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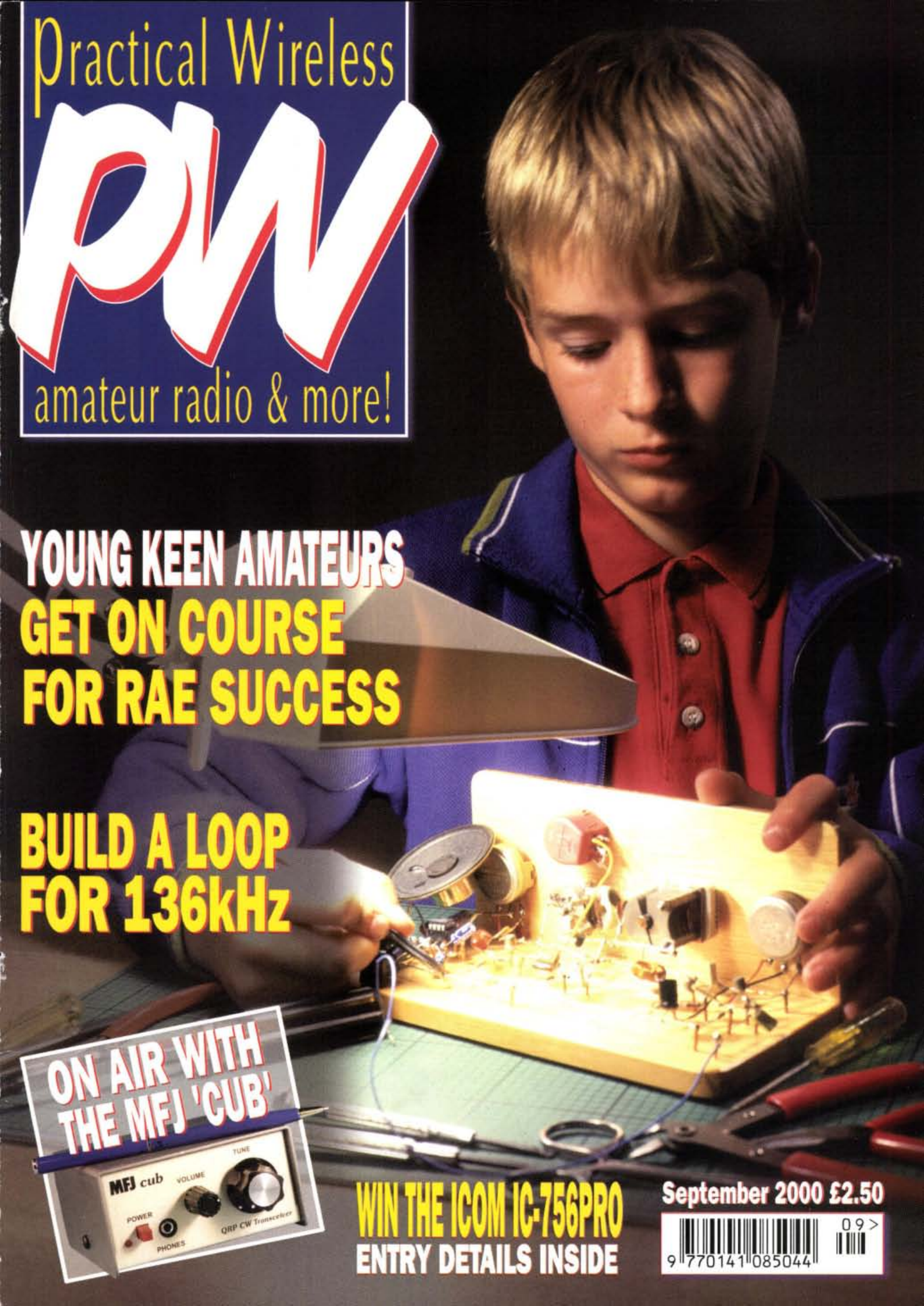

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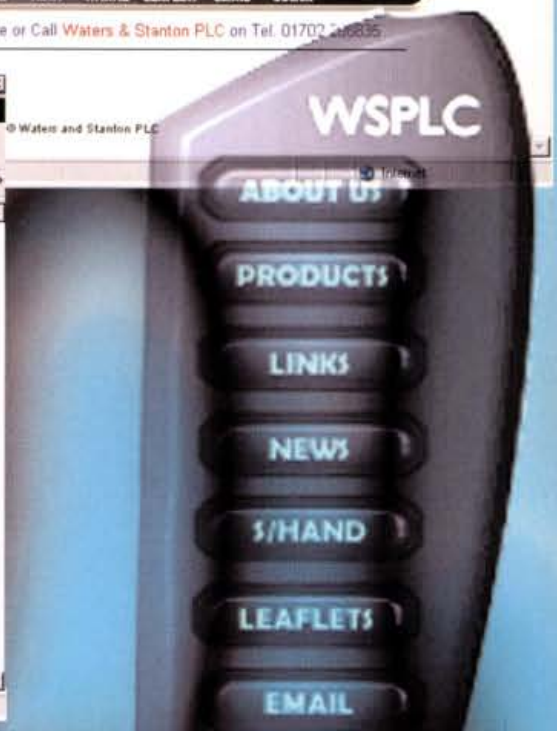

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EDITORIAL OFFICES
Practical Wireless
Arrowsmith Court, Station Approach
Broadstone, Dorset BH18 8PW

☎ (01202) 659910
(Out-of-hours service by answering machine)
FAX: (01202) 659950

Editor
Rob Mannion G3XFD
Technical Projects Sub-Editor
NG ("Tex") Swann G1TEX
News & Production Editor
Donna Vincent G7TZB

ADVERTISEMENT DEPARTMENT
ADVERT SALES & PRODUCTION
(General Enquiries to Broadstone Office)
Chris Steadman MBIM (Sales)
Steve Hunt (Art Director)
John Kitching (Art Editor)
Peter Eldrett (Typesetting/Production)

☎ (01202) 659920
(9.30am - 5.30pm)
FAX: (01202) 659950

ADVERTISING MANAGER
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☎ 020-7731 6222
FAX: 020-7384 1031
Mobile: (07885) 851385

BOOKS & SUBSCRIPTIONS
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It's here, the third and final part of our **'Win An IC-756PRO'** competition in conjunction with **Icom (UK) Ltd**! It's easy to enter and you never know it could be you who becomes the proud owner of this fantastic prize.

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A transmitter built in a brown cardboard box - whatever will **George Dobbs G3RJV** come up with next?

44 VALVE & VINTAGE
Phil Cadman G4JCP admits to doing something silly with valves which results in the 'Cadman effect' being born.

Front cover photograph:
Eight year-old **Sam Warman** is a keen radio and electronics enthusiast and encouraged by his Dad **G0ODP**, manages to find time for building radio projects between school and sport.

Photograph by: Tex Swann G1TEX

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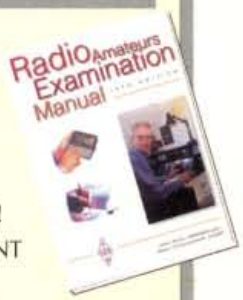

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50 RadioScene

Our monthly round-up of what's been happening across the bands.

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Regular 'Keylines' readers will know that I've often said that "Life is full of coincidences". Well, I've got yet another excellent example of just how true the statement is! The handsome young gentleman in the photograph is in fact **Matthew Balmer M1EVT** who now holds the newly-issued callsign which came his way on July 13th (Just two days before I met him!

Matthew, his Father and I were all in the **Shortwave Shop** at Christchurch here in Dorset. I watched with interest as the young man decided on which second-hand v.h.f. transceiver to buy. However, on chatting with Matthew I very quickly realised he's the 15 year-old who is now the Club Secretary of the **Yeovil & District Amateur Radio Club**, and features in **Mike Glasson G0VFK's** letter (page 6 this issue) under the heading 'Club Closures'. What a coincidence!

Although a little shy, Matthew kindly agreed to have his photograph taken. (Any journalist worth their salt is never without a camera and this time I had my battered old Practika SLR - Okay you purists - never mind the state of my camera, I still manage to get some good shots with it - ready for action.

And as my car was parked alongside the Shortwave Shop (their special, well-known Mercedes long-wheel-base van is in the background) I managed to get a good photograph of the 'future of Amateur Radio'.

Yes, **surely there's much hope for our future** if we get young people like Matthew coming into the hobby? **I was very proud indeed to meet this young man** - and his Father (who took the RAE many years ago) is now beginning to revive his own interest once again.

I wonder who'll be on the h.f. bands first? But, whatever happens ... it's congratulations all round to Matthew, his father (for the encouragement) and to the Y&DARC for their confidence in such a bright young person. Finally, speaking for myself...that meeting left me feeling extremely happy indeed.

● The Future of Amateur Radio - Matthew Balmer M1EVT, Honorary Secretary of the Yeovil & District Amateur Radio Club.

Window Callsign

I'm full of clichés this month so I don't want to miss the opportunity to use the term 'Two birds with one stone' (Modified term because I encourage birds in my garden!) in the column. My chance came when I photographed Matthew behind my relatively new VW Sharan car complete with inside-the-windscreen callsign lettering.

Thanks to the original suggestion by **Duncan Walters G4DFV's** idea it works well. I've already had my first (one way) QSOs from a G4' I'd passed on the A31 and another on the M4. Very passable 'Aldis Lamp' Morse they provided on their car headlamps too! Provided they 'keyed' their lights slowly, I was able to read the 'c.w.' in my mirrors with little difficulty, the only problem was 'QRM' from wheel-spray!

Incidentally, it's amazing just how many 'closet' and 'lapsed' Radio Amateurs I've met since displaying my callsign, along with many *PW* reader friends. Yet another way to remind people Amateur Radio is still alive and very much 'and kicking'!

Radio Basics On Holiday!

For various reasons - including the fact I will have had a short holiday by the time you read this - 'Radio Basics' is taking a very short break too! However, I'm working on some new and interesting ideas for the coming 'Autumn' season.

In fact, in the coming months, thanks to a suggestion from **Tex Swann G1TEX**, I'll be getting even more ideas (and some extra help) in planning what I'm to present in the column. I was delighted with the suggestion from Tex because, even with the best will in the world, ideas can be slow in coming occasionally!

However, you too can help us to produce what you most need and enjoy in the column by mentioning the projects you like the most and what you'd like to see in future. So, keep writing, I really do enjoy all your letters as you to in turn enjoy simple 'home-brew' radio.

On Course For The RAE

Donna Vincent G7TZB has worked hard to produce the comprehensive (as we can make it) RAE Course list on pages 12 and 13. Among the courses listed is that being organised by the **Foyle & District ARC** (F&DARC) in Londonderry, Northern Ireland. And, owning to the historically difficult circumstances in the area, I'm delighted to see the small club (19 members so I'm told) is thriving (and determined to do so!

Trevor Campbell GI1XGA, Secretary of the F&DARC has already been in contact with me extending an invitation (a delight to accept) and I plan to visit them in the New Year. After all with such hope, enthusiasm and determination I think **they must be supported in every way**.

New Broadcast Author

Following my announcement ('Keylines' August *PW*) regarding a new author for the 'Broadcast' column in the magazine, I'm very pleased to say that professional broadcaster **Tom Walters** will be joining us from the October issue of *PW*. Although officially 'retired' Tom can still be heard regularly on the BBC's 'World Service'.

Welcome to the 'team' Tom! We look forward to reading your column each month.

Your Chance to Win

Now you've got your copy of this issue - it's your big chance to win the marvellous new Icom IC-756PRO transceiver. Read the review (May issue), look at the comments and fill in your form. Good luck and the Icom team and I hope to be presenting the prize to **you** very soon!

Rob G3XFD

Letters

COMPILED BY ROB MANNION

Restored Faith In Amateur Radio

Dear Sir

I have just read with particular interest the letter from **Glyn Burton M0CHO** (August *PW*) in which he shows that the spirit of Amateur Radio lives on! It has served to restore my faith in human nature after a disappointment I have just experienced. Let me explain!

My callsign is 1948 vintage and during the intervening 52 years I have regularly scanned the readers' 'Wanted Ads' in the various Amateur Radio magazines. I get a great satisfaction from trying to fulfil the needs of their enquirers and I have sent out lots of items and information, usually for very little pecuniary return. I just like to help!

I recently noticed a 'Wanted Ad' for information on a piece of equipment I happen to have. After confirming by telephone exactly what the advertiser's needs were, I set to work on photocopying several pages of A4 and an enlarged A3 copy of the circuit diagram for greater clarity. With it all stapled together and placed in a strong manila envelope, it was sent off. All I asked for in return was a book of stamps to cover the costs of paper and post. The response? Nothing!

After several days of thinking that perhaps it had got lost in the post, I telephoned the enquirer who confirmed that he had safely received it and 'would be in touch'. The response? Nothing ... again!

After waiting several more days and 'in the spirit of amateur radio', I sat down and wrote him a friendly and encouraging letter in the hope of pricking his conscience. The response? Nothing!

Finally, in despair, I sent him one of my QSL cards on which I wrote, 'Ah well. You win some, you lose some'! The response? Nothing! What is particularly disappointing is that his advert contains the words 'All costs met'.

So, now you can perhaps realise why I found Glyn Burton's letter such a joy to read? It's nice to know that there are still some 'good guys' out there. I shall still continue to read and respond to the 'Wanted Ads' in the sure knowledge that over the past 52 years I have won more than I have lost and I look forward to doing more of the same.

John Hoban G3EGC
Bolton

Club Closures

Dear Sir

Rob Mannion G3XFD's 'Keylines' editorial (July 2000) struck a familiar note. It is a great pity that clubs are closing or, at best, suspending their activities because of the difficulties in persuading members to accept office. Here at the Yeovil Amateur Radio Club (YARC) we have experienced the same reluctance to play an active role in running the club - or even to support club events during the year.

At the last two AGMs considerable pressure and moral blackmail were needed to obtain enough candidates to make up the committee. However, we succeeded. The committee now has a better than usual balance of members and a quite impressive age range. There are some long serving members plus two who joined us to study for the spring RAE - **one of whom is 15 and** has been quite properly concentrating on his other exams - plenty of time for Amateur Radio later! The club has avoided being ruled by a 'gerontocracy'*, which has to be a good thing. (***Ruling by Geriatrics!**).

So, club members everywhere, get weaving and put some effort into making **your** club a success.

Mike Glasson G0VFK (On behalf of the committee YARC)
Somerset

Dear Sir

The comments in Keylines (July *PW*) concerning the 'common link' in club closures calls me to put forward some suggestions. Before doing so, pay I point out that **I think the local club is not a fringe activity, it is mainstream and not peripheral to the well being of Amateur Radio**. For me it was, and still is, the cutting edge of the learning curve from Novice, then full licence, or even (for many) the delight of s.w.l. The local club provides the impetus to broaden our horizons.

Now back to my suggestions. Since there is a lack of support or reticence in coming forward to run for office, or serve on the committee, might it be a good idea for a club to limit the term of office that a candidate can serve? Once you limit the term of office, it shouldn't be difficult to groom a suitable candidate to replace anyone coming to the end of his or her term of office. This way you eliminate, as far as possible, the likelihood of burnout, and discourage cop-out. Limiting the term of office provides the necessary impetus to recruit 'new blood'. This change requires the minimum disruption to any constitution yet provides maximum benefits.

'Burnout' or 'rust-out' is common to all clubs or members of committees. As a member of the **World Association of Christian Radio Amateurs And Listeners** (WACRAL) I can honestly testify that 90% of work in any Christian fellowship is done by 10% of its members.

Finally, excellence does not come from tired people, mediocrity does. Your Club Secretary of Treasurer will perform at peak efficiency if he or she knows that at the end of their term they can look forward to a rest. So, let's build a schedule into our regulations which gives to those who serve office a realistic chance to take time off at the end of their term.

Peter Knowles M0BRV
Manchester

Dear Sir

After reading the 'Keylines' Editorial on club closures, I decided that I would put 'fingers to keyboard' and add my small 'tuppence' worth. First of all I am really disappointed to see that clubs are closing as I whole heartily agree with the Editor that **they are the future of Amateur Radio**. Yes it does take commitment to run a club (that I **certainly** know about) but no matter how 'down' you get you must be positive and look on the good that can be achieved. I really do ask people that they do not give up but look at other ways of running the club, i.e. no committees, no subscriptions or just have a general meeting and keep it totally informal.

I feel I can justify any of the above as that is how the club I started back in 1984 is run. I will say that it works for us and it has been successful to say the least, in fact, far more than I ever anticipated, b**ut that really is down to everyone concerned**. Our structure from day one has been that there is absolutely no committee structure and definitely no annual subscriptions and totally informal meetings.

What we have is that we meet once per month in the local lounge bar of our local pub and if you turn up to this evening, then you are classed as a club member Easy isn't it? We average throughout the year 30 people attending each club night, so we must be doing something right. Also, on club

nights our monthly newsletter is also distributed which is produced free of charge.

We also, through the winter months, try and organise another event, like a talk, radio check night, etc. which we hold in our local Community Centre. Everyone pays £1 when they come to these nights, this pays for the hire of the room and any excess money goes towards our adopted charity - the British Heart Foundation.

I know that there will be comments about holding meetings in a public house, as it is difficult for youngsters to attend. This definitely applies to us, hence the reason that we try and organise the Community Centre events.

As mentioned earlier, we have adopted the British Heart Foundation as our adopted charity and have successfully raised over £4500 for them. The majority comes from our now Annual Junk Night. This is run so that when members turn up, tables are provided on a 'first-come-first-served' basis and at no charge. Pay your £1 entrance fee to come in the door and as well as that, hopefully you will buy a raffle ticket and have a cup of tea or coffee with some of the donated home baking and maybe a filled roll. The night is aimed at just being a very social night and raising some money for charity.

The club runs an annual Novice Class, puts on demonstration stations, is very active in v.h.f. and h.f. contests and lost, lots more. **So, even thought we run it very informally, we are also very, very active.**

How is this all achieved, you may ask? Well, I would tell a lie if I didn't say that I possibly do 90% of the club organisation, but that is my choice alone. There are members who produce the newsletter, organise the v.h.f. contests, organise the h.f. contests, particularly the trip to Tiree for the Islands On The Air (IOTA) contest and others do bits and pieces as and when required.

If anything needs doing, it's only a matter of asking and it will be done and I can honestly say since 1984 nobody has ever said 'No' to any request. We are a friendly group and since 1984 we have only had one real disagreement, but this was not kept in and allowed to fester, as we promptly hired a room and had an open chat about the problem, arriving at a very amicable solution.

The above has worked for us and we have been successful with it, but it shows that a club can be run without the normal structure. I honestly believe, with regards to ourselves, that if we introduced the formal structure and subscriptions the club would collapse, it is the informality that is its success.

You always need to remember that there are what I class three levels of club member - **(1)** the very active member who wants to get things done and organised, **(2)** the member that will do **what they can when asked** and lastly, **(3)** the member who just wants to turn up to club night and just attend.

We are not all the same and we want difference things. The club is just the same, but it is accepting all these levels that makes the difference. Running a club is hard work, there is no thanks and you cannot please everyone, but such is life. So, my plea to those giving up, **don't!** keep the chin up and look for the right direction to go in It will not be easy, that I know!

A huge 'thank you 'goes out from me to those that run clubs, you do a great job, so keep it up.

That's my say Mr Editor, but whether you publish this or not, it's how I feel. If anyone wants to chat with me about our club and the way we run it, then just put them in touch, we are more than glad to help.

Bob Glasgow GM4UYZ
Cockenzie & Port Seton ARC
East Lothian

Editor's comment: What an excellent response! Please join me on the 'Keylines' page for further comment on clubs.

Club spirit is a wonderful thing - shown here are members of the Irish Amateur Radio Emergency Network - just one example of why we should all work to keep Amateur Radio clubs alive.

Letters Received Via The 'Internet'

A great deal of correspondence intended for 'letters' now arrives 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! All letters intended for publication on this page must be clearly marked 'For Publication' (on the letter itself). **Letters for possible publication are not normally acknowledged and we ask that wherever possible letters are not sent in by 'FAX'. Editor**

Car Boot Support

Dear Sir

On the subject of 'supporting clubs' could I please through the 'Letters' column of *PW* and on behalf of the Leeds & District ARS thank everyone who, in atrocious weather, came and supported our car boot sale in June?

The event had to be moved from the field to the car park, but just enough people turned up to change what would have been a disastrous end to weeks of effort, into a reasonable day. Let's hope the weather is kinder for the next one on 20th August 2000.

John A. Mortimer M1CAI
Leeds

Morse & The Digital Age

Dear Sir

Let me lend my support to the comments made by **Henri Walser** in his aritcle 'Morse & The Digital Age', *PW* July. New isn't necessarily better!

With all this new information becoming available e.g. the Internet, perhaps Henri is wise to wonder if it's really PSEUDO information. I'm often asked about frightening medical information that people read on the Internet. The information's wrong but if it's on the 'Net - they believe it!

Godfrey Manning G4LFM
Middlesex

News

COMPILED BY DONNA VINCENT G7TZB

Headline News

Louis Varney G5RV - A Personal Appreciation

As time goes on the ranks of those Radio Amateurs who by their expertise and pioneering efforts gained entry to the 'Hall Of Fame' are becoming noticeably thinner. With this in mind, I was greatly saddened to hear of the death of **Louis Varney G5RV**, who died in the last week of June.

Louis was a great character, a humorous man and a delightful companion with an impish sense of humour reflecting his 70 years or so in the hobby. And now the time has come when I've got to pay a tribute to the man behind the internationally famous G5RV antenna which I've used many times myself and very successfully I might add.

I think - to sum up his humour and achievements - I can do no better than to share with you two little stories involving G5RV, including one which rather humbled me at the **Mid Sussex Amateur Radio Society's (MSARS)** venue several years ago. I had been invited to visit and provide a '*PW* Club Talk'. However, on arriving at the club I was at the same time delighted at the excellent turn out and somewhat overawed by the fact that G5RV was sat in the front row! On being introduced to the Membership I felt it necessary to say that **I should be in the audience listening to Louis speak instead**. Quick as a flash G5RV told me he wasn't in front to 'put me off' but to make sure he could hear me as his increasing deafness was then becoming much more obvious.

The evening proved to be very successful and ended up with a superb 'Raffle' with virtually everyone in the room winning a prize - including Louis himself. His prize was some 'finger biscuits' which he promptly suggested could be used as antenna feeder 'spreaders' provided it didn't rain!

Everyone enjoyed the joke!

The second story relates to the very first 'Leicester' show to be held at Castle Donington. Louis was there to provide his talk during the 'One Hundred Years of Amateur Radio' event at the Donington Thistle Hotel on the Friday evening (very enjoyable as it turned out). However, the comical event took place when Louis was looking around the stands (only dimly lit because of the infamous power cut) where he found a pre-packed commercial version of the G5RV antenna on sale. The spotty looking youth behind the counter - sensing a sale to this frail looking old gentleman - started explaining what it did. The look of surprise on the salesman's face said it all when told he was talking to G5RV himself!

Well, that really does 'say it all'. What can you say other than that the G5RV antenna is a great tribute to Louis Varney himself? As I understand it, he never made any money from the antenna design himself, but even though he may have lost out money-wise, Louis is held in the highest esteem by myself and many others. A delightful man, a great character and I was proud to have known him and surely...we can never forget him can we? This fact was amply demonstrated at the funeral which took place in Brighton as many amateurs paid their respects to a truly great Radio Amateur and character.

Rob Mannion G3XFD

Stocks of Fairhaven Available Now!

In late 1999 SMC took over the production rights of the Fairhaven RD500VX receiver. Due to demand stocks were diminished very rapidly, and the Company set about the task of sourcing replacement components. They encounted several difficulties in obtaining identical parts but now new memory i.c.s and several modifications have been incorporated into the new production run.

Despite the wait to supply new stocks of the Fairhaven RD500VX, SMC believes that it was well worth the wait as not only has the instruction manual been updated, but so has the Mpeg video, which is included with the database software on CD-ROM. The Mpeg video gives a brief outline of what the RD500VX functions can do in terms of it's versatility plus a short tour on production followed by a tutorial.

For more information or to find your nearest dealer call **Geoff Brown** at **SMC Ltd.** on **0238-024 6222.**

Missing Out?

Are you having trouble finding *Practical Wireless* in your local newsagent? And did you know you can buy a single copy at cover price direct from the *PW* Book Store? Call Shelagh or Jean on **(01202) 659930** to place your order for a single issue - remember to have your credit or debit card number to hand. So you'll never miss out on your favourite radio read.

Haydon Have The Power

The DPS-1020 is latest power supply to be added to **Haydon**'s product range. This commercial grade 25A switch-mode power supply features over-voltage protection, short circuit current limiting with warning and more output sockets than most other p.s.u. currently available.

The DPS-1020 is priced at £79.95 plus £10 P&P, comes complete with detachable mains power lead and weighs just 2.3kgs. To place your order or more information contact Haydon Communications on **(01708) 862524.**

Double Whammy

The **Mid-Glamorgan Amateur Radio Group** strikes a double. A group of 10 students aged between 11 and 76, with mixed abilities, have all successfully passed the Novice RAE. Not content with that, they have also taken and passed the full RAE and are nearly up to speed to take the 12 w.p.m. Morse test!

One of the students, Christopher Young, was only 11 years of age when he sat the full RAE, and he is set to become the club's youngest full A class Amateur licence holder. The RA had to be approached before Chris could be considered to hold a full licence, because of his age, and that he has not held a Novice licence for a full year, although he has clocked up quite an extensive list of countries, and exotic DX on 50MHz.

Tutor **Tom Beedle GW0TOM** believes that Christopher could be the youngest full A licence holder in the UK, or possibly even Europe. The Mid-Glamorgan Amateur Radio Group was hoping that Christopher could be nominated for Young Amateur of the Year Award, but unfortunately the award is not being run this year, but hope that the RSGB will consider him when the award runs again next year,

The club prides itself with its successful results, during what has been one of the most difficult years the club has had to contend with since it was formed in September 1994. September 1999 to June 2000, saw only one tutor available to take on both the Novice and RAE classes, which meant that support had to be seconded from former students whenever the clubs senior tutor, Tom Beedle, had to honour work commitments. The latest recruit into the role of club tutor is **Mike Evans MW0CNA**, who has been recently elected to the post of club secretary.

Unfortunately the examination centre where the club holds its exams is no longer available to them but not to be disheartend the group are actively involved in setting up their study centre as a satellite examination centre of the RSGB, and are awaiting a visit for verification by the society. The group hopes that the club house will become an examination centre ready for the courses starting in September.

The groups' commitment to providing knowledge of Radio and electronics is based on the philosophy fostered from **Clive Trotman GW4YKL**, former President of the RSGB, that it was morally wrong not to share information or knowledge on any subject that could benefit others. His words were "Knowledge not shared or used is knowledge wasted."

Cutting Edge of Data

Data modes are the cutting edge of radio communications, making maximum use of precious band

space. For example operating using, PACTOR and PSK31 you can pull signals out of the noise and decode them 100% when voice communication would be impossible.

If you fancy having a go a data mode operation then check out the WSA-1 sound card adapter which enables you to connect a receiver or transceiver to your PC and operate SSTV, FAX, c.w., RTTY, PSK31 and PACTOR without the need for an external power supply. The WSA-1 which is available from **Waters & Stanton PLC** is supplied complete with connection to Soundcard, Open Ended radio cable and a CD-ROM containing the WSA-1 software, antenna designs, satellite tracking and much more.

Minimum requirements to run WSA-1 are a PC with *Windows 95/98*, Pentium 100MHz processor or better, 32Mb RAM, CD drive and Soundblaster or compatible sound card.

The WSA-1 costs £39.95 and is available now from Waters & Stanton PLC, **Spa House, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 203353, FAX: (01702) 205843**.

All At Sea

The Scarborough Special Events Group made history recently by operating Maritime Mobile from on board one of the remaining Dunkirk 'small ships'

during a commemorative voyage from Scarborough to Whitby to mark the 60th Anniversary of Dunkirk. The event was made extra special due the fact that never before had the Radiocommunications Agency given permission for a shore based Special Event Station to Operate Maritime Mobile.

Pictured here are the members of GB6SS from left to right (back row) Geoff G4ZGP, Jim G0NXX, Peter G3JBR, Roy G4SSH, (front row) Nick G4OOE, Robert GWHO and Andy G0KFG.

Raedek Relocated

Raedek Electronics, supplier of valves, tubes, r.f. power transistors and obsolete semiconductors have recently relocated from Garretts Green, Birmingham to **Unit 12, Avenue Fields Industrial Estate, Stratford-upon-Avon CV37 0HT, Tel: (01789) 209294, FAX: (01789) 295757.** They also have website at **www.raedek.com** So, if you're looking for a device then Raedek is the place to look as they have over 500,000 devices currently in stock.

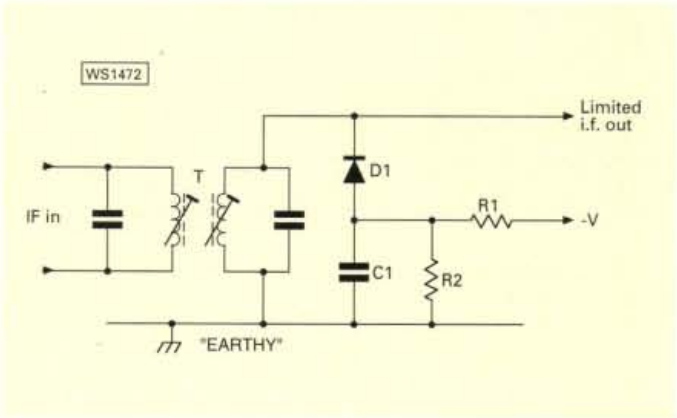
FM DETECTORS – PART 2

Gordon King G4VFV features ratio and phase-locked loop detectors in the second part of his look at f.m. detectors.

The Foster-Seeley (FS) circuit that I featured last time is linear and efficient but is sensitive to a.m. and f.m. To overcome this, spurious amplitude variations of the waveform, resulting from electrical or r.f. interference, are ironed out before the signal arrives at the detector by preceding amplitude limiting.

Modern receivers use efficient transistor or i.c. limiting which, regardless of a varying amplitude input i.f. signal, holds the amplitude of the output signal constant, once the limiting threshold is reached. Low threshold limiting gives weak and strong signals, a constant audio output, albeit, with an impaired signal-to-noise ratio as the signal strength falls.

The basic principle of amplitude limiting is shown in **Fig. 1**. Diode D1 is reverse-biased to a given threshold level by the divider R1/R2 and is rendered non-conducting. If the amplitude of the i.f. signal exceeds this threshold, diode D1 conducts and bypasses the excess amplitude through C1. This limits further increase in amplitude and flattens other spurious amplitude variations.



● Fig. 1. The basic principle of amplitude limiting. More sophisticated circuits utilise two diodes or amplitude limited i.f. stages to cater for both positive- and negative-going signal cycles.

Ratio Detector

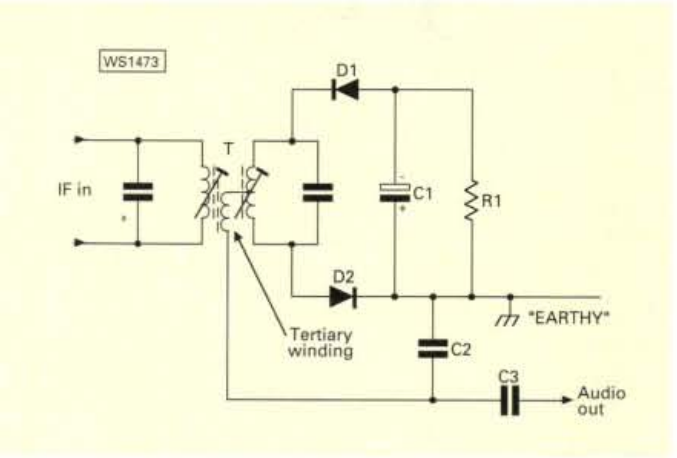
Before phase-locked loops (p.l.l.) and other i.c. detectors, a popular detector was the ratio detector. This is similar to, and works on the same phasing principles, as the FS circuit but it boasts a.m. immunity, though a limiting circuit can be incorporated in receivers using the ratio detector.

The version of ratio detector circuit in **Fig. 2** differs from the FS in two ways. Firstly D1 and D2 are effectively connected in a series, instead of back-to-back, and secondly a third (tertiary) winding, tightly coupled to the primary of the transformer T, provides the primary winding phase reference, instead of a capacitor.

The ratio detector can be balanced or unbalanced. The circuit in Fig. 2 is an unbalanced version and works because the two diodes are series aiding. An unmodulated i.f. signal produces a steady current through load R1 and a steady voltage across it, which charges the electrolytic capacitor C1.

The steady-state balance is destroyed when the i.f. signal is modulated. The diodes then try to conduct unevenly - one more heavily than the other, resulting in the unbalancing current, which corresponds to the audio modulation, flowing out of the circuit from the centre tap of the secondary winding. The resulting audio signal is developed across C2 and then coupled to the audio stages of the receiver through C3

Without the charge of C1, the voltage of the rectified signal across R1 tends to vary with the amplitude of the i.f. signal. Because the time-constant of the C1/R1 is large (about 200ms) compared to the frequency of unwanted a.m., the voltage across R1 holds substantially constant, and is unable to change fast enough to produce an a.m. output. In this way the ratio detector provides automatic limiting.



● Fig. 2. The detector of many f.m. receivers is styled around a version of the ratio detector. (An unbalanced version is shown here).

The voltage at the end of the tertiary winding is zero when the receiver is tuned accurately, but mistuning results in a positive or negative-going voltage, relative to the 'earthy' side of the circuit. This can be used for automatic frequency correction (a.f.c.), in conjunction with a variactor diode in the l.o. tuning, and also to work a tuning meter.

The negative-going voltage at the D1 end of R1, relative to the 'earthy' side, can be used as a bias for automatically controlling the gain (a.g.c.) of the r.f. and i.f. stages. When a positive-going (a.g.c.) voltage is needed this is picked up from the D2 end of R1, after shifting the 'earthy' side from the bottom to the top of R1.

The circuit also has built-in muting control, which can be introduced by connecting an adjustable source of positive voltage to the top of R1 (via a potentiometer). The detector will not activate until the signal level rises sufficiently to produce a voltage across R1 strong enough to cancel the potentiometer-set muting voltage.

Phase-Locked Loop Detector

The primary elements of a p.l.l. chip detector circuit are shown in **Fig. 3**. The 'heart' is the voltage-controlled oscillator (v.c.o.), whose phase is locked in synchronism with the input signal.

The phase detector (p.d.) yields a plus or minus voltage (from a given datum) related to the phase angle between a pair of input signals which, in this case, are the i.f. and v.c.o. signals. For example, the output voltage is positive when the signals are in phase, negative when antiphase or zero when in phase quadrature (i.e., ±90° displacement). Inputs of differing frequencies produce a signal output corresponding to their difference, owing to the inputs running

sequentially through the in-phase, phase-quadrature and antiphase conditions.

The d.c. output from the p.d. is passed to the controlling input of the v.c.o. by a low-pass filter (l.p.f.), to delete residual signal, and a d.c. amplifier. When the free-running frequency of the v.c.o. approaches the nominal frequency of the incoming i.f. signal, the loop will 'lock'.

While the i.f. signal is deviated within the loop's locking range, the p.d. delivers an audio output corresponding to the originating modulation. It has a fairly linear transfer characteristic, and provides a degree of amplitude limiting.

Other methods of f.m. detection based on i.c.s include pulse-counting, using an integrating circuit, and quadrature detection. The latest 'one major chip' receivers are sophisticated, including very efficient limiting and a.m. detection. Oh for the old days and 'real servicing'! *PW*

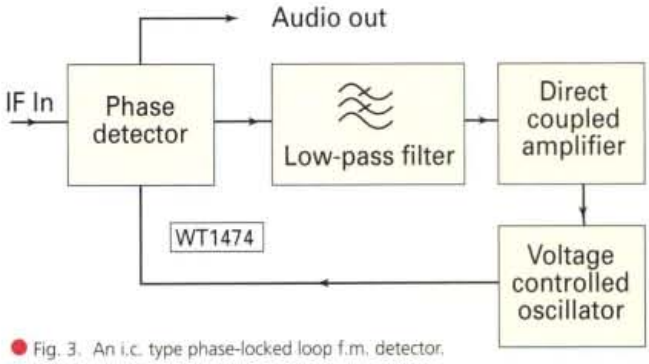


Fig. 3. An i.c. type phase-locked loop f.m. detector.

Radio Diary

GET OUT AND ABOUT AND SUPPORT YOUR LOCAL CLUB EVENTS

August 11: The 2000 Cockenzie & Port Seton ARC's 6th annual radio junk night takes place from 1830-2130 at the Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, East Lothian. Bring along your own junk and sell it yourself. Tables will be provided on a first come, first served basis and there will be no charge for the table. Raffle at approximately 2100. Refreshments available, disabled access. Entry Fee: £1, all money donated to the British Heart Foundation.

August 13: The 11th Great Eastern Radio & Computer Rally is to be held at the Park High, Queen Mary Rd, Gaywood, Kings Lynn, Norfolk. Refreshments will be available all day. Talk-in on S22, free parking, Bring & Buy and lots more. Contact telephone number is **(01553) 841189**. For latest, please see **www.qsl.net/G3XYZ**

August 20: The Leeds & District ARS are holding the second of their twice yearly car boot sales at the Yarnbury Rugby Club, Brownberrie Lane, Horsforth, Leeds. Please contact **J.A. Mortimer M1CAI** on **(01943) 874650** for details. It will be a general car boot sale but with Amateur Radio, electronics and computer sections. Sellers' cars (inc. small trailer) will be £5 with vans/large trailers being charged £10. Refreshments and plenty of free parking will also be available.

August 27: The Milton Keynes ARS will be holding their 14th fayre and car boot at Bletchley Park Museum. Open to Traders from 0700, £7 in advance, £10 on the day. Doors open to buyers at 0900 and entrance is just £1. Talk-in on 145.550/433.550MHz, refreshments, Morse tests, museum open. For more details contact **Dave G3ZPA** on **(01908) 501310** or E-mail: **m0bzk@bletchley.madasafish.com**

August 27: The Coleraine & District ARS will be holding their annual rally at the Bohill Hotel, Coleraine. Usual traders and Bring & Buy present, doors open at 1200, all welcome. Further details are available from **Brian GI8LTB** on **0287-035 8664** or **Jim GI4ORI** on **0287-035 2393**.

August 28: Huntingdonshire Amateur Radio Rally will take place at Ernulf Community School, St. Neots, Cambridgeshire (near Tesco Superstore on A428). Open 1000-1400, admission £1.50. Hot and cold refreshments available, features hall and car boot sale on hardstanding. Talk-in on S22. Details from **David Leech G7DIU** on **(01480) 431333** (between 0900-2100).

September 3: The Andover Radio Amateurs' Radio Rally takes place at the Middle Wallop Airfield, near Andover. More information from **Jack G0UJW** on **(01264) 391383**.

September 3: The Bristol Computer & Radio Rally will take place at the Brunel Centre, Temple Meads Station, Bristol. Doors open 1030 (disabled access from 1015) and close at 1600. Admission is £1.50, accompanied children under 12 free. There will be 250+ tables, table hire at £15 each, large Bring & Buy, under £30 Bring & Buy and refreshments. More details from **Muriel Baker, 62 Court Farm Road, Whitchurch, Bristol BS14 0EG** or telephone **(01275) 834282** (24-hour answerphone).

September 10: The Lincoln Short Wave Club are holding their Hamfest at the Lincolnshire Show Ground, on the A15, five miles north of Lincoln. There will be extensive parking, talk-in on 2m (144MHz), catering and refreshments, trade stands, Bring & Buy, car boot sale, flea market, Morse tests and other attractions. Admission is £2 per person (under 14s free). Contact **John G8VGF** on **(01522) 525760**

September 10: The Telford Radio Rally moves to a new unique location at RAF Museum Cosford, Shropshire - 3.2km south on A41 off J3 M54, 32km NW Birmingham. Buy, sell and browse amongst the aircraft. There will be traders, a Bring & Buy, flea market, Morse tests, RSGB & Special Interest Groups, refreshments, disabled facilities and a talk-in on S22. Further details from **Bob M5BWQ** on **(01952) 770922** or E-mail: **bob@somrob.u-net.com** Trader enquiries to **Jim G8UGL** on **(01952) 684173** or E-mail: **jim@tweedale15.freeserve.co.uk** or visit their web site at: **www.telford-rally.co.uk**

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

September 22/23: The 29th Leicester Amateur Radio Show and Convention takes place this weekend at The Castle Donington International Exhibition Centre, Donington Park, NW Leicestershire. Doors open 0930-1730 each day, admission £3 (one day ticket), £5 (two day ticket), concessions available and uner 14s free. Over 150 stands of computers, radio and electronics including flea market, Bring & Buy, clubs and societies and Morse tests on demand. For more information contact **Geoff Dover G4AFJ** on **(01455) 823344** or **E-mail g4afj@argonet.co.uk**

October 1: The Great Lumley Amateur Radio & Electronics Society are holding their rally at the Great Lumley Community Centre, Front Street, Great Lumley, near Chester le Street, County Durham, just off the A1(M). There will be free parking, plus easy access, good, inexpensive food and drink, radio, hobbies, electronics, computer, satellite and component stalls, Bring & Buy in two sections - junk and good buys. Doors open 1100 (1030 for disabled visitors). Admission is £1, free of charge to under 14s accompanied by an adult. Talk-in. Further details on **0191-384 2803** or **0208-937 2772** or from Rally Organiser **Nancy Bone G7UUR, 49 South Street, Durham City DH1 4QP**.

October 15: The Blackwood Radio, Computer & Electronics Rally is to be held again at the Newport Centre, Newport, South Wales, which is about 2km from J25A on the M4. Opens at 1030/1100. There will be a Bring & Buy, talk-in, car parks, trade stands, special interest groups, licensed bar, catering, disabled facilities and family attractions. Further information can be obtained from **Stuart Instone GW0NPL** on **(01495) 240260/(07970) 777756** (combined telephone/FAX number) or E-mail: **fireham@aol.com**

October 15: The Hornsea Amateur Radio Club Rally will be taking place on this day. For more details on where it is and what will be there, contact **Duncan G3TLI** on **(01964) 532588**.

October 29: The Galashiels & District Amateur Radio Society are holding their Annual Radio & Computer Rally at The Volunteer Hall, St Johns Street, Galashiels, Scottish Borders, from 1100-1600. There will be traders, Bring & Buy and refreshments, etc. More details from **Jim GM7LUN** on **(01896) 850245** or E-mail: **jimk@gm7lun.freeserve.co.uk**

November 4/5: The 14th North Wales Radio & Electronics Show will be held at the North Wales Conference Centre, Llandudno. The show opens at 1000 both days and the entrance fee is £2 for adults and under 14s free when accompanied by an adult. There will be a club room and an extensive Bring & Buy. **M. Mee GW7NFY** on **(01745) 591704** (combined telephone and FAX number).

November 12: The Midland Amateur Radio Society are holding their 12th Radio & Computer Rally at Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open at 1000. There will be a large, free car park, special interest exhibits, local clubs, etc. Trader information from **Norman G8BHE** on **0121-422 9787** or general information from **Peter G6DRN** on **0121-443 1189**.

November 12: The Tenth Great Northern Hamfest takes place at the Metrodome Leisure Complex, Queens Road, Barnsley, South Yorkshire. Doors open at 1000. For further information please contact the Hamfest Manager, **Ernie Bailey G4LUE, 8 Hild Ave, Cudworth, Barnsley, Yorkshire S72 8RN** or telephone on **(01226) 716339** or **(07787) 546515** (mobile).

RAE COURSES LISTING

Three Steps To RAE Success...

Forget computers, the Internet and video games and discover radio! Yes it's that time of year again and to help you on the road to getting your Amateur Radio 'ticket' we've compiled this list of RAE, Novice RAE and Morse courses taking place across the country. The list has been compiled from details we have received and is by no means exhaustive. So, there's absolutely no excuse for all you 'would-be' Radio Amateurs - why not encourage a friend to have a go too and together you'll discover the fascinating secrets behind radio communications.

Step 1
Browse through our list, pick a course in or near your area and get yourself enrolled.

Step 2
Attend your course every week, study hard and read 'Radio Basics' in *PW* every month to help you along.

Step 3
Revise, sit your exam and hopefully your name will be among the new batch of Licensees!

Good Luck!

So, what are you waiting for?

You can't beat 'hands on' experience to help you put the theory learnt on RAE & NRAE courses into practice - why not take a leaf out of keen enthusiast Sam Warman's book and take up the challenge?

Bedford & District ARS will be running a **Novice RAE (NRAE)** at the club premises in **Ravensden Village Nr. Bedford** starting in **September 2000** through to the **June 2001 exam**. Instructor/contact is **Steve Down G3USE, Tel: (01234) 270738** or **E-mail: steve.down@btinternet.com**

Bexley College, Kent will be running the City & Guilds **RAE** course from the **12 September**. The RAE course will run for an academic year **finishing in May 2001** with students able to sit the **May 2001 RAE**. They are also running a **Morse** class from **May to July 2001**. Contact the **Guidance & Admissions** Centre on **Tel: (01322) 404000** or **(01322) 404001** and leave your name, address and telephone number so an enrolment form can be sent to you.

Bishop Auckland ARC are running **RAE** and **Novice RAE (NRAE)** courses from **September 2000**. The courses will be held at the Club which meet on Thursday evening sat **Stanley Village Hall**. Those interested should contact **Tim Bevan** on **Tel: (01388) 832948**.

Blackwood & District ARS (B&DARS) will be holding the following courses: **RAE**, **Novice RAE (NRAE)**, **Morse class** and a **Construction class**. They will take place on **Friday evenings**, commencing on the **15 September 2000** at the **Oakdale Community College, Oakdale, Blackwood, Gwent**. The examinations and Morse tests will also be held at the College and they say that they will also be conducting roving exhibitions on request. Further details can be obtained from the college (above address) or by contacting **Kevin**, B&DARS' Liaison for New Members, on **Tel: (01443) 829554** or via **E-mail: kevin@workforce1.demon.co.uk**

Bromsgrove & District ARC (B&DARC) will be running courses for the **RAE**, **Novice RAE (NRAE)** and **Morse** at the **Avonscroft Arts Centre, Bromsgrove, Worcs** commencing **September**. Further details are available from **John Burford G4OAZ** on **Tel: (01527) 871903**.

Broxtowe College in **Beeston, Nottingham** will be running an **RAE** course. The Tutor will be **Paul Benson G0SPA, Tel: 0115-917 5279** (daytime) or E-mail **bensonp@broxtowe.ac.uk** The course will start on **Monday 11 September** and will run for 32 weeks leading up to the **May 2001 exam**. You can enrol anytime throughout the summer period (0900-1630).

East Cleveland ARC (ECARC) is offering a **Novice RAE (NRAE)** course on **Friday evenings** in the Committee room of the **New Marske Institute Club, Gurney Street, New Marske, Nr Redcar**. Enrolment will be on the **8 September**. Further details available from **Alistair G4OLK** on **Tel: (01642) 475671**.

Farnborough College of Technology (FCOT), Hampshire are offering classes in the **RAE** (City & Guilds) as well as **Morse** classes for Radio Amateurs. The RAE classes will be held on **Wednesdays or Thursdays** starting on the **20/21 September 2000** from **1900-2100** (30 week course). The Morse class will take place on **Tuesdays** from **1900-2100** starting on **19 September** (15 week course). If you are interested please contact **The Information Centre** at FCOT on **Tel: (01252) 407040**.

Flight Refuelling ARS will be running an **RAE** course for club members at its club house in Wimborne, Dorset. The course starts on **Tuesday 14 September** and new nembers are welcome. For more details contact **Tony Baker G3PFM** on **Tel: (01202) 622262**.

Foyle & District ARC (Northern Ireland) will be running an **RAE** course beginning in early **September** (exact date to be arranged). The course will be taken by **Ronnie GI0WYO** at his QTH so spaces will be limited. For further information contact **Ronnie** on **Tel: (02871) 342636** as soon as possible to book your place.

Halton Radio Club will be holding a **Novice Course** from the **4 September**. Classes will be held at their headquarters: **The Play Centre, Norton Hill, Windmill Hill, Runcorn, Cheshire WA7 6QE**. Further details can be obtained from **Sam Bell G0SBI** (Senior Novice Instructor) on **Tel: (01928) 714231** or **Alan Parker 2E1DSF** on **Tel: (01928) 790228** (daytime only). You can E-mail: **hrc-uk@hrc-uk.freeserve.co.uk** and there's also a **Web site** which you can visit: **hrc-uk@freeserve.co.uk**

Harrow Radio Society will be starting a series of courses for anybody interested in sitting the **Novice RAE (NRAE)**. The courses will start on **Monday 18 September**. For further information, please contact **Don Lamb G0ACK** on **Tel: 0208-845 9575**.

Mexborough ARS will be running the **RAE**, **Novice RAE (NRAE)** and **Morse code Amateur Radio training** courses this year to be held at the **Mexborough Radio Club, Harrop Hall, Mexborough, South Yorkshire**. Enrolment for the RAE will be at **1900** on **Friday 8 September** (the Morse course is a rolling program) with the course starting at **1900** on **Friday 15 September** (Morse course rolling program - any Friday). For further details please contact **Roy G0FYM** on **Tel: (01977) 645691**.

Mid Glamorgan ARG run the full **RAE** and **Novice RAE (NRAE)**. They meet at the **Aberkenfig Social Club, Aberkenfig** every **Thursday evening** from **1930-2200**. The Club is also awaiting its final inspection in order to become an examination centre. Contact **Tom Beedle** (Chairman) on **Tel: (01656) 736954** or **Mike Evans** (Secretary) on **Tel: (01792) 416768** for more details.

Murray Park Community School will be offering you the chance to study for your RAE at their **Adult Education Section, Murray Road Mickleover, Derby**. Course commences in September on **Wednesdays from 1900-2100.** For details on fees, enrolement, etc., contact **(01332) 515922** or **Frank Whitehead,** Course Tutor on **(01332) 512080**.

Preston ARS (PARS) will be running **Novice RAE (NRAE)** courses from the beginning of **September**. They will be rolling classes and can be joined at any time. They will take place at **1900 every Thursday evening** at **The Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston, Lancs**. For further details contact **Eric Eastwood G1WCQ (Novice Instructor)** on **Tel: (01772) 686708**.

Useful Contacts

City & Guilds (C&G), 1 Giltspur St, London EC1A 9DD. Tel: 0207-294 2468. FAX: 0207-294 2400 - can provide a list of all courses running this year

Subscription Services Ltd. (SSL), Bristol. Tel: 0117-925 8333 - act as the licensing issuing point for the DTI and will on request send copies of the free booklet *How To Become A Radio Amateur and* other DTI associated publications.

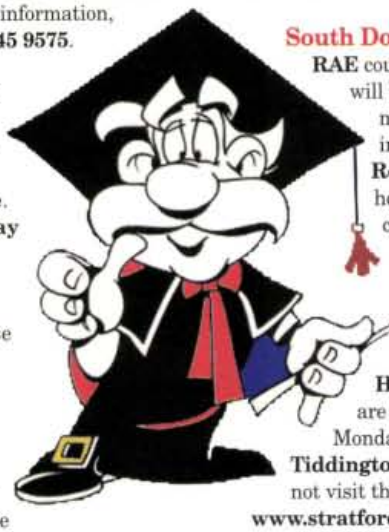
Radio Society of Great Britain (RSGB) Herts. Tel: (01707) 659015 - national society.

Radiocommunications Agency (RA). Tel: 0207-211 0211 - deal with licensing enquiries

Rossendale ARS run an **RAE** course all year long with a good pass rate and a good instructor. It costs **£40** for the full course plus **50p per session** which is once a week on **Mondays** and is held at the **Rossendale Youth & Community Centre, Old Fire Station, Burnley Rd, Rossendale, Lancs**. **Tel: (01706) 215493**. They also run a **Novice** course and **Morse** course when required. For full details get in touch with the Chairman, **Billy M1EAP**, on **Tel: (01706) 872866** after 6pm. Next intake is for September for the December Exam.

Sandwell ARC will be running both the **RAE** and the **Novice RAE (NRAE)** in **September 2000** at their headquarters in **Broadway, Oldbury, West Midlands**. The RAE tutor will be **Barrie G0VLO** and the NRAE tutor, **Martin G2BXP**. Courses will run on **Thursday** evenings at **1930** commencing on **14 September** with enrolment on **7 September**. The club is also a registered examination centre. Further details are available from **Martin G2BXP** on **0121-552 4902 (QTHR)**, **Archie G4OJJ** on **0121-532 7039 (QTHR)** or **Clive G0TVR** on **0121- 429 6061 (QTHR)**.

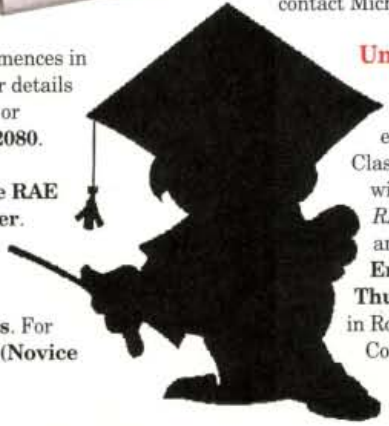
South Derbyshire & Ashby Woulds ARG are running **RAE** and the **Novice RAE (NRAE)** at **The Replan Centre, Moira, Nr Swadlincote & Ashby de la Zouch**. The courses will start from the week beginning **18 September**. Further information is available from **Pete G7MGX** on **Tel: (07976) 268263** or **E-mail: g7mgx@lineone.net** or from **Lew G4CRT** on **Tel: (07966) 378916** or **E-mail: g4crt-p@talk21.com**



South Dorset Radio Society (SDRS) will be running an **RAE** course in **Weymouth** from **September 2000** - the tutor will be **Colin Pearless G3PGK** who has successfully taught many operators in the area. For the latest details, including availability of places, please contact **John Rose M0BQO** on **Tel: (01305) 832057**. Prospective hobbyists might also like to enquire about the **Novice** courses that SDRS run, if sufficient numbers come forward to warrant one this year.

Stratford upon Avon & District ARS will be running the **RAE** and **Morse** classes. For details about the RAE classes please contact **John Harris G8HJS** on **Tel: (01789) 295257**. Morse classes are normally held before meetings on the second and fourth Monday of the month at the **Home Guard Club, Tiddington, Nr Stratford upon Avon**. For further details why not visit their **Web site: www.stratfordradiosociety.freeserve.co.uk**

Tile Hill College, Tile Hill Lane, Coventry CV4 8SU will be running an **RAE** course this year on Thursday evenings leading up to the December 2000 and May 2001 examination. For further information, please contact Michael Dixon G4GHJ, Course Tutor on **Tel: (0247) 6694200**



University of Plymouth Amateur Radio Society will be running an **RAE** course from **Room 312, Smeaton Building, Drake Circus, Plymouth** from early **September** until the **examination** in **May 2001**. Classes will last one hour from **1830 every Thursday** and will cost **£40** inclusive of copies of the *RAE Manual* and an *RAE Students Notebook*. There will be a reduction for anyone under the age of 18 and in full-time education. **Enrolment** will be on the **first and third Thursday of August** from 1900-2030 in Room 312 of the Smeaton Building. Contact **Bob Griffiths G7NHB** on **Tel: (01752) 343177** for more details.

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All entries must be received by 29 September 2000.

Q1: What is the highest Amateur Band covered by the IC-756PRO? Is it 28 or 50MHz

Q2: What do the initials RTTY stand for?

Q3: What is the maximum output power that the IC-756PRO is capable of? Is it 50 or 100W?

Back copies of May, July and August issues are available for £2.50 by calling (01202) 659930.

Yes! I want to win the IC-756PRO. My answers are:

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Send your entry (photocopies acceptable with all three corner flashes*) to:
***PW*/Icom Competition,**
September 2000,
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone, Dorset BH18 8PW.

Editor's decision on the winner is final and no correspondence will be entered into.

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Contact:	Sales
Tel:	0500 737388 (orders), (01702) 206835

Single Band - Doub

You could take a 'Cub' QRP transceiver anywhere - it's that small!

Using their different skills to best advantage Clive Hardy G4SLU and Rob Mannion G3XFD have tried out a QRP rig from MFJ in the USA. Clive built it - and Rob went on the air!

Product

The MFJ 'Cub' 7MHz CW QRP Transceiver

Accessories

A matching tuning unit will be available later in the year

Pros & Cons

Pros: *Everything is fitted to the p.c.b., all component are easily identifiable, fun to use and provides good performance.*

Cons: *The lack of a tuning scale or calibration of some sort. (Waters & Stanton say a matching tuning unit will be available later this year).*

Naturally, the first thing you've got to do with a kit is to build it. So, with this in mind Clive G4SLU got busy with his soldering iron! Here's what he had to say:

Building the MFJ Cub: This is the first MFJ kit that I've built, and it has to rate as one of the better kit building experiences that I've had!

The MFJ Cub is a single band c.w. transceiver kit that can be made for any one of several of the h.f. bands, and Rob and I chose 7MHz. The single conversion receiver (12MHz i.f. on the MFJ-9340) has a crystal ladder filter providing a claimed specification of 750Hz (-6dB point). The transmitter on this band is rated at a maximum of 2.2W output.

The kit has a single screen printed p.c.b., supplied with the vast majority of components already surface mounted. This means that the constructor only has to add the frequency specific items, controls, and other hardware to complete the transceiver.

Everything is fitted to the p.c.b. There are no off-board connections or flying leads, which all helps to keep up reliability. From the p.c.b. to the screen printed case, the finished article is a smart, compact, and robust c.w. transceiver that has a very professional look, although there's no tuning dial.

Building Straightforward

Building the kit is very straightforward, and everything except tools and solder is supplied. The components are supplied in plastic bags, with a separate one for the hardware.

A soldering iron and wire cutters are the only tools required. The project took me a little under two hours to build the kit, the task was helped by the clear, well written construction manual.

In my opinion it's essential for any kit to be supplied with good instructions, and the Cub's construction manual certainly fits the bill. The manual has step-by-step instructions, and every aspect of construction is covered, from identification of the components to advice on fitting and soldering them in place.

All the components are easily identifiable, as are their positions on the board they all fit neatly. The only glitch in an otherwise smooth construction process was caused by a minor fault in one component. The push **on/off** power switch supplied didn't lock in the 'on' position and had to be held in place with a piece of plastic (I used a slice from an old credit card!).

Moving back to the work bench; most of the coils are prewound, but there are a couple for the constructor to wind. **Don't be put off by that. They are single windings onto toroids!** Just remember, when winding toroids, once through the hole is one turn. Construction really does fall into the "you can't go wrong" category!

Once completed the p.c.b. fits straight into its box, and all that remains to do is to fit the control knobs and set up the transceiver. The only hitch I encountered fitting the p.c.b. was with the tuning knob which is fixed to its shaft with an Allen screw.

Because I was born lucky, the only Allen key in my collection was the right size. However, life would have been easier if there were slotted screws in both knobs.

Setting Up

Setting up requires a little care but by following the instructions it's difficult to go wrong. Diagrams show exactly what to connect, and where. There are five coils which need to be trimmed, but I found that they were already close to the required settings and only needed very slight tweaking.

Whilst the coverage **can be** adjusted using a general coverage receiver, I used a frequency counter. However, setting the 600Hz transmit offset needs another receiver, unless you have perfect pitch and can tell the frequency of a note by ear!

Completing the setting up requires a power meter, dummy load, and the **correct trim tool** for the coils. **Warning: Don't use a screwdriver!** It's all in the instructions, just follow them, and within two or three hours of opening the packet you can get the Cub on the air.

The MFJ Cub, we built was the 7MHz version, and covered from 7.000 to 7.060MHz, with an output power of about 1W. Having long lost the knack of c.w. I only listened with the Cub. The receiver's sensitivity and selectivity are impressive, and the audio output is more than enough to drive headphones.

As a constructor I can only say good things about the Cub. Apart from the defective switch in the particular kit that I built, the MFJ Cub is of good quality with excellent instructions. So, with my task completed, I passed the Cub to Rob to try out on the air!

On The Air

Clive G4SLU seemed genuinely surprised at just how quickly and

le Experience!

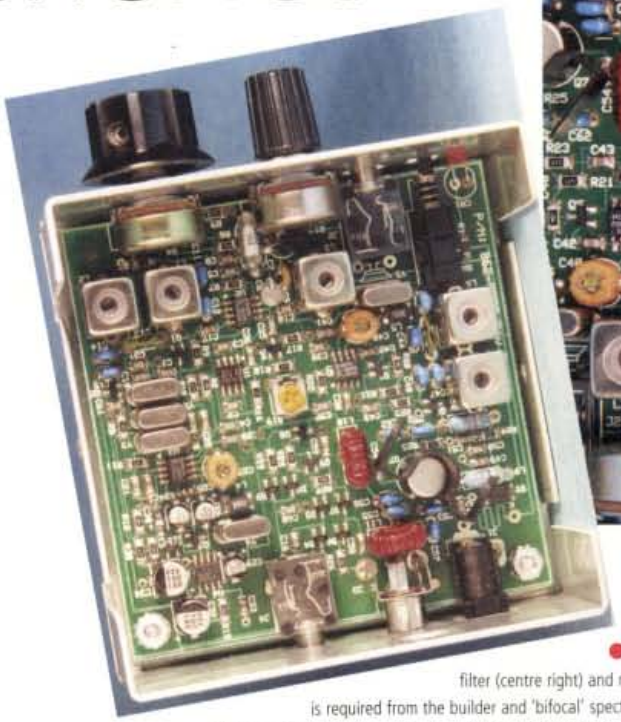


Fig. 1: Inside view of the complete MFJ-9340 (7MHz) QRP transceiver as built, by Clive Hardy G4SLU (see text for construction comments).

Fig. 2: Close-up view of the completed p.c.b., with ladder filter (centre right) and main controls (bottom centre) prominent. Minimum assembly is required from the builder and 'bifocal' spectacle-equipped readers (such as G3XFD!) should take note that the surface mount components are already mounted on the board (sigh of relief?).

easily the kit turned into a completed transceiver. Having had much experience with kits we're both a bit jaded when it comes to reading a manufacturer's claims to completion time. However, to quote an often-seen aid on ITV "It does what it says on the (tin) box"!

When Clive arrived at my home in Ferndown with the 'Cub' I noticed a sliver of plastic credit card sticking up from the front panel. He quickly described the problem and I remembered that even Heathkit - the best speciality kit manufacturers I ever came across from the USA - had some quality problems with vital components.

My much lamented Heathkit HW-7 (the original very microphonic 7, 14 and 21MHz d.c. transceiver, built in 1971 and now somewhere at the bottom of the Caribbean Sea, thanks to a tropical storm!) arrived as a kit with several faulty variable capacitors. These problems were soon sorted out and I have no doubt that any UK-based readers will soon sort out any problems that do arise as the importers will obviously have rapid access to spares and service facilities.

The rig itself is a neat little box, absolutely the ideal size for 'pack and go' portable operations. I was looking forward to using it on the air and was not disappointed at the performance, and after working several stations immediately after 'switch on' I have only one comment. Where's the tuning dial?

In fact, the lack of even a crude tuning dial is the first thing that struck me with this little rig. Sensitive and selective it certainly is, but although the 7MHz version only covers 60kHz of the band - **I feel that the 'Cub' does need a tuning scale or calibration of some sort** (If I were to buy one it's the first 'mod' I'd be undertaking).

Versions of the 'Cub' are made for 3.5, 7. 10, 14, 18 and 21MHz. The tuning range of the transceiver is 60kHz for the 9380 Model (3.5MHz), the 9340 Model (7MHz) and the 9320 Model (14MHz). The tuning range on the Model 9317 (18MHz) and 9315 (21Mhz) models are 50kHz. The narrowest range (for a narrow band!) is 20kHz on the 9330 Model (10MHz).

Tuning is 'normal' (i.e. increasing in frequency as knob is turned to the right) on all bands except 3.5 and 7MHz . Here, because of 'subtractive' mixing tuning is reversed (high end at left-hand end of knob travel).

As Clive G4SLU has already stated - **the construction manual is good**, simple in format and very easy-to-use. Additionally, the operating manual is just as good and it's easy to find out how to adjust the v.f.o. range to suit your requirements (there's enough latitude to allow 7.030MHz (QRP calling frequency) - for example - to allow it to be 'centralised' on the 40 metre model's tuning range and I assume this will also generally apply on the other band version.

Once switched on, and having got used to operating 'blind' (no tuning scale or frequency read-out) the little transceiver was a delight to use. It's **very sensitive** (no sensitivy figures mentioned in the manual) and the ladder filter coped extremely well with the usual 7MHz QRM (whoever says that c.w. is 'dead' doesn't listen to 40 metres!).

The receiver is very quiet and the a.g.c. proved able to cope with extremely strong nearby transmissions - in other words it doesn't 'pump' as some designs can (particularly early DSP equipped receiver). Audio output is adequate for small loudspeaker operation and perfectly acceptable for headphone operation.

Keying is referred to as "seamless" by MFJ - and if this statement means the operator won't notice the switch over from transmit to receiver, I agree it is just that! And, unusually for a simple rig, the 'sidetone' is provided by the receiver itself rather than by a separate sidetone source. Neat, and rather nice on such a simple job.

In Your Suitcase?

I soon found that there are already a few 'Cubs' on air in the UK, Several of the stations I worked (they all provided good reports, excellent stable signals and clean 'click free' keying) had heard them although I've yet to have a Cub-to-Cub QSO.

Altogether, I think that this little transceiver is fun to use and provides good performance. If I owned one I'd fit some form of calibrated dial to indicate where I was frequency wise. But what a challenge - you could easily take one of these transceivers up a mountain or remote spot and enjoy a QSO! *PW*

Summary

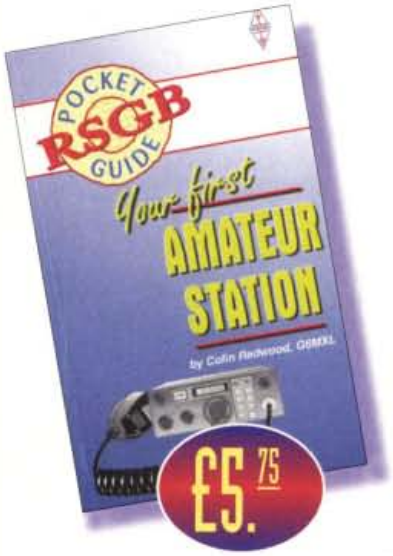
The 'Cub' really is a suitcase rig where you don't have to leave out the clothes so you can operate while on a package holiday (for example). And provided you could use a dipole antenna or could squeeze an equally small antenna tuning unit (to enable the use of a simple long wire) you'll be bound to get a QSO even though it's a real QRP rig.

My thanks go to
Waters & Stanton PLC
22 Main Road,
Hockley,
Essex SS5 4QS.
Tel: (01702) 206835,
FAX: (01702) 205843
for supplying the Cub.

RRP:
£89.95 for the kit version,
£139.95 for the ready-built version

Free delivery if you mention this review when ordering.

Book Profiles



Your First Amateur Radio Station

Colin Redwood G6MXL

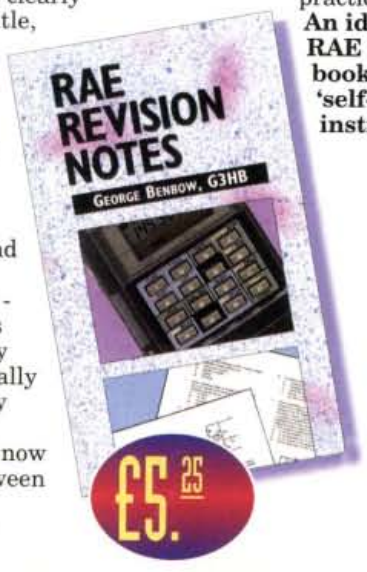
Colin Redwood G6MXL is no stranger to *PW* readers as he is an established author and specialist reviewer. Well known also for his v.h.f. operations, Colin is also keen on home construction. The simple but thorough writing techniques adopted by Colin reflect his general approach to the Amateur Radio hobby and his enjoyment of radio comes through to the reader as he guides you through from 'Information to newcomers' right the way 'up' to v.h.f. In reality it's a miniature Amateur Radio 'handbook' (as such it was first published by the Poole Radio Society in 1995 specifically for Novices) and is an ideal book for the beginner and NRAE, RAE student. Also a very handy little reference source. **Very highly recommended.**

The team at PW are always keen to encourage 'new blood' into the hobby of Amateur Radio and as colleges and radio clubs throughout the country prepare for RAE learning we've selected some books to help you on your way.

RAE Revision Notes

George Benbow G3HB

Although this book first appeared in 1971, it has been re-printed in 1993 and 1995 which is an indication of its success as a basic 'no frills' reference source for RAE students, covering all the topics required. As it clearly states in the title, the book is full of useful 'building block' length revision notes. Just long enough in length for memorising and for attention span purposes - many students will find it very helpful, especially if they can only snatch a few minutes every now and again between RAE course sessions. **A good course reference and back-up book.**

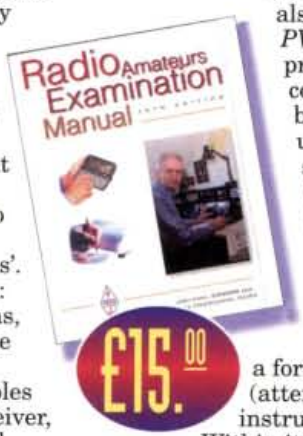


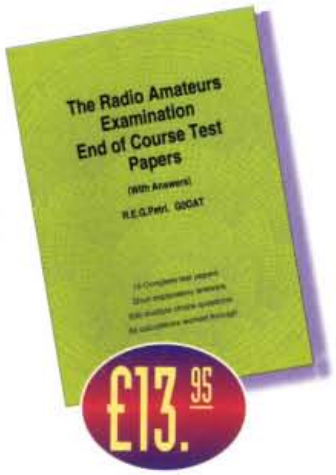
Radio Amateur Examination Manual

John Case GW4HWR & Hilary Claytonsmith G5JKS

There cannot be many Radio Amateurs who have not used this popular book at some time or another in its earlier forms. Now in its 16th edition it's changed dramatically from the 960s when it first made a real impact. Incorporating the original 'How To Pass The RAE' this book is exceedingly thorough in its approach.

It is also an interesting read, reflecting (in particular) John Case GW4HWR's lively approach to teaching. When used in conjunction with RAE Revision Notes the student will have two powerful 'tools' to help towards an examination 'pass'. Contents include: Licence conditions, operating practice and procedures electronic principles and practice, receiver, transmitters, and transceivers, transmitter interference, EMC, propagation and antennas, measurements and much more (including sample exam paper and answers to practice questions. **An ideal formal RAE course book or for 'self-instruction.**





The Radio Amateurs Examination (End of course test papers - with answers)

Ray Petri G0OAT

Ray Petri G0OAT's RAE course teaching, books and dedication to the subject are well known to many readers, and he's also written for *PW*. This clearly presented soft-cover book will be particularly useful for any student (whether studying alone or in a group) to prepare for the examination at the end of a formal (attendance) or 'self instruction' course.

Within its A4-sized format the book contains ten complete RAE test papers, short explanatory answers, 800 multiple choice questions and all the calculations are 'worked through' to assist the student's understanding of each process and procedure. **Highly recommended for the RAE student.**

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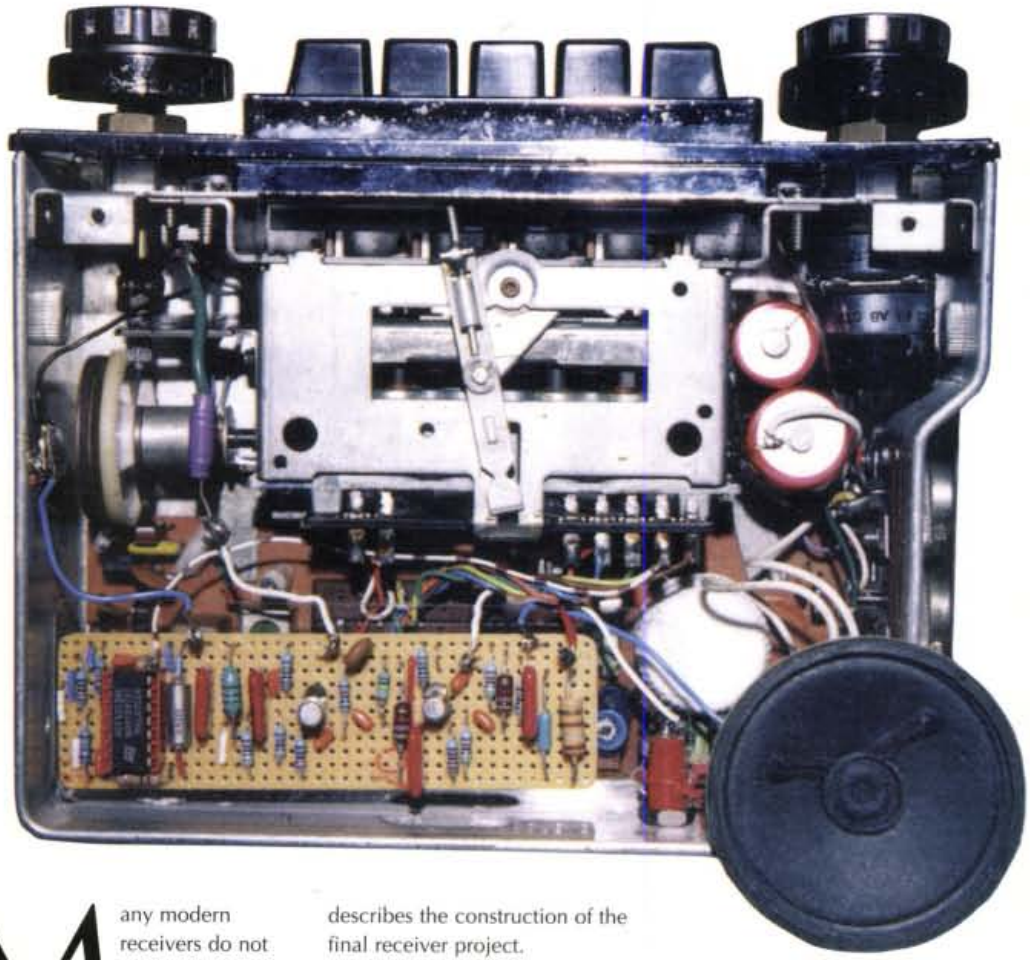
A Receiver For VLF Radio Bands



Michael Mucklow G4FIA gives the low-down on turning a redundant car radio into a receiver for those v.l.f. signals.

Many modern receivers do not tune below 150kHz. Some of the more expensive scanners and communication receivers claim Very Low Frequency (v.l.f.) coverage. However, an external v.l.f. to h.f. converter is usually required. So, monitoring v.l.f. can tie up a considerable amount of expensive and complex equipment needlessly. This receiver was developed for the 73kHz Amateur Radio band and subsequently adapted for general v.l.f. coverage and my article describes the construction of the final receiver project.

Recycled Parts

I've made extensive use of recycled parts giving an economical solution that's rewarding to build. There's also an instructional insight into the workings of standard superhet circuitry. It's a home construction project for those who enjoy the traditional component assembly and hand soldering that was once the 'bread and butter' filling the pages of *PW*.

The full receiver is a double conversion superhet based on a push-button long and medium wave a.m. band car radio modified as shown in **Fig. 1**, to cover the 73kHz band. Additional circuits built onto a piece of stripboard achieve v.l.f. reception.

The car radio a.m. circuits and alignment are not modified and thus perform their original functions. The resulting receiver is self contained, fully screened and will work with a whip antenna. The input band-pass circuits help to reject interference from power lines and breakthrough from broadcast stations.

Additional Board

The signal path through the additional board convertor is shown in **Fig. 2**. which should be compared with the circuit diagram of **Fig. 3**. Around the r.f. amplifier (Tr1) are two tuned circuits (L1/C1 and L2/C4). There's a mixer (Tr2) and an l.o. prescaler (IC1). The tuned circuits are centred at 73kHz although it will cover 50 to 150kHz. Broadcast frequencies above 150kHz and power-line interference below 10kHz are attenuated.

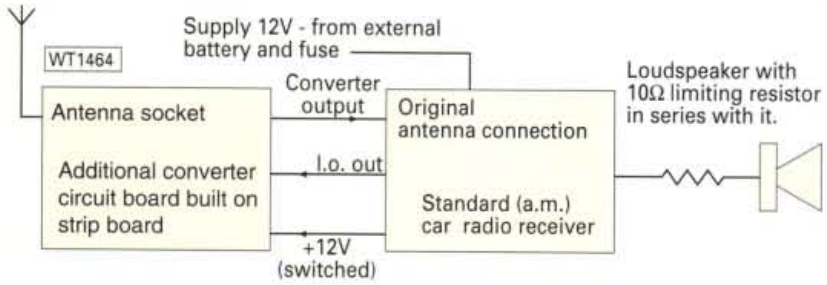


Fig. 1: A simplified connection diagram for the overall scheme of the v.l.f. receiver.

The first mixer (Tr2) has an oscillator injection frequency of 538kHz, derived by dividing the a.m. radio local oscillator (l.o.) running at 1076kHz by two. The resulting first i.f. from this mixer stage is 611kHz and is fed to the original a.m. radio r.f. input point via the matching components R11, C8 and C9. This unconventional approach gives three distinct advantages not present in the original car radio apart from the altered frequency coverage.

Firstly the v.l.f. tuning is covered by the existing radio dial and mechanical parts. Secondly, the v.l.f. tuning rate is one half that of the a.m. dial tuning rate, so that a 10kHz change at v.l.f. is covered by a 20kHz dial adjustment of the l.o. This method of mixing gives a two-to-one 'bandspreading'. The third advantage is that, there are no audible heterodynes between the two local oscillators since they are both constantly related.

The circuit shown assumes a radio with a negative earth operation. For positive earth either certain extra decoupling will be needed or the board can be built with *pnp* transistors. Care would have to be taken with polarity sensitive components such as electrolytic capacitors.

Check the car radio reception and alignment on the normal a.m. broadcast band with either a car radio type antenna or a short wire antenna with a 47pF shunt capacitor to simulate the coaxial cable.

Fit a small loudspeaker (a unit salvaged from another radio perhaps) and a 10Ω series resistor into the radio. The loudspeaker must be inside the radio's metal case to minimise stray broadcast pick up. (The series resistor limits the power fed to the speaker with the volume control at the normal setting. This in turn improves the oscillator stability).

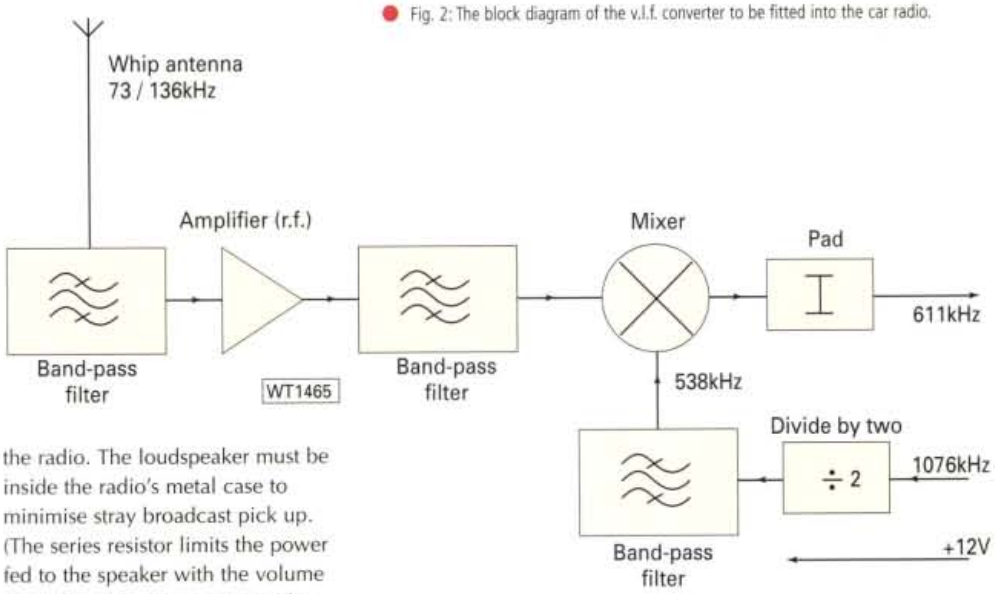


Fig. 2: The block diagram of the v.l.f. converter to be fitted into the car radio.

Building And Installing

Now some note about building and installing the unit. Capacitors C1, C4, C11 and C12 for the tuned circuits should be silvered mica or 1% polystyrene types. The decoupling capacitors (approximately 100nF) are all ex-computer board components.

Assemble the components onto the strip-board using short track lengths or small islands. The component positions should follow the pattern of the circuit diagram. So, one end would be the r.f. amplifier, the mixer stage in the centre and the frequency divider at the other end of the stripboard. Leave room to fit two capacitors beside inductor L3.

Now for another break with standard radio design practice! The tuning coils or inductors are actually 'RF chokes'. The *Q* factor of these modern miniature components exceeds the requirement of the circuit. Ideally inductors L1 and L2 should be at right angles and not too close to each other. Fit them 3mm clear of the copper Track or any other metal.

Thread a ferrite bead onto each transistor emitter lead before soldering them onto the strip-board. (There was distorted reception of a local Band II f.m. broadcast occurring on my receiver without these ferrite beads).

In general the steps to be taken are:

1) firstly locate the antenna connector and disconnect its link to the radio input. In some cases a printed Track may need to be cut.

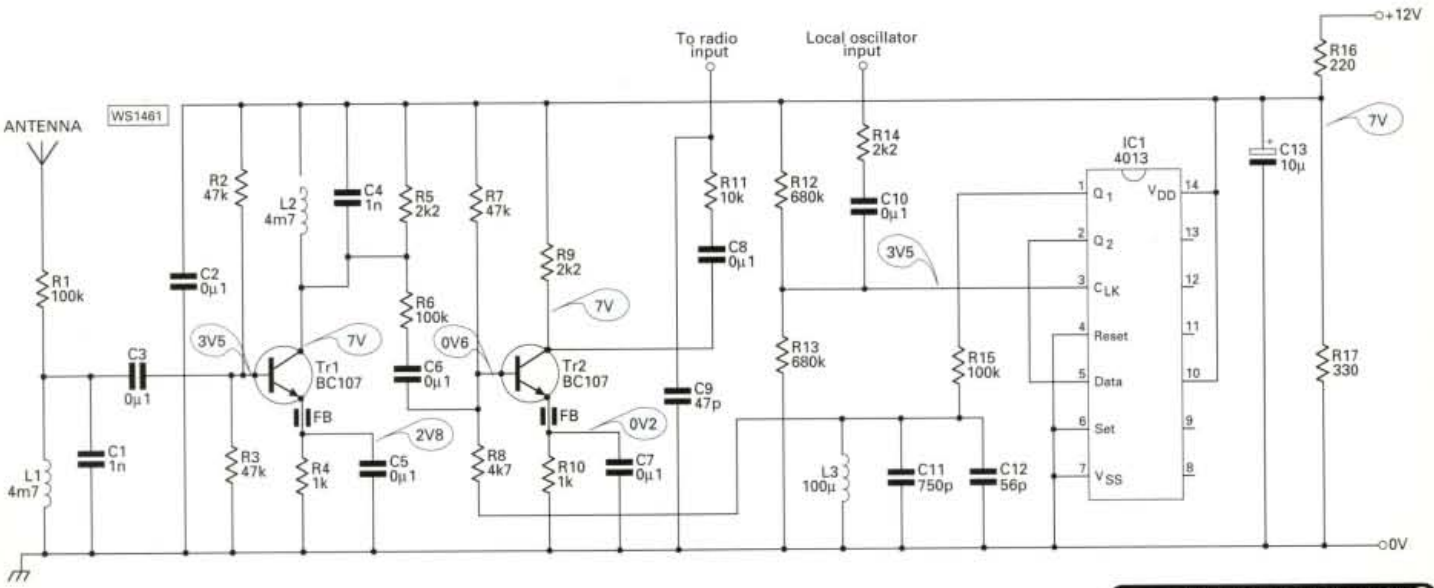


Fig. 3: The full circuit diagram of the converter, with approximate voltage levels shown.

Continued on page 24

Continued from page 23

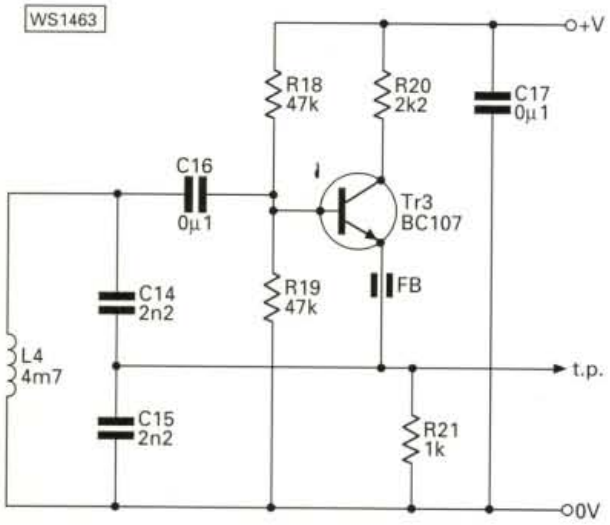


Fig. 4: A simple test oscillator, doubling as a b.f.o., runs from a single 1.5V AA cell for several months.

i.f.= 465kHz			i.f.= 455kHz		
v.l.f. (kHz)	Dial (kHz)	(m)	v.l.f. (kHz)	Dial (kHz)	(m)
20	505	594	20	495	606
30	525	571	30	515	583
40	545	550	40	535	561
50	565	531	50	555	541
60	585	513	60	575	522
70	605	496	70	595	504
73	611	491	73	601	499
80	625	480	80	615	488
90	645	465	90	635	472
100	665	451	100	655	458
110	685	438	110	675	444
120	705	426	120	695	432
130	725	414	130	715	420
140	745	403	140	735	408
150	765	392	150	755	397

Table 1: Determine the i.f. of the radio you are using and the v.l.f. bands will appear at these points on the tuning scale.

2) Locate a positive supply point (12V) that is controlled by the on-off switch and is on the set side of any filter components.
3) Next select a pick-off point for the l.o. signal. Typically there should be a three peak-to-peak sine wave at the variable inductor.
4) Then find an area for the converter stripboard so that the l.o. link to R15 is as short as possible. This will largely determine the size and shape of the stripboard.
5) Finally arrange for the new r.f. amplifier input to be near the antenna socket. (A nearby ground point is required).

Check the converter board carefully against the circuit diagram and for solder bridges. Fit it into the radio and wire up with short lead links, then connect the 0V pin to the chassis and the switched plus 12V supply to the resistive divider R16/17.

Initial adjustments

Now a few notes about making initial adjustments and using the receiver. Connect the supply to the radio, which may well tune in broadcast stations while the covers are removed.

The resistive voltage divider (R17, R18) provides about 7V, and will in most cases prevent damage to the board should the rail be short circuited. Voltage regulator i.c.s should be avoided because of the possibility of radiated r.f. interference!

Tune the radio to 611kHz, then look for 538kHz oscillator sine wave at L4. then vary the radio's tuning dial and, if necessary, choose C13 and C14 so that the voltage across L4 is maximised at 538kHz. The values shown are close to the calculated value of 880pF.

Do not stray too far from the values given because it is possible to tune the circuit to 1614kHz. And 1541kHz happens to be an image frequency near to 611kHz. The converter will work with the wrong frequency, however the selectivity of the radio r.f. stage is lost and the tuning is more critical.

Test Oscillator

The circuit of the 73kHz test oscillator, which runs from a single 1.5V battery, also doubles as the b.f.o. is shown in **Fig. 4**. The unit should be built separately and placed in the vicinity of the v.l.f. antenna. The frequency is set by choosing the values of capacitors C14 or C15 and may be checked by tuning in the second and third oscillator harmonics at 219kHz (1370 metre) and 292kHz (1023 metre) on long-wave.

If you have an oscilloscope and a signal generator then inject 73kHz at the antenna input and check the waveform at L2/C4. If possible adjust the test frequency over the range 50kHz to 100kHz. The maximum response should be near 73kHz. If the r.f. amplifier oscillates then reduce R5 or re-orientate L1.

Fine adjustment can either be made by positioning L4 relative to the copper Track or by adding small capacitors across the inductor. An AA size cell will power the oscillator for over six months, so once it has been tuned the oscillator can be run permanently. The stability is more than sufficient, especially if the layout is compact. The note can be 'wobbled' by bringing a magnet (or typical screw-driver blade) near the inductor to identify the oscillator signal.

Connect a vertical two metre length wire aerial to the antenna input socket. Do not use a car radio antenna with a coaxial cable because the capacitance introduced by the coaxial cable will load the antenna input.

1) Note that a high impedance tuned loop or pre-amplifier output may be connected to the antenna socket.
2) Tune in the 73kHz signal with the test oscillator or b.f.o. unit placed near the antenna. Optimise the car radio antenna trimming capacitor.
3) It should be possible (in the UK) to tune in the 60kHz time coded broadcast. The characteristic one second interval bursts should be heard.
4) The metal chassis panels should be securely replaced to reduce broadcast station breakthrough.

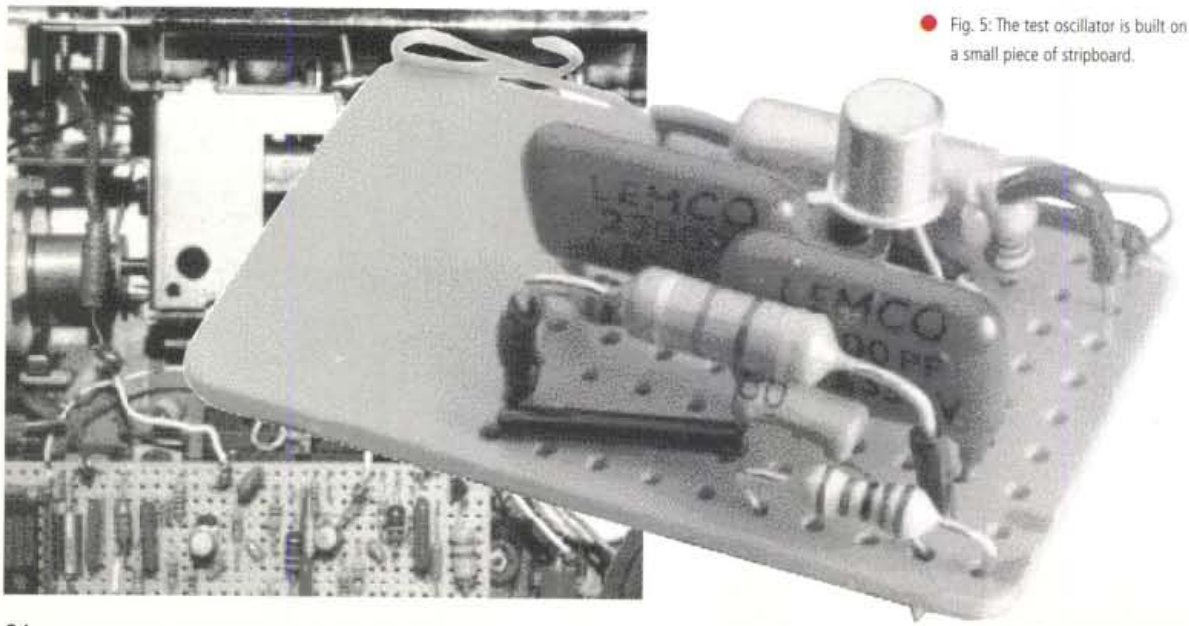


Fig. 5: The test oscillator is built on a small piece of stripboard.

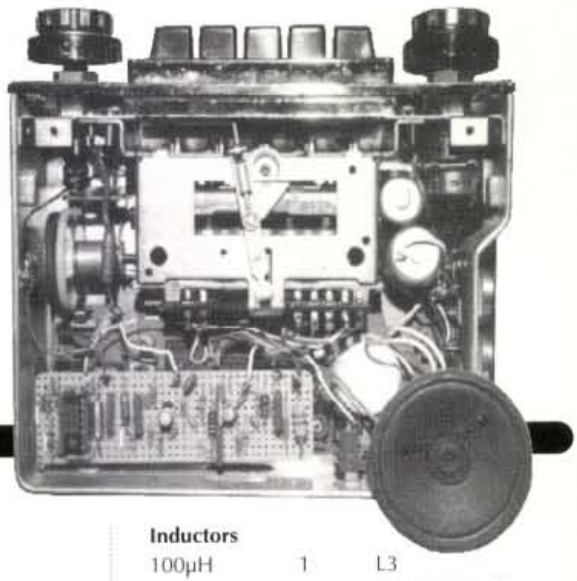
Frequency Of Interest

The tuning of the r.f. amplifier stages should centred on the frequency of interest.

For example replace the 1000pF r.f. stage capacitors with 3300pF to change from 73kHz to 40kHz. To operate at 137kHz, 270pF or 220pF capacitors could be tried. (Strictly speaking the first local oscillator should be retuned; however in practice this is not always necessary).

To retune to cover the newer band of 136Khz, my oscillator required C14 to be 500pF and C15 to be 1880pF to produce 137kHz. Fine adjustments were made by checking harmonics on 274kHz and 548kHz.

So, what more do you want to receive v.l.f.? Just a car radio ... and you're off! *PW*



SHOPPING LIST

Resistors

Film type 1W 5%		
10Ω	1	Series resistor for loudspeaker
220Ω	1	R16
330Ω	1	R17
Film type 0.3W 5%		
1kΩ	3	R4, 10, 21
2.2kΩ	4	R5, 9, 14, 20
4.7kΩ	1	R8
10kΩ	1	R11
47kΩ	5	R2, 3, 7, 18, 19
100kΩ	3	R1, 6, 15
680kΩ	2	R12, 13

Capacitors

Disc ceramic 10%		
0.1µF	9	C2, 3, 5, 6, 7, 8, 10, 16, 17
Polystyrene 1%		
47pF	1	C9
56pF	1	C12
750pF	1	C11
1nF	2	C1, 4
2.2nF	2	C14, 15
Electrolytic Tantalum		
10µF	1	C13

Inductors

100µH	1	L3
4.7mH	3	L1, 2, 3 Maplin UK80B

Ferrite beads (3 off) Maplin LB62S

Miscellaneous

A redundant a.m. car radio (negative earth preferred), a piece of Veroboard suitable to build the two circuits on, p.c.b. pins, wire, a small 8Ω loudspeaker, insulating material

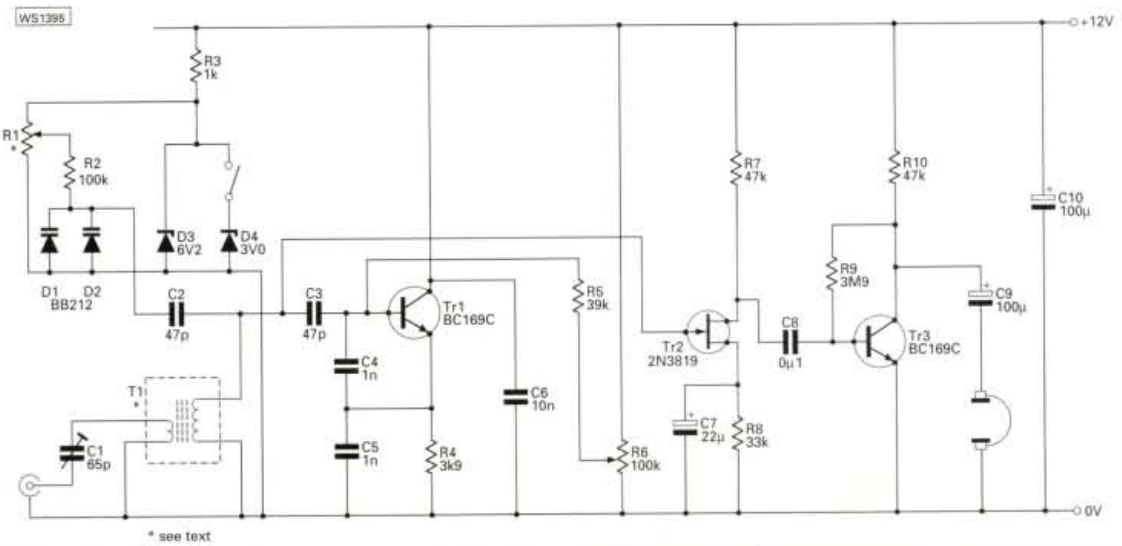
Errors & Updates

A Miniature Multi-Band Receiver *PW* July 2000 pages 24-26.

The gremlins have made themselves known again, by making sure that an earlier version of the circuit diagram for the Miniature Multi-Band Receiver, a design by David Rowlands G6VEB, was published on pages 24-26 of the July 2000 issue of *Practical Wireless*. The latest, and correct, circuit diagram to replace **Fig. 1** on page 22 of that issue, is published here.

There were also three errors in the shopping list that crept through as well. In the capacitors list for 1nF values, the reference to C3 should be C4. And amongst the listing for semiconductors the 2N3819 should be referenced Tr2, rather than Tr1 which should, of course, be one of the BC169C transistors along with Tr3.

Please accept my apologies for these errors. Editor.



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-20dB amplitude	:	>2Vpp no load
-40dB amplitude	:	>200mVpp no load
Sinewave distortion	:	<0.05% (500Hz-50kHz)
Size & weight	:	150 x 250 x 130mm, 2.5kg
Power requirement	:	115/230Vac 50/60Hz

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Output control	:	High/low switch & fine adjust
Int modulation	:	1kHz (AM) 30% approx
Ext modulation	:	50Hz-20kHz at <1Vrms input
Audio output	:	1kHz min 2Vrms
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Join Patrick Allely GW3KJW for a historical tale

THE BULLETS HAD BARELY STOPPED FLYING

Patrick Allely GW3KJW provides a potted account of the pirates, frequency wars and licence fabrication that occurred at the end of the Second World War.

Before the outbreak of the Second World War in September 1939, there were approximately 3000 licensed Radio Amateurs in the UK These were split into two groups, those with a full transmitting licence, (also known as a radiating licence), indicated by a two letter callsign preceded with a number and the national and regional indicator such as GW2PA and the non-radiating 'artificial antenna' licensees who were allocated a callsign in the group 2AAA to 2HZZ. There was no national indicator letter, just 'G' preceding this callsign series and even today I occasionally hear a G2 with three letters still dropping the national and regional indicator from their callsign.

At the outbreak of war all British mateur licences were withdrawn, equipment was seized by the authorities and Amateur Radio ceased as far as transmitting messages was concerned. But the bug bites deeply and even as early as 1942, in the middle of the war, plans were already being aired in the radio magazines. (*Short Wave Magazine* and *RSGB Bulletin*), about frequencies being re-allocated and the vast amount of war surplus equipment which would be available for the amateur.

In June 1945 the General Post Office (GPO) issued a notice saying that it would accept applications for the re-issue of Amateur Licences from those who had held a full radiating licence. There was a caveat with the notice, 'It must not, however, be inferred that licences are to re-issued immediately'. It also stated that impounded equipment wouldn't be returned immediately, but that a further announcement would be made and equipment would then be returned without application by the owner.

Anxious Amateurs

The Second World War finally ended in August 1945 and Radio Amateurs immediately started pressing the GPO for the re-issue of their licences and permission to operate again, anxious that the rights of frequency allocation were not lost permanently. Unfortunately this was not to be at that time, as many of the Amateur bands were now being used by the services and although promises were made that the amateur licence would eventually be returned, no fixed date was agreed.

In September 1945 the GPO agreed to accept applications for radiating licences from those who had held a pre-war 'artificial antenna licence' and who could provide proof of their ability to send and receive the Morse code. This proof could be in the form of their military discharge certificates which would show their military trade, i.e. Wireless Operator. It was further agreed that on issue of this licence the callsign would be the old call with the addition of the national identifier. ie 2HMS would become G2HMS.

By October 1945, British Amateurs still had not been given permission to transmit, as it had been agreed that the United Nations would decide on a date when Radio Amateurs the World over would be activated together - but this was not to be. Already a number of Amateurs were on air using callsigns, some of which were genuine but many of which were not.

A number of overseas Amateurs were already on air operating under various forms of semi-official and official sanction. A Royal Air Force group together with an American Air Force group in Italy were allowed to use the frequencies 7120-7210kHz, for amateur transmissions from 0600 - 1800 hours daily, using the callsigns XAAA, B, C etc.

British Amateurs in the UK were grumbling that the Post Office was the only authority that was heeding the United Nations. In October 1945 callsigns such as W2LVV, VU2XO, FA8JD, SU6ZY were heard on 7 and 14MHz. The callsigns, often genuine pre-war vintage, were being used by their holders from the place at which they were stationed, which meant that a W2 could quite easily be in Germany.

Other callsigns heard were self issued ones such as ZZ2X and J0AA and it was becoming apparent that a great number of 'pirates' were on the air. Additionally G7s were heard and it was obvious to some that these were in fact operating from within the United Kingdom.

To make matters worse Swiss Amateurs were granted permission to operate and were given the 56, 112 and 224MHz bands, while the Norwegians were allowed to operate on 28 and 56MHz. But strangely the 'pirate' with the strongest signal in the exclusively Amateur 7-7.3MHz band was the BBC Home Service transmitting totally in defiance of the Cairo Convention which had designated the amateur frequency allocations in pre-war days.

In the November 1945 an announcement was made that British Amateurs would be granted 28 to 29MHz and 58.5 to 60MHz with a power restriction of 100W and 25W respectively and that holders of pre-war non-radiating licences (aa) would be authorised to use 25W on both bands subject to a Morse test. No date was given when this would come into effect, but the GPO stated that "due to over riding military requirements" it would not be possible to open up the bands for another four to six months. This was a bitter pill to swallow as on November 15 1945, the US and Canadian authorities were given permission to operate on 28 and 56MHz and to make matters worse the 28MHz band was wide open.

Pirate Games

December 1945 began as a frustrating month for British Amateurs. A game now being played was to find the most obvious pirate and that month W9JGQ operating 'Fixed Portable' declared that he had no licence, was running 400W and operating from Madrid.

Other applicants for the award were LZ1AC stating he was in Switzerland and B1G claiming to be in Turkey. In the same month 2FSR was in Labuan, Borneo saying that he was licensed as VS5AH and AC3SS from Sikkam Tibet was licenced and Harry Baker, the licensee, said that Princess Kula the daughter of the local ruler would sometimes be on the 'key'. Also in Tibet, Reg Fox AC4YN was back on the air, whilst in Iran, G5SO was operating as EP5SO and at the same time G6SM was hoping to operate from Aden using the callsign VU8SM. Anyone

● The war was over but Government orders stated that licences and impounded equipment would not be returned immediately, many months of frustration followed.

who worked KZ1A found themselves talking to a pirate in Switzerland.

An official 'Flash' notice was published in December stating that licences authorising operation on the frequencies 28000-29000kHz and 58500-60000kHz were to be issued 'within the course of the next few days to holders of pre-war radiating and non-radiating licences who had made applications to the GPO'. The Big Day(s) arrived over the latter part of December as relatively few applicants received their licences for amateur operation in the United Kingdom but only on the frequencies 28-29MHz and 58.5-60MHz as previously announced. This was a start and UK amateurs quickly and legally came back 'on air' aided by the sale of surplus government radio equipment.

In January 1946 a notice from the GPO appeared asking for applications for a radiating licence for those who had not previously held a radiating or non radiating licence. Those applicants who could not claim exemption by reason of service in HM Forces in a radio trade of approved standard or other qualification had to sit an exam. An extensive list of military trade qualifications was published for the guidance of would-be applicants.

It was also announced that from the 8th December 1945 New Zealand Amateurs were authorised to operate on 3.5-3.96MHz and 58.5-60MHz, but were not allowed to make contacts outside New Zealand. The thinking behind this legislation defeats me, but I suppose someone in authority could justify it. Danish Amateurs were granted 58.7-59.8MHz with a power limit of 5W. At the time this was considered by British Amateurs as absurdly low power, but with the sun spot cycle as it was in 1946 I don't think that this was much of a restriction.

Pirate activity was still as high as ever with calls like XQ4BB and G7TR. This last callsign seems somewhat obvious, could it be that the operator had served **or was serving** with the 7 Training Regiment Royal Signals?

An oddity was W9VND who was heard telling that he was in ZC6 (Palestine), had been in Syria as AR8VN , would soon be in Cyprus as ZC4VN, in Malta for a day as ZB1VN, then in France as F8VN. Questions were raised in British radio magazines about his ability to obtain licences in British territory. A large number of Italian nationals were also back on the air, but their legality was questionable and the fact that they were transmitting, whilst UK amateurs could not was a bone of contention.

Brits Abroad

The British Radio Amateur who was abroad and in the service was fortunate to be able to operate on other bands. For example ST4RX (G4RX) and VS5JH were both on 14MHz although the latter was closed down by the Borneo authorities on 20m (14MHz).

Numerous other callsigns, used by British Amateurs (some who had **never** held a licence) were being used from exotic and distant locations throughout the world. Operating from a RAF base was PR1VY on the Anderman Islands and was in contact with G6EX, obviously an early re-issue licence at Christmas 1946. The callsign PR1VY may be some indication of the plumbing arrangements on those islands at the time!

In March 1946, UK Amateurs had further good news when the frequency allocations were extended to 1.8-2MHz and 29-30MHz with input power limited to 10W on the lower band. The Swiss were granted 3.5-3.65, 3.85-3.95, 7 - 7.2, 14-14.4, 28 - 3, 58.5 - 60 112 -120 and 224 -230MHz. At the same time all Central and South American republics re-issued licences for 14MHz.

Six months after the war ended, in April 1946 a notice appeared that the 7 and 14MHz bands were anticipated to be released to UK Amateurs around 1 June 1946. However, the 3.5MHz band could not be sanctioned at that time because of pressing military requirements, although the US amateurs were permitted to operate within the band 3.7 - 4MHz and were also given 27.145 - 27.455MHz for unlimited operation.

Gradually the Amateur bands were phased back in and the pirate activity reduced dramatically. The number of amateurs in the UK increased greatly, the training thousands of people had received during their military service helped them to obtain a licence without the necessity of passing a civil examination.

Wonderful home-made callsigns disappeared, as normality returned and countries which had been occupied reverted to their own government administrations. Will we ever hear VQ6 from British Somaliland, XAAA from Italy or a D2 from the Rhine Army again? I for one sincerely hope not, bearing in mind the reason for them to be on in the first place. *PW*

"By October 1945, British Amateurs still had not been given permission to transmit, as it had been agreed that the United Nations would decide on a date when Radio Amateurs the World over would be activated together - but this was not to be."

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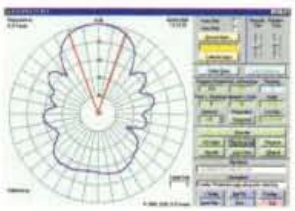
Antennas-in-Action

Hello and welcome to the September outing of Antennas-in-Action (AiA) where it's all about wire antennas this time. First some ideas and then some answers to a question posed in the last session of AiA.

I've had an E-mail from **Bob Freeth G4HFQ**, who tells me he took a concept, by **Bill Sykes G2HCG**, and wrote a program to run under *Windows 95/98* or *NT*, to measure the polar diagram of a beam antenna in its installed location. The program uses nothing more than an audio connection between receiver and the sound card of a standard PC. You can get more information and an evaluation copy of the program from Bob's web pages at *http://www.bob.freeth.dial.pipex.com/polarplot*

Though I've had a look at the the site, I haven't had the opportunity to run the programs yet, they look just the thing for someone wanting to experiment with antennas and is looking for the tools to do it! The image of **Fig. 1** shows the sort of plots that Bob's polar plotting programs can provide.

Fig. 1: Antenna plots using the audio card on your PC are possible with a programs from Bob Freeth G4HFQ.



Series Of E-mails

In another series of E-mails, this time from **Dieter DL2BQD** in Germany, I received the ideas shown in the illustrations of **Fig. 2, 3** and **4**, where you will see the antenna, a full-wave delta loop for 7MHz (40m) and two simple ideas for wire antenna users. All three ideas from Dieter are nice and simple, but above all are cheap. The wire antenna joint shown is made from a small section of a strong plastic, and a pair of connectors that are cheap and easy to find in most garages or car accessories shops. Dieter should be over in this country on holiday about now so, keep an ear open for his callsign on the bands working QRP c.w.

Back in the July 2000 AiA **Mal Broxton MW0CHI**, was having trouble with a 'Commercial G5RV' and asked "What is the standard way to feed a G5RV"? Sadly **Louis Varney G5RV**, recently became a silent key, but the G5RV antenna will be a marvellous on-going memorial, a sentiment echoed by **Denzil G3KXF** who sent in a lengthy reply when he said: "First a G5RV must include a twin feeder section fed by a coaxial feeder.

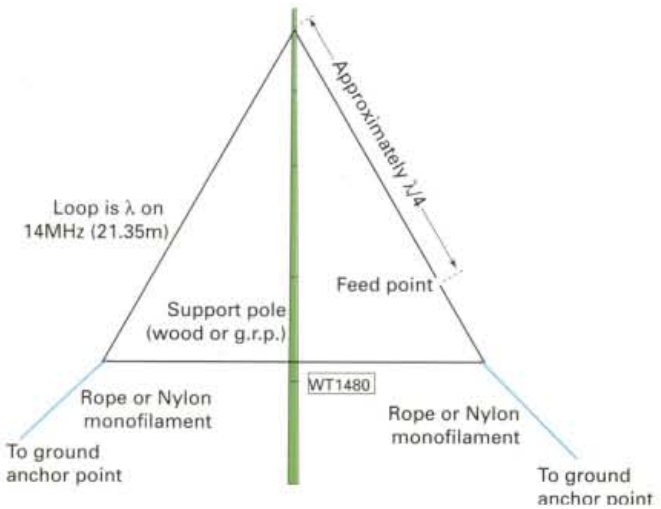


Fig. 2: Dieter's simple, but effective delta loop for 7MHz is easily portable.

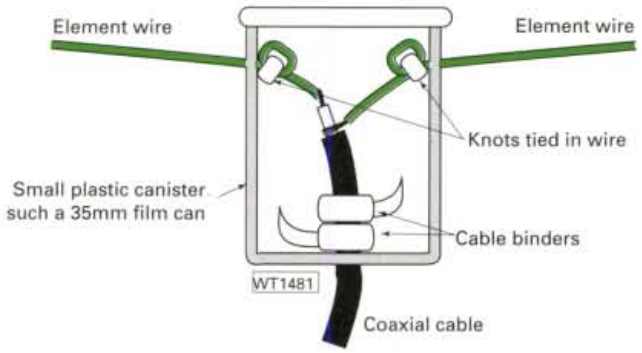


Fig. 3: Using a 35mm film canister as a dipole centre gives a quick and easy solution.

Without the coaxial feeder it becomes a Doublet which is another story. Compare Fig.1 on page 32 (AiA July 2000), with the dimensions given by Louis Varney in his 'G5RV Up-to-Date', in *Radio Communication* July 1984. The updated top part is 14s.w.g. 15.54m each way. The feeder (Louis recommended open wire for low losses) is 16s.w.g. spaced 51mm and should be 10.36m long".

Denzil continued "Using standard 300Ω ribbon (unslotted) its velocity factor (v.f.) is about 0.82 making its length 8.5m. While slotted 300Ω ribbon (v.f. about 0.90) requires a length of 9.3m. The twin feeder section is not a matching stub, but more an impedance transformer. The coaxial cable characteristic impedance Z_O, should be 75Ω (though 75Ω twin wire feeder could be used). Louis said that on 14MHz a good match is obtained so no a.t.u. is necessary, and using

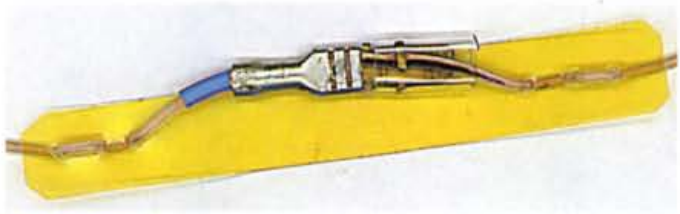
Here's Paul Tuton's answer to Mal MW0CHI's problems with a G5RV:
After using a G5RV exclusively for seven years, I've gleaned information from a variety of sources over the years and one of the best being the excellent *Practical Wire Antennas* by **John Heys G3BDQ**. I'm not setting myself up as a G5RV expert, but it seems pretty clear that there are a number of misconceptions that can be dispelled quite easily once a few basic facts are understood. Here goes!

The G5RV is a doublet antenna with dimensions optimised for easy feeding on the traditional h.f. amateur bands. Many of us will be familiar with the G5RV's 'magic' top length of wire as a quick and easy way to put out a bit of a signal on 3.5MHz and higher. The G5RV is a balanced arrangement, with 10.36m (34feet) or so used as a feeder.

Traditionally, the feeder of the G5RV was open-wire with a nominal 600Ω impedance. Manufacturing convenience replaced this with 300/450Ω ladder or slotted feeder, neither of which is efficient as open wire. Good quality 450Ω slotted is a good compromise between mechanical convenience and electrical performance. Most 300Ω ladder feeder detunes and becomes lossy when it gets wet.

Vary Widely

Though we talk about '600 or 450Ω', the impedance at the end of the open-wire (or slotted or ladder) feeder will vary widely with operating frequency. The book *Practical Wire Antennas* says that the G5RV feed-point presents "... a 75Ω non-reactive load on 14MHz, 90-100Ω non-



● **Fig. 4: A cheap, simple and effective joiner for portable antennas.**

50Ω coaxial cable would result in only 1.8:1 v.s.w.r. However, on all other bands a matcher unit is essential, because the antenna plus the matching section presents a reactive load on those bands. For 1.8MHz the shack end of the cable, or twin feeder are strapped and matched against earth".

Then Denzil finished "I do not see any need for a 4:1 balun, the antenna tuner should cope alone (if the supplier states a balun is needed, why wasn't one supplied with the antenna?). Unless properly designed and tested, In my experience baluns are a source of trouble, so should **only be used after all other methods have failed**. Commercial 3 to 30MHz baluns made by such as Granger and Marconi, that I have tested, have caused serious attenuation up to 40dB due to self resonance (peculiarly at 14 or 21MHz). Balloons are far more effective for antenna work! Louis suggests a coaxial choke be used, but only in certain cases where TVI can be attributed to r.f. current flow on the outer of the coaxial cable. That will only apply to 14MHz, on other bands the coaxial feeder acts as a tuned feeder and will likely be radiating anyway".

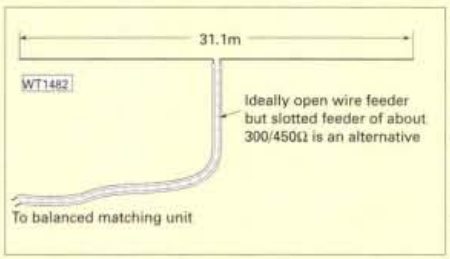
Another reader, **Bill Wright GM3IBU** sent in his suggestions for Mal. One of his ideas, was as he said "..having used a G5RV for many years for quite a number of special event stations and I have always used Z-Match type a.t.u.s both commercial (KW107) and a home brew 'rats nest'. I have found that the a.t.u. gives a match on most bands from 3.5 - 28MHz. But I always carry a few spare lengths of coaxial cable (each about 8m) with matching connectors so, that if I have a matching problem I can add an extra lengths of coaxial cable, which will do the trick".

Comprehensive Reply

Another reader who sent in a long and comprehensive reply to Mal's original query was **Paul Tuton G0UBV**. His answer is in the separate panel. I can only say thanks for all who wrote or telephoned in with their ideas and solutions to Mal's 'problem G5RV'. I think that it should no longer be a problem. With answers like these around, all I can do is echo a question posed Denzil who asked "why would anyone buy a commercial G5RV"?

Ah well space eludes me once more. See you all next time.

Tex



● **Fig. 5: The 'ideal' G5RV setup. But opinions differ!**

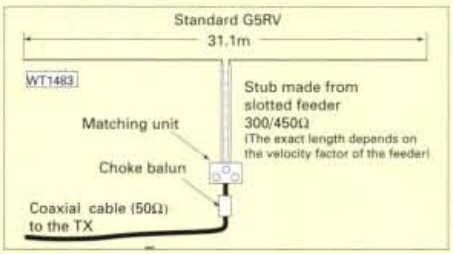
reactive load on 24MHz. Reactive and/or high resistive loads on all other bands".

I believe it's a common misconception that the feed-point impedance is always the same as the feeder. Also that an impedance transforming balun reduces the impedance to a more convenient value. It is, but only in the specific case where the chosen working frequency results in the correct impedance at the feed point. Ferrite cored baluns 'dislike' reactive loads so, there will often be some power loss and heating in the balun.

Small losses result from mismatching 600Ω open wire feeder in this manner, and though in 300/450Ω2450Ω feeder, the losses are greater, for most purposes seem not to be serious. Using the 'ideal' arrangement, with balanced feeder throughout is shown in **Fig. 5.** However, things can go badly wrong when we stick our piece of 50Ω coaxial cable at the G5RV feed point. The only case where this would appear to be acceptable is 14MHz where the feeder presents a 75Ω non-reactive load. In just about every other case, who knows, unless you can use a Smith Chart or are lucky enough to have an antenna analyser.

Undesirable Extension

In most cases, you can regard the coaxial cable as an undesirable extension of the main feeder, that's mis-matched, and will affect the antenna tuning as you adjust its length. It seems that this is where many people get into difficulty with an 'untuneable' G5RV, as the length of coaxial cable is the problem. The resulting impedances simply cannot be handled by a typical a.t.u. because coaxial cable lengths vary from one installation to another.



● **Fig. 6: Using this arrangement allows coaxial cable to be used most effectively**

Baluns simply add another variable. In my experience, when used with a G5RV, the simple coiled 'choke' balun changes the feed characteristics and can introduce considerable losses, particularly at lower frequencies. On the other hand, it might 'tame' an otherwise unmatchable feed point, simply because it has the effect of altering the total feeder length and therefore the feed point impedance. Ferrite chokes, baluns and so on at the junction between the main feeder and the coaxial cable are, in my view, an inefficient botch to solve a problem that we would have been better to avoid.

So, if the G5RV will not tune, try fiddling with the length of the coaxial cable and add or remove a short length. Better still, if at all possible, feed the antenna with a balanced tuner at the end of the main feeder as shown in **Fig. 6**. In most cases, the ideal arrangement will be to use a Z-match of some type.

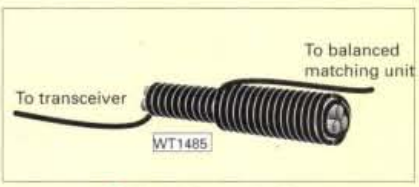
Alternatively, you can turn any a.t.u. into a balanced version by inserting a choke balun between the TX and the a.t.u. and though that is a subject in its own right and really needs an a.t.u. in an insulated cabinet for power other than QRP. The best choke balun, I have found is the one shown in **Fig. 7** and **8**. Don't feed a G5RV via the type of balanced output found on most commercial a.t.u.s. These almost always use a 1:4 ferrite balun that as explained above, will be effective only when the impedance is purely resistive. In general, this is rarely if ever the case with a G5RV.

Still on the subject of feeding directly into a balanced a.t.u., don't worry if for the sake of installation convenience, you have to add or remove a few feet of the main feeder. At the worst, it will make the antenna tricky to tune (even untuneable) on some frequencies. The answer? Add or remove a few feet of feeder until it works on the bands that you want, with your particular a.t.u. and rig. What you actually end up with is a random doublet that happens to have a 31m top.

● **Fig. 7: Start with six lengths of ferrite rod in a bundle!**

Over the seven years, and armed with an MFJ antenna analyser and feeder current meter, I've done a lot of measurements and tinkering using various a.t.u.s and balanced and unbalanced arrangements on G5RV-like antennas. My main operation is on on 1.8 - 7MHz but I've had good results up to 28MHz.

Paul Tuton G0UBV



● **Fig. 8: Then wind about 55 turns of coaxial cable around the bundle of ferrite rods to make an affective choke 'balun'.**

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23rd June 2000

Mr Martin Lynch
Martin Lynch & Sons
Ealing, London

Dear Martin,

Last year, when I decided to 'renew' my interest in Amateur Radio I was faced with a number of stark decisions. It was not just a matter of choosing one 'black' box in favour of another, but the difficulty of reading behind the lines of product reviews and getting expert advice based solely on quality and not on mark-ups or potential commissions. In this regard I approached two companies - yourselves and a substantially larger outlet.

In the end, however, there was no real competition. The advice I received from yourselves was absolutely first class and value for money could not be beaten anywhere. What I did not realise at the time, however, was that I had bought from a company that truly values its customers - providing nothing short of excellence in customer service and after-sales care and support.

In this regard, I remain particularly grateful for all of the care, time and effort which Chris Taylor has provided in resolving the current issues with Yaesu. It was Chris's excellent advice that brought me to ML&S in the first instance and his excellent sense of customer service that will keep me a loyal customer for the long-term future.

May I wish you all the very best of success - it is well deserved.

Yours sincerely,

Dr Bruce Styne
MI0CML

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Antenna Workshop

LOOPING LOW-DOWN – An Antenna For The 136kHz Band

Richard Q. Marris G3BZQ

describes a multi-turn receiving loop for our newest band of 136kHz. So, read on and get 'the low down'.

The recent introduction of the European 136kHz amateur band has added a new challenge to the hobby. This new band is located below the 'bottom end' of our long wave (l.w.) broadcast band, and actually covers 135.7 to 137.8kHz. Looking at it another way, when on 136kHz you'll be transmitting and listening on a wavelength of 2206m!

As more European countries are authorising the use of the new band, it is hoped that, across the Atlantic, the Federal Communications Commission (FCC) in Washington will eventually authorise US amateurs to use 136kHz. For many years there has been the USA 1750m (160-190kHz) experimental band, fortunately for them, there are no l.w. broadcast stations on North America so, such a band is operable. It would, however, be impossible here, in Europe where it would be swamped by the multi-kilowatt l.w. broadcast stations.

Antenna Question

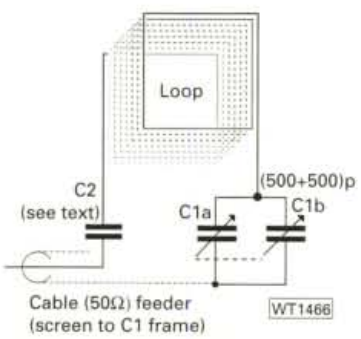
The question of an antenna for 136kHz presents real problems. Why not use the good old faithful popular dipole? It is extensively used throughout the h.f. bands. Well to answer the question - a half-wave dipole at 136kHz would be just over a kilometre long! Using metric or imperial dimensions, it's still a mighty long piece of wire!

In practice, any antenna used for transmission on this amateur band, will probably consist of as much wire as possible outdoors and matched heavily with a loading coil, etc. Such a loaded long wire antenna can be very a efficient noise collector!

In the days when this vintage amateur started playing with 'wireless' on l.f., the general rule seemed to be, that the longer and higher the antenna, the more stations would be received! This theory certainly worked in my parental home in Devon. In those days of the distant past, apart from atmospherics, man-made QRM seldom seemed to enter into the picture.

These days, apart from QRM from other stations, the proliferation of man-made noises gets worse year by year with the ever-increasing electric, electro-magnetic and electronic wizardry. When all this is added to atmospheric noise, they can produce a diabolically noisy situation when searching the l.f. spectrum.

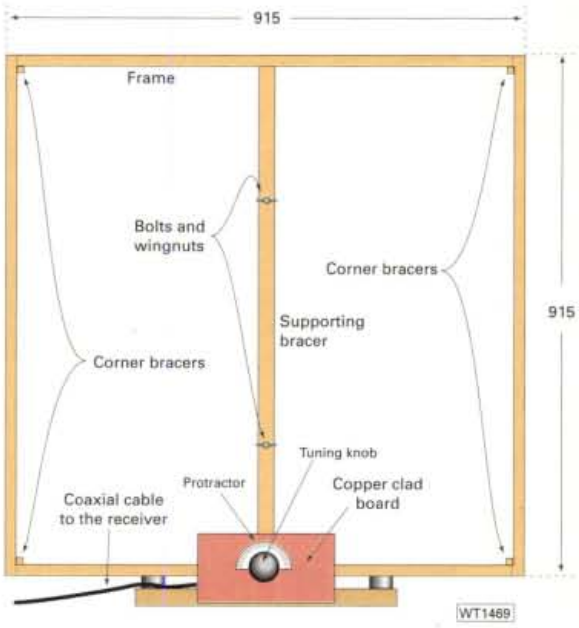
However, the 136kHz loop which I am going to describe produces excellent signals that are lost in noise with a 30m long antenna (loaded or otherwise). An antenna that has a frequency tuning range (of the prototype) of 115-170kHz (or 2609-1756m). It also has directivity with a 'figure of eight' pattern.



● Fig. 1: The 'circuit' diagram of the Low Down Loop. See text for dimensions.

Loop Schematic

The 'schematic', **Fig. 1** shows a 915×915mm loop containing 22 turns of wire. It's resonated onto frequency by a 1000pF variable capacitor (made up of a parallel combination of a dual 500+500pF capacitor), shown as C1a and C1b (which I'll now just call C1) in the circuit diagram. A simple coupling arrangement, via C2, connects the loop to the receiver antenna input via coaxial feedline.



● Fig. 2: Front view of the loop antenna, which uses over 80m of wire in 22 turns around the frame.

More detail of the construction of the loop and its layout are shown in **Fig. 2** and **Fig. 3**. In these illustrations you see a square loop frame, supported by a vertical pole, attached to a heavy baseboard. The variable dual capacitor C1 is mounted on a small control panel with a calibrated dial. The coaxial feedline exits via a socket located to the left of the front panel.

Construction

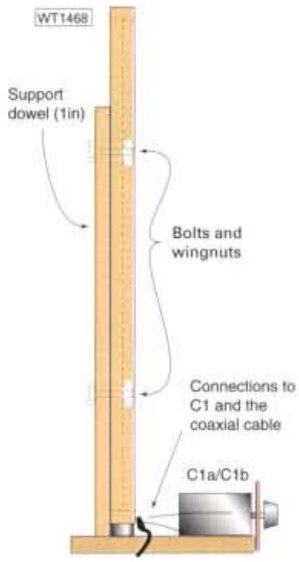
So, let's now turn to the loop construction. Referring to the illustrations, construct a square frame with outside dimensions of 915×915mm using 33×12mm section timber. A vertical stiffener, or support member, is fitted vertically in the centre, and flush with one edge of the frame. The whole frame should be securely glued together with corner blocks. I've given measurements in the units used (inches or millimetres) when purchasing the items themselves.

The winding for L1 (**Fig. 4**) around the circumference of the frame uses solid core *pvc* covered wire - 1/0.6mm wire with an overall outside diameter of 1.2mm . The use of *pvc* covered wire effectively separates and insulates each turns of wire.

The first layer of the winding comprises 16 closewound turns. Over this is wound one turn of

Shopping List

C1 - A dual 500+500pF variable capacitor, air spaced rigid type. (a Jackson type E was used on the prototype)
C2 - Silver mica capacitor 470pF (see text for possible alternatives)
1 Reel of *pvc* covered wire (1/0.6mm copper - 1.2mm o/d - Maplin PA56 L)
1 8×4 inch single sided copper-clad fibreglass panel (Maplin HX01B).
1 Coaxial surface mounting type socket (optional)
1 Large diameter instrument knob
1 0-180° protractor and some white card
5m of 33×12mm planed hardwood
1m of one inch wooden dowel



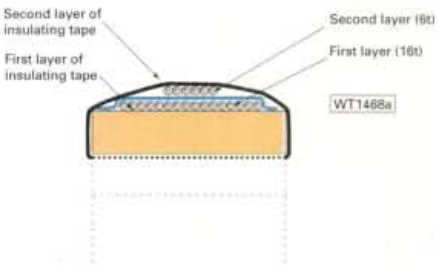
● Fig. 3: Side view of the loop antenna, showing how the frame is attached to the support pole with two bolts and wingnuts.

masking (or insulating) tape around the circumference of the loop. The second layer of the winding is six close wound turns over the masking tape. The ends of L1 are taken through small holes, drilled in the loop base limb. After testing another layer of *pvc* tape is lap wound around the complete winding and frame.

Heavy Base

A heavy base must be constructed to prevent the loop overbalancing. The base I constructed consists of a piece of timber 360×160 some 20mm thick (see **Fig. 5**). Towards the rear, as shown, is a one inch (standard size) diameter vertical support pole, some 600mm long. The dowel is supported by securely fitting and gluing it into a one inch diameter hole which is bored some 30mm from the rear of the baseboard.

The front panel is a standard 205×102mm (8×4in) single side copper clad board (ex Maplin), fitted to the centre front of the baseboard, with two wood screws. The main tuning capacitor, C1, is mounted on the panel, as shown, and fitted with a large instrument knob. On the panel, behind the knob is fitted a 0-180°C protractor, backed with a piece of white card. A coaxial socket is fitted on the baseboard in the left-hand front corner.



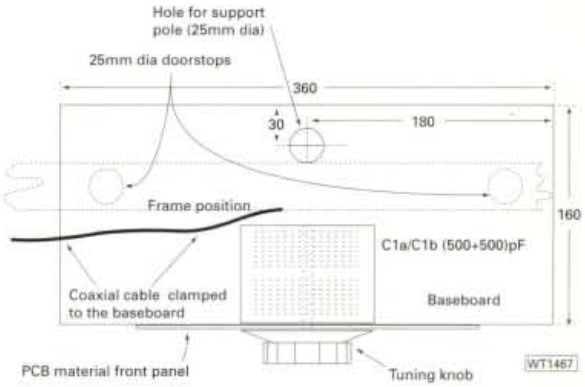
● Fig. 4: A cross section through the loop showing how the 22 turns of wire are wound in two layers, the first with 16 turns side-by-side, the second layer of 6 turns is wound over the centre of the first winding.

Final Assembly

The central vertical limb of the loop is fitted to the vertical pole with two bolts with wing nuts as shown to allow the loop to rest on two rubber doorstops that are screwed to the baseboard. These two extra support stop the loop moving around too much.

The loop frame is lightly pressed against the rubber stops and two holes drilled for the two fixing bolts and wing nuts.

The 50Ω impedance coaxial feedline (RG58 as short as possible) to the receiver should be mounted on the baseboard in the position shown.The short length of coaxial cable is taken to the base of the pole behind C1 - it should be securely attached to the baseboard. The simple wiring, as Fig. 1, can now be completed.



● Fig. 5: A plan view of the baseboard. This should be quite heavy to give some stability to the completed antenna.

Testing & Operation

If the receiver has a 50Ω impedance antenna input, C2 can be a 470pF silver mica capacitor. For receivers with 70/75Ω input impedance, a length of 70Ω TV type coaxial feedline should be fitted. If 300Ω twin feedline is used (as with some older valve receivers), it may be necessary to experiment with the value of C2.

I use a Palomar VLF-A converter into a good 3.5MHz band receiver. I've found that the gain of this converter is such that a pre-amplifier isn't necessary.

The receiving system should be set to a steady, weakish signal near the centre of the 136kHz band. Capacitor C1 should be adjusted for maximum signal - the loop's maximum signal will occur when the edge of the loop points towards the station. A complete, or partial, null will occur at 90°, when the flat side of the loop is towards the station.

My loop antenna, which is indoors, where it stands on a table near the operating position, has captured a wide variety of stations, many of which were lost in noise with a 30m matched long-wire antenna. So, now you don't have an excuse for not, at least, listening to the band. Now you've got the 'low down'!

Carrying On The Practical Way

Have you become disillusioned with 'Black Box' Amateur Radio? If so, you might find the Rev. George Dobbs G3RJV's recipe for a cardboard box transmitter an interesting diversion for scissors and soldering irons after you've read the appropriate quotation!

"Simplify, simplify"
Henry David Thoreau.
"Where I Lived And What I Lived For"

In last month's column I went rather beyond the sound advice of Thoreau in suggesting that the making of one-off printed circuit boards (p.c.b.s) is no real problem. I often make one-off p.c.b.s simply because I have the equipment and it takes little extra effort.

However, my own approach is not intended to belittle the effectiveness of alternative methods of electronic construction. To redress the balance, this month I'll describe a very simple, and, certainly inexpensive, method of constructing an electronic project.

The 'Carrying On The Practical Way' (COTPW) column has often described the use of 'Perfboard' to make one-off projects. Perfboard is a sheet of insulating material with a matrix of holes spaced at 0.1in.

The component leads are pushed through the holes and the component interconnections are hard wired underneath the board. Usually the surplus wire on the component leads can be used for the interconnections.

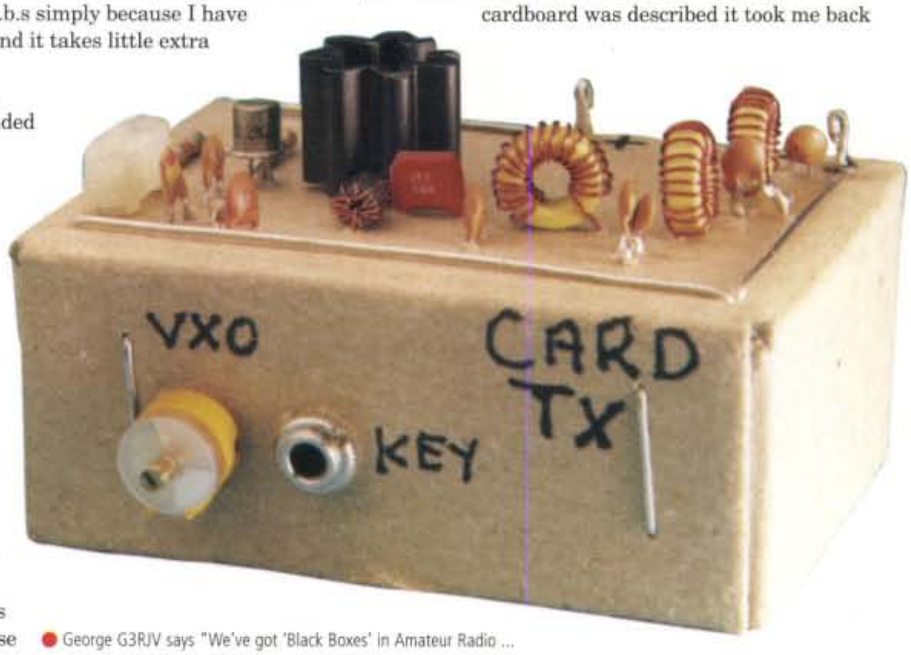
Pictures of Perfboard construction have often graced these pages and it represents a viable method of building even quite complex electronic circuits.

From time to time I've received complaints about Perfboard construction from *PW* readers. Not complaints about the method itself you should understand, but problems with the availability and cost of the material.

The problem is that Perfboard, although elegant ... is certainly not cheap! Some readers have suggested that for simple projects, the mounting board can cost more than the mounted parts. That is not surprising as very often the hardware (cases. knobs, switches etc.) can cost more than the electronic components in any project. So this month I'm going to describe a construction method that costs nothing!

Using Cardboard

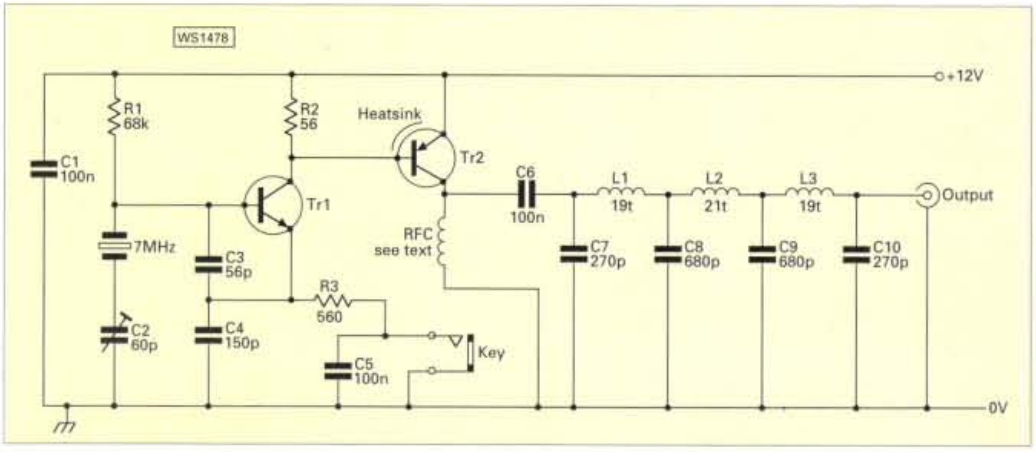
When in a recent issue of *Sprat* (The Journal of the G-QRP Club) a method of circuit building using cardboard was described it took me back over 20 years. In the 1970s I spent some time with a radio club in a local school and one of the beginner's projects was a crystal set which was used to demonstrate circuit reading and soldering.



● George G3RJV says "We've got 'Black Boxes' in Amateur Radio ... so why not try the 'Brown (Cardboard) Box approach too - it's much cheaper"!

The crystal sets were all built on a postcard using a compression trimmer, a coil wound on a scrap of ferrite rod and a diode. The circuit diagram was drawn on the postcard and the components were mounted above their symbol with interconnections wired under the card. A good many young people enjoyed for the first-time the thrill of hearing radio signals coming from something they had made themselves.

In later years I was once given a large stock of thin 'Paxolin' (Phenolic resin-impregnated paper) sheets. These I used for circuit board construction, by drilling holes in the appropriate places and using it like Perfboard to make a whole



● Fig. 1: Circuit of the 'Card TX' - (see text).

range of both simple and relatively complex projects.

However, any suitable thin insulating material can be used in such a way. For many applications a sheet of stiff card can be used as the carrier for a circuit. I still have (if I could only I find it!) a two stage active audio filter built on a sheet of thick polythene. It once fitted inside a small portable 14MHz direct conversion transceiver.

Transmitter On A Box!

To illustrate the principle of no-cost circuit boards, I offer a little transmitter built on a small cardboard box which I found lurking inside my desk drawer. This not only provided the circuit board but also mounting panels for the connectors and a trimmer capacitor. The general appearance can be seen from the heading photograph.

The circuit of the 'Card Transmitter' is shown in **Fig. 1**. The circuit is borrowed and is based on the 'Pippin Transmitter' by **Dr. Mike King G3MY**, which appeared in *Sprat* some years ago. However, this version has more comprehensive r.f. filtering and a wider VXO range.

The oscillator, Tr1, is a Colpitts crystal oscillator on the 40 metre band. I used a 2N2222A for Tr1 but many other devices (BC108, BC109, BC182, 2N706, etc.) could be used for the oscillator. The output is taken from a low value collector load resistor. A trimmer capacitor between the crystal and ground allows a limited shift of the oscillator frequency producing a VXO (Variable Crystal Oscillator).

The circuit is somewhat like the GM3OXX 'STX' transmitter in that a *pnp* device is used for the power amplifier (p.a.) stage. This transmitter uses direct coupling between the oscillator and the power amplifier. This gives a small amount of forward bias to the p.a. stage.

However, there's not enough bias to switch the p.a. on but enough to make it easier to drive from the oscillator signal. The oscillator is keyed in the emitter so when the key is up there is no forward bias on the p.a. stage.

The result is excellent isolation of the p.a. from the oscillator. There is little, if any, 'pulling' of the oscillator by the p.a. For an oscillator-keyed transmitter, the stability and keying characteristics are very impressive. It really is a simple but elegant little transmitter circuit!

Several Types Suitable

I used a 2N2905A *pnp* transistor for the p.a. transistor but several types are suitable including 2N2904A, AFY64, BFX29, BFX30, 2N3905, etc. **Warning: the p.a. device requires a heat-sink**. My p.a. stage was very robust and survived open circuit and short-circuit conditions and a typical output should be in the order of 1W

It is odd to look at p.a. circuits 'up-side-down' isn't it? But you'll soon get used to the different view!

The r.f. choke (r.f.c.) in the collector is 10 turns of 32s.w.g. wire wound through a ferrite bead. The output passes through a seven-element low-pass filter derived from the W3NQN SVC Low-pass Filter data. This may seem overkill for a 1W transmitter but high harmonic output is just as illegal from 1W as it is from 100W.

Fig. 3: Wiring the transmitter is exceedingly simple using the same technique for a p.c.b. lay-out. The whole assembly looks neat and innovative and will appeal to those of us who enjoy 'minimalist' radio construction!

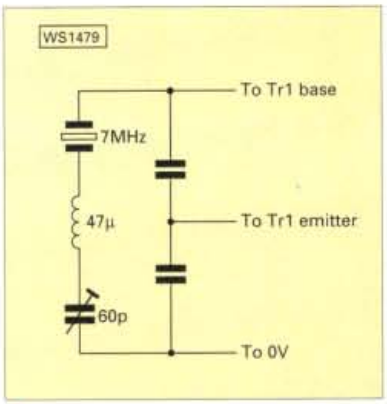


Fig. 2: Modification to provide wider range variable crystal oscillator (VXO tuning for the 'Card TX'. In his prototype G3RJV achieved coverage from 7.002 to 7.036MHz (see text).

Wider Range Option

The diagram, **Fig. 2**, shows a wider range VXO option. A trimmer capacitor in Fig.1 allows the frequency of the crystal to be 'pulled' upwards in frequency. Adding inductance pulls the frequency downwards.

The combination shown in Fig. 2 provides a VXO range either side of the nominal crystal frequency. My oscillator used a 7.030MHz crystal (the International QRP Calling Frequency) and the arrangement in Fig. 2. gave me a coverage from 7.002 to 7.036MHz.

Note: *Surprised at the frequency coverage provided by this option, I spoke to George and he said "You'll be surprised at the 'swing' this circuit gives you Rob - have a go yourself! (I will George...I will!)* ***Editor.***

Crystals

Suitable 7.030MHz crystals are available from **Chris Rees G3TUX** at **The QRP Component Company, PO Box 88, Haslemere, Surrey GU27 2RF. Tel: (01428) 661501**

Simplicity Itself

Building the transmitter is simplicity itself and the photograph tells the whole story. (I followed the circuit diagram layout for the circuit board layout). Holes for inserting the component leads were made using a p.c.b. drill held in a small collet but almost any sharp tool would do the job.

All the interconnections (tracks) were made using surplus lead length on the leaded components and some tinned 22s.w.g. wire where this was required. An earth (or ground) bus-bar goes round two sides of the box and another smaller bus-bar carries the 12V supply line.

Using a box, I was able to mount the output and key sockets, with the trimmer, on the sides. This makes the whole transmitter self-contained.

The result is a useful and very cheap transmitter. All the parts came from stock and the box came from somewhere or other. Who said Amateur Radio is expensive? Why not make a change from 'Black Box' technology to 'Brown (cardboard) Box' instead? *PW*

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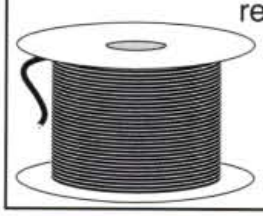

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Valve&Vintage

This month - whilst wearing the obligatory vintage 'Wireless Shop' brown dust-coast - Phil Cadman G4JCP admits to doing something seriously silly with valves and blames the Editor for the idea!

Earlier this year I was suffering from an acute lack of fun in my Amateur Radio activities. The only cure was to do something seriously silly! Appropriately, the Editor's April 'Radio Basics' column came to my rescue. The sight of series-connected PP3 batteries gave me an idea. What about making a one-battery-valve transmitter, powered by a couple of 9V PP3s, running a colossal 1mW output using as many surplus parts as possible. (suitable companion receiver designs have also been featured in the 'Radio Basics' column this year, in May and June).

The circuit of the transmitter is shown in **Fig. 1**, is very simple and can be built on the copper side of p.c.b. laminate using 'glued islands' for connecting components. The **Rev. George Dobbs G3RJV** described the technique in 'Carrying on the Practical Way' in the February 2000 issue of *PW* and I found the method worked very well indeed.

Going back to Fig. 1, the resistors need be no larger than 0.25W types and all the 10nF capacitors are disc ceramic types commonly used for decoupling integrated circuits. **But make sure they're rated at 30V (or more, depending on the h.t. voltage you choose)**. This little transmitter runs so little power any crystal will be suitable for XL1, even when you use a modern crystal **which are much more susceptible to damage** through 'over-driving'.

Junk Box

A little digging around in my junk box revealed several 3686.4kHz crystals, so I used one of those. Computer enthusiasts might recognise 3686.4kHz as a frequency used by some baud-rate generators. Another common baud-rate frequency is 1843.2kHz.

Most fundamental-mode crystals are specified for a 30pF load ... the reason for including trimmer C4. The value isn't critical as long as you can adjust it to around 20pF (Stray capacitance will make up the other few pF).

The combination of L1 and C6 must resonate at the crystal frequency. Old radio handbooks recommend 23μH for 3.5MHz operation and 7.5μH for 7MHz. That being so, an appropriate component for C6 would be a 150pF, air-spaced variable, but an old 365pF broadcast type will work.

A cheap inductance meter solved the problem of how to wind L1 accurately. I managed to get around 23μH with 25 turns of insulated hook-up wire wound (at 20 turns per inch) on a 1.7in (43mm) diameter cardboard former. The coupling winding, L2, is two turns of the same wire, coiled so that they can slide over L1.

The meter, M1, is essential, although it doesn't have to be accurate. The full scale deflection (f.s.d.) required depends on how much power you want to run. I found a 1mA f.s.d. meter ideal when running 1mW output.

The resistor R3 is a 'parasitic stopper'. However, quite honestly, I doubt whether parasitic oscillations would ever be a problem with a transmitter like this 'milliwatter' project!

Resistor R4 is desirable if a 1.5V cell is used as the l.t. supply. The DL96's filament is rated at a nominal 1.4V, but I rather prefer 1.3V. With so little cathode current being drawn the filament voltage can be reduced with no ill-effects. If you want to use a 1.2V NiCad as the l.t. supply, or your D-cell is rather tired, resistor R4 should be shorted out.

Incidentally, I only chose the DL96 because of its low - 50mA - filament current. The DL94 is pin-compatible and can be used with no circuit modifications, but it does take double the filament current of the DL96. (You needn't necessarily change the value of R4, though).

Another valve to try - indeed, it may even be better suited to very low voltage operation - is the 100mA-filament DL92. However, the pin connections are different and they don't look so well suited for operation at radio frequencies (Let me know if you try one).

Initially, I used two PP3-type batteries in series to give an h.t. of 18V. However, you can use a higher voltage so long as the anode current **never exceeds 6mA**. A 47Ω resistor, R5, wired across the antenna and earth terminals, provides a suitable dummy load.

Because the power output is so low, the best way to check the operation of the transmitter is with either an oscilloscope or an r.f. voltmeter. Failing that - and for use in actual operation - an ordinary, moving-coil voltmeter connected between the test point and earth terminals will give some indication of the transmitter's output.

Prototype Power

On completion of my prototype I connected a 1.5V D-cell to the l.t. terminals and ... the transmitter flatly refused to work! Actually, I half expected that to happen (Honest).

The B7G valve-base pin layout of the DL96 is arranged so that the stray capacitance between the control grid circuit and the anode circuit can be kept very low. Great ... except this circuit relies on a measure of stray capacitance to work.

To artificially increase the stray capacitance, simply connect a short (about 50mm) piece of insulated wire to pin 2 (anode) on the valve holder. Position this wire close to the wiring that's connected to pin 6 (control grid) on the valve holder **but do not make electrical contact!** It might take a bit of trial-and-error but you should get the circuit to oscillate at some setting of C6.

Having done the modification, my transmitter burst into life and, this time, really did surprise me. Let me explain: According to the text books, as

No 'chassis' needed for this month's project- all you need for an 'old fashioned' circuit is modern printed circuit board laminate!

capacitor C6 is gradually reduced from maximum capacity, the anode current should suddenly dip as the circuit begins to oscillate - see **Fig. 2.** Have a look in an old radio handbook if you want to know the details. As C6 is further reduced, the anode current should increase until the circuit stops oscillating.

The dip in the anode current is due to the negative grid bias developed when the circuit oscillates, and due to the increase in the dynamic resistance of L1/C6 at resonance. The dip is somewhat shallower when the transmitter is working into a load.

Well, I got the exact reverse! As you can see from **Fig. 3,** the anode current increased as the circuit began to oscillate. And adjusting C6 away from resonance caused a decrease in anode current.

To give you some idea of the voltages and currents involved, the h.t. was 19V and the anode current was 0.4mA (400μA - **yes microamps**) with the peak at 0.7mA. In Fig. 3, the dashed line is what happens when C6 is adjusted from minimum to maximum capacity; the peak in anode current is slightly higher.

No, the valve wasn't faulty! I tried five DL96s and one DL94, and all but one behaved the same. The only one that actually went by the book - although the dip was rather slight - was an 'unbranded' fairly new DL96 . The unusual '**Cadman**'* effect must be due to the very low anode and screen voltages involved. I have my own theories, but I'd be very interested in what other people think.

Editor's choice of term. I too experienced Phil's 'discovery with low h.t., so anything that works in the opposite way to that expected will now be known as the 'Cadman Effect' in my workshop!

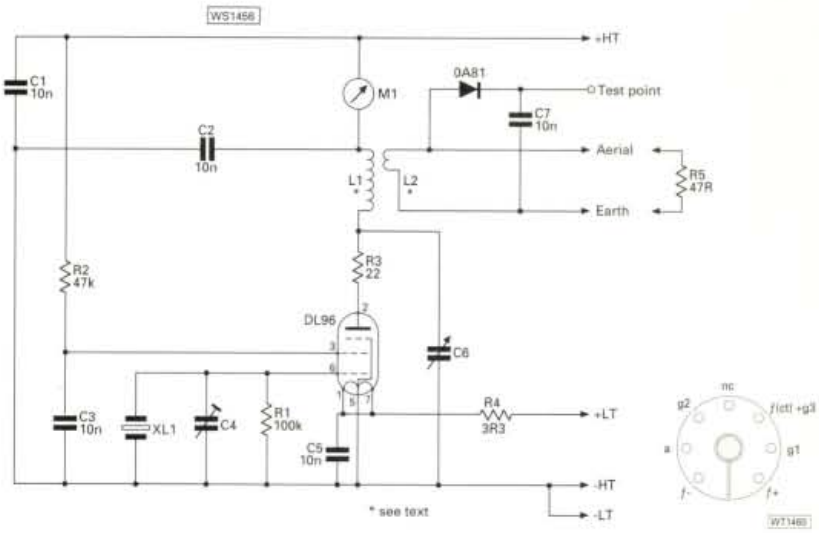

Fig. 1: Circuit of the simple very low power transmitter with the valve pin-out (viewed from the underside of the B7G base) of the DL96/94valves as an inset (see text).

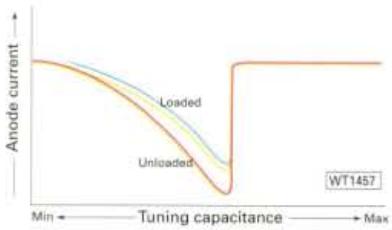

Fig. 2: According to the text books, as capacitor C6 is gradually reduced from maximum capacity, the anode current should suddenly dip as the circuit begins to oscillate (see text and the 'Cadman' effect in Fig. 3).

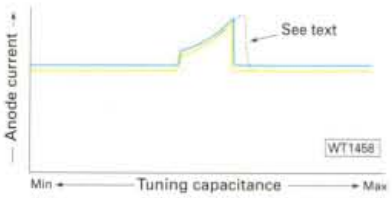

Fig. 3: What really happened! The dashed line is what happens when C6 is adjusted from minimum to maximum capacity; the peak in anode current is slightly higher (see text).

Tuning & Transmitting

Tuning the transmitter is simply a case of reducing the value of C6 from maximum until the anode current suddenly changes (I'm not saying which way!). The correct tuning position is a little further on.

By moving L2 (which should be positioned at the 'earthy' end of L1 - the end connected to the meter) with respect to L1, you can adjust the loading on the transmitter and hence the power output.

If the setting of C6 is correct and the loading isn't too great, the transmitter should start-up immediately and cleanly, with no sign of chirp, as soon as the h.t. is applied. For actual QSOs you can put a Morse key in series with the meter. But be aware, this means both sides of the key are above ground and so electronic keyers **may not be suitable**.

My friend **David Reynolds G3ZPF**, two miles distant listened on 3.686MHz. In case of problems, we had a talk-back channel on 70MHz. In the event, he gave me a 559 report, although he did say that looking at his S-meter, I was more like an S1 than an S5!

All this reminded me of the 1000 Miles Per Watt QRP award, sponsored by the QRP Amateur Radio Club International. To find out if a QSO qualifies for the award you simply divide the QSO distance by the transmitter power (output) in Watts.

Unfortunately, dividing the distance by the transmitter power favours stations running very low powers communicating over short distances. My contact with G3ZPF was hardly momentous but according to the formula I'd managed 2,100 miles-per-watt.

For a better assessment of QRP performance, I'm suggesting miles-per-root-watt (m.p.r.W). That is, divide the distance by the square-root of the transmitter power in watts. Now my 1mW transmitter was only managing 66 m.p.r.W. A more realistic figure, I think. If you want the details behind the m.p.r.W formula, take a look at: www.valveandvintage.co.uk/data Alternatively, send an s.a.s.e. to my home address for a printed copy.

I'd like to think my little transmitter could manage 1,000 m.p.r.W - that's 32 miles at 1mW output - so how about giving it a go? The transmitter only takes a couple of hours to build and if you've not tried QRP operation before, this could be a good place to start!

PW

I see it's 'closing time', so cheerio until it's my turn 'in the shop' again. Please send your comments and letters to me either **via the *PW* offices, via E-mail to phil@valveandvintage.co.uk or direct to: 21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**. Good QRP'ing!

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VHF REPORT

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

DAVID BUTLER G4ASR BRINGS NEWS OF MARITIME MOBILE ACTIVITY AND ALSO REPORTS OF FANTASTIC OPENINGS ON THE 50 & 144MHZ BANDS DURING JUNE.

Firstly this month, **Andy Adams G0KZG** provides details of his trips on board the Royal Research Ship *Charles Darwin*. On 14 July he sailed from Glasgow and should, by the time *PW* appears, be operating as **G0KZG/MM** from locations in the Northeast Atlantic.

On 14 August, he expects to be docked in Lerwick, Shetland Islands to take on provisions. Then follows a 4-week cruise again in the North East Atlantic area. They'll be between the Shetland Islands and the Faroe Islands covering locator squares IO59, 69, 79 and IP50, 60, 70, 71, 80, 81.

The *RRS Charles Darwin* will end up in Southampton (IO90) on 15 September, the trip from the Atlantic working area being made via the North Sea. Andy also expects to activate squares, JO08, 07, 06, 05, 04, 14, 13, 12. This will provide an ideal opportunity for stations with simple v.h.f. stations to contact a 'wet' square or two. The station of G0KZG/MM will operate on 144.120MHz for meteor scatter schedules, 144.125MHz for random (unscheduled) meteor scatter operation and 144.240MHz for general c.w. and s.s.b. contacts. Times of operation will be between 0300-0600UTC and 1700-2000UTC with some activity on weekend afternoons subject to workloads.

Fig. 1.

Another station, operated by **G7KES**, will be active on the 50MHz band. He usually listens on 50.110MHz and 50.150MHz. The photograph, **Fig. 1.**, shows the 11-element F9FT Yagi for the 144MHz band located towards the stern of the *RRS Charles Darwin*. In the background is the new P&O superliner *Aurora* (an apt name!) passing by in Southampton water.

CONSIDERABLE AMOUNT OF DX

As any active v.h.f. operator will tell you there was a considerable amount of DX available on the 50, 70 and.144MHz bands during June. In fact all continents (Africa, Asia, Europe, Oceania, South America and North America) were heard, if not worked, on the 50MHz band. The primary modes to enable this were Sporadic-E (Sp-E) and trans-equatorial propagation (t.e.p.).

Propagation via Sp-E was really impressive with the 50MHz band open via this mode every single day during June from somewhere in the UK. Conditions on the 144MHz band were equally good with enhancements in tropospheric propagation enabling contacts to be made from central England into southern Europe on many days during June. However, it's up in the E-layer where the real DX contacts are created and I'm pleased to report that this area was fully 'charged' on many occasions during the reporting period.

Propagation via Sp-E enabled contacts to be made in excess of 2000km, and was significantly better on the 144MHz band than it has been for many years. Ionospheric scatter, a relatively rare type of propagation (at this frequency) was also noticeably better, either that or a higher proportion of DXers are realising how to achieve contacts via that mode! Also up in the E-layer (around 90-120km) is where auroral backscatter contacts take place and the increased geomagnetic activity ensured that there were a few openings of this type on the band during the month.

Meteors also ionise in the E-layer and as June is the most productive month for sporadic meteors (that is normal day-to-day meteors as opposed to monthly shower meteors) it came as no surprise to the 'ping-jockies' that daily meteor scatter contacts during June were much more productive.

THE 50MHZ BAND

During June the 50MHz band was open every single day via single-hop Sp-E propagation. All of Europe was in there including rarities such as C31HK (Andorra), HB0/DL4MP (Liechtenstein), HV5PUL (Vatican City), JX7DFA (Jan Mayen), OH0RB (Aland Island), OX2K (Greenland), TF3FK (Iceland) and ZA/N7BHC (Albania). The double-hoppers included the stations of JW5RIA (Svarlbard), JY9NX (Jordan), OD5PN (Lebanon), TA1AZ (Turkey), 4Z4TL (Israel) and numerous Russian stations whose legitimacy has yet to be proven.

I counted at least 25 days in June when the 50MHz band was open to Africa, South America and North America. Openings into deepest Africa occurred on at least 15 days, mostly around midday or early evening. A representative sample includes the stations of FH/TU5AX (Mayotte), FR1GZ (Reunion), TR8XX (Gabon), ZD7VC (St. Helena), ZS6BTE (South Africa), Z22JE (Zimbabwe), 5R8DA (Madagascar), 7Q7RM (Malawi) and 9J2BO (Zambia). Openings into South America, normally from 1700UTC onwards, included choice DX such as CX4ABA (Uruguay), FY5KE (French Guyana), LU9EHF (Argentina), PY5CC (Brazil) and PZ5RA (Surinam).

There's not very much 50MHz activity from the Caribbean islands so the competition for the DX stations is very intense. Notables heard battling it out with the pile-ups were KP4A, KP4EIT, KP4JN and WP4G (all in Puerto Rico), 8P9HW (Barbados) and J87AB (St. Vincent).

Mike Wise J87AB/G0GPX will be active from St. Vincent until the end of the year. On the 50MHz band he runs an Icom IC-706 MkII transceiver and a 5-element F9FT Yagi. Later in the evening, normally from 2230UTC onwards, the band can open up to North America. I recorded six days 9, 12, 13, 20, 22 and 23 June when this occurred but there were probably a few more.

A sample of typical DX included the stations of K1SIX, W2RTH, WA4NJP, (USA call areas) and VE1YX, VE9AA, VO1JN (Canadian call areas). Interestingly there were reports of Australian signals being heard in the UK. **Roy**

Neilson GM0EFT heard the station of VK8AH (Australia) calling CQ on and off for 30 minutes between 1140-1210UTC on 30 June. His c.w. signals peaked 549 but were mainly 529 with fading.

A few UK operators replied but VK8AH couldn't copy, due to the high level of video interference from co-located TV transmitters. The stations of VK6JQ and YB5QZ (Indonesia) were also heard by stations in southern England but no two-way contacts were made. Incidentally the best period for contacts with VK will be during October/November and March/April between the hours of 0800-1100UTC.

John Hilton GM1ZVJ (IO86) is active on 50MHz running 100W from an Alinco DX-70TH transceiver into a 5-element F9FT Yagi. On 31 May he contacted TF3MLT for country no.46 and mentions that this was the first time in two years that he had heard an Icelandic station from his QTH.

Contacts during the first two weeks of June included F6IPR (JN27), SM3NRY (JP82), SO8FHG (KO10), SQ3HTJ (JO83), YL3AG (KO26) and 9A9AA (JN92). On June 12 at 2335UTC he made it across the Atlantic Ocean to the station of VE1YX (FN74) and on the following day contacted an Italian station II0JX using a special 'Jubilee Year' call sign.

"I never thought I would do so well," exclaimed **Jamie GW7SMV (IO81)**. On 9 June he contacted stations in Africa, Asia, Europe and South America bringing his score to 96 DXCC countries, 77 of them worked in the first 5 months of this year. Among the DX worked on 9 June were CN2DX, CT3FT, CU8AO, JY4NE, OD5PN, PZ5RA, SV4FGT, UN7IY and Z21FO.

Mark G1PIE (IO83) reports that during June his DX contacts included SV1EPP (KN17), SV8CS (KN07) and UU2JJ (KM75). Best of all though was a multi-hop Sp-E opening to North America late in the evening of 12 June. Commencing at 2330UTC he contacted the stations of K1GUP, K1SIX, N1RWY, NM1W, W1EN, W1GCI, W1RA and AA2DR. Mark uses a Yaesu FT-920 transceiver running 80W into a 3-element Chelcom Yagi. He mentions that he used a Cushcraft Ringo vertical antenna to contact one of the North American stations.

Last month I mentioned that 12 year old **Christopher Young 2W1HUK** (IO81) had recently taken the RAE. He passed and has reserved the call sign MW1TYO after his Dad's callsign **GW6TYO**. Congratulations! Using his Novice call 2W1HUK he reports making s.s.b. contacts with the stations of FH/TU5AX and PZ5RA on the 50MHz band.

THE 144MHZ BAND

Conditions on the 144MHz band were very good in June. Tropo, Aurora, Sp-E, ionoscatter, meteor scatter, it was all there! There were seven days, 1, 7, 11, 12, 15, 16, 17 June when the band was open from central and southern UK into northern Spain. Some of the stations worked included EA1BLA (IN53), EB1ENP (IN62), EA1CRK (IN73), EA2AVM (IN82) and EA2ADJ (IN93). The stations of HA7P, I2FAK (JN45) and OK1VVT/P (JO60) were also worked by a few observant stations.

Toby DH1TW (JN48) reports that during the evening of 1 June he noticed a nice tropo opening into southern England. Running an Icom IC-720A h.f. transceiver and transverter, a 60W amplifier and 11-element DL6WU Yagi he made s.s.b. contacts with the stations of M0BTZ (IO91), G3NAQ (IO91), G4DOL (IO80) and G8HGN (JO01). Best DX of the event was M0BKL at 956km and G6YAY (both located in IO80) at 962km.

Dick PA4VHF (JO32) says that conditions were very good at the start of the *PW* 144MHz QRP contest on June 18. It was a typical ducting event that decayed slowly as the lower atmosphere warmed up and by 1130UTC it had all but disappeared. He worked 18 stations which were over 500km away his best DX contacts with GW0NMR/P (IO82), GW0PTH/P (IO83), GW0PZO/P (IO83), GW7JYK/P (IO82), GW8ZRE/P (IO83), all around 650km and GI6ATZ (IO74) at 850km. Dick also mentioned that the stations of G0TOO/P (3W into an 11-element Yagi) and M0AFC/P (3W into a 13-element Yagi) were both peaking S9+ over a path of around 620km.

ASTRO ALERT

On June 6 the Solar Terrestrial Dispatch (http://www.spacew.com) issued an 'Astro Alert' concerning a major X-Class solar flare. It warned that an enormous coronal mass ejection (c.m.e.) associated with the flare was heading our way and was expected to slam into the Earth's magnetosphere sometime during the mid-to-late UTC hours of June 8.

The velocity of the c.m.e. was clocked to near 1,200km per second (4.3 million km per hour or 2.7 million miles per hour) by measuring the radio emissions created by the supersonic shockwave of the disturbance as it travelled outward through the inner part of the solar corona. Expectations were high but until a c.m.e. impacts the Earth's magnetosphere you can't be sure that the subsequent auroral backscatter opening will be any good.

The event wasn't exceptional but there a few DX stations were worked. The opening in the UK commenced at 1530UTC with the station of MM0BQI (IO85) hearing the SK4MPI beacon peaking 53A. At my QTH (IO81) my first c.w. contact was made at 1609UTC with the station of GM0CLN (IO85). Further c.w. contacts were with MM0BQI, GI4OWA (IO64), GM1XOI (IO85), GM3WOJ (IO77), GM4BYF (IO85), GM4ILS (IO87) and an s.s.b. contact with GM0PWS (IO68) on the Isle of Lewis. At 1740UTC I managed to crack the pile-up of dozens of DL stations to work the Latvian station of YL3AG (KO26) over a 1820km path.

Another station active from an ex-Russian republic was **Vidas LY2SA** (KO14) located in Lithuania. He runs an Icon IC-821H transceiver, 250W amplifier and a 16-element KLM Yagi. Vidas made a total of 58 contacts with stations in 11 countries his best c.w. contacts being G4SWX (JO02) at 1460km, G4XBF (IO91) at 1620km and G7RAU (IO90) at 1681km.

DX CONTACTS

In my opinion the best DX contacts on the 144MHz band are always accomplished via Sp-E propagation. Although it's relatively rare at these frequencies the tuned-in DX operator will always catch a handful of openings each season. This year has been exceptional with four days of openings on 27, 28, 29 and 31st May. This situation continued into the following month with further openings on 9, 10, 11, 13, 24, 27 and 30th June.

Jamie GW7SMV managed to find EA6SA, EA6XQ (both in JM19) and EA7GBG (IM67) during a short opening on June 9 and 9A3MR and 9A3XR (different stations!) on11 June. A few days later between 2013-2046UTC on 13 June he contacted F1NSR (JN33), IZ0COK (JN61), IK1PAG (JN35), IK1/DK5DQ/P (JN43) and IZ5EME (JN61). At my QTH in Herefordshire I made s.s.b. contacts during the opening on June 9 with EA5HB (IM98), EB5BCF (IM99), EA6XQ (JM19) and I7CSB (JN71) and on June 11 a solitary QSO with 9A3XR (JN83).

Alec Trusler G0FIG (IO90) reports working 9A3MR (JN73) on June 11, IZ5EME (JN52) on 13 June and IT9VDQ (JM68) and 9H1CG (JM75) on 24 June. The station of Gius IT9VDQ, in an ideal location for Sp-E, made 91 contacts including G1HWY, G3JHM, G4DOL and M0BKL, all incidentally located in southern England.

Reg Wooley G8VHI (IO92) is now active from his new QTH near Nuneaton, Warwickshire. On the 144MHz band he is using a Yaesu FT-225RD transceiver, a 60W amplifier and two stacked 14-element Yagis fed with Andrew FSJ4-50 hardline feeder. On 9 June he worked EA6XQ (Balearic Islands) and I8MPO (JN70). Other s.s.b. contacts in the month included I7UGO/7 and IK7UXU (JN81) on June 11 and F1NSR, IK1/DK5DQ/P and IK1MTZ (JN35) on June 13. Earlier, around 1900UTC Reg also contacted S51DI and S53J on the 70MHz band.

Ray James GM4CXM (IO75) running 400W into a 9-element Vargarda Yagi caught a brief opening between 2010-2033UTC on 27 June. His s.s.b. contacts were with EA1CLR (IN72), EA4CTF (IM89), EA5DIT (IM99) and EA7GTF (IM87).

DEADLINES

That's it again for another month. Next time around I'll be reviewing what happened when a major contest (v.h.f. field day) coincided with a large Sp-E opening!

Forward any news, views, comments or photographs to the address and by the date given at the top of the column.

THANKS FOR YOUR LETTERS AND GOOD LUCK WITH THE DX. SEE YOU AGAIN NEXT MONTH.

73 David G4ASR.

HF FAR & WIDE

BY CARL MASON GW0VSW

12 LLWYN-Y-BRYN
CRYMLYN PARC
SKEWEN
WEST GLAMORGAN
SA10 6DZ

Tel: (01792) 817321 E-MAIL: carl@gw0vsw.freeserve.co.uk

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

I was lucky this month to have a week's holiday on the Island of Minorca where I operated as EA6/GW0VSW. The h.f. conditions during the day were terrible, resulting in me getting up around 0500UTC to stand any chance of making a QSO!

Contacts using QRP were also very hard going and I was glad to have my IC-706 with me, as it enabled me to operate with slightly higher power and at least receive replies to my CQ calls! The antenna was a half-size G5RV, which worked much better than expected, especially as it was folded around the roof of the apartment just above us.

Contacts were made as far away as Australia (VK) and New Zealand (ZL) on 14MHz using c.w. before the bands closed a few hours later. It was frustrating at times to have stations come up on frequency and call CQ without first asking if that frequency was in use. This happened on a number of occasions during the week when I was working 2xQRP. This resulted in the loss of a several contacts. It only takes a few seconds to send 'QRL' or to ask "Is this frequency in use" allowing time for any reply!

News now of a new kit from MFJ Enterprises. Their single band superhet Cub transceiver for either the 3.5, 7, 10, 14, 17 and 21MHz bands is now available from Waters & Stanton.

The kit includes surface mounted and conventional components mounted on a circuit board that fits in to a case, 90 x 90 x 38mm. Tuning range will be 50-60 kHz depending on band and MFJ say the Cub can be built in about three hours which includes setting up. The power output is adjustable up to 2W and the transceiver has power consumption of just 40mA on receive and 380mA on transmit. Sounds ideal for portable battery operation! **(see review of the Cub on pages 16 & 17).**

CATCH THE DX

Fred Zeil WF6Z will be in China as part of the American K2 North Ridge Expedition climbing team until 15 August. Look for him operating as BT0QGL on 7, 14, 21 & 28MHz. QSL via K6EXO.

Antonio Pereira CT1EGH is very active from East Timor as 4W6GH. He can usually be found on 14, 18 and 21MHz between 1300 and 1630 UTC using s.s.b. and RTTY. QSL via home call.

Masafumi Ishihara JA6GXK will be active from Meshima Island AS-056 (Danjo Archipelago) during August 22 - September 1st, September 12 - 22nd and October 13-24th. **This is not a Dxpedition** and he will only operate in his spare time. Look for him on 14260 or 21260 ±10KHz (QSL only via the Bureau).

Most of our reporters have complained of very mixed conditions on the h.f. bands, despite this, they have still managed to work some good and exotic DX!

CARL MASON GW0VSW ROUNDS-UP YOUR REPORTS FROM THE HF BANDS, AND BY THE LOOKS OF IT THEY HAVE BEEN VERY IRRATIC THIS MONTH.

THE 7, 10 & 14MHZ BANDS

Sean Gilbert G4UCJ in Milton Keynes starts us off and says: "Conditions have been up and down this month. The solar flares have been playing havoc with the bands but I have still managed to pull a few good ones out of the ether. Despite the odd conditions I have managed to work more DX this year than at a comparable time last year, so things can't be so bad". Sean used his Alinco DX-70 and half-size G5RV on 7MHz to reach OD5/OK1MU (Lebanon) and P49V (Aruba) both around 2359UTC with 30W of c.w.

All c.w. operator **Ted Trowell G2HKU** on the Isle of Sheppey used his G5RV and QRP on 10MHz to work OY/DL2VFR (Faroe Islands) and HF0POL (Antarctica). Ted says, "My low power rig is a Icom 721S which is not available here. It was bought back from Japan by an Icom director and was originally intended for internal (Japanese) novice use. Modified for our bands, the QRP only rig is really an IC-725 without the PA stage. It works fine and I have been very pleased with it".

Next up is **Leighton Smart GW0LBI** in Trelewis who has been listening and operating on 14MHz. Using a MFJ-9020 single band QRP transceiver and 3W of c.w. into a dipole cut for the band, Leighton worked

Jayne 2E0ASR, now M5ASR, received this card for a QSO using just 3W of s.s.b. into a dipole in her attic.

HB0/DA1WA (Liechtenstein), UA9AJ (Asiatic Russia), K2TQC (U.S.A.), 4K9C (Azerbaijan) and VE1ALZ (Canada) between 1800 and 2200UTC. His listening log includes VK3KE (Australia) working N3KIL (U.S.A.) at 0535UTC, ZL1ACE (New Zealand) working in a local net at 1024UTC, FM5GU (Martinique) working OM6TA (Slovak Republic) at 2258 and finally VU2RTF (India) working RW3QFY (European Russia) at 0028UTC. Glad to see you're having fun with your new rig Leighton!

Also on 14MHz this month is **Robin Trebilcock GW3ZCF** in Bishopston who also found conditions 'unstable'. Robin said "I found signals dropped from S9 to unreadable in a just a matter of seconds. I made just one s.s.b. contact VK6MV (Australia) at 0819UTC but had lots of fun using PSK31". Stations that made it into his log using this mode include YB4JIM (Indonesia), PY4KS (Brazil), ZD7MY (St. Helena), CP1FQ (Bolivia) and LU6YBF (Argentina). All contacts were made between 1930 and 2300UTC.

THE 18 & 21MHZ BANDS

Over now to **Don Mclean G3NOF** in Yeovil who says "I hardly know how to describe the bands this month, as I've found them so poor. There seems to have been a series of 'solar events', that have caused the bands to completely close up at times. During the day the h.f. bands have been almost dead, only opening up again early in the evenings. The 18MHz band did open to Australia on the short path around 0700UTC but this was only for very short periods". Even with these conditions Don has still managed to find FR5DX (Reunion Island), CE0ZIS (Juan Fernandez), CE3CDV (Chile), OX2K (Greenland) and SU1SK (Egypt) between 2000 and 2230UTC using s.s.b. and 100W.

Ted G2HKU used his QRP to work OH0/OH7MM (Aland Island) at 1450 and JW/DL3NRV (Svalbard) at 1500UTC. QRO contacts with his Ten Tec Omni V and HF6 vertical included BV3/DJ3KR (Taiwan) and 9M2TO (Malaysia) both at 1900UTC.

On 21MHz s.s.b. using his Sangean ATS909 receiver with a long wire antenna, Leighton GW0LBI heard VU2SDN (India) working S57AC (Slovenia) at 0925 and 4S7EA (Sri Lanka) calling CQ again at 2230UTC with no takers!

Back now to c.w. and the log of Sean G4UCJ who did well to bag FW/G3SXW (Wallis Island) at 1024UTC, 3V8BB (Tunisia) at 1220UTC followed a little later by NH7A (Hawaii) at 1626UTC. PZ5JR (Surinam), 6Y8A (Jamaica), HC8N (Galapagos Island), TE6U (Costa Rica), ZF2TR (Cayman Island) and VQ9VK (Chagos Island) were all worked in the evening between 1700 and 2300UTC.

THE 24 & 28MHZ BANDS

On 24MHz Don G3NOF used s.s.b. to reach FH/TU5AX (Mayotte) at 1706UTC while Ted G2HKU used c.w. again to reach 5B4/YL2RR (Cyprus) and ZS5LB (South Africa), both stations around 1500UTC.

Finally, to 28MHz where we usually find our reporters very active. However, this month the band has been very poor with a marked decrease in the amount of DX worked. Despite this, our reporters have managed to weed out one or two contacts starting with Ted G2HKU who found TF3IRA (Iceland), VP5GA (Turks & Caicos Islands) at 1400UTC and a nice QRP contact with J28/F5LDY (Djibouti) at 1500UTC.

Sean G4UCJ managed YI9OM (Iraq), TU2XZ (Ivory Coast), P49V (Aruba) and V25A (Antigua) all contacts made using c.w. around 1430UTC. Using PSK31 Robin GW3ZCF worked CP1FQ (Bolivia) and 5H3MS (Tanzania) at 1500UTC.

Last but by no means least is Don G3NOF who operated later in the day around 1730UTC. His s.s.b. reached out to VQ9NL (Chagos Island), FG/F5SNY (Guadeloupe) and 9A1OC (Croatia) on Palagruza Island EU-090.

THE QSL CORNER

It would appear that **Denzil Evans GW3CDP** has a slight problem. Denzil says "I was the QSL manager for Serge EK4JJ and his son Alex EK4GK up until 1 April 1999. However, both Serge and Alex wanted their cards sent to them direct and requested from that date all QSLs should go to their home address. Despite this, I am still receiving bureau cards for both these stations with no way of passing them on". If readers have worked either station could they please send another card direct to

S. K. Mnatsakanyan, 9A/33, 2 Norki Massiv, Yerevan, 375062, Armenia.

Here's this month's list of QSL information: 3W2LC via VK6LC, 4W6GH via CT1EGH, 9A1OC via 9A7K, A45XM via A47RS, E20REX via E21EIC, E4/DL7FER via DL6FCK, N6M via WC6DX, UE0LEZ via UA0MF, V31OM via DJ6SI and VQ9NL via W4NML.

SIGNING OFF

That's just about it for this month but there's just time to mention the International Lighthouse/Lightship weekend starting at 0001UTC on Saturday 19 until 2359UTC Sunday 20 August. Last year 218 Amateur Radio stations were set up at lighthouses and lightships in 39 countries and 6 continents from Finland to the Falkland Islands. This year is going to be just as popular with Chile and Turkey taking part for the first time.

Special thanks to all our reporters for their time and effort in putting together the reports and logs for this column. Also thanks to **Ted Mirgliotta** and the OPDX Bulletin for this month's DX information.

AS USUAL REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH. DETAILS AT THE TOP OF THIS COLUMN.

73, Carl GW0VSW

PW LISTENING & OPERATING WATCH LIST. (All times UTC)

Charlie Blake M0AIJ listens and operates:
0500-0700 on 7.061MHz s.s.b. with an NRD-525 receiver and Sloping Wire antenna and is also busy with his mobile rig.

Sean Gilburt G4UJC operates:
Around 0700-1100 and 2100-0000 7 days a week on all bands using an FT-307 and Alinco DX-70 tranceivers at 3/30W into a loft mounted G5RV dipole antenna.

Rob Mannion G3FXD listens and operates:
Weekdays and weekends, 1800-1830 on 3.7MHz with 100W s.s.b. and 3.530 or 3.560MHz and 18.105MHz QRP c.w. using an Alinco DX-70 transceiver and a long wire or mobile whips.

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

Leighton Smart GW0LBI operates:
On 14.060MHZ c.w. mornings at 0800 and weekday evenings between 1900 and 2230 using a MFJ-9020 QRP transceiver and 3W into a dipole antenna cut for 14MHz.

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

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

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

DATASCAPE

BY ROGER COOKE G3LDI

TEL: (01508) 570278

E-MAIL: rcooke@g3ldi.freeserve.co.uk

PACKET: G3LDI@GB7LDI

ROGER COOKE G3LDI REPORTS ON USB PORT FEEDBACK, CLIK DRIVES AND HAS MORE SITES FOR YOU TO 'SURF'.

The information I gave in my May column regarding USB ports, has resulted in a couple of requests for further information, in particular the pin-outs. There are several sites on the Internet with lots of information, so I suggest that a search with Google be used with the words USB + PIN-OUT.

One of the requests came from **Godfrey Manning G4GLM** who also mentioned the July column regarding back-ups. He makes a very interesting point.

Hard drives these days are measured in giga-bytes, and have reduced in price over the last decade. I can remember paying £140 for my first 10mB hard drive and thought at the time that I would never need any more space than that provided. Still, we can all say the same about RAM when the Beeb first hit the market!

Godfrey suggests another identical hard drive for backing up the original. This can be made easy by using a removable "caddy" system. This is a plastic drawer and frame arrangement in which the back-up drive is replaced and kept away from the machine. Inserting it prior to power-up and removing again after power down enables a complete mirror image of the original. Obviously there would be no bootable system on the back-up drive but all the directories are identical to those on the main system.

There is one disadvantage to this method and that us that it requires the operator to remember to save any new file, written on the main system, to the back-up drive.

The caddy is available from Maplin and there are several variations available. I would suggest that £3 invested in their catalogue is very worthwhile! Many thanks to Godfrey for the feedback, and I look forward to more of the same from him and others too.

CLIK DRIVES

As the floppy disk drive heads for the 'bit-bucket' of history, larger disk platforms vie to be the next removable media format. When Iomega launched the Zip drive, it revolutionised low-cost removable storage. The Zip fulfilled most of the criteria needed for a floppy drive replacement. It was a large capacity external disk drive, built from plastic and using proprietary, but robust 100Mb magnetic disks.

For the desktop this was ideal, but for today's wider uses the Zip is too big. Digital cameras, video games consoles, set-top-boxes and so on all need a cheap removable form of storage.

The Clik Drive is an evolution of the Zip, taking the concept, the drive and the media are smaller and lighter. Naturally there is some capacity loss because of the smaller disk platter size, but the result is a drive mechanism that is no thicker than three credit cards!

Iomega miniaturised the mechanism to such a degree that it would fit into a PC Card-sized container. The card can then sit in a spare PC Card slot and be treated like an internal drive, ideal for laptop users.

For desktop users Iomega has developed a dock system to remedy the lack of interoperability. The Clik Dock is simply a PC Card interface adapter for any USB equipped computer. By leaving out full PC Card support electronics, Iomega has reduced cost, size and weight. Sadly the Clik Dock has been adapted to work only with the Clik PC Card drive and not as a general PC Card adapter.

As with any USB device, installation of the Dock is simply a case of plugging it into the system and installing the driver software when prompted. The Clik Drive will then be automatically mounted and unmounted whenever it is inserted or removed from the Dock. There is a small external power supply as USB is not able to supply both the Dock and the drive.

PERFORMANCE

The Clik Drive is limited by the available transfer speed over USB of 1.2Mb/sec. Used natively in a full PC Card slot the drive can achieve transfer rates in excess of this. Other than this, the drive works as it would when used natively. The full range of Iomega disk tools can be used to format and manipulate the disks.

There are a few niggles though. Firstly, the power adapter is not multi-voltage. This would seem to be an oversight in design as this device is **meant** to be used with a laptop and laptops travel to regions using other voltages!

The device is also very light, which in itself is a good point when travelling, but the weight of the power and USB cords can drag it off the worktop. These are minor issues for what is otherwise a very useful device, especially with the increasing use of digital cameras that also use Clik Drives, the need for shared use will grow.

SURFER'S PARADISE

Here are a few sites for all you avid 'surfers' to try. Remember it's just a bit of fun!

Thanks to streaming audio, the 'Net gives us music and talk radio. However, annoising.com has found another use for this technology - sound effects. Categories include explosions, car crashes, wild beast attacks, and gastric indigestion. Point your browser at: **www.annoising.com**

If you are a 'mouse potato', you probably spend all your spare time in front of the computer screen. If you like to 'think' about exercise instead of actually taking some, then **www.parkwalk.com** is for you. Parkwalk can take you through a park in your very own town. Just click the mouse on a distant spot and a new picture will download in the time it would take for you to walk there. And, thanks to computer-generated images, your local park will be decorated with bill-boards that aren't found in the real world.

If you don't have time to wash the car there's a company that will do it for you and it won't cost a penny. Point your browser at **www.kleankar.com** and click on New Subscriber button, enter your name and address, and car type as well as target marketing information on at least ten of your neighbours. Before you know it, your car will be cleaned, polished and plastered with shiny new advertisements.

THE RTTY JOURNAL

The RTTY Journal website is well worth a visit. The RTTY mode is still extremely popular despite being around for over 40 years and having competition from Pactor and PSK31.

Look at **Fig 1** there maybe somebody here that you recognise. The pictures were taken at Dayton so most are USA RTTY-ers.

On the subject of RTTY, there has been a lot of discussion on the RTTY reflector of WF1B regarding the use of multiple rigs in contesting. Some people have become very agitated to put it mildly.

If you subscribe to *Jims' Gazette*, by N2HOS, you'll see that opinions have become extremely heated. This is only a hobby, but I suppose some people would quote the football manager and say that "it's not a matter of life and death, it's more important than that". I don't see it that way, but I would imagine everyone has their own views. The BARTG have already taken a stand and here is a copy of a message sent to the W1FB reflector from John Barber at **ska@bartg.demon.co.uk** on the subject of future BARTG contests. John writes:

"I have carefully looked at what is happening, and the best way to keep everyone happy. As I have made clear in the past the idea of a separate class for single/multi is not to my liking, as by itself it does not stop anyone using multiple rigs in the single/single class. It would also get us into defining a 'multi' set-up, and is impossible to police.
So this is what will happen in future BARTG contests:

1: The March contest will have an 'expert' class along the same lines as the Sprint; **2:** There will be a ten-minute band change rule, but this will not apply to the expert class.

This will mean that a multi-TX system will be very little advantage in the normal single op class. Anyone who wants to go down the road of consecutive multi-band operation will have to enter as an expert.

As soon as I have time to write up the new rules you will see them on the BARTG website, and I will let you know here on the reflector. Finally, this is only intended to allow the single operator multiple rig stations to make quick band changes. Transmitting at the same time on more than one band will not be allowed. I have personally seen this happening in the Volta contest, and will be watching for it in our contests. Any single operator station monitored on two bands at once will be disqualified and refused future entry. Ninety nine per cent of us just want some fun in the RTTY tests - let's try to keep it like that"!

If you are interested in RTTY contesting, one of the most popular programs in use is the one from WF1B. Try the following URL's where you can purchase on-line and also subscribe to the chat-room, where lots of useful hints and tips are available.

Submissions:
mail to: **wf1b-rtty@wf1b.com**
Administrative requests:
mail to: **wf1b-rtty-request@wf1b.com**
WWW:
http://www.wf1b.com/
Questions about RTTY reflector:
mail to: **owner-wf1b-rtty@wf1b.com**
Questions about RTTY by WF1B:
mail to: **wf1b@wf1b.com**

An RTTY DX bulletin has been issued by VK2SG for as long as I can remember and this is sometimes available on the Packet network on your local BBS. I import them along with all the VK News bulletins, via the Satgate. However, I have not allowed them onto the UK network as some of them are quite large. Instead, I have put them into the Teletext server, so have a look there.

Interestingly this server has been on my BBS for the last 3 years and I have yet to see anybody use it! Take a look at the Web site: **http://stoli.one.net.au/~ctdavies/anarts.htm** See **Fig 2.**

AND FINALLY...

Overheard in a computer shop: Customer: "I'd like a mouse mat, please." Salesperson: "Certainly sir, we've got a large variety." Customer: "But will they be compatible with my computer?"

NEWS, VIEWS AND PICTURES TO ME PLEASE - USE DETAILS AT THE TOP OF THE COLUMN.

Roger G3LDI

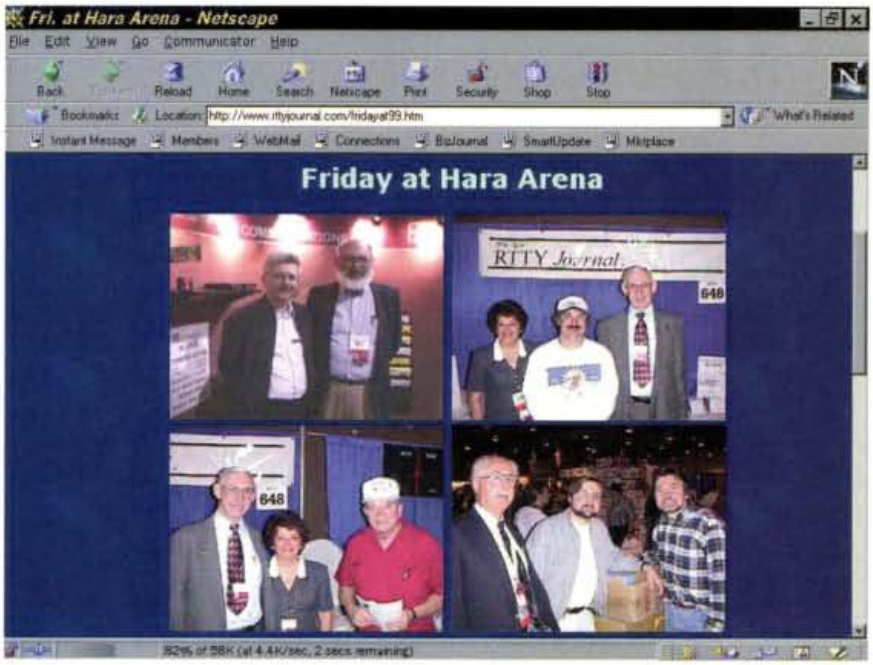

Fig. 1.

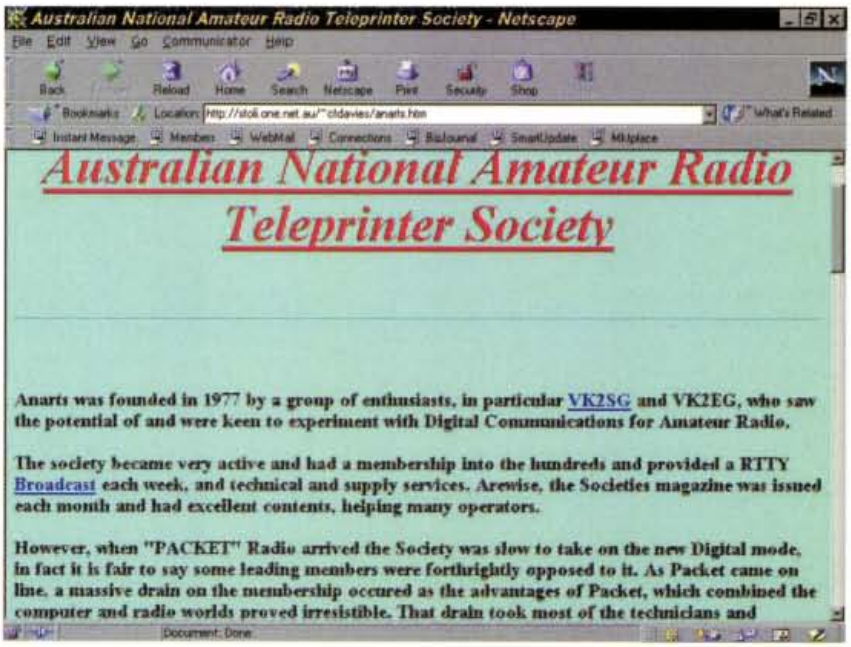

Fig. 2.

Trader's Table

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PALSTAR KH6 50mhz FM Handie £55
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TRIO TS-711E 2M MULTIMODE BASE £299
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ICOM IC-R70 HF RECEIVER £225
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BOX 123
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E-MAIL: editor@radiomag.com

LETTERS & REQUESTS FOR TOPICS YOU'D LIKE COVERED TO ME PLEASE

CHRIS EDMONDSON VK3CE HAS NEWS ON THE GREAT MORSE DEBATE AND HOW THINGS ARE CHANGING DOWN UNDER.

G'Day from winter in Sunny Queensland! Ah, this is the life... chilly nights below 10°C but clear, bright, sunny days of endless blue skies. So why are you still *there* when you could be *here*?

HALF-SPEED MORSE FOR OZ

Rob Mannion G3XFD, a man who fervently believes in the worth of **Morse Code** testing, will probably be disappointed to hear that amateurs in Australia now have access to *all* h.f. bands, in all modes and with 'full call' privileges, after passing a low-speed **5 w.p.m.** Morse Code test. Our regulatory authority, the Australian Communications Authority, made the announcement about changes to licensing matters on 12 July. Formerly, our licensing allowed those with 'full' theory and 5 w.p.m. access to only 3.5, 21 and 28MHz, leaving the other h.f.bands to those with a 10w.p.m. pass.

While it's not yet been said in so many words, the expectation is that the next World Radio Conference in 2002 or 2003 will remove *all* Morse Code testing from the amateur syllabus - and Australia will be among the first to follow suit.

Okay, so it's now a *fait accompli* - but is this really what people wanted? How does anyone really *know* what people want? Is this a good move or a bad one? Will amateur radio survive?

Many of you will know that I work as Editor of Australia's poor southern cousin* to *PW, Radio and Communications* magazine. We haven't been in publication quite as long as *PW*, of course (I hear *PW* first went on sale on the deck of the Ark!), but in more than 20 years we've had long enough to find out what our readers want. But there is a better way than simply guessing.

* Editor's comment: *Not poor Chris! Far from it - it's very readable!* **Editor.**

READER SURVEY

We ran a Survey of Readers in our May 2000 issue. In it, we asked our readers all manner of questions about what they wanted in their magazine and, of course, we touched on the prickly issue of Morse Code. So, what did Australia's amateurs have to say?

I should first explain that *R&C* has a rather wide reader base than *PW*. We cater for radio enthusiasts of *all* kinds, so the questions had to cover all the various groups. We got around this simply by asking different questions of different groups of people, which means that we really have a very valuable resource in the database of answers! However, almost all of our respondents were males, most of them in the eastern states and slightly more than half were licensed amateurs.

Let's look at the questions relating to Morse Code. turning first to the non-amateur. The question asked was had "Morse turned them away from becoming amateurs?". Of those who answered this question, almost 90% said yes, that Morse *had* influenced their decision not to become amateurs. Presumably, many of those people would now hold an amateur ticket were it not for the Morse Code examination requirement. I should amplify this result by explaining that those who did not answer simply had no interest in Amateur Radio in the first place.

We also asked non-amateurs if they'd reconsider their position if the Morse requirement was slowed or removed altogether, and the very encouraging response was that some 80% of the 90% original responses would look again at becoming Radio Amateurs.

For the amateurs, of course, the biggie was: 'Should the amateur service continue to require a Morse proficiency?' Out of those 1.4% answered yes, and that the requirement should have an increased speed. A further 10.1% wanted the old 5/10w.p.m. to continue and 24.2% supported Morse continuing, but at a maximum speed of 5w.p.m. for all licence classes – our new standard. That left a clear majority, **64.3%** who said **No, Morse Code should be dropped altogether, world-wide, and as soon as possible**.

We then asked 'Did the Morse tests help rid the hobby of 'undesirable elements'? The result came back as a resounding No. (About 75%)

Would Morse's removal from the testing mean its end, or would it be used anyway? A slightly less-decisive answer – about two-thirds expected it would continue to be used, while one-third thought it would eventually die off.

I can see no clear reason for thinking that opinions would vary greatly around the world. In the early days of radio, when Morse Code was the only means of communication via wireless, it would surely have been foolish folly to allow anybody who was not proficient in Morse anywhere near a 'key'. Even in later days, when voice transmissions were a reality, Morse was still widely used across a variety of commercial services, so a clear understanding of it was a most useful and potentially life-saving asset. And we all **knew** that Morse would get through when other things simply could not.

But are **any** of these things the case today? Morse has now been dropped by virtually all services outside amateur radio, and we **do** today have access to seemingly magical digital modes which seem able to get a path when literally nothing can even be heard from the speaker! Frankly, I defy you to work someone, even on c.w., when you cannot even hear his signals!

Are we sticking with Morse only from a sense of tradition, from a fear that, once retired from the formal syllabus, it will be lost forever to us? Could Morse be our eventual undoing?

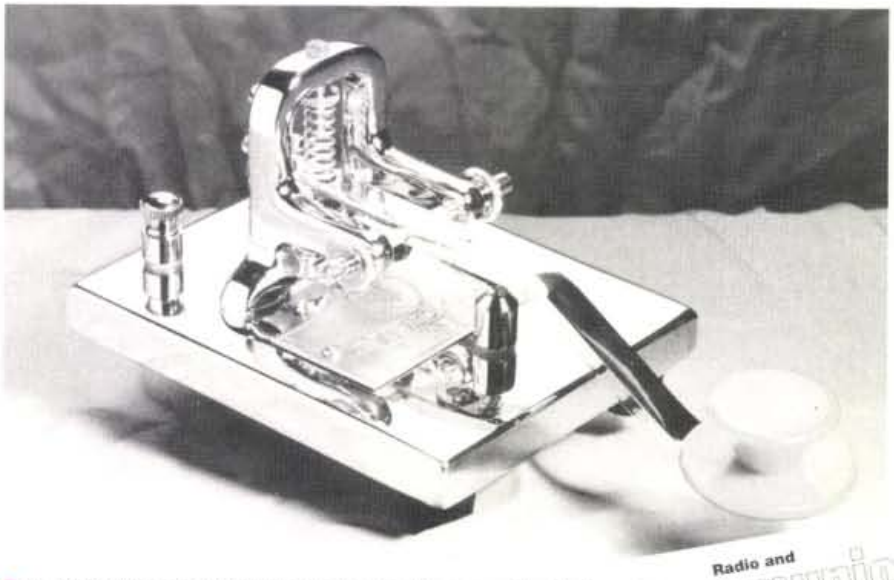
For the sake of the hobby's future, my feeling is that tests in its proficiency cannot go soon enough. Let's not be blinkered here. After its removal from the testing curriculum, Morse **will** continue to be used, and many newcomers **will** continue to take it up for the challenge and reward it offers. Let's not lose sight of that...

AUSTRALIAN RADIO CERTIFICATE SCHEME

Waiting for you in the Downloads' section of the *Radio and Communications* internet Web site at **http://radiomag.com** is the first part of an all-new introductory electronics course which we've called the Australian Radio Certificate Scheme (ARCS). There is no charge to download it and no charge to read and learn from it. Also, in Australia, there is no charge to apply for and receive the various certificates along the way.

I'm telling you about it because, with population densities being what they are, I guess there are even more people over there who might value our course! We put it together not to make money from it but to help others experience and enjoy our love of radio.

An incentive-based course, ARCS is aimed at teaching people from all walks of life, from



● Fig. 1: Chris VK3CE asks are we sticking with Morse only from a sense of tradition?

kids through retirees, rich and poor, about how radio and electronics works. The certificates issued along the way are incentives, of course, but there's also the very real incentive of achieving something. That achievement may simply be a greater understanding, but it could also be an amateur licence if that's the aim or interest. The final stage of the multi-level course will certainly equip candidates with sufficient knowledge to pass a Novice Amateur examination.

GET THE BUG

You might be surprised at the number of 'phone calls and letters we get from people who are interested in learning more about radio, possibly to get themselves into Amateur Radio. There are a **lot** of them!

Think back for a moment. How did **You** get the 'radio bug'? What was the 'defining moment' which pushed you to work for your hobby? It really doesn't matter which branch of radio you are interested in. Everybody has to start somewhere! Be it amateur, CB, scanning, utility listening or SWLing... something drove you to learn more about it.

Real experts in each of the fields will be reading this now. And every one of them started somewhere. So tell me... have *you* ever worried where it's all going, wondered where the 'new blood' might be coming from?

Hobbies, particularly those dependent on technology, evolve. It's fascinating to compare each of our branches of radio to what we had, say, 20 or even 50 years ago. And it's equally illuminating to see how people became involved in things back then.

Probably the least changed aspect of the hobby, if you think about it, is SWLing. After all, 20 and 50 years ago, nations broadcast to the world. Many of the stations are different now, and the equipment we use to listen to them has certainly changed a lot, but the essence of that hobby is pretty much intact.

What of Amateur Radio? How about CB? And could the scan buff even **get** a scanner 50 years ago? Would there have been anything to listen to on the u.h.f. f.m. bands even if they could?

Communications has undergone huge change in the past few years, and the rate of change is accelerating. Today, most of our young turn to computers and the Internet for their communications needs. Somehow, radio is no longer the irresistible magnet for the young which it was when I was a youngster.

Our next aim is to get ARCS used in schools around the country. We hope to spread it far and wide. Do have a look when you're next on the 'Net and please let us know what you think!

As ever, you can write to me at the address at the top of the column, I look forward to your letters and E-mails so keep them coming. I look forward to catching you next time with another brief glimpse of radio Down Under...

73 ChrisVK3CE

● Fig. 2: *Radio & Communications* are trying to encourage new blood into the hobby with the launch of their Australian Radio Certificate Scheme.

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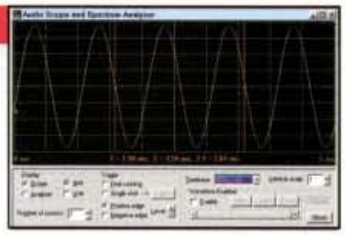

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Model Name/Number	WR-1000i & WR-1000e	WR-1550i & WR-1550e	WR-3100i & WR-3100e
Construction of internals	WR-1000i/WR-1550i-3100iDSP- Internal full length ISA cards		
Construction of externals	WR-1000e/WR-1550e - 3100e - external RS232/PCMCIA (optional)		
Frequency range	0.5-1300 MHz	0.15-1500 MHz	0.15-1500 MHz
Modes	AM,SSB/CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W
Tuning resolution	100 Hz (5 Hz BFO)	10 Hz (1Hz for SSB and CW)	10 Hz (1Hz for SSB and CW)
IF bandwidths	6 kHz (AM/SSB), 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
Receiver type	PLL-based triple-conv. superhet		
Scanning speed	10 ch/sec (AM), 50 ch/sec (FM)		
Audio output on card	200mW	200mW	200mW
Max on one motherboard	8 cards	8 cards	6-8 cards (please ask)
Dynamic range	65 dB	70 dB	85dB
IF shift (passband tuning)	no	±2 kHz	±2 kHz
DSP in hardware	no - use optional DS software		YES (ISA card ONLY)
IRQ required	no	no	yes (for ISA card)
Spectrum Scope	yes	yes	yes
Visitune	yes	yes	yes
Published software API	yes	yes	yes (also DSP)
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I. IDBT: Interlocked Digital Bandwidth Tracking System

The IDBT feature greatly simplifies operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system monitors the settings of the SHIFT and WIDTH controls, and automatically sets the DSP bandwidth to match the user settings within the net bandwidth of the Analogue IF Filtering.

IDBT: A Breakthrough in Selectivity!

II. VRF: Variable RF Front-End Filter

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.

VRF Features Large, High-Q Coils and High-Quality Relays

VRF Typical Bandpass Response (3.5 MHz)

III. 200 Watts of Transmitter Power Output

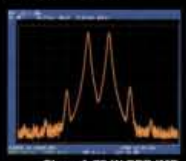
Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.

Philips Power MOSFETs

High-Speed Automatic Antenna Tuner

IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP , a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd- order IMD suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!



Class A 75 W PEP IMD

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Photo shows optional MD-100A8X Deluxe Desk Microphone

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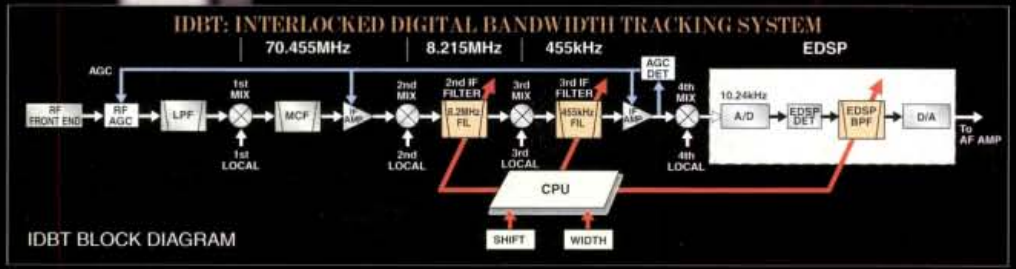
MARK-V FT-1000MP



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