimmer capacitor allows a final match down to 50Ω and I mounted mine on a small p.c.b. The p.c.b. is very simple, consisting of a piece of glass fibre single sided board some 50×12mm.

The board is only to provide a stable mounting for the trimmer and a tie point for the RG58 (see **Fig. 2** for details). You don't have to make a p.c.b., a small piece of any insulating material will do.

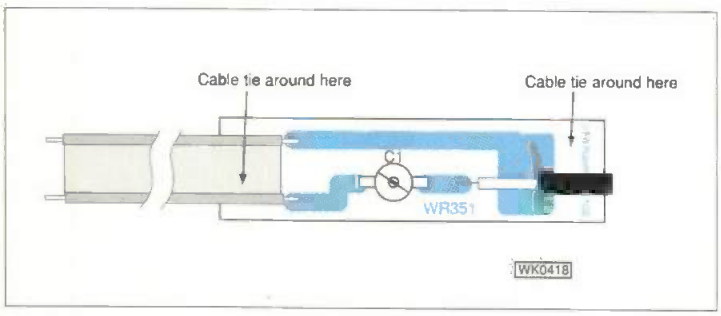

Fig. 2: A small p.c.b. gives stability to the join of the feeder and cable. The p.c.b. isn't a neccesity as almost any insulating material will do (see text). Trimmer C1 is 10pF.

Balun Needed

As the antenna is balanced and the coaxial feed is unbalanced, a balun is required in the line from the radio to the balanced loop. There are many forms of balun that could be used. But I decided to use the easiest to create.

The easiest balun to create (at v.h.f./u.h.f. anyway) is just to coil the coaxial feed into a multi-turn loop. I found that two turns of the RG58 coaxial feed with an inside diameter of 40mm was adequate.

The balun was formed some 25mm from the p.c.b. and was kept in place with two cable ties. Although I used cable ties, you could of course use insulated tape or even string to hold the turns in place.

At the centre of the top dowel rod a 250mm length of string is tied with a crocodile clip on the free end. The clip is quite large, like those used in car battery chargers. This clip is the clamp used to suspend the antenna from any convenient horizontal item.

Don't forget of course the loop should only be suspended from a structure capable of supporting the loop's weight. The loop should also, as far as possible, be suspended away from metallic structures.

Setting-Up

Setting-up the antenna is very simple. After suspending the cubical quad away from metal objects, key up the radio on low power. Then adjust the trimmer capacitor until the lowest s.w.r. is obtained. On my prototype I could achieve an s.w.r. of 1:1!

It's a bit fiddly trying to key up and adjust a moving cubical quad, some assistance will probably be required. I found the best way was to ask someone else to key up the radio.

I used this method, and all I had to do, while holding the coaxial cable just below the balun, was to adjust the trimmer using a plastic trimming tool. (A plastic trimming tool is definitely recommended for this operation).

Performance

The antenna performance is like a dipole and is bi-directional. That is to say it has a figure-of-eight polar response. In terms of gain it compared favourably with my standard HB9CV twin element beam. Unlike the beam antenna, it had the advantage of working equally well off the back as the front of the beam.

The Suspend-a-Loop also has the advantage of being bundled up and stuffed in a wardrobe. I've found that when used after rehanging the s.w.r. is unchanged. Its a great antenna for those who are not allowed external antenna's, yet do not want an assembled array cluttering up the shack.

I am sure there are many out there who'll find this a useful antenna, especially as it costs virtually nothing to make. It can be made literally from junk in the garage or the shack !

PW

RAE Caseb

By Murray Ward G3KZB

With RAE course time looming again, Murray Ward G3KZB takes a look at the transistor audio stage and at some possible questions.

A question about a transistor audio stage caused problems in a recent radio amateur examination (RAE). The examiners reported that 'Some candidates thought the main function of a collector resistor was to limit the current rather than to provide a load for the signal voltage'.

Have look at **Fig. 1** which shows four resistors that are connected directly to a transistor in an audio frequency (a.f.) amplifier stage.

Incidentally, the transistor is an *npn* type.

Let's first deal with resistor RE, between the emitter and the 0V rail (sometimes called 'ground' although it may not be 'grounded'). The value of this resistor is much smaller in value than the other three resistors.

So the emitter is almost at ground. When the transistor is connected in the way shown in this circuit of Fig. 1, it's said to be in the common-emitter configuration.

The load resistor R_L is connected between collector and the positive (+12V) supply. The voltage at the base of the transistor is fixed by the potential divider formed by R1 and R2.

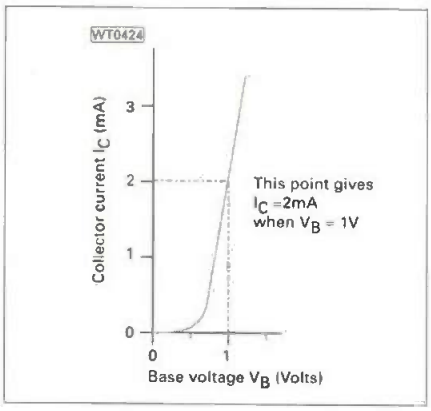

Fig. 3: The base voltage collector current graph.

Immediate Question

Immediately there is a question! What are the voltages and currents in the circuit when there is no signal coming in? The circuit of **Fig. 2** has some typical values put in and gives you an indication.

It's usual to deal with voltages with reference to (w.r.t.) the 0V line unless

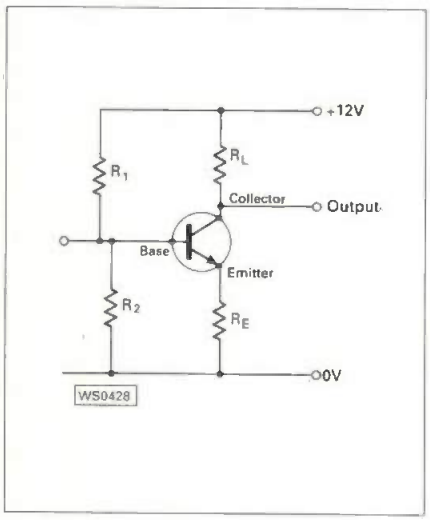

Fig. 1: The basic transistor biasing model.

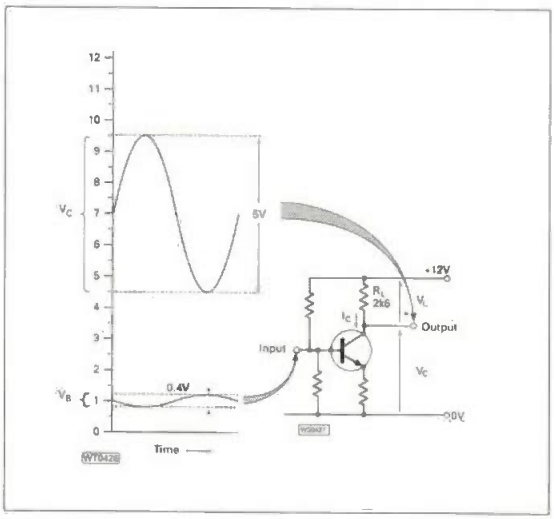

Fig. 5: The phase and voltage levels to be found at the input and output pins.

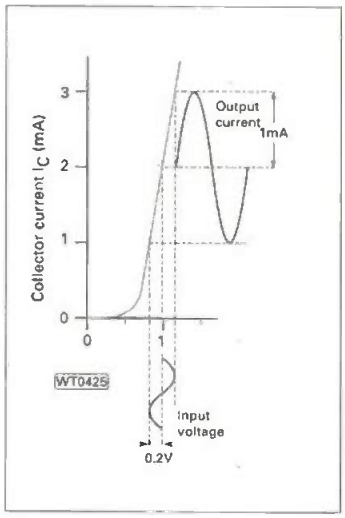

Fig. 4: With a ±0.2V base drive the collector current swings ±1mA.

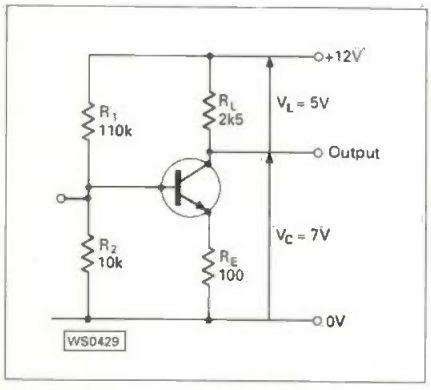

Fig. 2: Adding a few typical values.

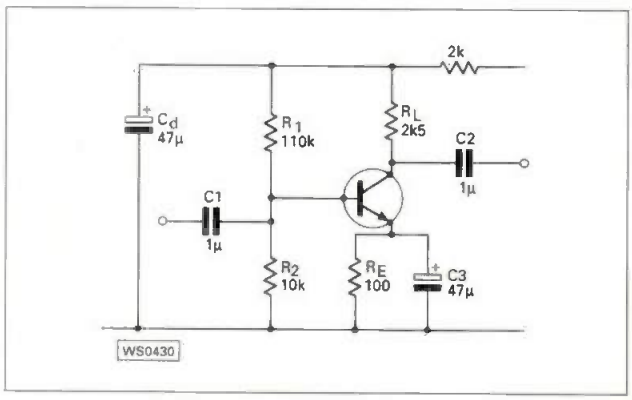

Fig. 6: Additional components to make a working amplifier. The 2kΩ resistor and 47µF capacitor reduce the power supply ripple that gets onto the output signal, but does alter the various voltage levels.

ook

stated otherwise. The base of the transistor is biased at 1V above ground by R1 and R2. From the graph **Fig. 3**, you can see that a base voltage (V_B) of 1V gives rise to a collector current (I_C) of 2mA.

A current of 2mA through R_L causes a drop of 5V across this resistor (by Ohm's law: $V_L = I_C \times R_L$). This voltage drop (not referenced to the 0V rail) gives a voltage of 7V, referenced to the 0V rail, at the collector (12 - 5V).

Now let us apply a signal at the input. The graph of **Fig. 4**, shows that by varying the input (shown horizontally) by ±0.2V, the collector current (I_C) will vary between 3mA and 1mA (on the vertical axis).

The variation in collector current gives rise to variations in the voltage developed across the load resistor (R_L). Of course there are also variations in the emitter voltage, but we can ignore them for now.

A total swing of 0.4V (peak-peak) at the input results in a total swing of 5V (peak-peak) at the output **Fig. 5**. As the output voltage is greater than the input voltage, we can say the stage has 'gain'.

To calculate the voltage gain we divide the output voltage by the input voltage. So, the gain is 12.5 (5V/0.4V). In practice you would expect the gain to be higher than this, but I've chosen the values to keep the arithmetic simple.

When the voltage at the input is on the increase, the output voltage decreases and vice versa: in other words, there is a 180° phase shift between input and output. For an ordinary audio stage this phase shift doesn't matter.

Finally, **Fig. 6** shows a practical circuit with the capacitors that I left out of the earlier diagram. The two 1µF capacitors are to isolate the voltage levels in previous and later stages. This allows each stage's biasing to be specifically set-up.

The circuit illustrated is for small signals, such as in a microphone amplifier. If we want to draw power from an amplifier stage (to drive a loudspeaker, for example), then a different circuit is needed. But that's another problem!

PW

Questions

Now let's have a look at a few questions about the circuit!

Q1 Which two resistors in Fig. 1 determine the voltage at the base of the transistor?
(a) R1 and R_L
(b) R1 and R2
(c) R_L and R_E
(d) R2 and R_E

Q2 The purpose of a coupling capacitor between the stages of a multi-stage amplifier is to:
(a) provide a phase shift
(b) improve the high frequency response
(c) provide a suitable bias for the second stage
(d) isolate the d.c. voltages in the two stages

Q3 In the complete amplifier stage shown in Fig. 6, the phase difference between the input and output waveforms is:-
(a) 90°
(b) 180°
(c) 270°
(d) 360°

Q4 In Fig. 5 the main function of R_L is to:
(a) provide a load for the signal voltage
(b) limit the current through the transistor
(c) bias the emitter to the correct voltage
(d) isolate the transistor from the rest of the circuit

Answers
Q1 b Q2 b Q3 b Q4 a

A Quart...

By Bryan Wells G3MND

Can a wire antenna with half the normal span provide a satisfactory performance? The answer to this question is a definite 'Yes'! - within the limits stated below.

I judged the performance of the QUIPP experimental 3.5MHz antenna against a full size vertical 3.5MHz loop, in use for some 15 years. The full sized loop is in the form of an upside down isosceles triangle standing on its apex feed point, which is about 4m above ground. The long side (39.5m) of the triangle runs (horizontally) E-W at a height of about 12m and the circumference of the loop is some 82m.

I found that in comparison to the full size loop, the QUIPP experimental antenna, for 3.5MHz, was only one 'S-point' down on receive and less than two 'S-points' down on transmit. This performance I consider to be effective.

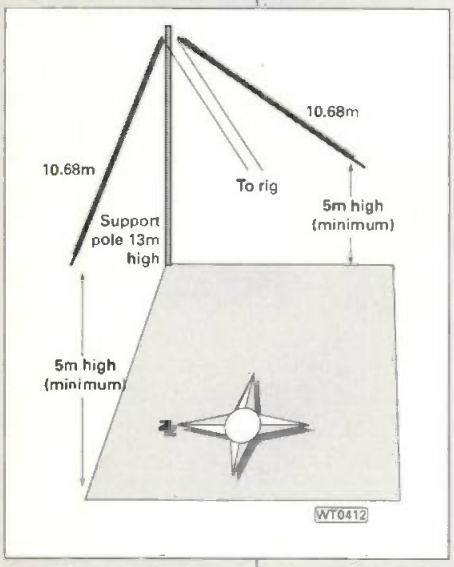

Fig. 2: An effective layout that G3MND found worked well in a small space.

Antenna Performance

The QUIPP 3.5MHz antenna performance is within the limits I've mentioned at my location. The main problem with linear loading for wire antennas, probably the most efficient method, is the complication brought about by spacers and tensioning.

My QUIPP 3.5MHz design overcomes the problems by utilising 300Ω slotted ribbon feeder with the additional element made from insulated wire. This additional element is interlaced, back and forth every 150mm or so through the slots in the ribbon.

The form of the QUIPP antenna and the dimensions are shown in the diagram **Fig. 1**. With the simple linear loading of this kind of antenna you will really appreciate that a 50% reduction in size is near to the maximum reduction that can be accommodated.

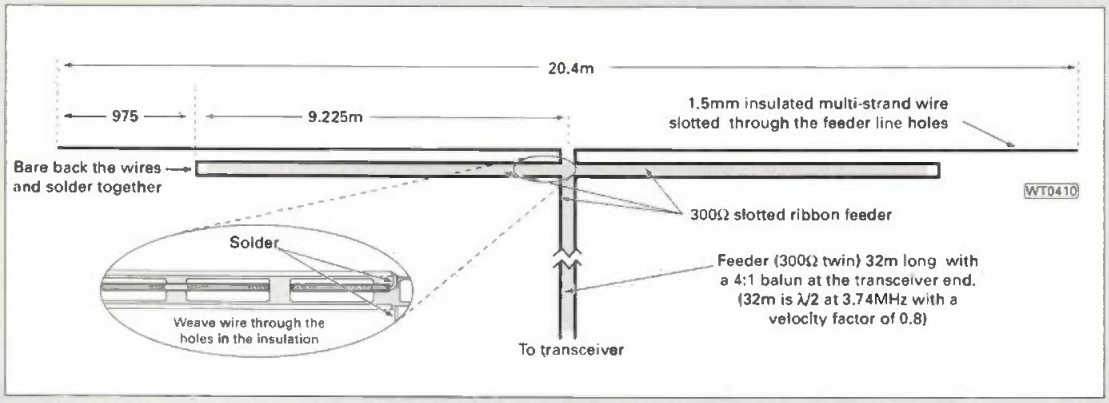

Fig. 1: Dimensions for the QUIPP antenna for 3.5MHz. Made from slotted 300Ω feeder with the extra conductor threaded through the slots.

Please note however that in Fig. 1, the elements are shown separate only for clarity. In reality the longer elements are woven through the slots in the insulated material forming the web of the 300Ω twin feeder as shown.

The close spacing does not seem to degrade the performance to any significant extent. But as with many gains, there is however, a penalty!

With normal linear loading it's usually reckoned that the total conductor length should be increased by up to about 20% at the design frequency. I've found that with the close spacing of the QUIPP the overall length increase is more of the order of 40%.

The performance of the QUIPP antenna falls within the limits specified when used as a horizontal doublet at 11m or as an inverted 'V' at 12m. In both cases fed with an approximate electrical half wavelength of 300Ω solid ribbon terminated in a 4:1 balun.

The balun I used is made by winding 15 bifilar turns of 2mm (16s.w.g.) insulated wire on a ferrite rod of about 150mm long. The ferrite rod I used is some 15mm diameter. The specific inductance value (AL, the inductance value per number of turns) is given as being 70mH per thousand turns.

Antenna Bandwidth

The bandwidth of the QUIPP, assuming that means having an s.w.r. of less than 1.5:1, is in excess of 100kHz. The lowest s.w.r. figure of 1:1 occurs, on my prototype, at about 3.69MHz. This was against an original design frequency of 3.74MHz. Again I stress that these figures relate to my particular surroundings.

The calculated inductance of a straight wire of length 19.05m, (half a normal dipole length for the design frequency of 3.74MHz) is about 40μH. The measured inductance of half the span of the QUIPP linear loaded as shown, is about 23μH.

From

$$f = \frac{1}{2\pi\sqrt{LC}}$$

we can find the LC value that gives resonance at 3.74MHz.

$$2\pi f = \frac{1}{\sqrt{LC}} \quad \text{or} \quad (2\pi f)^2 = \frac{1}{LC}$$

$$\therefore LC = \frac{1}{(2\pi f)^2}$$

$$LC = \frac{1}{(2 \times \pi \times 3\,740\,000)^2}$$

$$= \frac{1}{(2 \times \pi \times 3.74 \times 10^6)^2}$$

$$= \frac{1}{552 \times 10^{12}} = 1.812 \times 10^{-15}$$

$$= 1812 \times 10^{-18}$$

Bryan Wells G3MND describes the Quart In a Pint Pot ('QUIPP') - his effective and simple linear loaded, half sized antenna for 3.5MHz.

I've shown the power as 10-18 because this is the same as defining inductance in *Micro* (10-6) Henries and capacitance in *Pico* (10-12) Farads. So to find system resonance take values, where the product of inductance (defined in µH) and capacitance (defined in pF), give a figure of 1812.

It seems from the above that the reduction in system inductance is compensated for by a commensurate increase in system capacitance provided by the close spaced linear loading. Presumably this accounts for the relatively generous bandwidth and will mean that the system *Q* is also reduced.

Other layouts

You can try out other layouts if you don't have space for a complete horizontal run of 21m including the support ropes. Have a look at the drawings of Fig.s 2, 3 and 4, where I've shown other possible layouts.

I've tried the three differing layouts with various degrees of success. The two forms shown in Fig. 3 and Fig. 4, of course 'fire' east-west. I've also used it in the inverted-V form mounted on one 13m pole in one corner of my garden with one sloping leg to the West and the other to the South.

In the inverted-V case where there is only 90° horizontally between the legs, the total space taken up is just over 10m square. If you have an especially small garden then you could combine the 'drop-leg' ideas of Fig. 3 or Fig. 4, but you will lose out on efficiency though.

Other Bands

I discovered something else, and that is, in addition to 3.5MHz there were three other bands with a reasonable match to 50Ω, So on these bands I didn't need an antenna matching unit.

Because the matching to three other bands may be a feature of my particular set-up (and may not be exactly repeatable) I won't say which bands. But you may find something similar when you come to check out your system.

Other Sizes

You can make antenna of others sizes to suit other bands. Apart from the half size 3.5MHz antenna I've used the same method to construct a 54.88m (42.68m horizontal and the rest dropping vertically at each end) for 1.8MHz. I've also tried a similar version (with 54.88m dimensions) as an extended double Zepp for 3.5MHz.

My modified double Zepp antenna has a total conductor length of 140m while a 'normal' extended double Zepp length (cut for 3.74MHz) has only about 100m. The layout is a 21.4m three wire linear loading plus 6.1m tails either side.

The versions for both bands were effective, although I have no antenna to make a comparison with on 1.8MHz. However, the extended double Zepp with a 42.7m top (with 6.1m 'tails') at 12m high, worked particularly well. It was sometimes one or two dBs or so better than the 3.5MHz loop. Although at other times it was the same amount down.

Final Point

One final point I must make. I've tried using the more usually illustrated linear loading method shown in Fig. 5 (this is written up in the *ARRL Antenna Book* - 16th edition, section 6-7).

I term the version shown in the ARRL book, the 'twin opposed' method. In my experiments I found that this format was significantly less effective compared with the simple version I've used for the QUIPP.

I hope that the 3.5MHz version will encourage those operators who do not have enough room for a full size antenna, or even perhaps for a G5RV, to have a go.

PW

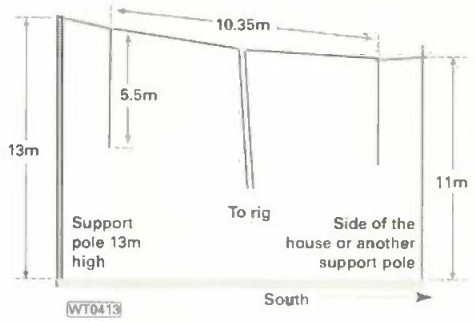

Fig. 3: Dropping the ends like this reduces efficiency a little, but reduces the space needed even more.

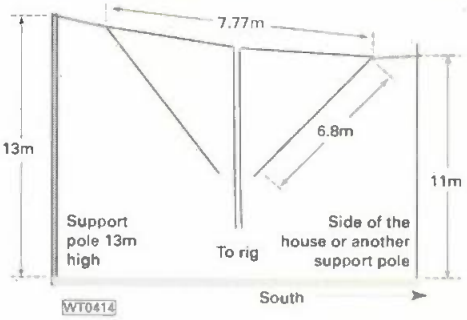

Fig. 4: This layout needs even less 'real estate' than the layout of Fig. 3, but with a little drop in efficiency.

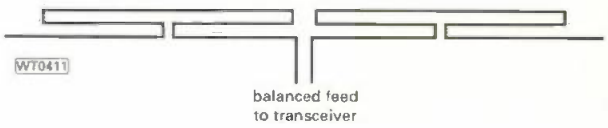

Fig. 5: This is the 'twin opposed' form of antenna shortening suggested in the ARRL Antenna Book, but Bryan G3MND found it rather poor in efficiency.

...In A Pint Pot!

RADIO Diary

Compiled by Zoë Crabb

1996

August 11: The 39th Annual Derby Mobile Rally takes place at the Littleover Community School, Pastures Hill, Littleover, Derby. Doors open at 9.30am. The school is located off the A5250 (Burton Road) south of Derby, one mile south of the village of Littleover and the A5111 Derby Ring Road. There will be a large flea market, tables by the hour, wide range of radio and computer traders, monster radio & computer junk sale run by the society - with silly prices, famous for many years, starts at 11am. There will also be a wide range of refreshments available. Ample accommodation if wet. **Martin G3SZJ, QTHR. Tel/FAX: (01332) 556875.**

***August 11:** Flight Refuelling ARS Hamfest '96 will take place at the Flight Refuelling Sports Ground, Merley, Wimborne, Dorset. The event will run from 10am to 5pm and will include the usual mix of traders, Bring & Buy, craft exhibitors, car boot sale and field events. Talk-in will be on S22. **Richard Hogan G4VCQ on (01202) 691021.**

August 16: Cockenzie & Port Seton Amateur Radio Club Radio Junk Night will be held from 1830 to 2130 in the Cockenzie & Port Seton Community Centre. Bring along your own junk and sell it yourself. Tables will be provided free of charge on a first come first served basis. Entry fee £1 and refreshments will be available. All money raised to go to the British Heart Foundation. **Bob GM4UYZ on (01875) 811723.**

August 18: The Red Rose Rally is being held at Horwich Leisure Centre, Victoria Road, Horwich, Nr. Bolton of J6 M61. There will be a cafe, bar, Bring & Buy, RSGB stand, special interest groups, parking for 300 cars, free cash draw every hour, children's activity room up to seven years, supervised by parent. Doors open at 10.30am and admission is £1, free for children. Talk-in on S22. **Albert G7RZW on (01204) 62980.**

August 18: The 7th Great Eastern Rally is to be held at the Cattle Market, Hardwick Narrows, Kings Lynn. Doors open at 10am (9.45am for disabled visitors). There will be an outdoor car boot area, a spacious indoor area with national exhibitors, a Bring & Buy, talk-in on S22, free parking, refreshments on site, easy access for disabled. It is a good family day out with Sunday car boot nearby and close to Hunstanton Beach & Sandringham House. For bookings and information contact **G0BMS on (01553) 765614** or at **GB7OPC** or E-mail **leo@feline.conqueror.co.uk**

August 18: The Cardiff Amateur Radio & Computer Fair will be held at The Star Sports & Recreation Centre, Splott, Cardiff (M4 J32). Doors open 10.30am to 5pm. More details from **Stuart Robinson GW0WMT on (01222) 613070.**

August 25: The Galashiels and District Amateur Radio Society Open Day and rally will be held at a new and larger venue, The Volunteer Hall, St. John's Street, Galashiels from 11am to 4pm. There will be a Bring & Buy, refreshments and a raffle. Talk-in on S22. **(01896) 850245** or **(01896) 755943** evenings only.

August 25: The East Coast Amateur Radio & Computer Rally, Clacton Leisure Centre, Vista Road, Clacton-on-Sea. There will be major suppliers of radio equipment, antennas, second-hand gear, computers, computer software, accessories and electronics. There will also be a Bring & Buy sale and Internet demonstrations throughout the day by Ke-Connect, the local Internet Access Provider. A bar and cafeteria will be available from 11am. Free car parking and talk-in on GB1ECR. **Sharward Promotions, Upland Centre, 2 Upland Road, Ipswich, Suffolk IP4 5BT. Tel: (01473) 272002.**

August 26: The Huntingdonshire Amateur Radio Society Annual Bank Holiday Monday Radio Rally is to be held at Ernulf Community School, St Neots, Cambridgeshire. Doors open at 10am and admission is £1. Refreshments available. Talk-in on S22. Further details from **David Leech G7DIU on (01480) 431333.**

***September 1:** The Bristol Radio Rally is being held at Brunel Centre, Temple Meads Station, Bristol. Doors open at 10.30am to 4pm (disabled 10.15am). Admission is £1. There is ample under-cover parking, refreshments, large Bring & Buy and talk-in on S22. **(01275) 834282.**

September 1: The Telford Radio Rally will be held at the Telford International Centre. Two large, purpose built exhibition halls offer a day for the whole family. Main dealers are already booked along with a Bring & Buy, flea market and many special interest groups represented. Parking is on site and it is easy to find, just off the M54 motorway. Further details from **Tony 2E1DXR** or via **GB7PMB on (01743) 235619.**

September 7: The Annual Wight Wireless & Computer Rally is to be held once again at Arreton Manor, near Newport, Isle of Wight between 11am and 5pm. There is no charge for admission to the Wireless Museum or the extensive gardens, lawns and grounds, with plenty of free parking. There is no charge for trade stands or the Bring & Buy sale, so bring all your surplus equipment. There will also be a collection for the Radio Invalid & Blind Club. The cafeteria will be open for the much needed 'cuppa'. Talk-in on S22. Further information on **(01983) 567665.**

***September 8:** The 15th Lincoln Hamfest will be held on the Lincolnshire Showground. Entry fee, £1.50. Morse test available, plus all usual attractions. Caravans welcome (Saturday night only). **Sue Middleton on (01522) 525760.**

September 15: The Central Lancaster Radio Rally are holding their rally at the Central Lancaster High School, Crag Road, Lancaster, five minutes from Junction 34 on M6 motorway. Doors open at 10.30am and the entrance fee is £1. **Susan on (01524) 64239** or **(01384) 896199.**

September 15: The East of England Rally is to be held at the East of England Showground, Peterborough, Cambs. Doors open at 10am. Further information from **Vince G8NGZ on (01733) 331211.**

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

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

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

Editor

***Practical Wireless* & *SWM* in attendance**

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2: We cannot give advice on modifications either to our designs, to commercial radio, TV or electronic equipment.

3: All letters asking for advice must be accompanied by a stamped self-addressed envelope (or envelope plus IRCs for overseas readers).

4: Make sure you describe the problem adequately, with as much detail as you can possibly supply.

5: Only one problem per letter please.

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This month Ray Fautley G3ASG goes hunting in the attic to find space to put up trapped dipoles for use on at least two bands.

Antenn

Trapped dipole antennas are variations on the simple doublet wire antenna. But there are two very useful advantages to be gained by the use of a trap dipole:

a) Resonant operation on more than one band. They also have a 50 - 70Ω feed point impedance (depending on height) for each band.

b) The total physical length of the antenna is less than that required for a full-size dipole for the lowest frequency band.

Commercial versions of trapped dipoles have been available for a long time, particularly for use on the 3.5 and 7MHz bands. Most amateurs will be acquainted with the arrangement shown in **Fig. 1**. The secret of operation lies in the design of the traps, which by the way are parallel tuned circuits.

For 3.5 & 7MHz

Let's consider the case of a 3.5/7MHz trapped dipole. At 7MHz the traps are at resonance so, they have a very high impedance. In fact each trap operates as an open circuit.

Because to r.f. it seems to be just like an insulator, no r.f. energy can get into the outer parts of the antenna. The wire between the two traps becomes a full-size half-wave dipole resonant at 7MHz.

The extra bits of wire at each end have virtually no effect at 7MHz. So, now let's consider what happens at 3.5MHz?

At frequencies below 7MHz, such as 3.5MHz, the traps behave just like inductors, the reactance of which depend upon frequency and the inductance values used for the tuned circuits.

The inner lengths of wire plus the inductive reactances, plus the lengths of wire beyond each trap become resonant on another, lower, frequency. With some manipulation, it could result in another half-wave antenna resonant at 3.5MHz. So we have two antennas with a common feed point and similar feed point impedances.

Now, from what we should already know (we do know - don't we?) about tuned circuits, there are, theoretically at least, an infinite number of combinations of inductance (L) and capacitance (C) which would resonate at any single frequency.

Taking the single frequency (7MHz) for the trap, from calculations, charts or Abacs where we can look up a resonant combinations. For instance I've found that when:

L is 0.1μH and C is 5150pF
or L is 5μH and C is 104pF
or L is 10μH and C is 51.5pF
or L is 200μH and C is 2.6pF

all give resonance at approximately 7MHz! So, how do we decide which actual values to use?

Since the value of the inductor has the greatest effect on the rest of the antenna, that's the component we'll concentrate on. Once we've settled on the inductance value, it's then just necessary to find the value of capacitance for resonance at 7MHz.

I'll try and ignore all the mathematical rigmarole so, here's an easier design procedure for a two-band trap dipole. Remember, the overall length of the antenna must be less than that of a full-size half-wave dipole at the required lower frequency.

Table 1

B \ A	5	10	20	30	40	50	60	70	80	90	95	98
5	5200	2800	1500	1000	720	530	385	275	165	80	38	15
10	5300	3000	1600	1100	750	560	400	285	175	83	41	16
20	5800	3300	1750	1200	830	600	450	320	190	93	46	18
30	6500	3900	1900	1300	930	680	500	360	215	110	52	21
40	7000	4200	2200	1500	1100	790	590	410	260	130	62	25
50	7500	4800	2700	1750	1300	950	700	490	320	160	78	32
60	--	5700	3200	2200	1600	1200	870	630	420	215	110	43
70	--	7200	4000	2750	2100	1600	1200	880	600	320	160	68
80	--	10k	5700	3400	2900	2300	1850	1400	970	580	300	130
90	--	--	10k	7000	5300	4200	3500	2800	2200	1400	850	390

Symbols used:

A is half the overall antenna length available (in metres)
B is length from centre of antenna to trap (in metres)
CT is the capacitance value for trap (in pF)
FLF is the centre frequency of the lower band required (in MHz)
FT is resonant frequency of trap (ie. centre frequency of higher band (in MHz)
L is physical length of full-size half-wave dipole for FLF (in metres)
LT is inductance value for trap (in μH)
X is the overall length of the complete antenna (in metres)

Design Procedure

Now I'll go through the steps in the design procedure to create our individual trapped dipole.

(1) Determine A in metres (measure)
(2) Define FLF in MHz
(3) Define FT in MHz
(4) Determine L from

$$L = \frac{142.6}{F_{LF}}$$

where L is in metres and FLF in MHz
(5) Determine A' from

$$A' = \frac{2A \times 100}{L}$$

(6) Determine B from

$$B = \frac{142.6}{2 \times F_T}$$

where B is in metres, FT in MHz
(7) Determine B'

$$B' = \frac{B \times 100}{A}$$

(8) From Table 1 find X_L for A and B with X_L in Ω
(9) From X_L determine Lo at FLF. ‡

$$L_O = \frac{X_L}{2\pi \times F_{LF}}$$

(10) Determine LT from:

$$L_T = L_O \left[1 - \left(\frac{F_{LF}}{F_T}\right)^2\right]$$

(11) Determine CT from:

$$C_T = \frac{10^6}{4\pi^2 (F_T)^2 L_T}$$

with FT in MHz and LT in μH

****In Table 1, the dashes (--) in the table mean that the value of X_L would make the inductor value so high that the tiny capacitance value necessary for resonance would likely to be lower than the coil's self-capacitance!**

a Workshop

Bit By Bit

I'm sure you think the process looks rather complicated, but taken bit by bit it's not so bad! So, just to illustrate how it works, here's a worked example.
The problem is:
Given a maximum antenna length of 11m (that's the length of my attic!) I want to design a trap dipole for operation on the 10.1MHz and 18MHz amateur bands. The drawing **Fig. 2.** shows the basic layout of the antenna design, now I'll show you how I arrived at those figures.

By referring to the design procedure, we carry out the steps:
(1) Determine A:
A = 11 ÷ 2 = 5.5 metres
(2)Define L_{LF}:
F_{LF} = 10.125MHz (band centre)
(3) Define F_T:
F_T = 18.118MHz (near band centre)
(4) Determine L:

$$L = \frac{142.6}{10.125} = 14.084\text{m}$$

(5) Determine A':

$$A' = \frac{2 \times 5.5 \times 100}{14.084} = 78.1$$

(6) Determine B:

$$B = \frac{142.6}{2 \times 18.118} = 3.935\text{m}$$

(7) Determine B':

$$B' = \frac{3.935 \times 100}{5.5} = 71.55$$

(8) From **Table 1** we look up the value for X_L when A = 78, B = 72. It's shown as being about 600Ω
(9) Determine L_O at F_{LF}:

$$L_O = \frac{600}{2\pi \times 10.125} = 9.43\mu\text{H}$$

(10) Determine L_T:

$$L_T = 9.43\left[1 - \left(\frac{10.125}{18.118}\right)^2\right] = 6.5\mu\text{H}$$

(11) Determine C_T from L_T and F_T

$$C_T = \frac{10^6}{39.8 \times 18.118 \times 18.118 \times 6.5} = 11.87\text{pF}$$

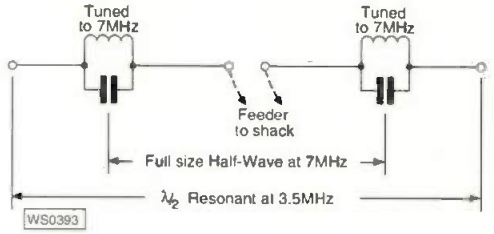


Fig 1: The basic layout of the a trapped dipole, that may be made resonant on two bands.

Bit By Bit continued....

In practice, you could use a 12pF capacitor rated for at least 1kV, and wind the inductor with about a 25mm diameter.

Using tinned copper wire about 1.6mm diameter (16s.w.g.) wind a 32 or 33 turn coil with at least one wire diameter spacing between turns. The coil should be about 100mm in length at this stage.

Adjust the number of turns. Then finally squeezing them together, or slightly opening them out, until the tuned circuit resonates at 18.1MHz (to be pedantic, 18.118MHz!).

Check resonance with a dip oscillator. When both tuned circuits have been resonated, wire them into the positions shown in **Fig. 2**.

The simplest wire to use for the antenna is 16 or 18s.w.g. tinned copper as soldering is so easy (no enamel to clean off!). Just staple the wire to the roof timbers.

Once again - please use an a.t.u. at the shack end of the feeder, it will ensure that your transmitter 'sees' the correct load impedance (usually 50Ω). With so many modern transceivers having semi-conductor power amplifiers, the a.t.u. will help considerably in getting the maximum power into the antenna system.

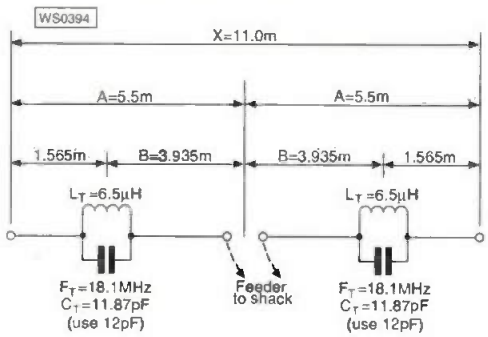


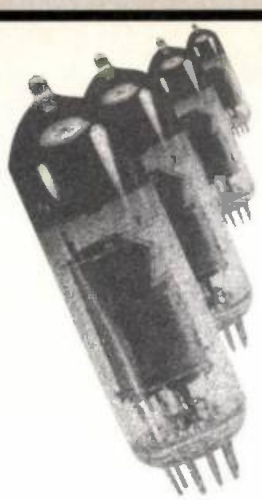
Fig 2: The layout of the antenna system resonant on both the 10 and 18 MHz bands.

Follow The Rules

If you follow the above rules, it should be possible to design traps for other two-band antennas. The only limiting factor is that the overall length of the trap dipole antenna must be less than the length of a full-sized half-wave dipole at the lower of the two frequencies.

PW

Valve & Vintage



By Phil Cadman G4JCP

It's Phil Cadman G4JCP's turn to look after the vintage wireless 'shop' this month. This month he's describing a popular one-valved set from the 1960s and the circuitry of valved receivers in a little more detail.

Hello again, it's good to be back...and I'm wondering how many of you tried the regenerative detector I described in my last column? Those of you that did probably found it none too satisfactory. The difficulty is in finding a tapping point on the coil which gives both good sensitivity and good audio quality.

Next time, I'll tell you how to modify the circuit to allow separate adjustment of the audio detection point and the amount of regeneration. All you'll need is an r.f. choke of around 1mH inductance, a 250pF variable capacitor and a short length of wire. No prizes for guessing what the modification will be.

Whilst still on the subject of coils, the *PW* book service can supply an excellent little book on coil and transformer design. The title is *Coil Design and Construction Manual (BP160)* and it's published by Bernard Babani.

Hear All Continents?

I recently received a letter asking for information about an 'HAC' model 'DX' receiver. Luckily, I still have one of these little sets stashed in my loft.

For those of you who have never heard of 'HAC' the letters stood for 'Hear All Continents'. I always thought it rather an optimistic name for what was a one-valve radio.

The basic 'HAC' model 'DX' used a rather antique-looking battery valve which drove a pair of high-impedance headphones (S. G. Brown, of course!). An add-on audio stage was available but I seem to remember that it too only drove headphones. I suppose it did make the signals somewhat louder.

I don't think I ever did 'hear all continents' on my set but I've no doubt it was possible. The manufacturers of the 'DX' had at least one other design. In its simplest form it was just another regenerative detector but it used a modern miniature valve. However, this set could be upgraded to give loudspeaker operation.

The 'HAC' radio sets were popular throughout the 1960s, advertisements regularly appearing in copies of *Practical Wireless* and *Radio Constructor*. I wonder, does anyone know what happened to the company?

Superhet Receivers

As promised, this time I'm going to talk a little about simple super-sonic heterodyne or 'superhet' receivers. Unlike tuned radio frequency (t.r.f.) sets, which do their r.f. amplification at the incoming signal frequency. In a superhet most of the r.f. amplification is done at a fixed, intermediate frequency.

If you take a look at **Fig. 1**, you'll see that V1, is actually two valves in one - a triode-hexode. The triode section is wired as an r.f. oscillator - the 'local oscillator' (l.o.) and the hexode section looks as if it's just a straightforward r.f. amplifier. However, its third grid is internally connected to the grid of the triode section.

The hexode section of V1, is known as the 'mixer' or 'frequency changer'. This is constructed so as to make the r.f. signal from the l.o. mix with, or rather **multiply**, the wanted radio signal fed in at grid one. As if by magic, four frequencies now appear at the anode.

First, there's the wanted radio signal. Then there's the l.o. frequency from the triode section. All quite obvious. But, two new frequencies put in an appearance!

One frequency is equal to the wanted frequency **added to the l.o. frequency**. The other frequency is equal to the **difference between the wanted frequency and the l.o. frequency**. These are, not surprisingly, known as the 'sum' and 'difference' frequencies.

The intermediate frequency transformer (i.f.t.) in the anode circuit of V1, is tuned to the difference frequency. You'll appreciate that this difference frequency has now become the **intermediate** frequency (i.f.) at which substantial amplification now takes place.

In most domestic valved radios the intermediate frequency is either 465 or 470kHz. But manufacturers have used frequencies ranging from 450kHz all the way up to 475kHz.

Also, beware of very old radio sets and of communications receivers. They may have totally different intermediate frequencies!

Assuming an i.f. of 465kHz, it follows that the l.o. has to run 465kHz higher (or lower) than the frequency of the wanted signal. This is easy enough to achieve at one particular frequency but not so easy over say, the whole of the medium wave band. Keeping the l.o. and the input tuned circuit 465kHz apart is known as **tracking.**

In Fig. 1, the wanted frequency is

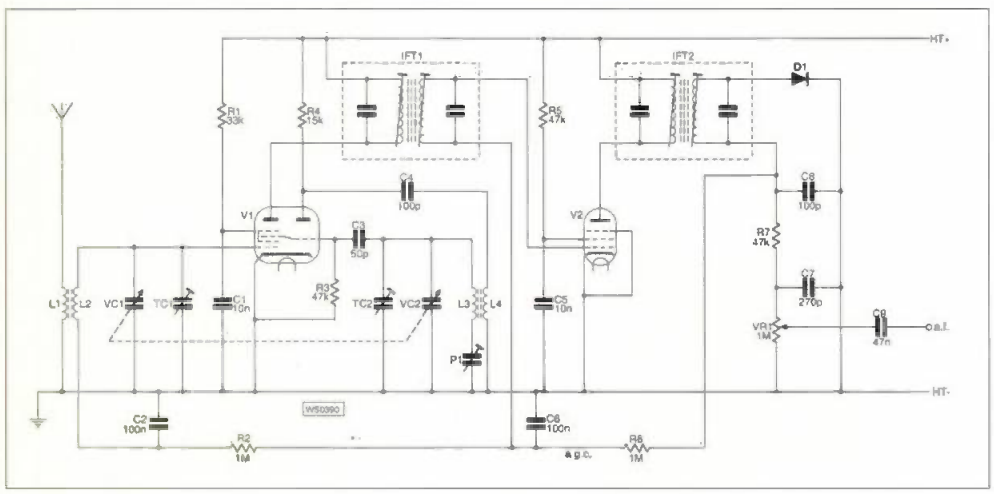


Fig. 1: Simplified superhet r.f./i.f./detector circuit.

tuned by L2, VC1 and TC1. The l.o. is tuned by L3, VC2, TC2 and P1. At any place on the dial these two tuned circuits **should** resonate exactly 465kHz apart. I say 'should', for they seldom do. Fortunately, a slight error is of little consequence but a large error most certainly is.

Enthusiasts of a 'twiddling' disposition are apt to go berserk on seeing all the trimmers and adjustable cores you find in a multi-band superhet radio. Even in the single-band example shown in Fig. 1, there are no less than **seven** possible adjustments (not including VC1 and VC2).

You can imagine the mess you can get into if you're not sure of what you're doing. So, don't twiddle with a superhet unless you have a clear idea of what to do.

I'm not going to describe the alignment of a superhet, it's simply too involved to cover here. If you ever have need to align a superhet do try and get a copy of the manufacturers service information.

The service sheet will (hopefully) detail how you go about the alignment. Failing that, at least get a circuit diagram. In any event, only make one adjustment at a time and if in doubt - don't touch.

Two Tuned Circuits

An intermediate frequency transformer (i.f.t.) is nothing more than two tuned circuits mounted in close proximity to each other. The tuned circuits are usually inductively coupled by the rather obvious technique of winding the two coils on the same former.

In the good old days the tuned circuits consisted of fixed coils and variable capacitors. But the i.f.t.s you are most likely to come across will have fixed capacitors wired across coils which have an adjustable iron-dust cores.

Designing (and manufacturing) i.f.t.s is a little more involved than my description of them may suggest. The spacing, and hence the coupling between the two coils is critical and is usually the result of much trial and error.

The diagram, **Fig. 2**, shows the relative amplitude response of two tuned circuits in close proximity to each other. If they are spaced just right then you'll get a response like curve **A** when they are both tuned to 465kHz.

You may think that this curve is just what we want but sadly, it isn't. Remember sidebands?

Radio broadcasts have sidebands that extend to at least 6kHz either side of the carrier frequency. Yet curve **A** shows that at just 3kHz from the peak the response is well down. The higher frequency sidebands will be heavily attenuated and so the demodulated audio will sound very muffled.

The trick is to physically move the tuned circuits a little closer together so that they become **over-coupled**. Curiously, it will **not** now be possible to get a single peak. And you'll find as one core is adjusted it will affect not only its own circuits resonant frequency but also the resonant frequency of the other tuned circuit.

If the designer of the i.f.t. has got it right a response like that of curve **B** can be achieved. It may look like a slice through a volcano but a whole lot more of those precious sidebands will get through making the demodulated audio sound much better.

In reality some radio manufacturers took the single-peak approach while others preferred over-coupling. And when aligning a radio it's useful to know **which method** the manufacturer has chosen (hence my comments about the importance of getting hold of service data).

Of course, with practice it's possible to align almost any radio set even without a circuit diagram. However, until you attain those lofty heights you'd better read the manual!

Just two points going back to Fig. 1. The diode D1, demodulates the amplified i.f. signal. And components C8, R7 and C7, form a low-pass filter which stops the intermediate frequency from reaching the following audio stages.

By the way, for simplicity I've shown D1, as a semiconductor diode. In reality, it's far more likely to be a thermionic diode. Sometimes it will be included in the i.f. amplifier valve, V2, or, more usually, it'll be within the following audio amplifier valve.

The diode, D1, also provides the negative automatic gain control (a.g.c.) voltage which is fed back to the mixer and i.f. amplifier (V2). The stronger the received signal then the more negative will be the a.g.c. voltage and the lower the gain of V1 and V2.

The idea of a.g.c. is to keep the audio level constant no matter how strong or weak the received signal. More about a.g.c. another time.

More Complicated

Superhet receivers are more complicated to build than t.r.f. receivers. But they give more satisfactory results without the need for critical tuning adjustments whilst in use.

The problem in recent years has been the unavailability of new i.f. transformers (and r.f. coils) suitable for use in valved designs. The i.f.t.s available from the mail-order suppliers are optimised for use in semiconductor designs and, therefore are not suited to the high impedances found in valve circuits.

Riding to our rescue is Ron Allwright, managing director of Denco (Clacton) Limited who has begun manufacture of selected Maxi-Q coils. Once again Denco are producing both r.f. coils and intermediate frequency transformers for use in valved designs.

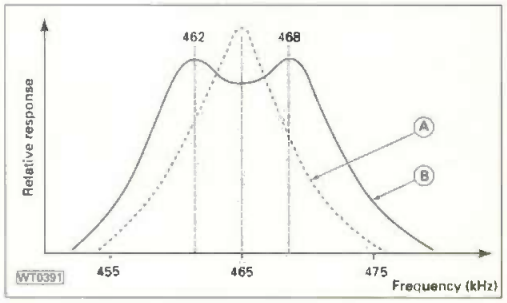


Fig. 2: Example i.f. response curves.

Of course, you don't have to use new components. Surplus i.f.t.s sometimes turn up at junk sales and rallies. Very occasionally an advertisement will appear in a magazine. You should **never** pass up the opportunity to acquire a scrap radio if there is a chance of salvaging a set of coils and i.f.t.s (not to mention all the other useful bits).

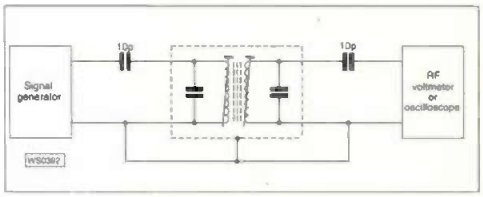


Fig. 3: Testing i.f. transformers.

Need To Check?

If you ever have need to check an i.f.t., I suggest you use the circuit shown in **Fig. 3**. You don't have to remove the i.f.t. from a chassis but **do disconnect** all the terminals and earth the radio chassis to the signal generator.

It's most important to leave the shielding can on the i.f.t. and connect it as shown. Use shielded cable for connections greater than a few inches and connect the 10pF capacitors as close as is reasonable to the terminals of the i.f.t.

The 10pF capacitors are very important. This is because the output capacitance of the signal generator and the input capacitance of the r.f. voltmeter (or oscilloscope) will appear in parallel with the fixed capacitors inside the i.f.t., and will affect the resonant frequencies of the tuned circuits.

However, some capacitance **is acceptable** as it will partly simulate the stray capacitances that are present in the normal working circuit. The capacitors don't have to be exactly 10pF but do try not to use less than 10pF or greater than 20pF.

You may need to use a signal generator with a fairly high output, 1V or more, to get a reasonable reading on the voltmeter. Then gently sweep the signal generator backwards and forwards between 400kHz and 550kHz (or around whatever frequency you think the i.f.t. is tuned to) whilst looking for any movement on the voltmeter.

Once the resonant frequencies have been established tune the cores to maximise the peak. If the i.f.t. is off frequency, adjust the signal generator a little towards the desired frequency and re-tune the cores to move the peak in that direction.

Some cores are prone to move at the slightest touch, so before making any adjustments run a short length of cut rubber band down the hole in which the core travels. That will hold the core in position but still allow adjustments.

Also...be warned and adjust the cores **gently**. They can be very brittle and prone to break (especially the older types).

Closing Time

Oh well it's closing time and once again I've to put the shutters up. So, until it's my turn 'in the shop' again I'll say cheerio.

Remember, your letters and E-mails are most welcome, send them to me either via the *PW* offices, via E-mail to **phil@oldpark.demon.co.uk** or direct to me: **Phil Cadman G4JCP at 21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**.

Cheerio from Phil, see you in December.

DAVID BUTLER G4ASR

VHF REPORT

This month David Butler G4ASR has further reports of DX contacts made on the 50 and 144MHz bands during the Summer Sporadic-E season.

I mentioned last month that conditions via Sporadic-E (Sp-E) propagation were excellent during the month of May. On the 50MHz band there were numerous European openings allowing contacts to be made up to 2000kms or so.

Some of the more hard to get European countries included HA, HB0, LX, LY, LZ, T7, OY, UA, YL, YO, ZB and Z32. I also reported that the station of JX7DFA in beacon mode was heard on a number of occasions but that no other activity was noted.

Paul Southgate G6ILD (JO01) reports however that on May 20 at 2104UTC he was fortunate to work JX7DFA (IQ50) on the island of Jan Mayen. Running 50W from an FT-650 transceiver into a home-made 6-element Yagi, he received a 55 report on s.s.b. Paul also heard the JW7SIX beacon located on Svalbard.

There were also a number of long distance openings during May to the African continent. Stations worked from the UK included CN, CT3, EH8, EH9, TR8CA, 5T5BN and reception of the ZD8VHF beacon. Also workable via 2-hop Sp-E were Asiatic stations such as 4X6UJ, 5B4AAI and 7Z5OO.

Conditions were also very good to North America with three transatlantic openings occurring on May 27, 28 and 29. Many keen DXers managed to work operators in VE and W and a lucky few managed to work the stations of FP5EK, N4HSM/VP5 and W6JKV/VP5.

June Activity

So much for May, now I'll move on to reports of activity, or lack of them, on the 50MHz band during the month of June. After what seemed like a promising start to the season, the intensity of Sp-E openings took a nose dive.

Yes, there were openings nearly every day but the intensity and duration of them was definitely very much reduced compared to previous years. What I found interesting though was the fact that a number of multi-hop openings to the Middle-East and North America still occurred.

It seemed to me (and I could be wrong) as if there were two distinct types of Sp-E propagation. One type was responsible for intense, sharply focussed single-hop propagation, probably via discrete clouds or 'bloblets' of ionisation. The other type gave the impression of a thin, diffuse layer of ionisation, allowing longer distance contacts of 3000-5000kms to be made.

Although Sp-E conditions in June were nothing to write home about, there were still many European countries that could be worked from the UK. These were via single-hop Sp-E propagation allowing contacts to be made up to 2000kms away.

In addition to the usual European countries some more interesting stations, such as HA8BE, HB0LL, OH0JET, SV5/DL8SET, T98TFA and ZB2EO were also to be found. Although not very difficult to work, most of these were the only active station from that particular country.

Peter Lowrie GI7JYK (ID74) reports that propagation has been very poor at his QTH in Northern Ireland. Openings were very few and far between with contacts only being made with stations in DL, EH, LA and SP. The best DX of the month was ES2SW/2 (KO29) at 1971kms.

Peter uses an FT-690R running 3W into an indoor dipole which might explain why not many signals were heard during the period. It's true to say that when conditions are poor you will be struggling to work DX stations with only a dipole. On the other hand, when conditions are 'right' some amazing contacts can be made with QRP and a very small antenna.

A Dutch expedition to the Republic of Georgia was operational during June. Using the call sign **4L6PA** (LN21) the group made some excellent contacts but regretfully very few in the UK. All openings were generally very weak and of limited duration.

The distance from central UK to Georgia is in the order of 3500km. This is one of those awkward distances approximately mid-way between 2 and 3-hop propagation.

Some of the fortunate stations to make a QSO with 4L6PA included G0NYL, G3FPQ, G3IBI, G3KNU, G3WOS, G4IFX, G4JCC and GJ4ICD. Following one brief opening into

The Windbreakers and Hadrabs Contest Group show off their trophies presented to them at the 1996 RSGB VHF Convention.

southern Europe the group turned the antenna towards Japan.

The bright idea of pointing the antenna at Japan resulted in contacts with JA6QGG, JA6IMJ/4 and JK6PAC. The distance? A mere 7700km!

Contacts with Asia

During June there was also the opportunity to make contacts with stations located in Asia. All of these were located in the Middle-East area and included 4X1IF, 4X6UJ, 4Z4UL and 5B4AAI.

The beacons 5B4CY and OD5SIX were also heard in the UK on a number of occasions. It was also possible to contact stations in the African continent via single or double-hop Sp-E. These were all located on the northern edge of the continent and included CN8CC, CN8HB, CT3FT, EH8ACW, EH8BPX, EH9IB and EH9IE.

One new station to look out for is **5A1A** in Libya. He was reported to be working a number of stations in DL and OE on June 8.

Somewhat further to the south the station of 9G1YR, located in Ghana, made his first 50MHz QSOs on June 3. At 1853UTC he contacted PA3DWD and later at 1922UTC he worked I0JX. Although no contacts were made with the UK this is another station well worth looking out for in future openings.

Transatlantic Openings

Despite the generally poor Sp-E conditions there were a total of seven days when transatlantic openings were recorded between the UK and North America. These multi-hop Sp-E events took place on June 6, 7, 9, 10, 11, 16 and 20.

Bob Mobile WA1OUB has been paying particular attention to transatlantic openings between North America and Europe this summer. He has been plotting openings on a daily chart with some interesting results.

Bob mentions that the (triple-hop) openings don't just pop up from nowhere. The Sp-E conditions seem to build up to a peak over a period of several days, fade away, and then a new cycle starts.

The time period between SP-E peaks is between 5-7 days. These results are similar to that noticed previously in the UK.

There is a peak in intensity, then bang, it all disappears to re-start again with a small opening. The ionisation then builds in intensity over a few days, reaches a peak in maximum usable frequency (m.u.f.),

before it all collapses again.

Bob WA1OUB reports two time periods when there is an enhanced probability of making transatlantic contacts. The first, a minor peak, is between 1030-1230UTC. The highest probability is between 1830-2330UTC reaching a maximum peak at 2130UTC.

The first UK-North America opening of the month was on June 6 and was very much a weak and watery affair. Signals were in and out during the afternoon period with the VO1ZA beacon (50.039MHz) being heard by **GU7DHI** (IN89) at 1200UTC, by **G0JHC** (IO83) at 1510UTC and by **G6YIN** (IO93) at 1630UTC.

Geoff Brown GJ4ICD (IN89) managed to work WA1OUB at 1358UTC and **G3FPQ** contacted KM1H at 2133UTC. But apart from those contacts I don't have any other reports.

Another series of events occurred on June 7 with some good propagation to the Turks and Caicos Islands. Among the lucky stations to work the expedition group, W6JKV/VP5 and N4HSM/VP5 (FL31), were GJ4ICD (IN89), GW3JXN (IO72) and G0JHC (IO83).

The expedition group were first heard in the UK at 1345UTC with signals disappearing around 1630UTC. The next transatlantic opening, on June 9, occurred between 1150-1345UTC. Although fairly brief there was some very good DX to be worked for those prepared to dig into the noise.

The station of GJ4ICD worked both C6AIE (Bahamas) and KC4AUC/J6 (St. Lucia) at the very beginning of the event. Propagation then moved into the W4 call area with a number of G, GJ and GW stations working W4WHK (EM90), KJ4E (EL98), KQ4PI (EL99) and W5HUQ (EM90). At my QTH (IO81) the station of KJ4E was peaking 559 at 1300UTC but nothing else was heard.

The next opening took place on June 10 but, although signals were at times peaking S9, it was very geographically selective. Only one station, VE1PZ (FN85), was worked during the period 1900-2030UTC.

At the UK end of the path, operators in IO73, IO74, IO80, IO81 and IO83 were known to have made contact with the VE1PZ Canadian station. On the following day, June 11, another opening to North America occurred.

This North America opening was far more extensive at the US end with many stations in the W1, W3, W4, W5 and VE1 call areas being worked. Activity in the UK was dismally low however, possibly because the opening occurred between 2155. and 2300UTC on a Monday night!

An excellent opening, favouring stations in southern and central England took place on June 16 between 1715-2100UTC. The propagation was to island of Puerto Rico with the stations of KP4A and KP4EIT (FK58) working many UK operators in IN89, IO73, IO80, IO81, IO82, IO91, IO92 and IO93. The VO1ZA and CU3URA (HM68) beacons were also heard during the period.

The last transatlantic opening of the month was on June 20, between 1730-1800UTC and surprisingly it was to Puerto Rico again. The two resident 50MHz operators, KP4A and KP4EIT, made a number of contacts with stations situated mainly in central England (IO90, IO91, IO92).

Perhaps conditions weren't so bad during June after all. With openings into Europe, Africa, Asia and North America and some choice DX such as C6, J6, KP4, VE, VP5, W, 4L6 and 4X4 it made a number of operators very happy.

By the way, if you're wondering why you didn't hear much of this DX it could be because most contacts were made using c.w. Time and time again I've heard the comment 'I don't need c.w. because I'm a v.h.f. operator'. In my opinion this is completely wrong. If you are a v.h.f. operator and you want to catch those rare countries, you need c.w. because that's where the **real DX** is!

The 144MHz Band

Last time I mentioned that a total of five Sp-E openings, on May 18, 19, 23, 24 and 27, had occurred on the 144MHz band. Some very good contacts had been made from the UK including stations located in I, LZ, OK, SP, UT, YO, YU and Z31.

Operators in the Greek call areas SV1, SV2, SV3, SV4 and SV8 were also worked. It was hoped that propagation via this mode would be frequent during the month of June but as already reported the Sp-E conditions were not very intense. As a consequence, only two openings, on June 7 and 23 were recorded in the UK.

But before I turn to reports of those openings I've an apology to make. I did mention previously that I always reckon that the Tuesday after the first weekend in June is statistically good for Sp-E propagation on the 144MHz band.

I hope not too many people took annual leave (like I did on June 4) only to listen to white noise. There was some good tropo to OZ and EA but that's not the same as a good Sp-E opening!

The Sp-E opening on June 7 started around 0935UTC with contacts being made from northern England into Italy. The station of I8MPO (JN70) worked G6YIN and G8ESB (both in IO93) at this time.

Signals temporarily disappeared around 0950UTC but returned ten minutes later producing a very intense opening between 1000-1115UTC. Stations throughout the UK, from Northumberland (IO95) down to Cornwall (IO70), could make s.s.b. contacts with operators in HA, I, OE, S5 and 9A.

Len Boston G7NMQ (IO83) caught the opening between 1000-1110UTC. Running a Trio TR-9130 giving 25W into an 8-element Yagi he made s.s.b. contacts with five stations in 9A (Croatia), DL3MAD (JN59) and S53AC (JN76) in Slovenia. Len mentions that all contacts were made on 144.270MHz with the exception of S53AC who was worked on the calling frequency, 144.300MHz.

According to the DX Cluster, the station of G6YIN (IO93) worked IW3RJZ (JN66), IV3SUM (JN65), 9A2AD (JN65) and 9A3NI (JN65) between 1015-1035UTC. The stations of S51AG (JN65), S57IIO (JN65) and S57NWG (JN65) were also contacted during this period.

Charles Banner G7UBA (IO92) reports that the opening at his QTH near Birmingham lasted for about 20 minutes. He was using an FT-290R Mk1 transceiver, a 15W amplifier and a small 5-element Yagi and mentions this was the first Sp-E opening he has ever heard on the 144MHz band.

At 1015UTC Charles heard the club stations 9A1CCY and 9A1KDE. A few minutes later he was very pleased to work 9A4EW (JN95), 59 both-ways, for his first ever Sp-E contact. Well done Charles.

Istvan Horvath HG7JAL reports that between 1029-1036UTC he made s.s.b. contacts with EI4DQ (IO51), G4PCI (IO91) and GW4UWR (IO81). Located in northern Italy the station of I4YNO (JN54) mentioned hearing and working only one station, G1AWP (IO95).

The second Sp-E opening of the month took place on June 23, exactly one solar rotation (27-days) after an event on May 27. At the start of the opening, from 0950UTC stations in DL and PA were making contacts into the Ukraine (KN66, KN79, KN89, KO70).

Half an hour later, commencing around 1020UTC the station of G4FUF (JO01) heard UR3GEZ (KN68) and UT2GB peaking 599. Signals faded out at 1035UTC

Deadlines

It's deadline time again. If you did manage to make any Sp-E contacts, even if it was on 50MHz, please let me know about it.

Send reports, or any other news (to reach me by the end of the month) to **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP**. You can also contact me via packet radio @ **GB7MAD**, the DX Cluster @ **GB7DXC** or E-Mail via: **davebu@mdlhr1.igw.bt.co.uk** Alternatively you can telephone me on **(01873) 860679**.

END

LEIGHTON SMART GW0LBI

HF FAR & WIDE

Leighton Smart GW0LBI welcomes readers to the column that relies on your input to help and encourage h.f. band operations.

Well, I'm writing this month's column during one of the sunniest and warmest days we've had this summer. The temperature outdoors in my Welsh Valley is around 24°C!

Listening to my newly acquired KW 2000B, (which by the way is currently heating the shack up to considerably more than 24°C!) I find very little to hear on the h.f. bands.

I've always wondered whether weather conditions have an effect on h.f. propagation modes. I know that generally, propagation on the h.f. bands 'dies off' to a certain extent during the summer months due to the position of the Sun relative to the Earth. But I wonder if any other readers have, like myself, considered if the prevailing weather has an added (and negative) effect on radio wave propagation?

***Editorial note:** Please see comment in 'Keylines', page 9, **July** PW, on this subject.*

The G5RP Trophy

The June 1996 issue of the RSGB *DX News* carries news of the G5RP Trophy. This trophy is awarded to someone making rapid progress in DXing in the recent past - which only newcomers have the scope to do!

The G5RP award isn't limited to youngsters, or those newly licensed. The 'DX bug' can bite at **any age**, and even after many years of operating experience. Experienced DX operators are able, under this programme, to encourage DX operators by nominating an up-and-coming DXer for this award.

The Trophy is jointly awarded by the **Vale of the White Horse Radio Society** and the **RSGB HF Committee**. It will be presented at the RSGB International HF & IOTA Convention on the 5th of October this year.

Nominations should be sent to: **F.C. Handscombe G4BWP, Sandholm, Bridge End Road, Red Lodge, Bury St. Edmunds, Suffolk IP28 8LQ**, and must arrive no later than August the 30th. So if you know any budding DX operators who you would like to encourage, get your nominating pen out quickly!

DX News

The RSGB *DX Newsheet* says that Dave KC9IM hopes to be operating from Guinea Bissau in mid August as J25IM, on 7 to 28MHz. You can QSL via KB9XN, and meanwhile, Joe KC6JF is resident on Belau Island, and uses s.s.b. often around 14.222MHz at 1115z, QSL to Box 66, Koror, Palau 96940.

An international team lead by Frank AH0W/OH2LVG are planning a 'multi-multi' style operation in early August on Midway Island (KH4) using c.w., s.s.b. and RTTY on all bands. (but with the emphasis on working Europe and Africa). QSL via KE7LZ.

And finally, Yoshi JA1UT, and Ray G3NOM will be QRV from Palestine as ZC6/KH2Y and ZC6/G3NOM while delivering h.f., v.h.f. and u.h.f. gear to the Ministry of Communications and Ministry of Health. They'll be training local operators to use them for emergency communications, but the length of their operation is not known at present.

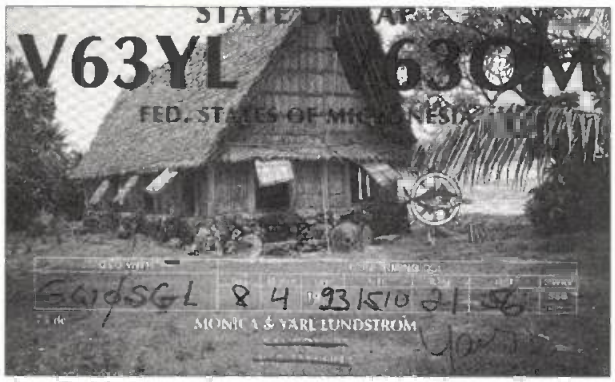
Your Reports

I'll start your reports with 1.8 and 3.5MHz this time. But now summer is here 'Top Band' has gone to sleep!

However, **Eric Masters G0KRT** in Worcester Park, Surrey, who uses a QRP Plus transceiver and a 26m long end-fed wire antenna, is still bashing away on 1.8MHz. He reports 5W QRP c.w. contacts with G3KSH, G3WGV/P and G4FOX/P all at around 2200UTC.

Yours truly, GW0LBI, is back on 1.8MHz after a break of nearly a year. And after quickly erecting a 55m long wire with the help of my 10 year - old son **Dewi**, I was able to have a couple of quick s.s.b. contacts using 'QRO' (yes, a massive 30W p.e.p.!) with Charles G3JCL in Croydon, and Rick G4WXF in Hereford around 1.938MHz at 2300UTC, now I've got a KW 2000B transceiver on long term loan.

Eric G0KRT has also been busy on 3.5MHz where he reports his contacts with special event station GB10ARM at 2029, which is celebrating 10 years of RSGB Morse Testing. A QRP - QRP contact was also made with Brian G3JHC in Stockport at around 0751UTC.



Perhaps the archtypal 'shack'? And it comes complete with manually controlled 'air conditioning flaps!

Derek Blunden BRS-171057 (Swindon), is one of our s.w.l. reporters who reports s.s.b. reception of LU8EEM (Argentina) at 2100, and Murtada 9K2MU in Kuwait City at 2300UTC.

Rarely heard DXing on 3.5MHz is **Steve Locke GW0SGL** in Mountain Ash, Mid-Glamorgan. But as he's been testing a vertical antenna, he seems to have put it to good use, listing 100W c.w. contacts here with LU6KBX at 0220, SM3EXQ (Sweden) at 0240, and VU2AU (India) at 0300UTC.

***Editorial note:** Steve GW0SGL's review report on the vertical antenna appears in PW this month.*

The 7MHz Band

On to the 7MHz Band now and 'thank goodness for forty' I hear many h.f. operators say! (Well, those who like the band, that is!) I fall into the latter category I must admit, after having some great fun on this band in the past.

However noisy 7MHz is, it still carries a large amount of h.f. amateur traffic. Although it's a case of 'love it or hate it' for many amateur radio operators.

It really is surprising what can be worked on 7MHz even with a mediocre antenna, particularly on c.w. I remember working a string of US stations with just 5W of c.w. using the aluminium rain trough of my house as an antenna! With the a.t.u. I found I could load it up and eventually worked 3 continents with it!

Over to 'early bird' **Ted Trowell G2HKU** on the Isle of Sheppey in Kent now. Ted uses a Ten Tec Omni V rig and a collection of G5RV, HF6 vertical and MFJ loop antennas, all using c.w. at 70W output. Ted's report this month indicates that he's had early morning contacts with P49V (Aruba Island), HC5AI (Ecuador), VK3MR (Australia), and 7Z5OO in Saudi Arabia, all at around 0500UTC.

Our Buckinghamshire s.w.l. reporter **Charlie Blake RS96034** has also been 'up with the larks' on 7MHz lately. Charlie's reports include s.s.b. reception of ZL3RG (New Zealand) working IK4GRO in Italy at 0557, Greta HB9ARC (Switzerland) in contact with M0ACO at 0607.

Charlie also logged CE1CKA (Chile) working DL1RBW in Germany at 0559, Carlos TI4CF (Costa Rica) chatting with G3PMR at 0535, 8P6HG (Barbados) in contact with Dennis G0KFN at 0529. Finally, there was SV8CRI (Greece) working F5UTE in France at 0607UTC.

Derek BRS-171057 has also been 'earwigging' on 7MHz. His s.w.l. log includes s.s.b. reception of HB9JAP (Switzerland), AP2EH (Pakistan), PY2SLR (Brazil) ZP5WBM (Paraguay) and LU2QC (Argentina), all at around 2300UTC.

Steve GW0SGL has given the

vertical antenna he's trying out a right bashing on 7MHz, and his log shows it too! Contacts on this band include FG5HR (Guadeloupe) at 0148, VK6ACY (Australia) at 0045, CU2AA (Azores Islands) at 0048, and LU4DXU (Argentina) at 0045 all on 100 watts s.s.b.

Steve's c.w. operation accounted for VE3FN (Canada) at 0210, N4RP (USA) at 0222, CP6RP (Bolivia) at 0023. He also logged FM5BH (Martinique Island) at 2256, and UA9KM (Asiatic Russia) at 0003UTC.

The 10MHz Band

Carl Mason GW0VSW of Skewen, in West Glamorgan uses a G5RV antenna and about 100W and has been using the 10MHz band for quite some time. His latest log shows that he has hooked up with N1CPX (USA), and TK/DL7YY (Corsica) at around 2000, plus 9H1AL (Malta) at 1926, 4L4GV (Republic of Georgia) at 1800, VK3BW (Australia) at 0514, and YR0FJG at 1900UTC (QSL via YO4FJG).

Eric G0KRT also likes the 7MHz band. He lists 5W QRP contacts with SM5DYC (Sweden), HA5BW (Hungary) S50B (Slovenia) and YU1AAV (Serbia). All were worked between 1500 and 2100UTC.

The 14MHz Band

Again, the 14MHz band is 'where it's at' for most of our reporters. And as usual I'm starting off with our Yeovilian DXer, Don Mclean G3NOF's report.

Don reports that -"conditions on h.f. have not been very good during the day for DX. There's been alot of Sporadic 'E' on all bands with UK stations coming through at S9. The 14MHz band has been best for DX in the evenings from 1800 onwards with strong north Americans from around 2200".

Don's extensive list includes s.s.b. contacts with A71EM (Qatar) at 1716, A92FZ (Bahrain) at 2021 QSL to W3HCW, C6AGN (Green Turkey Bay, Bahamas) at 2323UTC (QSL to KA1DIG), VU2AU (India) at 1810, ZF2DR (Cayman Islands) at 2309 QSL to K5RQ, 5H3DC (Tanzania) at 1800, and 4X4JU (Israel) at 1839UTC.

Carl GW0VSW's 14MHz c.w. list shows 100W contacts with C53HG (Gambia) at 1700 (QSL via W3HCW), VE2DOH (Canada) at 1232, FY5YE (French Guiana) at 2100, JY5HF (Jordan) at 1833, and a s.s.b. contact with OH0/CT1DW/P (Aland Island) at 0800UTC (QSL via LX2DW).

Steve GW0SGL used his TH7 beam antenna (mounted at 15m) on 14MHz band to work EX7MA (Kirgizstan) at 1631, 5N9KWO (Nigeria) at 1800, SV2ASP/A (Mount Athos) at 1222, JR2SEN (Japan) at 1559. He also logged JT1BG (Mongolia) at 1601, 9V1UU (Singapore) at 1645, HS1NGR (Thailand) at 1823, BA1CO (Peking, China) at 1543, HL1KIS (South Korea) at 1511, and XX9AS (Macao) at 1833UTC.

Down to Bristol now, and **Gordon Foote G7NCR**, who uses his monoband 20m receiver and a loft-mounted receive antenna. Gordon, as usual, sends a massive log, and this includes s.s.b. reception of 3V8BB (Tunisia) working G0OMS at 1645, 5A1A (Libya) in contact with G0VMT at 1700.

Gordon also logged 9K2HN (Kuwait) working RZ3CC in Russia at 1733, PY2CC in contact with RA3QSY (nice call!) at 1836, UR3WDX (Ukraine) in contact with G0RNH. Also heard were W8QBG (USA) working S52HA in Slovenia at 2000, 9V1JY (Singapore) in contact with 9A2D in Croatia at 1415, and finally J3CSY (Grenada) working LA1ICI in Norway at 1434UTC.

It's back to Ted G2HKU now, who has been wielding some pretty effective c.w. on 14MHz. He lists contacts with P42V (Aruba Island), and 9H1AZ (Malta) both at around 1500, while operating at 2100UTC gave him a contact with CX8BBH in Uruguay.

I can't end this month's 14MHz report without mentioning Eric G0KRT. Eric is 'as pleased as punch' with himself after working a couple of Texan stations.

Eric says that the distance works out as something like 4700 miles, the greatest distance he's worked so far. Nothing better than beating your **own** record is there Eric? The stations were W5FO and KA5W, and Eric worked both at around 2200UTC.

The 18 & 21MHz Bands

Up to the 18 and 21MHz bands now where Don G3NOF reports that - "18MHz has been poor during the day, although on a few days it opened to North America around 1200 then faded out. A few Japanese stations were heard around 1200UTC".

Don's long list contains contacts with CE8EIO (Chile) at 2013, HC4L (Ecuador) at 2200, JA5XAE (Japan) at 1222, N2WCQ/6W1 (Senegal) at 1841 QSL via PA3BUD, TJ1RA (Cameroon) at 2228, TU4FF (Ivory Coast) at 0749 QSL via OH8SR, XE3VD (Mexico) at 2316, XX9GD (Macao) at 1303, Z2/G3UUV (Zimbabwe) at 1642, and YM22HCS (Asiatic Turkey) at 0822UTC (QSL via Bureau).

On 18MHz, Ted G2HKU worked 9J2BO (Zambia), R1FJL/FJL (Franz Josef Land) at 1500, while at 1900UTC he contacted 9L/DJ6SI in Sierra Leone.

Finally for this month, over to Carl GW0VSW who lists 21MHz c.w. contacts with DL2MIF, 3B8CF (Mauritius) and EA7OW (Spain) all at around 1200UTC, while Eric G0KRT used his low power to contact YU1ACR (Serbia) at 1034, HG2O (Hungary) at 1033, and OM3RKA (Slovakia) at 1602UTC.

Signing-Off

Well, another month has flown by and it's time to be signing-off! My grateful thanks to all reporters for your time and efforts.

I get many favourable comments over the air about the column, but always state that it's **not my column**....it's **yours**. Without your continued (and patient) support, it wouldn't be here at all! Hope to catch you on the air now I'm operational again!

As usual, reports and information by the 15th of each month to: **Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Mid-Glamorgan CF46 6DB, Wales. Tel: (01443) 411459.**

END

PW Listening & Operating Watch List

All times in UTC

Charlie Blake RS-96034 listens: 0500-0700 on 7.061MHz s.s.b. with an NRD 525 receiver & Sloping Wire antenna.

Steve Locke GW0SGL operates: 1100-1500 most days around 14.180MHz s.s.b. using a Kenwood TS-940 & TH7 beam antenna, normally beaming to OC.

Don Mclean G3NOF operates: 1030 Saturdays on 3.685MHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net 3.665MHz s.s.b. using a Kenwood TS-950 & Trap Dipole antenna.

Leighton Smart GW0LBI operates: Most Sundays (and some weekday evenings) at around 1000-1300 on 1.933 or 1.949MHz s.s.b.using a KW 2000B transceiver and a long wire Marconi antenna.

Rob Mannion G3XFD listens and operates: (weekdays & weekends) 1800-1830 3.7MHz 100W s.s.b., & 3.530 or 3.560MHz QRP c.w. using an Alinco DX-70 transceiver and Trap Dipole/Long Wire antennas. Also at 2300 on either 3.530, 3.560 or 7.025MHz (c.w.) or 3.7MHz s.s.b. Occasionally on 7.025MHz c.w. between 0100-0200.

Gordon Foote G7NCR listens: 1730-1930 & 2030-2200 (weekdays) and 1430-1630 (weekends) on 14.250MHz s.s.b. using a Howes DcRx receiver and loft mounted wire antenna.

T. Ibbitson G0VTI operates: each evening between 19.00 - 20.00 on or around 7.020MHz c.w., or 14.035MHz c.w. using a Ten Tec Scout at 50 watts.

David Kennedy G7GWF listens: on 7MHz using a Howes receiver and a Lake DTR 7 Transciever.

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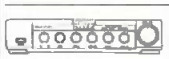

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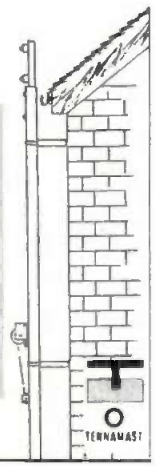

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IAN POOLE G3YWX

EQUIPMENT SPECIFICATIONS

This time Ian Poole G3YWX takes a look at some of the limitations of antenna design.

Anyone who experiments with antennas knows that every design has its limitations. One of these limitations is bandwidth.

No antenna can operate over an unlimited range of frequencies. Outside a given range an antenna's performance will deteriorate (sometimes very quickly).

Most antennas used by amateurs have a relatively narrow bandwidth, usually just sufficient to accommodate one band. Although for the h.f. bands it may even be necessary to select either the s.s.b. or c.w. section of the band.

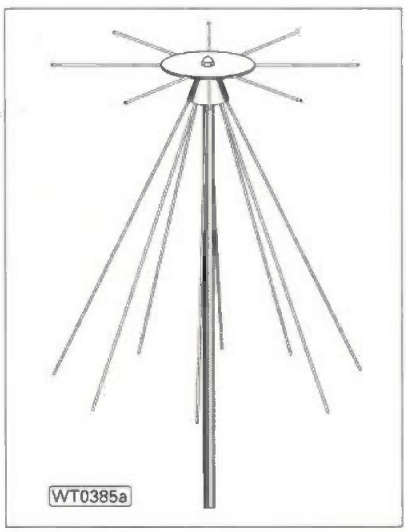
As many amateurs need to operate on several bands, multi-band antennas are popular, particularly for h.f. On multi-band antennas traps are widely used to isolate various sections of the antenna giving different effective lengths on different frequencies. Even so, the bandwidth of these antennas is limited and outside the specified bands the performance falls away.

Some antennas are designed for true wide band operation. Scanner users will be familiar with the discone antenna.

Some discone antennas are able to operate over a frequency range of 10:1 which is ideal, enabling signals to be picked up over a wide range of frequencies without the need for a variety of antennas. Whilst these are ideal for receiving they are not particularly efficient for transmitting and are seldom used in this role.

A wide band antenna which is used for transmitting is known as the log periodic array. This is directional and often used in professional applications where antenna gain, directivity and a wide bandwidth are required.

Unfortunately, log periodics are not widely used by amateurs. For their size they offer less gain than the more traditional trapped tri-band or multi-band beams. The true wide band nature of the log periodic is not usually required because amateurs can only transmit on a limited number of bands.



A typical Discone antenna.

Antenna Bandwidth

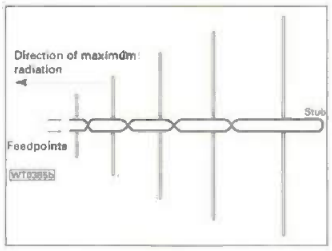
The antenna bandwidth is the range of frequencies over which it can operate satisfactorily. Unfortuantely this is vague because different people have different requirements for their antennas.

One antenna type may be used for a specialised receiving purpose for which one aspect of its performance is important. Others will be used for transmitting where another aspect is needed.

There are two main aspects of antenna performance, which usually determine the bandwidth. One is the standing wave ratio, and the other is the gain. Of these the most important to amateurs is usually the voltage standing wave ratio (v.s.w.r.), as the gain is normally less critical because it's less frequency sensitive.

Within the setting-up instructions of most trap verticals and dipoles a plot of the v.s.w.r. is usually given. This is very important because if the v.s.w.r. rises too high then this can affect the transmitter.

As semiconductor devices are very sensitive to high levels of v.s.w.r. most transmitter power amplifiers detect the levels of reflected power to protect the p.a. stage. When high levels of reflected power are detected the output from the transmitter is reduced to a safe level. Whilst this protects the transmitter it can also reduce the output power quite considerably.



A typical log periodic antenna array.

To overcome output power reduction it's necessary to ensure that the v.s.w.r. level is always kept as low as possible. Usually levels of 2:1 and less are considered acceptable, although if lower levels can be achieved this can sometimes help.

If an antenna is operated over a wide band of frequencies, changes will be seen in its polar diagram. This is particularly important for directive antennas where these changes will be more noticeable.

Where this is the governing factor the gain over a given operating range can be quoted. As this is rarely the most important factor for amateur communications this aspect is not widely seen.

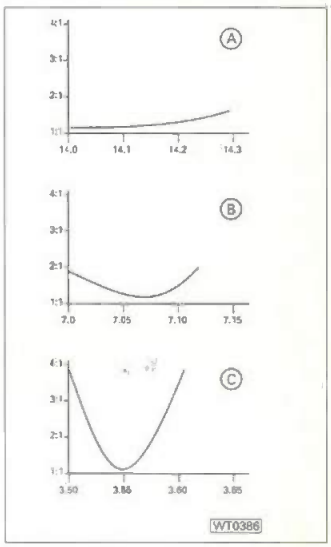
Number Of Factors

There are a number of factors which can affect the bandwidth of an antenna. For example it's found that compact antennas have a narrower bandwidth than full sized antennas. Trapped verticals are a common case in question where on the lower frequency bands the degree of loading from all the traps is greater, the bandwidth can be quite narrow.

Additionally a number of factors can help increase the bandwidth. The use of a folded dipole can help in this case.

It's found that a folded dipole has a wider bandwidth than a normal dipole. As most v.h.f./u.h.f. Yagis use folded dipoles to give a good impedance match to the 50Ω coaxial cable this also has the advantage of increasing the bandwidth.

It's also noted that decreasing the ratio of the length to thickness of the conductor can affect the bandwidth. For most h.f. antennas this is not applicable, but for v.h.f. and u.h.f. antennas, thicker conductors can make a difference.



A typical v.s.w.r. curve, note the much narrower bandwidth at the lower frequencies where the loading is greater.

That's all for this month, next time I'll be bringing this series to close by taking a look at the mysteries surrounding power supplies. Cheerio for now

END

MIKE RICHARDS G4WNC

BITS&BYTES - COMPUTING IN RADIO

Mike Richards G4WNC has this month's round-up of computing news which includes details of the new Internet Radio Guide in the Klingenfuss range.

Joerg Klingenfuss has built a formidable reputation through his popular *Guide to Utility Stations* and other utility related books. However, his latest venture will appeal to a much wider market.

The latest Klingenfuss publication is the new *Internet Radio Guide* and contains a wealth of information and important links to support everyone with an interest in radio. However, production of an Internet guide of any sort is always going to be a very risky business because the Internet changes so rapidly.

If anyone can make a success of producing an Internet guide Joerg Klingenfuss stands a very good chance, as he has so much experience with his regularly updated frequency lists. In fact, the problems associated with compiling a frequency list and an Internet site list are very similar. Both take a lot of investigative work to locate and then need to be constantly updated. Anyway let's get down to the business in hand.

The *Internet Radio Guide* is very well organised. The site lists are arranged into subject areas i.e. amateur radio, aviation, equipment, geography, meteorology, navigation, radio stations and solar data, to name but a few.

Each section comprises copies of the main or index pages of the listed sites with supplementary information on some of the sites. This actually proved to be very informative, particularly the full index pages as I found them much easier to use when printed than on-screen. For me, the best way to use the guide was to search-out interesting sites/links, note them down, and then enter them in my WWW browser's bookmark file. You can then go on-line and quickly access the selected sites.

I found the guide to be very helpful in planning my on-line time and highlighting sites that I probably wouldn't have otherwise found. For details of availability contact the **PW Book Service** on **(01202) 659930** who are selling the *Internet Radio Guide* for £30 plus P&P. My thanks to Joerg Klingenfuss for supplying the review copy.

Interference Tips

Barry Stone G6RSE has written an interesting letter explaining how he cured computer interference in his shack. He was suffering severe, S9+, interference right throughout the h.f. spectrum.

Barry started with the advice in my FactPack and discovered that the interference was still unbearable with just the computer base unit powered-up! He then tried just about everything he could think of to reduce the interference to manageable levels.

Trying to reduce the interference included changing screen resolution, earthing and even the addition of Tandy clip-on ferrites at each end of the mains lead - all to no avail. Just before he gave-up and changed from his Pentium back to a cheap 386PC, he noticed that Maplin sell ferrites that work to over 300MHz.

So, Barry bought a pair of the Maplin ferrites, chopped off the moulded mains plug of the computer and wound about four turns through a 25mm toroid. Ureka! the hash was reduced by around 80%. A bit more fiddling and he has now managed to reduce the interference level by a good 95%.

Barry didn't tell me the type of toroid he used, but a look through the Maplin's catalogue suggests that he opted for the 38mm Ferrite EMC ring filters order code AM35Q (£1.95 each) on page 209 of the current catalogue. If you have any successful interference cures please write and let me know so I can pass on the good news.

Web Site

Frank G3YCC has contacted me with details of his web page on the Internet. Frank is a keen QRPer and therefore has designed his page to provide specialist information and links for other QRP enthusiasts. If you'd like to take a look the address is:

http://homepages.enterprise.net/g3ycc/

Home-Brew Data Modes

Johnny Melvin G3LIV of **JS Consultants** has had a long association with amateur data communications and is perhaps best known for his work with the BBC computer and the linkage with **G4BMK**'s excellent software. The latest development is a PC board terminal called the P-PAR (pronounced pee-par) that has been designed to handle PACTOR, AMTOR, RTTY, PACKET, SSTV and FAX modes.

All components except a single DIN socket are mounted on the p.c.b., so minimising the risk of wiring errors. The board has been designed with the following facilities: AFSK generator, 4.096MHz crystal oscillator, f.s.k., p.t.t. switching, switched filter bandwidths, additional op-amp for JVFAX type interface and s.s.t.v. transmit filter.

The P-PAR is supplied as a bare p.c.b. with a silk screen printed component overlay. All components are easily purchased through popular mail-order companies. For more details please send an s.a.e. to: **JS Consultants, 2 Salters Court, Gosforth, Newcastle-upon-Tyne NE3 5BH.**

Windows '95

Although I'm yet to be convinced on the real merits of the Windows '95 operating system, I know lots of readers have taken the plunge. The **Public Domain Shareware Library**, (PDSL) have just sent me details of a new CD-ROM that's dedicated to Windows '95 users.

The new PDSL Windows '95 CD-ROM is entitled *Blackhawk Shareware for Windows '95* and comprises a wide range of utilities, applications and accessories for this operating system. To give a you a taster here's a few of the more well known titles that can be found on the CD-ROM: WinZip 6.0, McAfee ViruScan, LviewPro, Snapshot, A-Talk, CommNet v2.1, Qmodem and even Mahjongg, Boggle and Bomb Squad in the games section.

The Blackhawk CD-ROM is available for just £24.00. For more details contact PDSL at **Winscombe House, Beacon Road, Crowborough TN6 1UL. Tel: (01892) 663298 or FAX: (01892) 667473.**

That's all the computing news I have for you this month, so until next time cheerio and don't foget you can contact me at PO Box 1863, Ringwood, Hants BH24 3ZD or via the Internet at mike.richards@dial.pipex.com

END

PETER SHORE

BROADCAST ROUND-UP

Peter Shore reports on a reversed decision regarding Channel Africa and has news of two new stations.

I reported last month that Johannesburg-based **Channel Africa** was to close following the South African Foreign Ministry's decision to stop funding the broadcaster. A meeting of the South African cabinet on 19 June reversed that decision.

A press statement issued after the cabinet meeting said that the continuation of Channel Africa was supported, although it would be in a rationalised form. A cabinet sub-committee chaired by **Thabo Mbeki**, the deputy President, would report on financing and the format of Channel Africa by October this year.

Protests had been lodged by listeners' and organisations across Africa and further afield. Amnesty International's South African branch, the International Committee of the Red Cross and the United Nations Development Programme, all lobbied for the station to remain on the air. Senior staff from a number of major international broadcasters including **Radio France International**, **BBC World Service** and **Voice of America** wrote to Channel Africa saying how important it is to ensure that South Africa continues to have a voice in international radio.

Save World Service

In last month's column I also described the changes to be made to the set-up of the BBC that would affect the World Service. Reaction to the plan has been extreme, with **John Tusa**, the former Managing Director of World Service, writing in the national press that it was 'an act of gross vandalism'. He is helping to lead a campaign involving two of his predecessors, **Austen Kark** and **Gerald Mansell**, to 'save World Service'.

A lobby of parliament is due to take place as this magazine goes to press, and outside Bush House there is a growing display of flowers around a sign saying 'R.I.P. World Service 1932-1996'. Around 500 staff gathered outside Bush House two weeks after the announcement of the restructuring to protest against the changes. Watch this column for more news!

Commercial Station

A new station has been launched by a well-known Danish DXer, **Stig Hartvig Nielsen**. The station **Radio ABC** is on the air each Sunday from 0800 to 1200UTC relayed from a 120kW transmitter in Kaliningrad, Russia. Stig is General Manager of Radio ABC, which is a successful commercial station in Denmark.

The ABC service has been operational since 1990 broadcasting on a number of f.m. frequencies in eastern, northern and central Jutland. The station reaches 300 000 listeners in Denmark.

The short wave operation is music-based, with the Danish Top 30 broadcast at 1000. Short wave enthusiasts can tune in to ABCDX Report at 1130 each Sunday.

The station transmits on the clear channel of 7.57MHz and welcomes reception reports from listeners. Write to **PO Box 174, DK 8900 Randers, Denmark**, or **FAX** to **+45 86 40 55 22**. Radio ABC has a WWW site, including a page relating to the short wave service. The URL is **http://www.radioabc.dk**

Radio Democrat International

Another new station on short wave is **Radio Democrat International** (RDI) beaming to Nigeria. The English language broadcasts are on the air for an hour'a day at 0600-0630 on 11.90 and at 1500-1530 on 15.12MHz, a frequency used in the past by the Voice of Nigeria's external service.

Radio Democrat International also plans to transmit at 2100UTC daily on 7.195MHz. The station uses the Meyerton transmitting station of Sentech, the South African Broadcasting Corporation's transmission arm, and programmes are distributed from London by

London-based **World Radio Network**. Radio Democrat International is run by the National Liberation Council of Nigeria, which is opposed to the current regime in the country.

Station News

Radio Vilnius is using **Deutsche Welle**'s Juelich transmitting station near Cologne to broadcast its North American service in Lithuanian and English. The station is on the air 0030-0100 on 9.56MHz to North America and 0830-0900 on 9.71MHz to Europe. The evening transmissions at 1900 and 2130UTC are now only carried on medium wave transmitters.

Radio Canada International broadcasts a large number of programmes made by parent Canadian Broadcasting Corporation's domestic services. One of these is *Global Village* which brings the 'News of the World in the World of Music' to listeners' in Canada and world-wide, thanks to the short wave relays.

The programme has reported from 92 cities in 51 countries and includes everything from jazz music from the New Orleans Jazz Heritage Festival to regional music from the Celtic-Bohemian Witches Day Festival in the Czech Republic. You can tune in on Thursday at 2300UTC on 11.94 and 15.305MHz.

Radio Exterior de Espana is on the air every day at 2100UTC with an hour-long broadcast that includes 30 minutes of Spanish and international news, with the emphasis on Latin America, followed by Spanish press review, pop music and reports from Spain on the arts and science. At the weekend, news is shorter and is followed by *Radio Club* with listeners' letters and record requests.

Tune to 6.125 in Europe, or 11.775MHz in the Middle East and Africa. There is also a transmission to the Americas at 0000 for two hours on 9.54MHz.

That is all for this time round. Until next month, keep searching the bands for interesting stations and let me know if you find anything unusual. All letters to me c/o the *PW* Offices.

Middle East Stations

Finally this month we travel to the Middle East. The peace process seems to be hanging by an ever thinner thread as this edition of *PW* goes to press. It might be worth keeping an ear on some of the stations that broadcast from the region in English as events unfold. Here is a selection:

UAE Radio Dubai: 1030-1110; 1330-1400; 1600-1640 on **13.675, 15.395,** 17.825, 21.605MHz.
Radio Cairo: 2111-2245 on 9.90MHz
Radio Jordan: 1100-1200 and 1400-1630 on 11.94MHz
Radio Kuwait: 1800-2100 on 11.99MHz
Radio Damascus: 2005-2105 on 12.085, 15.095MHz

END

ROGER COOKE G3LDI

PACKET PANORAMA

Roger Cooke G3LDI covers a wide range of news and views in his bi-monthly look at the Packet scene.

Several repeater groups now produce newsletters, something that I have always thought a good idea, especially for a group that is well-financed and well organised. However, it's an expensive thing to do, with postage and printing, etc., so it's not possible for all groups.

The Gloucester Group produce a monthly newsletter and incorporate both voice and data repeaters in the one group with an annual subscription to cover all repeaters. They are very well organised, packet-wise, with both 430 and 1296MHz high-speed nodes, with BBS facilities at **GB7GLO**.

The users of GB7GLO are encouraged to use a password to access, using the one-time pad system. Each of the nodes has TCP/IP routing capabilities with **GB7LGS** providing TCP/IP BBS facilities. If you're interested in joining, or just require further information, then the secretary is **Richard Brown G8JVM** who can be contacted on **(01453) 884945**.

The **Ridgeway Repeater Group** is organised in much the same way as the Gloucester Group, but produces a yearly newsletter, which is still quite adequate for such a service. The main BBS for the Ridgeway group is **GB7SDN**.

The links for **GB7SDN** are presently operating from **G0RRG**, but will soon change to **GB7NW** and will also hopefully go from 1200baud to 9k6baud. There are two voice repeaters as well and one membership covers all repeaters.

It's worthwhile remembering that repeaters are not provided by an ethereal being, nor by the RSGB, or indeed by Paul Daniels! However, I suspect that, just like here in Norfolk, each area has their own 'non-contributors', which is the polite expression to use! If all amateurs contributed to their own local repeater groups, more and better services would be possible.

Help Wanted

I received a telephone call from **Tom Polain G7TBW**. He would like to chat to somebody using an MFJ-1278B Modem.

Tom is not on packet (as he has a problem!) but can be reached by writing to **22 Hilltop Avenue, Hockley, Essex SS5 6BN** or by telephoning **(01702) 230862**. The computer Tom is trying to use the TNC with is the Amiga 1200, so if anybody can help, I'm sure Tom would be very pleased to hear from you.

Highlander BBS

Information has reached me of a landline service should anybody wish to use this method. It's known as the Highlander BBS and is available by dialling either **(01452) 384557** or **(01452) 384702**.

There are over 6000 amateur radio related files for user download with most amateur related newsgroups from Fidonet, Hamnet, Mercury, etc. The sysops are also hoping to build an area devoted to Radio Societies, Clubs and Special Interest groups.

If any secretaries would like to have their club listed in the Highlander database, then please send full details, name of club, meeting place, times, interests, Novice support and a contact name and 'phone number.

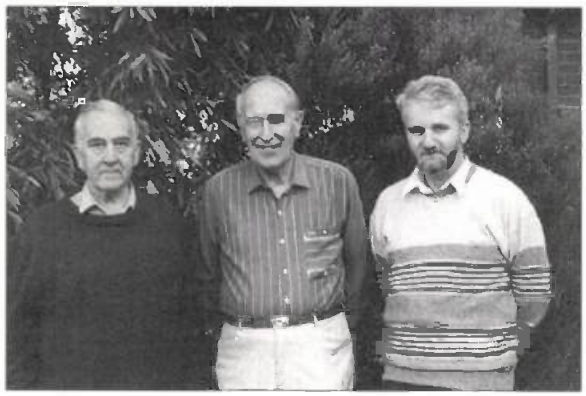
In addition to all of this, there are also more than 58,000 files covering DOS, Windows, Computer groups and so on. Various addresses are available to contact the sysop:

markt@esoftc.demon.co.uk
mark.trotman@esoftc.seuk.com
g1fyc @ gb7glo.#46.gbr.eu or Tel: **(01452) 531648**.

Australian News

Geoff Mills G3EDM, visits his daughter in Australia quite often and likes to keep in touch using data modes. The picture shows L to R, **Geoff G3EDM**, **John VK3WZ** and **Dieter VK3FFB**.

Geoff G3EDM, John VK3WZ and Dieter VK3FFB - the Australian connection!



Dieter was, until very recently, the only digimode h.f. station in New Delhi and operated under the call of **VU2DPG**. He ran an h.f. mailbox on 21 and 14MHz Amtor for several years, accessible from the UK.

Dieter is now active at the Pactor mailbox of **VK6TN** in Perth. Geoff uses this mailbox several times a week, despite the poor prevailing propagation.

John VK3WZ, runs a Pactor mailbox using Winlink and downloads each hour from VK6TN. For this, he uses a PK232MBX and for connection to the local packet network he uses a PK88.

The messages go into the File Manager of the Winlink software and messages downloaded from h.f. are passed to **Keith VK3ECC**, at Ringwood, a suburb of Melbourne. Keith has links with about 6 or 7 BBS in the Melbourne area.

John VK3WZ is the only h.f. mailbox in Melbourne and even in the whole state of Victoria. Geoff says that the only other BBS he accesses on h.f. is **Gordon VK2AGE**.

So, there are other ways to get mail to Australia other than the Satellite Gateway, so give it a try!

Follow-Up

A while back I reviewed a book called *The Why? and How? of TCP/IP*, by **David Norris G4TUP**. And now David has now produced his follow-up book. It's called *So You Want More of The Why and The How of TCP/IP*.

David has produced his second book in the same format as the first. There are a total of 41 pages giving information for the keen TCP/IP person who has just set up his system and wants to know more.

There are full details on the following: Optimising Throughput with your TNC, Mail usage - SMTP and POP3, News Gathering with NNTP, Connections - Ethernet and SLIP examined in full detail, Compiling your own version of JNOS, Using complex commands, Creating files uniquely for your own system, Understanding the main files in full and Future Protocols - Gopher, Archie, HTTP, Java and Shockwave.

David has taken particular trouble in citing many examples within each section. The reader is left in no doubt as to how to configure and get the best out of their own system.

David can be reached on packet at **G4TUP @ GB7NWI** or by E-mail at **dnorris@gult.demon.co.uk** You can also telephone him on **(01704) 535947** or **(01973) 549365**.

The subject of TCP/IP has always been a mystery to most people and G4TUP's books do take some of that mystery away. I think they explain the mode in language that most can understand.

Libel Against Sysops

Following on from my reporting last year on the possibility of libel actions against sysops, I have received several letters from individuals, including one from **Alex LA0GV/G4TTB**.

Alex makes some very interesting comments and I'm only sorry that I have not had room before to mention them. I hope to cover this subject again next time. In the meantime, if you have any comments, please let me have them.

Happy Packeting 73 de Roger G3LDI @ GB7LDI.#35.GBR.EU or The Old Nursery, The Drift, Swardeston, Norwich,

END

Advertisements from traders or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors.**

You should state clearly in your advert whether the equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibiltiy of the buyer to ascertain the suitability of goods offered for purchase.

BARGAIN basement

FREE ADVERTS

Compiled by Zoë Crabb

Free adverts? Yes it's true! As of now, all adverts will be ***FREE*** *of charge, to readers and subscribers.*

Now's your chance to send in a photograph of your equipment (a good idea if it's really unusual) to accompany your advert. Please note that **all photos** will only be **published at our discretion** and are **non-returnable**.

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Adverts are published on a first come, first served basis. All queries to **Zoë** on **(01202) 659910**.

All adverts should be sent to: **Zoë Crabb, Bargain Basement Free Ads, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**.

For Sale

Advance 63A a.m./f.m. sweep gen., £50. Farnell FG3 function gen., £55. Heathkit 30MHz counter, £25. Levell TM3A microvolt meter, £30. Heathkit LCR bridge, £20. Tel: London 0181-769 2760.

AKD 6001 6m f.m. 5/25W mobile/base transceiver with Parma power microphone in g.w.o., £100. John, N. Yorkshire. Tel: (01833) 621333.

Alinco DJ-G5, soft case, d.c. lead, £375. Mint Yaesu FT-51R MH29A2B EDC12, mint, £400. Yupiteru MVT7100, case, extras, mint, £250. Alinco DJ-580SP batts case, batts box, £270. Uniden UBC200XLT, used, £100. Tel: Coventry (01203) 650572.

Alinco PR-112E v.h.f. f.m. 2m (144MHz) mobile 12V transceiver with manual, £125. 12V 10/20A power supply, £10 each. Various GH ex p.m.r. hand-helds for 2m/70cm (144/430MHz), offers! Andy, Suffolk. Tel: (01449) 775395.

AR88D, excellent condition, 1358X RA17L, excellent condition and much more. Looking for HRO coils or complete set. Will part-ex. also want R1155. Eric, Lancs. Tel: (01254) 705454 or 760300.

AVO BM/100/2 electronic Megger with case, full IEE spec, limited use only, cost over £200, sell for £100 inc. P&P. Collect with real cash, £80. Ron, Exeter. Tel: (01647) 61753.

Base stand for pocket scanner, adjustable bracket holder, BNC lead fitted, new, unused, £14. Mr Rigby, Morecambe. Tel/FAX: (01524) 833506.

Bush valve radio, 1950 model DAC90A Bakelite case, superb condition, £40. Another one requires repair, valves ok, £10. Tel: Blackburn (01254) 240802.

Eddystone 840C receiver, covers 480kHz to 30MHz in five bands, professionally modified, BFO for easier s.s.b. tuning, super condition and with original brochure, can demonstrate, £150. Tel: Berks (01344) 772824 anytime.

FT-250 h.f. TX/RX 300W p.e.p. with power supply and speaker, original instruction manual, demo with pleasure, owner emigrating, bargain at, £95. Mike G4CUP, North Glos. Tel: (01684) 592546.

FT-790R all-mode 70cm (430MHz) transceiver, complete with accessories, boxed as new, £250. Cash only. One owner from new. Tel: Manchester 0161-788 8587.

Hammarlund receiver, 20 valve, 500kHz to 54MHz, six band in good condition, buyer collects (big and heavy), £140. J. A. Bird, Staffs. Tel: (01827) 65641.

Heathkit HW32A with manual, no power unit, £50. BC221 with charts and mains unit, £20. Heathkit valve GDO with manual, £15. Codar T28 receiver, £15. G8AHE. Birmingham. Tel: 0121-458 2406.

Heathkit HW8, £80. Trio **JR310** RX, £60. Yaesu **FLDX400 TX**, £80. Eddystone general coverage RX, 40A, £110. Scope, £25. Collect only. Mark G4HVK, Penzance. Tel: (01736) 50656.

Howes DXR20 receiver, covers 20-40-80m (14, 7, 3.5MHz), S-meter fitted, etc., works well, £50. Gordon 2E0AOG, Leeds. Tel: 0113-255-0626.

Icom 728 h.f. transceiver, general coverage RX, 10-100W f.m. board fitted, boxed, manual, excellent condition, £550 o.n.o. Tel: Chichester (01243) 671506.

Icom IC-745 TX/RX all-mode general coverage receiver (and TX) includes 27MHz, superb, bargain, £550. Tokyo all-band a.t.u., cross-needles, p.w.r./s.w.r. meter, £150. New low-pass filter, £10. Above together, £675, no offers. Derek, Stratford Upon Avon. Tel: (01789) 297158.

Jaybeam 'Minimax' 3-element triband beam for 10-15-20m (28, 21, 14MHz), 10ft turning radius, v.g.c., with manual. Buyer collects, £150. G0DLR, Kent. Tel: (01732) 823483.

Kenwood dual-band TH-79E hand-held, six months old, Alinco DJ-580E dual-band ext. RX, 12 months old, £290 each. Kenwood rapid base charger KSC14, £50. All boxed as new. Tel: N. Wales (01745) 730148.

Kenwood TS-430S h.f. and general coverage, all filters fitted, £525. Alinco DR599E dual-band v.h.f./u.h.f. mobile 40W output, £350. IBM computer DX2/66 8Mb RAM, 240Mb HD, Suga monitor, £350. Dave GM4UJZ, Fife. Tel: (01383) 823305 after 6pm.

Kenwood TS-820 s.s.b. transceiver, excellent condition, £350 o.n.o. Denton Clipperton-L linear amplifier, £350, excellent condition. Arthur G3YRB, QTHR. Tel: 0181-684 3974.

Kenwood TS-830S h.f. transceiver, narrow c.w. filter fitted, boxed and manual, immaculate condition, buyer collects, £450. Scott, QTHR. Tel: (01324) 471126.

Linear 2m (144MHz) s.s.b. mobile a.c. p.s.u., £55. CM Howes 20m (14MHz) QRP trcvr spkr key, £55. 1154/55 a.c. p.s.u.s, £60. 52 Set RX, £50. TCS RXs, £45. PCR2 with p.s.u., £50. GRC-9, £200. Tel: Worcs (01562) 743253.

Log periodic, 50-1300MHz, nearly new, 25-element, £150 o.n.o. 2m (144MHz) m/m transverter, 28MHz i.f., £40. 70cm (430MHz) m/m transverter 144MHz i.f., £40. s.a.e., many more items. Tel: (01623) 643355.

Mic Adonis 303G, as new, £45 o.v.n.o. Tel: Derbyshire (01283) 221870.

Microsoft office standard version 7.0 on CD for Windows, new, unregistered, full package, £195 insurance and delivery free. Jeff, Cardiff. Tel: (01222) 489008.

Mint, one owner, Ten-Tec Corsair plus p.s.u. plus mic., £600. Mint Trio 830S, just serviced by Castle Electronics, new p.a.s plus spares, filters, etc., £500. Harold, Stockport. Tel: (01663) 744087.

Momentum MCL1100 data decoder screen monitor with synoptic upgrade fitted, instruction books, p.s.u., printer, Commdore MPS1230 and 1400 sheets, c/paper, £300. Mr Rigby, Morecambe. Tel/FAX: (01524) 833506.

Murphy A122M valve radio, working, original parts, good condition, wood case, £80. Tel: Newbury (01635) 40866.

No 40A ex DTI with manual, mint condition, £120. 1155, good condition, £79. 19 Set, £150. Tel: W. Yorks (01274) 824816.

Oscilloscope OS25A double beam Advance Instruments, good working order, £60. AVO 8 multimeter, £15. Ken, Chester. Tel: (01244) 676167.

Oscilloscope Phillips dual trace PM3540 with logic functions. £95. Marconi TF2006 200-1000MHz f.m./a.m./c.w. signal generator, £70. Racal r.f. test meter/multimeter (up to 900MHz), £15. Would consider exchange radio gear. John G7EJK. Uttoxeter. Tel: (01889) 564477.

Pye black box hi-fi record player in working order, originally purchased 1956. Brown lacquered cabinet with built-in speakers. Instruction manual included. Offers. Tel: Dagenham 0181-593 9032.

R2000, 0-30MHz receiver, v.h.f. converter fitted, 118-173MHz, boxed with manual, v.g.c., £375. Colin, South Shields. Tel: 0191-421 8205.

Racal RA17 receiver, excellent condition and working order, £190. Thorens TD125 record deck, £95. Garrard 401 record deck, £150. Quad FM2 stereo tuner, £100. Tel: Lancs (01257) 263403.

Racal RA17(II) 1-30MHz, £125. Murphy B40, £70. Pye v.h.f. TX (QQV03 PA), £35. Pye Olympics base station/p.s.u., £30. Mobile units (3), £12 each, mics included. R1155 needs smartening, g.w.o., £35. Tel: E. Yorkshire (01482) 869682.

Realistic PRO2035, 1000 channel, wide band receiver, Tandy's best ever, boxed, as new, current price £329, bargain at, £200 o.n.o. Tel: Tewkesbury (01684) 295770 anytime.

Redifon 551N all-mode general coverage receiver with ARU18 a.t.u. and ARU11 synth complete in Navy cabinet, unmarked, also 386 computer, decode RTTY, c.w., SSTV, etc., also new printer, lot, £275. John, Staffs. Tel: (01538) 385735.

Robot 400 clone, b/w SSTV TX/RX, £40. Wood and Douglas 0.5W 70cm (430MHZ) ATV TX, £30. Collect or carriage extra. Bob G8VOI, Hampshire. Tel: (01705) 250830 after 6pm.

Sale scanner books, 1, 2 & 3 by Peter Rouse, *Scanning Secrets/Short Wave Communications/Scanner Busters/The Airband Jargon Book*, £35 the lot. Mr Rigby, Morecambe. Tel/FAX: (01524) 833506.

Selling up amateur radio station, bargain price for quick sale, h.f., u.h.f. beams, rotator, scope, geni amps, keyer, etc. SAE for list. Tel: (01766) 522591.

Sky Scan car mag mount MkII, freq 25-1300MHz, 4m of RG58 cable, BNC conn, £14. Mr Rigby, Morecambe. Tel: (01524) 833506.

Sony power adapter for Sony AN1 antenna d.c., 6/9/12V, 800mA, new, unused, boxed, cost £35, sell for £20. Mr Rigby, Morecambe. Tel/FAX: (01524) 833506.

SP-940 c/w filters, £50. Drake 2C W/2CQ, £60. KW **Vespa** MkII, £40. RF unit RA17, valves, circuit, £20. Hacker Sovereign II, manual, £20. Bill, Glasgow. Tel: 0141-562 4571.

Tektronix 4 beam storage scope model 4623A, complete with all leads and data, pristine condition and just calibrated, cost over £7000, offers please. G4TXS, Gedling. Tel: 0115-961 6619.

Test equipment manuals, 1940 to 1990. Complete range, including Tektronix, Packard, Advance, Marconi, AVO and Tek Spectrum Analysers. Tel: Surrey 0181-337 4680.

TH-79E dual-band, extend receive, menu system, also Duplex use, manuals, extras, £290. Bill, Glasgow. Tel: 0141-562 4571.

Transformer/suit PW Marchwood p.s.u., unused, as new, 16V 43A out, buyer pays carriage, £88.

G1OBF, Bristol. Tel: 0117-969 2590.

Transmitting valves QQV04-15/CV789, gold pin type, £5 each. 807, some Brimar, special quality, some American military, offers. Graham, Grimsby. Tel: (01472) 351809.

Trio TL20 100W h.f. linear amp, £90. GW4KUS, Swansea. Tel: (01792) 466383.

Trio TS830S, boxed with MC50 mic, spare valves, £410 o.n.o. or swap for base multi-mode, will deliver within 100 miles. Also FRDX 400 rec., amateur bands only, £80 or swap, w.h.y.? Tel: S. Wales (01443) 772387 anytime.

Two EIMAC 3-500 valves, new, matched pair, £225. G4WMP, Surrey. Tel: (01932) 846139.

Uniace 200, converted to 29MHz f.m., nice little rig with chrome front, in excellent condition, £35. Tel: Cardiff (01222) 488723 after 6pm.

VHF twin tetrodes and variable split stator and butterfly v.h.f. capacitors for 6/2m (50/144MHz) home-brew or might swap for 6146B valves or w.h.y.? G3AOY, Devon. Tel: (01803) 520065.

Vintage Marconiphone RK moving coil, cabinet, speaker, battery powered, offers. Tel: Cleveland (01642) 477174.

Watkins Johnson HF1000 RX, 5kHz to 30MHz, excellent condition, one year old, working, boxed, instruction manuals, hardly used, £3000 o.n.o. Mr Rigby, Morecambe. Tel/FAX: (01524) 833506.

Yaesu 51R hand-held transceiver, 2m (144MHz), 70cm (430MHz) with extended receive, 2/5W power, both battery types, included with cases, one year old, as new condition, £295. Tel/FAX: Basingstoke (01256) 51836 any evening.

Yaesu FR100B receiver and matching FL200B transmitter, Eddystone speaker mike and manuals, excellent condition, ideal QRO or QRP station, £140. Remote VFO 4B to suit KW2000B, excellent condition, £25. Tel: Huddersfield (01484) 645923.

Yaesu FRG-7700 with manual and circuit diagram, v.g.c., 150kHz to 29.9MHz, buyer collects, £200 o.v.n.o. Tel: Lancs (01282) 868127.

Yaesu FRG7700 with a.t.u., FRT, £240 o.v.n.o. John (The Younger), Wiltshire. Tel: (01747) 860752.

Yaesu FRG7700 with memory board fitted, £240 o.v.n.o. B300P Zetagi, £85 o.v.n.o. Trio TR9000 2m (144MHz)multi-mode, £220 o.v.n.o. Martin, Dorset. Tel: (01747) 826078.

Yaesu FT-101 160 - 10m (1.8 - 28MHz) inc 15, 18, fan, etc., £225 o.n.o. Trio 2300 2m (144MHz) inc. mobile bracket, £65 o.n.o. 28-30MHz linear amp, 30W, £25. IC-475 wanted, must be g.w.o., reasonable price. Shaun G7TGY, QTHR. Tel: (01273) 477998/0860 612055.

Yaesu FT-101ZD, WARC, f.m., fan, filters, plus 901R transverter, fitted 144MHz and 430MHz modules, £550. Tel: Northampton (01604) 762083.

Yaesu FT-200, nr. mint condition, complete new valves, £170, no offers. Trio RX 9R59DS, £85, excellent condition, Realistic RX DX160, £50, excellent condition. Tel: Nr. Keighley (01535) 630361 anytime.

Yaesu FT-209RH 2m (144MHz) f.m. hand-held, good condition with 1hr charger/p.s.u. and two NiCad packs, 5W, £120. Tel: Wokingham (01734) 619162.

Yaesu FT-290R MkI, fitted MuTek front end, complete with mic., strap, leatherette case and manuals, £220. Tel: Ipswich (01473) 612657.

Yaesu FT-480R 2m (144MHz) multi-mode, very good condition, base station prompts sale, 1W and 10W, £200. No offers. Tel: Cumbria (01768) 881866 night or (01768) 868144 day.

Yaesu FT-77 with f.m. and extra external v.f.o., £400. PK232 early version, £80. Revex 30amp p.s.u., £75. Tono 9000 RTTY, c.w., ASCII with Tono monitor, £100. G0IUW, Glos. Tel: (01453) 765406 after midday.

Yaesu FT-790 MkI, as new with manual and box, £300. AKD 2001, £90. Atari STFM, £50. Buyer collects. Ian, Walsall. Tel: (01922) 30668 after 5pm.

Yaesu FT-990DC, excellent condition, boxed, manuals, £1225 o.n.o. Yaesu SP-6 filtered desk speaker, excellent condition, boxed, £100. Yaesu MD-100A8 de-luxe desk microphone, excellent condition, £90 o.n.o. Andrew, Middlesborough. Tel: (01642) 814503.

Yaesu h.f. all-mode tcvr, new valves, nice condition, mic., headphones, boxed, £395. MFJ-941D a.t.u., £75. Manual for both. Tel: N. Yorks (01423) 868823.

Zetagi B300P 400W linear mint pre-amp, 13.8V, variable output. Icom 706 h.f./v.h.f., mint, 15 months warranty left, no unpaid HP, have receipt, £875. Both plus post and packing. Barry G0RZI, Cumbria. Tel: (01946) 812092.

Exchange

Aiwa CD midi hi fi with karaoke, also vintage radios, exchange wanted R1000, 2001D, Barlow Wadley XCR30 MkII, Perdio Park Lane, Piccadilly or Mini 66. Please write, will 'phone back. Mr L. Borthwick, 42 Eildon Road, Hawick, Scottish Borders TD9 8ES.

Supply Unit Vibratory No. 12, 24V input, ZA43208, antenna tuning unit No. 9, ZA47680 and Control Direction Finder C-1514/A USA - looking for WS46 w.h.y.? Andrew Humphriss, Warwick. Tel: (01926) 400876.

Yaesu FL50, FR50, FV50, Racal RA17 in case, complete h.f. station, v.g.c. with manuals and a.t.u., swap for FT-290, DJ-560, TS-5205, FT-620, TR-9000, IC-707, FT-747, the lot for any of the above. Andy G7UAD, Derbys. Tel: 0115-930 8096.

Yaesu FT-767GX h.f. + 70cm, 2, 50MHz, brand new, front + knob swap for Yaesu FT-736R with all bands for Novice or sell 767GX for, £1500. Mick, S. Yorks. Tel: (01226) 742971 after 6pm.

Wanted

Any QSL card from Easter Island, especially from the Cordell Radio Science Expedition in September 1995. Your price plus postage. David Maddock, 49 Dinorben Avenue, Fleet, Hants. Tel: (01252) 816814.

AR77 spares wanted extremely urgently, will make it worthwhile replying. Brian, Surrey. Tel: 0181-651 5345.

Boot/set-up disc for IBM 5170 computer. Tel: Northampton (01604) 645090 evenings.

Eddystone 840 receiver, CR100, SP600, all in good condition. Wanted by retired collector, old broadcast wireless sets, exchanges, w.h.y.? 42 Halvarras Road, Playing Place, Nr. Truro. Tel: (01872) 862291.

Eddystone receivers, models EC10, 1570, EM34, EB35, 960, 890, 930, 870, 870A, plus any Mimco sets and other models, also scrap sets for spares please. Some doubles for sale. Peter Lepino, Surrey. Tel: (0374) 128170 or (01372) 454381 anytime.

Ferrite rod antennas, must be half inch in diameter, no more or less. Must be six inches long or more. Peter Tankard, Sheffield. Tel: 0114-266 5253 from 9am to 9.30pm.

FT-101ZD in good condition, please write to Papaioannou Christos SV1DAF, 17 Xanthippou Str., 13562 Agii Anargiri, Greece.

Hallicrafters SX42 manual or copy (not service sheets), fair price paid. Dave, 141 Dunes Road, Greatstone On Sea, New Romney, Kent TN28 8SP.

Hammarlund SP-600/R274 URR or GEC BRT-400 radio receiver, working or not, w.h.y.? Also circuit diagram for GEC BRT400K receiver and R-1283/GRC v.h.f. receiver, ex NASA, please help. Bob, 247 Sandy Lane, Hindley, Wigan, Lancs WN2 4ER. Tel: (01942) 255948 anytime.

Help! How can I turn on the converter antenna on my Drake R8E. Can I also fool the display for an outboard v.h.f. converter, all costs refunded, many thanks. Richard Ackroyd G4SYV, 16 Pipits Croft, Bicester, Oxon OX6 0XW. Tel: (01869) 244453.

HF vertical ant, mini beam plus rotor and any h.f. loop/magnetic, etc., or anything interesting or similiar to above. Mr Howlett, Middlesex. Tel: 0181-364 3330.

HP 431C sensor lead, Icom IC202S, Bird 43 elements, B, C, K bands, BNOS 144MHz 50W or 100W linear amplifier. Bob G8VOI, Hampshire. Tel: (01705) 250830 after 6pm.

Mechnical filter assembly for Trio 500S receiver, part number L4005. Ian GW8VUG, Llanrwsy. Tel: (01492) 575238 weekdays.

Panels for a FDK multi 2700 2m p.l.l. transceiver, plus circuit diagrams. Tel: Stoke (01782) 415732.

Phillips cassette recorder, type made in 1970s with single forward/back/left/right function, knob and manual record level, working or for spares. Tel: Wokingham (01734) 619162.

Racal Speedrace equipment, RTA191 receiver, MA228 transmitter drive unit, TA349C linear amplifier, also any sub-units and any 'picture frame' 70.5in high cabinets. Set of manuals covering Speedrace. Nigel Boyd G0UGD, 2 Church Close, Eastbourne, East Sussex BN20 9QY.

Radio Constructor **vols 1-10** and **Vol 24** till end of publication, bound or complete volume runs loose. Good price offered. Phil Beckley, Gwent. Tel: (01633) 853906.

Standard C520 and **C528 hand-helds**, not working, for spares, also accessories and battery packs for above and Kenwood TH-26E required. Possibly consider other standard rigs too. Mike G1HGD, QTHR. Tel: (01926) 513073.

WWII German and Clandestine sets, crypto equipment, any period, w.h.y.? Need not be working. Otterstad, Hosterkobvej 10, DK-3460 Birkerod. Tel: 4281 5205 (Denmark).

BARGAIN BASEMENT ORDER FORM

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❑ FOR SALE ❑ WANTED ❑ EXCHANGE

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Telephone Number .....

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Your advert, you decide!

Classified Ads

To advertise on this page see booking form below.

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

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JVFAX/SSTV, HAMCOMM, PktMon. 9FD/25FD Tx/Rx interface, programs, manuals, pictures £28.50. SASE for leaflets. Peter Lockwood G8SLB, 36 Davington Road, Dagenham RM8 2LR. Tel/Fax: 0181-595 0823.

RadioLink 96 Propagation simulation software. Point-to-point radio links. £49.99 SASE leaflet. G6CPO (QTHR) Tel: 01299-822473 (Worcs).

Electronic circuit design and PCB package for sale, IBM PC, unwanted present. Tel: 01426 218014.

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Rallies

Harlow & District Amateur Radio Society
Amateur Radio, Electronics & Computer Rally
To be held on Sunday 29th September, 1996.
Starts at 10.30am (10.00am for disabled) at the Sports Centre, Harlow. Free car park (disabled parking near the entrance). Licensed bar and refreshments. Bring and Buy stall, Morse on demand (2 passport size photos plus the usual fee). Talk-in on S22 and SU22 by G6UT.
For more information phone the Rally Manager
on 01279 303786 or Fax 01279 865092 or phone
Len on 01279 832700 or Fax 01279 864973.

Holidays

NORTH WALES HOLIDAYS – Caravan - bunkhouse - camping. Elevated rural site, two miles from beach, use of shack and antennas, open all year. Tynrhos, Mynytho, Pwllheli. Tel: 01758 740712.

Educational

HEATHKIT EDUCATIONAL PRODUCTS UK DISTRIBUTOR/SPARES AND SERVICE CENTRE. Cedar Electronics. 12 Isbourne Way, Broadway Road, Winchcombe, Cheltenham. Glos. GL54 5NS. Tel: (01242) 602402.

CITY & GUILDS RADIO AMATEURS EXAM. Pass your exam the easy way with an RRC home study course. For details write or phone THE RAPID RESULTS COLLEGE, Dept. JX400, Tuition House, London SW19 4DS. Tel: 0181-947 2211.

RAE PAY AS YOU LEARN Correspondence. £3 per lesson includes tuition. Ken Green C. Eng, MIEE, Chylean, Tintagel, Cornwall. Tel: 01840 212262.

RAE COURSES, TAUNTON
Somerset College of Arts and Technology, Wellington Road, Taunton will again be offering the RAE course for the May 1997 examination. The course will be held on Tuesday evenings from 6.30pm to 8.30pm commencing September 1996. Course tutor is Peter Upton G7CCV.
For enrolment details, please contact the Faculty office on 01823 366371 or the course tutor on 01823 366366 ext.211.

Receivers

B.F.O. KITS Resolves single side-band on almost any radio, £16.49. H. CORRIGAN, 7 York Street, Ayr KA8 8AR.

DISCLAIMER

Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Practical Wireless* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available.
The publishers of *Practical Wireless* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

ORDER FORM FOR CLASSIFIED ADS PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 2.5cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to the PW Publishing. Treasury notes should always be sent by registered post. Advertisements, together with remittance should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659920, Fax: (01202) 659950

Please insert this advertisement in the ..... issue of Practical Wireless (if you do not specify an issue we will insert it in the next available issue of PW) for ..... insertion/s. I enclose Cheque/P.O. for £..... (42p per word, 12 minimum, please add 17.5% VAT to total).

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Telephone No.:.....

Box Number @ 70p: Tick if appropriate..... ☐

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Wanted

WANTED FOR CASH Valve or solid state communication receivers Pre-1980. Preferably working and in good condition. Non working sets considered also domestic valve radios. Items of Government surplus wireless equipment and obsolete test equipment. Pre-1965 wireless and audio components and accessories. Pre-1975 wireless and TV books and magazines. Also, most valves wanted for cash. Must be unused and boxed. CBS, 157 Dickson Road, Blackpool, FY1 2EU. Tel: (01253) 751858
or Fax: (01253) 302979.

Ferrite rod aerials. Must be half inch in diameter, no more or less. Must be six inches long or more.
Contact Peter Tankard: 0114-266 5253 (Sheffield) 9am-9.30pm.

Miscellaneous

VALVE ENTHUSIASTS: Capacitors and other parts at attractive prices! Ring for free list. Geoff Davies (Radio), Tel: (01788) 574774.

VALVE RADIOS radiograms, amps, obsolete spares. Also repairs. Tel: 01689 898291 anytime. 91 High Street, St Mary Cray, Orpington, Kent. Open Friday, Saturday 10-4.

VIDEO TAPE CONVERSIONS to and from all modes NTSC, SECAM, PAL(M) PAL(N) also VIDEO 8 NTSC. Digital processing. Fast and economical service. Also cine conversions. Phone G4WMP 01932 846139.

Valves

VALVES GALORE Most valves available from stock. Otherwise obtained quickly. Please send SAE stating requirements or telephone. **VALVE & ELECTRONIC SUPPLIES** Chevet Books, 157 Dickson Road, Blackpool FY1 2EU.
Tel: (01253) 751858 or Fax: (01253) 302979.

VALVES WANTED for cash: KT88, £48: PX4,PX25 £50; DA100 £90; EL34, £10: EL37, £9: CV4004, £5; ECC83 £3. Valves must be Mullard/GEC, West European to achieve the price. Ask for our free wanted list. Prompt and courteous service. Visitors by appointment only (we are a very busy Export Warehouse).
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West Sussex RH14 9EZ.
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VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ.
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JAPANESE GAAS-FET, RF power module, microwave TR's and devices for communication and industrial use. T.YOSHIHARA OSAKA 564, JAPAN, Cable: TYOSHIHARA SUITA.
FAX: 816-338 3381.

RADIO BOOKS. New and previously enjoyed. S.A.E. for lists. Old Time Supplies, PO Box 209, Banbury, Oxon OX16 7GR.

Yaesu FT-11R, boxed, mint condition, plus extra battery (FNB-35), plus soft case. Warranty valid until 13.11.97. Included is Sinclair Spectrum with packet modem. Complete set-up £300.00!
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Location:	**Eydon, Daventry, Northants**
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Dave Howes G4KQH started his kit business nearly 14 years ago in response to the need for easily built, high quality kits for the radio amateur. Using his professional expertise in r.f. design, his kits are designed so as to be capable of being built by anyone. "Howes Kits open the world of radio communications to the home constructor" is the slogan on the cover of his latest catalogue.

After trying a classified advertisement in a couple of amateur magazines, he decided to advertise 'properly' in *Practical Wireless*, as it was the magazine that pulled in the response. "Being a mail order only business, we rely on our advertisement in *PW* to bring in new customers. Over the last 14 years *PW* has consistently worked for us as our shop window", Dave said. "Mail order is all about confidence. Our regular advertisement in *PW* is designed to inspire that confidence among both new and old customers."

For further information on how to advertise in Practical Wireless, *telephone the Advertisement Manager, Roger Hall G4TNT on 0171-384 1031*

Order Form

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TEL: (01202) 659930 (24 HOURS)
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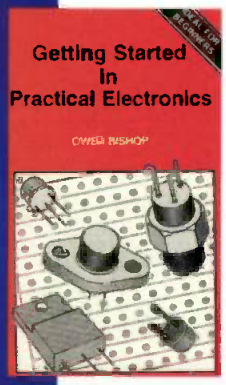
Profiles

On these two pages are eight books from the *PW* Book Store, which we've selected to 'profile'. There should be something here to suit all tastes, if not don't worry, this will be a monthly feature.

1 *Getting Started In Practical Electronics BP345*

Owen Bishop

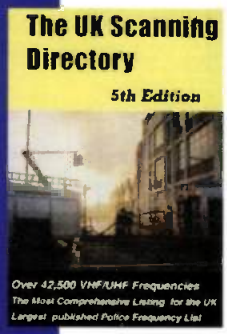


Getting Started in Practical Electronics is 'billed' as an ideal book for beginners and is just one of the many books in the Babani range. This 198 page book is divided into two parts.

Part A deals with the essentials of electronics construction and covers Components, Ohms Law, Basic circuits, Putting Things Together and Trouble Shooting, while Part B contains 30 electronics projects which includes things like a Transistor Tester, Fire Alarm, Voltmeter Probe and even a Lie Detector! All the projects should be within the capability of the beginner and are sorted into those for the absolute beginner, those easily built after gaining a little experience and those offering more of a challenge.

This book would be useful for anyone embarking on the journey into the electronics world or would perhaps be a use aid for those studying for the Radio Amateurs Examination. Priced at only **£4.95**, *Getting Started In Practical Electronics* is a cheap and extremely useful book to have on your shelf.

2 *The UK Scanning Directory 5th Edition*



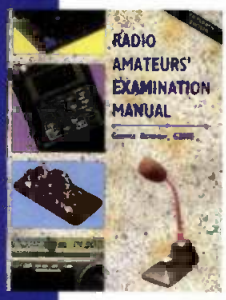
First stocks of the new and up-dated edition of the already popular *UK Scanning Directory* are now available. This book now in its 5th edition is said to be the most comprehensive radio book available.

The UK Scanning Directory contains over 42,500 nationwide spot frequencies and frequencies covered by the *UK Scanning Directory* are from 25MHz through to 1.8GHz. This book is now bigger than ever before with over 500 pages of frequency listings.

If you're interested in v.h.f./u.h.f. frequencies then the *UK Scanning Directory* deserves a place on your bookshelf and at only **£18.50** it's affordable too!

3 *Radio Amateurs' Examination Manual (RSGB)*

G. L. Benbow G3HB



Now, in its fifteenth edition this standard and popular aid to studying for the Radio Amateurs' Examination is one book that you just can't afford to be without. Topics covered within its 127 pages include Becoming A Radio Amatuer, Basic Radio Theory, Power Supplies, Measurements, Operating Practices & Procedures, Receivers and Transmitters.

It takes the candidate step-by-step through the course. Also included are two sample examination papers together with a section on basic mathematics.

So, If you're studying for the RAE place your order today and at only **£8.50** it won't break the bank either!

4 *Simple GPS Navigation*

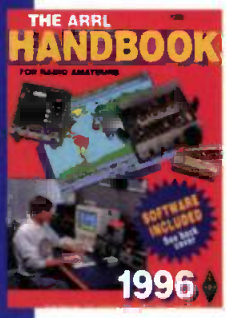
Mik Chinery

Global Positioning Systems (GPS) are certainly not a new idea but it's only recently that people have realised the full potential of using one. This book explains GPS and whilst it's written by a technical marine author it should set you up to wander capably around the world's oceans, deserts and airways.

Contained within its 96 pages are 15 chapters which cover everything from an Introduction through Initial Programming and Waypoint Navigation to Advanced Functions and Applications. So, if you're wanting to understand the technical jargon and find out more about the often baffling world of GPS then make sure you add this book to your list when you place that order.

Simple GPS Navigation is available for **£9.95**.

5 *The ARRL Handbook For Radio Amateurs 1996*



If you were to only have one general book in your amateur radio library, *The ARRL 1996 Handbook* is most likely to be the book because it is so comprehensive and readable. Updated every year *'The Handbook'* as its known throughout the world is undoubtedly the most comprehensive text book, manual and compendium available for the hobby. In fact, to really appreciate the book you have to see it to appreciate what it covers in its 1000 plus pages.

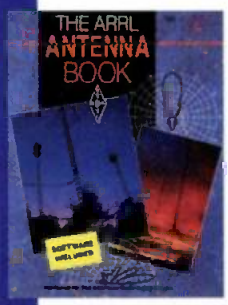
The new 1996 offerings include: Power supplies, 144MHz amplifiers (including a 'brick' p.a. stage to boost your hand-held transceiver's output to either 25 or 50W) and a 1.2kW linear! There's also in-depth coverage of PACTOR II, a loop antenna for 28MHz, a copper J-pole antenna for 144MHz and many more projects and ideas.

Build a 'junk box' satellite receiver, multi-band QRP transceiver with plug-in modules and an interesting v.l.f. project. Digital signal processing is available to the home-brewer with an 18-mode project (including DTMF and CTCSS decoding.

Finally, for the first time the *Handbook* comes with a computer disk (IBM-PC)with containing Windows-based parts suppliers list (expanded from the book) with data available in more than 200 categories. The disk also includes applications software: Pi network design, shortened dipole design, solenoidal coil design. SSTV, An aid to find true north, active filter design.

At just **£25** for over 1000 pages can you afford to Not to have this book in your library?

6 *The ARRL Antenna Book*



The ARRL Antenna Book follows on from the *ARRL Handbook* and also fits into the **'If you're only going to have one book...this is it'** category. This amazingly comprehensive manual covers the world of antennas and is literally **'The Antenna Handbook'.**

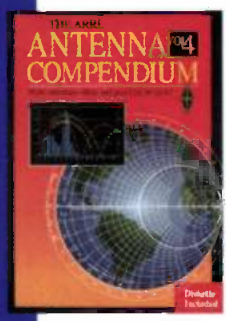
Within its 800 plus pages, antennas and propagation for the amateur radio enthusiast are covered in an exemplary and comprehensive fashion. The chapters dealing with antenna fundamentals and theory are (deservedly so) considered to be the best available in the world.

If you're interested in the growing 'sport' of amateur radio direction finding (DF Hunts) there's an interesting chapter just for you! Filled with interesting projects to back-up the informative theory and principle aspects, *The Antenna Book* also comes with a program disk suitable for IBM compatible PCs.

The disk is loaded with software covering subjects including: A state-of-the-art Yagi analysis program by **Brian Beezley K6STI** and a sophisticated propagation prediction program by **W1FM**. Also included are transmission line analysis and other utility programs by **N6BV**.

All in all, The *ARRL Antenna Book* provides a (very readable) 'complete' antenna anthology for anyone who wants to learn more about and enjoy working with antennas and is good value at **£21.95**.

7 *The ARRL Antenna Compendium Volume 4*



Radio amateurs around the world love experimenting with antennas and *PW* readers prove that time and again with the interest they show in the subject. This is the fourth in the popular series of collected antenna articles and projects covering simple ideas for home-brewing right down to heavyweight technical articles.

Included with Volume 4 is an IBM compatible disk with specialised software covering: antenna radiation pattern programs, a mobile antenna analysis and design program for whips, a v.h.f./u.h.f. propagation analysis over real terrain program and many more. Also included is computerised impedance matching from Peter Dodd G3LDO, the well known antenna specialist and former *PW* 'Antenna Workshop' author.

This comprehensive book is available for **£15.50**. why not order yours today?

8 *Your Packet Companion (ARRL)*
Steve Ford WB8IMY

There's a tremendous continuing (and growing) interest in amateur radio packet operation. The ARRL's *Your Packet Companion* introduces you to the exciting digital communications mode. Aimed at the beginner the book uses easy-to-understand language and an entertaining style of approach.

Within its 130 odd pages you'll learn how to assemble your own packet radio station, use your computer/terminal to chat with other packet operators, learn how to get the most out of bulletin boards, send and receive packet mail and hunt DX with packet clusters. You'll also be guided through advanced networking systems including ROSE, TexNet and TCP/IP.

There's also a reference section to help you locate equipment., other books and software. It's all aimed at getting you going on packet the painless way and at **£5.95** it should be within affordable reach too!

Profiles

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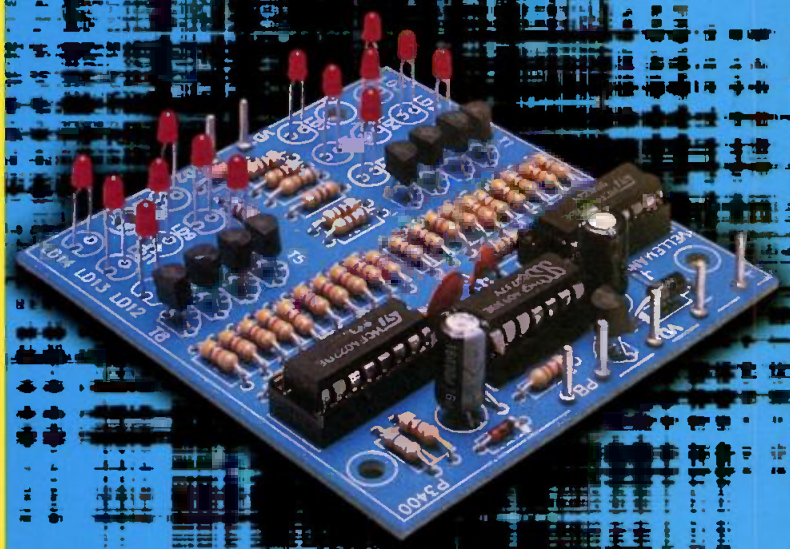

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