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*55/50W (3 pwr steps each band)
*Wideband Rx 118-173, 230-549 & 810-999MHz

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2m / 70cm 100W Base station all modes with option for 23cm module (**UX-910 £359**)

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2m 55W FM mobile with rugged construction and with digital option.

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This new handheld allows you to communicate cross band over the D-STAR Network. This dual band radio is rugged and water-proof to moderate depths.

D-Star Fitted **£369 C**

## Yaesu VHF/UHF Mobile/Handy

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NEW

**W&S £269 D**

FTM-10SE Motor Sport Radio - 50/40W design with optional Bluetooth, receiver coverage from 0.5-800MHz, PA system, Stereo radio capability

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Dual Band Mobile
*2m/70cms
*50W
*Wide receive inc. civil & military airband
*CTCSS & DCS
*Detachable front panel

**£189 D**

**FT-2800M** £124 D
*2m FM Mobile transceiver *High power 65W *Capable of VHF wideband receiver

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**FT-1802E** 2m 50W £119 D

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2m / 70cm, wide Rx, Lithium cell.
*Wideband Rx
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**£139.95 D**

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Wide freq. coverage 500kHz-900MHz

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**Yaesu Warning!**
Yaesu equipment on sale at lower prices is thought to be sourced outside the UK - So ***NO*** 2 Year Yaesu Warranty. W&S ***only*** sell with UK Yaesu.

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HF/6m/2m/70cm all mode 100W transceiver
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**FT-450 AT** **£629** *with min. PX* **£679** *no PX*

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*SPECIAL OFFER!*

**FT-2000**

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*Wideband Receive
*Built-In Echolink
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*Supplied w/ DTMF Mic.

**£289 D**

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2m FM 60W Mobile Transceiver. MIL-SPEC DTMF Mic. Built-in CTCSS & DCS encoder / decoder.

**£165 D**

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Kenwood's new mobile FM station is Great! APRS, Built-in TNC DTMF Mic and Weather Station ready

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Up to 6W out with Li-ion battery and **"scanner" style coverage from 100kHz to 1300MHz** including SSB on receive!

**£229 C**

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40 Amp (45A Peak) continuous switch mode PSU with Noise Offset Function (NF). *Output 4-16V DC Variable *Input 100-260V AC *Short Circuit & Over Voltage Protection

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22 Amp Cont. (25A Peak) with Noise Offset.

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| | | |
|---|---|---|
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*Pre-tuned & Weather Sealed*
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**W-2000** 6m/2m/70cms 2.15/6.2/8.4dB length 2.5m 150W **£85.95 C**

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*Watson - the name you know!*

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| W-7900 | 2m/70cm 5/7.5dBv length 1.58m | £31.95 C |
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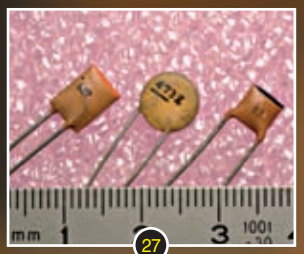






**Practical Wireless October 2009**

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## Rob Mannion's

# keylines

Discussing trouble and strife with cables and wireless linking.

During the 35 years my wife **Carol** and I have been married, we've had quite a few disagreements. Not unusual with married couples perhaps, and we've often weathered the storm, although Carol thinks that I sulk. In return I say that I can't understand why women can be extremely annoyed about something one minute and then forget about it very quickly! (While I'm still just thinking about the problem!).

Like other couples, we've also had misunderstandings about our children (and grandchildren!), other people and money! In other words, we've shared the problems millions of others also experience.

Carol is tolerant of my Amateur Radio hobby. She also copes with my eccentricities, such as having huge piles of books in my study/office at home with papers and documents strewn everywhere. Indeed, a visiting friend said, "Don't worry Carol, it's just the sort of jumble where you'd expect to find a mad scientist-type like Rob working!" I didn't know whether I should be proud of a compliment or ashamed of the comparison!

Incidentally, as I write this edition of *Keylines,* Carol is in New York for three weeks. I've promised to have much of my jumble sorted out before she returns and I'll do my best to keep my promise!

## Cable & Wires

Carol tolerates much, including the low ends of my inverted 'V' type antenna and other wires in the garden. However, Carol's patience ran out recently when she literally snapped regarding the plethora of cables behind our main lounge TV set.

Many TV set owners have linking cables between set-top boxes or satellite receivers, some even have extra switch boxes, so they can select off-air TV, the output of a VCR or DVD player, etc. We (**were**) no exception to this and – admittedly – there were quite a few cables visible from the armchairs. I agreed to that argument and acted on it – but Carol wouldn't agree with my rash statement that, "Everyone has those very necessary cables around, or near their TV set"!

Within an hour or so I had minimised the TV cabling and managed to achieve some semblance of order. There were some cables visible but these were taped up in a form of loom. Thankfully, Carol seemed satisfied!

The very next day I was rather surprised to see an announcement in various media outlets – that television manufacturers were planning to introduce TV receivers with built-in 'wireless' radio links so no cables were required. The idea seemed a good one until I really thought about it in frequency logistic terms. The problems are already apparent with wireless computer network routers.

## Wireless Router

Within our home – a large ground floor flat in an Edwardian house – my wife and I use a wireless router to give us freedom of portability with our laptop computers. And, of course, there are no wires, which pleases Carol no end!

Unfortunately, our neighbours use wireless routers too – and in fact many seem to be using the higher power units advertised by British Telecom (BT). My computer indicates six BT wireless systems working locally, plus others. Unfortunately for me the BT wireless router in the apartment directly above – causes real interference problems.

However, moving back to the proposed built-in 'wireless' TV connection systems, I'm beginning to wonder what level of interference viewers will suffer, before they go back to the (relatively) reliable cable connectors? Nowadays, many of us live cheek-by-jowl with our neighbours and radio waves don't stop at fence boundaries and walls!

The QRM from TV sets and associated accessories is appalling now – but it could get much worse. As Radio Amateurs we're almost bound to suffer from interference, or perhaps even cause problems, from or with low power wireless links. Indeed, I wonder just how much intelligent thinking has gone into the wireless linking suggestions? After all, manufacturers are widely promoting high definition TV so – surely – they wouldn't want their customers to get impaired screen displays?

Personally, I would rather see just one small diameter fibre optic system providing the necessary link for efficient, interference-free TV reception and accessory connection. They exist already in different forms – so why not for minimal cable connections for TV receivers?

**Rob Mannion G3XFD/EI5IW**


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

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

# readers' letters

The Star Letter will receive a voucher worth £20 to spend on items from our Book Store or other services offered by *Practical Wireless*.

## Mystery Badge – Readers' Help?


**Dear Rob**
Over the years I've collected quite an amount of radio ephemera (or 'junk' as my family call it).
With most of the junk – sorry, radio collectibles – I have been able to trace its history. However, I have one item which has so far remained a mystery – and hence I turn to the redoubtable *PW* readership to try to shine the proverbial light on the subject.

Many years ago in a junk shop I picked up the badge ( as shown in the photo), which bears the title "Radio Circle" and bears what I assume is the callsign "5SC". It's 0.75in in diameter (19mm in new money) and is in blue and white enamel on a gilt metal base.

Any information would be welcome and I'm sure someone out there must be able to satisfy my curiosity. Many thanks.

**Dale (Slim) Haines G4IPZ**
**21A Victoria Gardens,**
**Biggin Hill**
**Westerham**
**Kent TN16 3DH**

## Star Letter

### Forest Of Dean Amateur Radio Group

**Dear Rob**
I'm writing to you to confirm that the **Forest of Dean Amateur Radio Group** is now officially up and running. We have an extremely attractive – and permanent – QTH at **Ruardean Sports & Social Club** on Ruardean Hill at 951ft above sea level, real heaven!

We'll be meeting every Tuesday night as from now at 19:30 hours at the club and anyone with an interest in any aspect of radio or electronics is welcome. I'll keep you informed and we will be looking at inviting you over one evening when we have got fully up and running. Thank you for the enormous help that *PW has* provided, by publicising the possibilities of a new club being formed in the *News* section.
Yours sincerely.

**Adrian Lane M3TVF**
**Forest of Dean Amateur Radio Group**
**Ruardean Sports & Social Club**
**Ruardean Hill**
**Drybrook**
**Gloucestershire GL17 9AS**
Email: **adrian@fodarg.com**
Website **www.fodarg.com**

***Editor's comment:*** *We were delighted to help Adrian and that you're now 'up and running'. Please join me on the* Topical Talk *page for further comment.*

## Satisfied Maplin Customer

**Dear Rob**
I am sorry to see the problems that **Andy Foad G0FTD** has had with Maplins (Letters *PW* September 2009). I have the very good fortune to work opposite the Maplins branch in Newport road Cardiff and have used their services for many years and cannot fault their service or technical help.

To the Newport Maplin staff I am a customer, as they do not know me personally. In fact, I find it very important to support organisations like this with the ever increasing difficulty in getting support for our hobby. I am sure if Andy talks to the right people he should be able to sort out his problems. Regards to you all.

**Gary Donovan**
**Newport**
**South Wales**

## Dissatisfied Maplin Customer

**Dear Rob**
I read with interest **Andy G0FTD**'s comments about Maplins in the September 2009 *Letters* page and have to agree the company is really going down hill and abandoning its roots.

I'm building a computer interface for a rotator at the moment and some of the components are available on the web only, but you can't buy 0.6W resistors online. This means you have to visit both your local store and shop on-line to complete a project, crazy or what? Best wishes.

**Len Paget GM0ONX**
**Kilmarnock**
**East Ayrshire**
**Scotland**

## Computer Virus Problems

**Dear Rob**
I'm writing to say 'thank you' for your interesting *Keylines* editorial in the September issue of *PW*. My own computer – Chinese built – was obviously also effected by a similar virus to the one you mentioned. But the first time I knew anything about it was when my daughter (living in New Zealand) told me that I had sent her a very strangely worded E-mail inviting her to look at a particular website. Fortunately, she's very bright (unlike her Dad!) and didn't follow up the invitation. Then, over a period of days other relatives and friends around the country and abroad got back to me about the same message.

It appeared that my entire address book had been infiltrated by the virus but it stopped doing it after a few days, so I didn't have to go to the local 'Computer Doctor' to get the virus sorted out. I had no idea whatsoever what was going on until I read your *Keylines* but was reluctant to follow the instructions contained in the message my daughter sent back to me. I didn't want to risk another virus! Thanks for the comment and next time it happens I will know what's happened. Problem is, I don't know what website I picked up the virus in the first place because I'm always searching the net looking for radio news as I'm a keen listener. Best wishes to everyone at *PW*.
**William (Will) Evans**
**St. Clears**
**Carmarthen**
**Wales**

## Clever Chinese Advertising!

**Dear Rob**
I was very amused by your *Keylines* in the September issue of *PW* because I too was caught out by the clever spam messages, seemingly originating in China. In my case I had an E-mail from my son (**Steve**) – who lives and works in London and I thought the wording was a little strange, although like me he's a joker!

Intrigued, I clicked on the website link provided in the E-mail, foolish perhaps but I wanted to know what it was and ended up on a website that seemed to be a radio enthusiast's Aladdin's Cave. The postal address given on the website was certainly in China but an E-mail from me, enquiring about what valves they can provide, hasn't brought a response as I write this letter in late July.
My son Steve, works in IT, also browses the web as he's keen on electronics generally although I can't get him into short wave listening or Amateur Radio!

Although this sort of advertising spam is a nuisance, I think that it's an incredibly clever form of advertising that target the very people who could end up as customers. But I'm left wondering – just where did my son pick up the virus on his computer? Even as an IT Engineer, he doesn't know, as they received thousands of viruses each month.

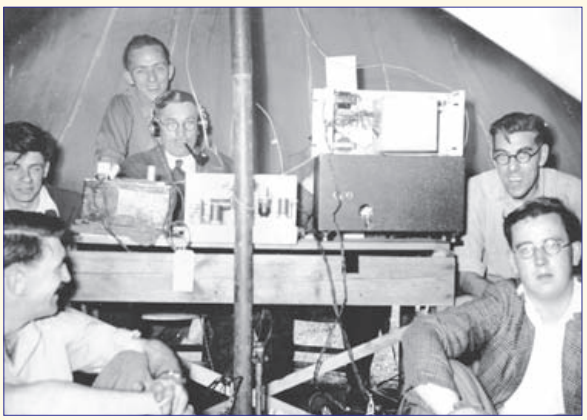
My regards to you all at *PW* and thanks for the laugh – I always enjoy your *Keylines* editorials, even if I don't always agree with you! But, of course, that's what editorials are all about aren't they?
**John Sutton**
**Spalding**
**Lincolnshire**

## Chinese Websites

**Dear Rob**
I am writing to comment on the September issue *Keylines*, which I thought was amusing – especially as I have also been guilty of sending out many spam messages from my own PC. At the time I thought I must have been very unlucky to get such a virus on my computer. Our family is spread all over the UK since I came up here to Aberdeen to work in the oil industry, so we use the internet a great deal, especially as I am retired now.

My family suddenly started asking why I was sending them E-mails worded in an odd way and promoting a particular website. My extensive

## Jack Paine G6PR – Silent Key



**Dear Rob**
A friend of mine, **Alex Cother**, recently inherited documents from a long-deceased relative who, it transpires, was **Jack Paine G6PR**. Despite losing an arm in the First World War, Jack was a proficient racing cyclist and a member of the Datchet Cycling Club and died in 1963.

Jack was active from his home in Alpha Street, Slough in Buckinghamshire and Alex has kindly loaned me QSL cards resulting from contacts with USA stations that Jack had from there on 21MHz (15m) c.w. in 1957. With the cards were some photos. One of them appears to be at a Field Day event under canvas. I've enclosed a copy.

Jack is sporting the headphones and smoking a pipe and looking suitably serious! The gear appears (satisfyingly!) home-brewed and driven by car batteries under the bench. It would be great to learn of the time it was taken and I wonder if anyone might recognise the other operators too? 73 to everyone on the *PW* Team!
**Chris Brown G4CLB**
**66 Denham Lane, Chalfont St. Peter**
**Buckinghamshire SL9 0ES**
**E-mail: chris@g4clb.co.uk**

**Send your letters to:**
Rob Mannion
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: pwletters@pwpublishing.ltd.uk

computer address book must have been used as everyone seemed to get the same message. Even with virus protection software my computer became infected. Just in case, I had the hard disk checked for viruses and since the problem in March I have had no more troubles.

After reading your serious, although rather amusing experiences in trying to track the source to see if it was officially backed by the Chinese authorities I was left wondering if I could get commission from the business I was unknowingly spreading adverts about for? I admire your attempts to contact the Chinese authorities in London but it's perhaps not surprising you didn't get a reply. Thanks for your letter and I appreciated the reply. Best wishes.
**John Taylor**
**Dyce**
**Aberdeen**
**Scotland**

## Chinese Websites

**Dear Rob**
After getting one of the E-mail messages advertising Chinese website selling a wide range of very useful radio components, I went on to the site and E-mailed them asking for a full catalogue and prices. No reply received but then I picked up my September *PW* and read your *Keylines*. Are they genuinely selling stuff – or is it an elaborate joke? Thank you for answering my letter and I certainly agree to you publishing mine.73.
**Mike Heath**
**Wellingborough**
**Nothamptonshire**

## David Meets Peter GM3CFK

**Dear Rob**
I expect you remember my letter (*Letters, PW February 2009)* regarding **Peter Harrison** who, when he was G3CFK, achieved the first two-way 144MHz QSO between the UK and Scandinavia. Well, I'm delighted to say that he visited me while on holiday and he discussed the equipment used for the record contact and to write the separate document I attach with my letter.

I saw in *PW* that my old friend the **Rev. George Dobbs G3RJV** quoted a forecast by **Heinrich Hertz** on the usefulness of wireless waves, which he thought were of little value. However, I now quote two similar opinions held by the leading men of their day.

Prior to the Second World War, *Wireless World*, edited by **Mr. Hugh Pocock** was probably the most respected monthly radio magazine in this country.

A well known contributor to *Wireless World* wrote in 1937, soon after the BBC's Alexandria Palace high definition TV transmissions started. He wrote, "*Television is a useful medium for entertainment and amusement but cannot be used for instruction!*"

After the War, in 1950 soon after the invention of the transistor was announced, Hugh Pocock of *Wireless World* wrote, "The transistor is a scientific oddity of no practical value."

Not being a great man, I never care, or dare to try to forecast the future!
Best wishes to everyone at 'HQ. 73.
**David Buddery G3OEP**
**Gorleston**
**Great Yarmouth**
**Norfolk**

***Editor's comment:*** *Thank you for sharing those gems of insight David! Thank you also for supplying the separate document providing the details of the equipment used by Peter G3CFK for his record-breaking QSO. There was no room to publish it in the* Letters *pages but I have scanned the document and I'll be pleased to forward a copy, if interested readers contact me via E-mail:* ***rob@pwpublishing.ltd uk***

## Call Book Data & Window Glass

**Dear Rob**
I'm writing with regard to to the free call book data (*PW* September 2009 news item). If this information has been withdrawn from the Ofcom web site then there are likely to be some very upset never-do-wells as this means they'll have to go out and about looking for bits of wire, etc., up in the air on a random basis (in frustration!), instead of simply going on line and finding suitable web-site with the information.

I was intrigued by the article entitled *Signal Detraction*! Having recently found out about the r.f. attenuation factor problems of the new glass the hard way when our front door was replaced. The old timber door – while nice – faced south and took the full force of the sun (when we get the sun!) and used to warp but didn't restrict the doorbell signals.

The problem that I then faced was that my battery driven wireless door bell needed the batteries taken out and cleaned sometimes more than once a day, if it was to work at maximum r.f. power output. I then replaced it with a new mains operated wireless door bell. Having fought my way through the hard plastic packaging and extracted the instructions that mentioned the r.f. attenuation.

Incidentally, I had to buy the item, trash the packaging without injuring myself and try and get the instructions out in one piece before I find out it isn't going to work through the treated glass!

I eventually fixed a nice white pattress and box to the brick wall (less attenuation) next to the door to mount the bell push. But even that wasn't the end because though the bell push has a very small indicator light – callers can't hear if the bell has rung because the new door is also soundproof. So, I might fit a door knocker to keep callers happy – oh the joys of modern living!
Regards
**Geoff Turner 2E0BVQ**
**Lawford**
**Manningtree**
**Essex**

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

Obituary

## John Worthington G3COI. July 1922 – July 2009

Versatile Cartoonist, Dedicated Radio Amateur and Great Friend

Rob Mannion G3XFD remembers *PW*'s retired cartoonist and author, who could also imitate many famous characters from radio and TV.

**John Worthington G3COI**, our very great friend, author and talented cartoonist died at his son's home in Shrewsbury on July 13th. In the last ten years or so, he'd been suffering the increasing effects of Alzheimer's. In compiling my tribute to a wonderfully funny and eccentric character, I'm indebted for information on his early life, to **Sally Port** his daughter who lives with her family in Tasmania, Australia.

John was born on July 31st 1922 in Stafford, Staffordshire, where he also met **Mo**, his future wife when he was 13. They eventually married at the end of the Second World War and had two children, **Michael** and Sally. John told friends that – as he served in *Lancaster* bombers and other aircraft as an RAF Wireless Operator – he was fortunate to survive.

Although I had an inkling that John had been involved in providing coach touring holidays, I had no idea that zany John had actually managed the business! Once, he sent a coach and driver with a load of passengers to mid-Wales rather than Scotland. That was when he decided he definitely wasn't cut out for the business!


*"Och aye Murdoch, they'rrre just waiting for the laser beam to be switched on, they canna fly home without it on ye ken".*

***John GW3COI and G3XFD enjoyed discussing the cartoon to illustrate the* PW *April Fool spoof in the April 1997 issue.***

Sally, his daughter writes. *"After the war, Dad took over and ran his father's coach touring company, 'Worthington Motor Tours'. It was based in Birmingham and they ran tours all over the UK and Europe. Dad hated it as he was never cut out for 'conventional' business, he was far too eccentric and creative! He managed to sell the business when he was in his early 50s and he and mum moved from Wolverhampton to Abersoch, not far from Pwlheli on the north Wales coast.*

*Dad took up piano tuning and also became a coastguard. They both loved the life in Abersoch and the only negative thing was that Dad, a keen semi-professional Jazz musician, never found anyone to play jazz with him. Dad was cremated at Shrewsbury Crematorium, and in January 2010, when my husband* ***Laurie*** *and I are travelling to the UK, we'll place some of his ashes in Mum's grave in Abersoch and a few them will be scattered at Port Bach, the little beach where he loved to swim each day."*

I first met John over 35 years ago when I was delighted to meet the *Short Wave Wave* magazine cartoonist who made me laugh for many years and he later continued to do so in *PW.* As Editor, I visited John on many occasions and he made Mandy my Labrador and I very welcome. Inevitably however, most of our contact was by telephone when I called to commission a cartoon.

We had many a laugh together as we discussed a cartoon. After Mo died he delighted in voicing many comic impersonations on his answering machine, ranging from Colonel *Chinstrap* ("I don't mind if I do Sir") to **Tony Hancock**. We never knew who we'd listen to when calling John!

John's commissioned cartoons illustrated *The Vectis Run* story for me, when I re-wrote it into a 12-part serial, from a radio drama. However, our funniest experience was preparing the 'Bats in the Belfy' laser antenna April 1997 Fool spoof. John and I were in hysterics, as was **John Cunningham GM3JCC**, the spoof's author when I updated him on the expanding joke!

Eventually, as the terrible effects of dementia took hold, this wonderfully gentle and kind man's work output dwindled. Eventually, nature forced his retirement and I received a little cartoon inside a Christmas card with the words, "*Worthington has retired and G3COI is QRT. John"* – written in a very spidery handwriting. John had even retired his ancient 'tripewriter' (as he called it!) and the liberal splashes of Typpex corrector fluid – which were always in abundance on the 'triped' sheet – were no more to be seen.

Thank you for so many enjoyable times John! May you rest in peace.

# National Hamfest News

The **Radio Society of Great Britain** and the **Lincoln Short Wave Club** suggest that – If you plan to visit just one major radio rally this year, make sure it's the National Hamfest in Newark, Nottinghamshire on October 2nd and 3rd!

In a press release issued by the RSGB, the society state that, "Visitors to the National Hamfest will be able to see all the latest radios on display by Icom UK, Kenwood Electronics UK Ltd., and Yaesu UK Ltd. – and talk to the staff who know their products well.

The organisers state that the show, "Is the only two-day show in the UK where the three main manufacturers will be seen together. All the major dealers will be in attendance with a huge variety of radios, antennas and accessories for sale – just look at the list of those attending!"

The UK's regulator, Ofcom, will also be exhibiting and this will give the visitors to the show the chance to talk to them about any concerns they have affecting Amateur Radio. Their staff will be at the show on both the Friday and Saturday.

The new 2010 RSGB *Yearbook* will be launched on Friday October 2nd at the show. There will be a great Bring & Buy too – no better time to turn out that unused equipment!

**Enormous Tower**

**Luso Towers** have created huge interest at Dayton and Freidrichshafen Amateur Radio Hamfests with their enormous towers. The company will be visiting the UK National Hamfest with a 36m version. Fully retracted and laid over, the four sections still take up 12.5m of floor space and the base is 1.7m across! To carry the rated 150kg of antennas, this tower will need a concrete base that measures 2.3 x 2.3 x 2m.

The tower comes with an outside platform for easy access to the antennas as well as steps. A computer controlled system is used to raise and lower the mast and it has a host of other features including a wind speed indicator, one-touch height memory and automatic wind speed descent control. Luso Towers have said that the tower is, as yet, unsold and that they are willing to negotiate a very special price to any UK Amateur wishing to buy the tower.

**Committees On Hand**

The RSGB have announced that the society will be in attendance with many members of their committees ready to talk to visitors about their concerns and questions. Additionally, **Steve Nichols**, who has written the popular *Understanding Propagation* column in *Radio Communications*, will be on the Propagation Committee stand.

Other groups to look out for are the very popular **Islands On The Air** (IOTA) programme, the **EMC Committee**, **Sport Radio**, **Amateur Radio Direction Finding** (ARDF), **Emerging Technology**, planning, exams department, QSL Bureau and the Regional team.

The RSGB have also confirmed that there will be a large number of special interest groups attending the Hamfest.

**Many Prizes**

There will be a free prize draw for visitors to the show as well as a daily draw for a Yaesu VX-8 prize. Visitors could also win an Icom IC-7200, a SuperAntennas Beam in a Bag, a Heil Quiet Phone and many more excellent prizes. Entry tickets can be filled in and placed in the main draw before mid-day on Saturday October 3rd and the draw will take place at 1pm that day.

Tickets for the Yaesu draw can be picked up at the main entrance or the *Radio Communications* stand. The draw for a VX-8 will take place each afternoon.

**Morse Proficiency**

Visitors to the show will also have the opportunity to take their Morse Proficiency tests as the Region 13 team will have their Morse examiners available throughout both days. Test speeds start at five words a minute and can go to 30 words per minute if the candidate wishes. Full details of the National Hamfest can be found at **www.nationalhamfest.org.uk/**

**Newark Showground** website **www.newarkshowground.com**

**Send all your news to:**

PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: newsdesk@pwpublishing.ltd.uk

**Hamfest Exhibitors**

**Note:** Exhibitors who have already booked and confirmed

bhi
BYLARA
Grantham RC
Icom
JBT Trading
Kenwood
LAM Communications
Lincoln Repeater Group
Lincoln Short Wave Club
Linear Amp UK
Luso Towers
March ARS
Martin Lynch & Sons
Mexborough & District ARS
Moonraker
Ofcom
Peak Electronic Design
***Practical Wireless***
***RadioUser***
RadioWorld
RAFARS
RAF Waddington ARC
RAIBC
RAOTA
RNARS
Sandpiper Aerials
Skegness
Spalding and District ARS
UK Tesla Coil Builders
Waters & Stanton
Westlake
Yaesu

# Happy 140th Birthday Hiram!

This year, the **American Amateur Radio Relay League** (ARRL) is honoring the 140th anniversary of the birth of the League's first president and co-founder, **Hiram Percy Maxim W1AW**. Hiram was born on September 2nd, 1869 and died on February 17th, 1936, in a Colorado hospital of complications stemming from a throat infection; his widow died just nine days later. Further details via **www.arrl.org/news/stories/2009/08/17/11025/?nc=1**

## Cushcraft Antennas Acquired By MFJ!

The internationally well known MFJ Enterprises, Inc., of Starkville, Mississippi, owned by **Martin F. Jue K5FLU**, has purchased the **Cushcraft Amateur Radio Antennas** product Line from **Laird Technologies**, of St. Louis, Missouri. The sale was effective from July 31st, 2009 and MFJ has announced that Cushcraft products will continue to be manufactured in Manchester, New Hampshire.

**History:** MFJ Enterprises, Inc., was founded in 1972 by Martin F. Jue. (Martin keeps his middle name a secret!). The company began operations in a small rented hotel room in the old Stark Hotel in downtown Starkville, Mississippi. The company began marketing its products in October of 1972. The first product was a high selectivity filter that would enable a receiver to separate one Morse code signal from scores of other signals that were being transmitted over the radio airwaves.

Website: **www.mfjenterprises.com/about_mfj.php**

## The DA0SS Swaziland DXpedition Fresh Water Help

The **Irish Radio Transmitters Society** (IRTS) reports that: **David Hutchinson GI4FUM**, has returned from the Swaziland DXpedition and reports that the 3DA0SS expedition was a big success. Around 20,000 QSOs were made, many of them using data modes. The International Scout Camp was also a great success with the scouts learning many new development skills.

The IRTS committee, with the agreement of the CQIR Contest sponsor, **Dargle Builders Limited**, agreed that the excess in the contest fund which amounted to more than €1,000, should be donated to the Swazi Scouts towards the cost of providing clean water at their campsite. While David was there, the new pump was installed and commissioned and clean water is now available for all the camp needs. Following the AFRI75 expedition to Swaziland and the resultant publicity for the Scout Project there, many individual society members donated funds for projects at the campsite.

The IRTS are happy to act as a conduit for any such funding and if you are interested in helping you should contact **Paul Martin EI2CA** or David GI4FUM. GI4FUM website: **www.qsl.net/gi4fum/page3.html**
IRTS website: **www.irts.ie/cgi/index.cgi**

***Editor:*** *My thanks go to the IRTS News (Sunday August 23rd) for this news item.*

# Calum In Charge At Tennamast!

**Norrie Brown GM4VHZ** reports that **Calum Mackie** is now in the driving seat at Tennamast (Scotland) Ltd., very ably supported by **Carol Wilson**. Despite having handed over to Calum, Norrie made his usual trip to the **Cockenzie & Port Serton Amateur Radio Club's** Radio Junk night on Friday August 14th and presented the Tennamast medal for the Scottish section of the *PW* QRP contest. This award is – traditionally – made before the main *PW* QRP Contest results are published in the November issue of the magazine.

The evening was well attended – with lots of bargains to be had by lucky buyers and Norrie commented, "Congratulations to **Bob Glasgow GM4UYZ** and his team for a very successful event".
**Tennamast (Scotland) Ltd, 81 Mains Road, Beith, Ayrshire KA15 2HT.**
Tel: (**01505**) **503824**, FAX: (**01505**) **503246**.
Website: **www.tennamast.com/**
**Cockenzie & Port Seton ARC** website: **www.cpsarc.com/news.php**

***The presentation of the Tennamast Medal to Jim Keddie GM7LMN. Left to right, Jim Keddie GM7LMN, Norrie GM4VHZ, Dave Smith GM0KCN and Duncan Taylor MM0GZZ.***

## Another Lincoln Short Wave Club Success!

The picture (courtesy **Gerry Duffner G6KGG**) shows the four proud candidates who, after receiving their tuition from **Les Clarke G1LQB** (extreme left in the picture) and working hard themselves, sat and successfully passed the RSGB Intermediate Examinations on Sunday July 26th 2009. The result, once again, represents a 100% pass rate (as there were only the four candidates on the course) and all the candidates are members of the Lincoln Short Wave Club (LSWC). It was good to hear **Val 2E0GAL** and **Mark 2E0ZLO** on the Thursday evening club 144MHz net (145.375MHz at 8.00pm) on July 30th – exercising their new respective call signs and a most impressive response time in obtaining their new calls! **Don Sobey 2E0DAX** (centre) had a special reason for choosing the suffix **DAX** – he's a very keen follower of the *Star Trek Deep Space 9* programme!

**Ian Handley M0RPD**, a retired BT engineer, helped out with the practical aspects of the syllabus, **Peter Grey G1FLL** was the examination invigilator and Gerry G6KGG assisted with the administration.

The LSWC's Chairman, **Jonathan Whiting G6JUT**, congratulated the successful candidates on their success at our meeting last Wednesday and on behalf of the Committee wishes their thanks be passed on to all involved for their hard work which had once again ensured an excellent result for the club. Well done!

Further details (may be had) from **Pam Rose G4STO**, Lincoln Short Wave Club Hon. Secretary via **pamgrose@tiscali.co.uk**
Website: **www.g5fz.co.uk/**

# Icom Dedicated Transverters From Spectrum Communications

**Tony Nailer G4CFY**, the proprietor of Dorchester based **Spectrum Communications** contacted *Newsdesk*, " In April this year, **Alex Gartshore GM3UMW** purchased a transverter from Spectrum to work with his Icom IC-756PROII transceiver. He subsequently modified the transverter to take advantage of the Icom transverter control facility. In this way, everything could remain connected and all the operator had to do was just turn on the transverter to put the rig into transverter drive mode."

"Alex contacted me at Spectrum and said he was excited by his work and intended to upload an article to the 70MHz website regarding the modifications. He wondered if I would be willing to make a dedicated Icom transverter along the lines of his modification. After receiving details of the modification, I agreed to produce this special product and designated the 70MHz version TRC4-10L-ICOM. It would be supplied ready built with cables for £280 including (Special Delivery) p&p."

"Details of the new transverter were added to my website and the *PW* advert will be updated. Alex forwarded a 3-page article to be uploaded to the website, **www.70mhz.org**


"Orders started to come in. The first unit built to this design was despatched and worked as required. Another customer asked for his standard built transverter to be modified to the Icom type, which I agreed to do. However, on its return to the customer it was found not to be compatible with his Icom transceiver.

"Research using the Internet then revealed that not all Icom rigs are the same with respect to transverter operation. A large number have no transverter facilities at all, but can be used with a standard 500mW – 5W drive transverter. These are the 77, 78, 707, 718, 725, 726, 728, 729, 736, 737A, 738, 746, 746Pro, 756, 7000, and 7400.

Amongst the older rigs, the 701, 720, 740, 741, and 751, all have a 24 pin accessory socket, with a pin for putting the rig into transverter mode by the application of +8V. They also have a transverter drive port phono socket, as well as an **Ant Out** and **RX In** phono sockets. These two are normally linked with a short patch lead. A transverter with four cables could be made for these rigs if there is demand and only if the 24 pin matching accessory plug can be sourced."

Further details from **Spectrum Communications**, **12 Weatherby Way**, **Dorchester**, **Dorset DT1 2EF**. Tel: (**01305**) **262250**. E-mail: **tony@spectrumcomms.co.uk**
Website: **www.spectrumcomms.co.uk**/

# Rev. George Gets His Plaque! (At Last!)


The Rev. **George Dobbs G3RJV** gets his plaque! Made especially for George by Irish based Dutchman **Jos Liefkins** (a keen radio constructor and s.w.l.) who with his partner – **Daireen McMullin** – runs the **Little Oak Stained Glass Studio** in in beautiful County Kerry in south western Ireland, it proved very difficult to deliver it to George G3RJV as he's been so busy since his retirement! Eventually, with the help of *PW* friend and author **Ian Brothwell G4EAN** – it was delivered to George's new home in Greater Manchester on our behalf – the beautiful plaque was safe in the famous hands!

The next problem was getting G3RJV – along with his plaque – somewhere to get the photograph it deserved and eventually, Technical Editor **Tex Swann G1TEX** met up with George at a rally (after pre-arranging that the plaque came too!) and collared him for a photo! All's well that ends well and *PW*'s thanks go to Jos, Ian G4EAN and Tex G1TEX for their combined efforts!

E-mail: **littleoakglass@gmail.com** Website: **www.littleoakglass.ie**/

# Ofcom Appoints Norman Blackwell

Ofcom today announced the appointment of **Norman Blackwell** as a new Non-Executive Board member for a three year term commencing on September 1st 2009. The vacancy was created when **David Currie** stepped down as Chairman of Ofcom in March 2009.

Ofcom has also announced that **Millie Banerjee** has been re-appointed as a Non-Executive Board Member until 30 June 2011. The full news release can be at **www.ofcom.org.uk/media/news/2009/07/nr_20090720**

# October Is JOTA Time!

**Dave Gemmel ZS6AAW** – a great friend of *PW* – who is resident in South Africa has asked us not to forget **Jamboree On The Air 2009**. Dave writes, "Hi *PW*, I thought it better to put the following in a separate letter. It's some info regarding the Scout (and Guide) JOTA. The JOTA/JOTI weekend is **October 17th and 18th 2009**."

Dave has also provided a list of websites:
**www.scout.org**
WOSM website for general scouting info.
**www.jota.sub.cc**
JOTA only website.
**www.joti.org**
(same website but for Jamboree On The Internet (JOTI only).

"These websites are very interesting. I hope you enjoy browsing. I'd be delighted to hear from any *PW* readers who are likely to support the event in any way whatsoever." 73 **Dave ZS6AAW**

PS: "Keep your woggle polished and I look forward to working *PW* readers on the air!" **dave@zs6mus.org.za**

# rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations. PW Publishing Ltd. is attending at rallies marked *.

**Send all your rally info to**

PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: newsdesk@pwpublishing.ltd.uk

## September

**September 12th/13th (New Date & Venue)**

**The Leicester Amateur Radio Show***

The Leicester Amateur Radio Show will now be held at Loughborough University.

**Geoff 01455 823344**
**E-mail: geoffg4afj@aol.com**
**www.lars.org.uk**

**September 13th**

**The Torbay Annual Communications Fair**

The Torbay Annual Communications Fair will take place at Newton Abbot Racecourse, Newton Abbot, Devon TQ12 3AF. Doors will open at 10.30am (10.00am for disabled) and admission will be £2.00. There will be trade stands, a Bring & Buy, a raffle, catering and facilities for the disabled.

**E-mail: rally@tars.org.uk**

**September 20th**

**The Hornsea Rally**

The Hornsea Amateur Radio Club Rally will take place in the Floral Hall, 7 The Esplanade, Hornsea, East Yorkshire HU18 1NQ. Doors will open at 10.30am, admission will be £2.00 and there will be car parking, trade stands, catering with a licensed bar, special interest groups, a Bring & Buy and facilities for the disabled.

**Rick M0CZR**
**E-mail: R106221@aol.com**
**Duncan G3TLI**
**E-mail: g3tli@hotmail.co.uk**
**www.hornseaarc.co.uk**

**September 27th**

**The West London Radio & Electronics Show***

The West London Radio & Electronics Show will take place at Kempton Park Racecourse, Sunbury-on-Thames, Surrey. There will be free car parking, the doors will open at 10.00am and there will be talk-in on S22 & V44, trade stands, a Bring & Buy, a flea market, catering, special interest groups and facilities for the disabled.

**Paul**
**Tel: 0845 1650351**
**E-mail: paul@radiofairs.co.uk**
**www.radiofairs.co.uk**

## October

**October 2nd/3rd (New Event)**

**The National Hamfest***

The Lincoln Short Wave Club/RSGB National Hamfest will be held in the George Stephenson Pavilion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY (close to the junction of the A1, A46 and A17). There will be trade stands, a Bring & Buy, catering, special interest groups, and facilities for the disabled.

**www.nationalhamfest.org.uk**

**October 4th**

**The Autumn Hangar Sale**

The Autumn Militaria, Electronics and Radio Amateur Hangar Sale will take place at the Hack Green Secret Nuclear Bunker, French Lane, Nantwich, Cheshire CW5 8AL. The Bunker is situated just off the A530 Whitchurch Road, a few miles outside Nantwich, 30 minutes from Chester. From Junction 16 on the M6 motorway, follow the signs to Nantwich, then Whitchurch on the A530 (follow the brown Secret Bunker signs). The doors will open at 10.00am and admission will be £2.50.

**Rod Siebert**
**Tel: 01270 623353**
**E-mail: coldwar@hackgreen.co.uk**
**www.hackgreen.co.uk**

**October 10th**

**The Chesterfield Radio Rally**

The third Chesterfield Radio Rally is to be held at Hasland Village Hall, Eastwood Park, Hasland, Chesterfield S41 0AY (this is less than 5 minutes from Junctions 29 and 29a of the M1). There will be talk-in on 145.525 & 433.525MHz (CTCSS 71.9Hz), parking and refreshments.

**Tel: 0844 4142056 or**
**0870 7669104**
**www.chesterfieldrally.com**

**October 11th**

**The Great Lumley Rally**

Great Lumley Amateur Radio and Electronics Society Rally will be held in the Great Lumley Community Centre, Front Street, Chester-le-Street DH3 4JD. Doors will open at 10.30am and admission will be £2.00. There will be trade stands, a Bring & Buy, catering and facilities for the disabled.

**David Barclay M0BPM**
**Tel: 0191 3888113**
**E-mail: m0bpm@btinternet.com**

**October 18th**

**The Galashiels Rally**

The Galashiels and District Amateur Radio Society Radio and Computer Rally will be held in the Volunteer Hall, St John's Street, Galashiels TD1 3JX. Doors will open at 11.00am, admission will be £2.00 and there will be trade stands, catering and a Bring & Buy.

**Jim GM7LUN**
**Tel: 01896 850245**
**E-mail: gm7lun@qsl.net**

**October 18th**

**The Blackwood Rally**

The Blackwood and District Amateur Radio Society Rally will take place in the Coleg Gwent Crosskeys Campus, Risca Road, Crosskeys, Gwent NP11 7ZA. Doors will open at 10.30am (10.00am for the disabled), there will be car parking and admission will be £2.00. There will also be trade stands, a Bring & Buy, special interest groups, a raffle and catering from Tony's café 50 yards away (10.00 to 4.00)

**Dave GW4HBK**
**Tel: 01495 228515**
**E-mail: ddlewhbk@btinternet.com**
**www.gw6gw.co.uk**

**October 25th**

**The Northern Mobile Rally**

The Northern Mobile Rally will be held at the Richmond School, Darlington Road, Richmond, N. Yorkshire DL10 7BQ. Doors will open at 10.30am (10.00am for disabled) and there will be parking, trade stands and catering.

**E-mail: rsars@hotmail.co.uk**
**www.rsars.co.nr**

**October 31st/November 1st**

**The North Wales Rally**

The North Wales Rally will take place in the John Bright School, Llandudno.

**Liz Cabban GW0ETU**
**Tel: 01690 710257**
**E-mail: lizcabben@vodafonee-mail.co.uk**
**Ron Roberts GW6ZDH**
**Tel: 01492 592884.**

**Before travelling long distances, please check with the organisers that the rally is taking place.**

Open six days a week. Mon - Fri: 9.30am - 5.30pm Sat: 9.00am - 5.00pm

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Web: www.hamradio.co.uk
E-mail: sales@hamradio.co.uk

# YAESU Autumn Specials!

Special prices on Yaesu HF for September – call now!

## Yaesu FT-450 HF Base Transceiver with & without ATU. HF & 6m Full DSP

When the FT-450AT was recently introduced, customers queried how could a rig offering proper IF DSP, Auto ATU, 100 Watts on HF & 6m, a roofing filter plus a whole host of other class leading features be any good when it costs less than £650?

To answer, in a recent review in Radcom, Peter Hart writes: "For a budget priced radio covering HF and 6m, the FT-450 is an excellent all-rounder for general use. With a high level of features for SSB, CW and data modes, easy to use and a good overall performance, it will suit the home station operator or someone looking for a lightweight radio which is easily transportable".

Yaesu FT-450 without ATU: **£589.95** Yaesu FT-450AT with ATU: **£639.95**

**Options**

| | |
|---|---|
| MyDEL MP-8250 23Amp PSU | £69.95 |
| Stand-FT450 Bail Stand | £19.95 |
| ATU-450 Optional internal ATU | £159.95 |
| MMB-90 Mobile Bracket | £18.95 |
| MHG-1 Carry Handle | £9.95 |
| MH-36E8J DTMF Mic | £69.95 |
| MD-100 Desk Mic | £149.95 |
| MD-200A8X Super Deluxe Desk Mic | £199.95 |
| YH-77STA Headphones | £54.95 |
| MLS-200 High Power weatherproof speaker | £27.95 |
| ATAS-120A Fully Auto Mobile 7.50MHz Antenna | £239.95 |

## Yaesu FT-2000 HF Base Transceiver

**FT-2000: £1869.95**
**FT-2000D: £2375.95**
**Available from stock and on permanent demo in our showroom**

### The Yaesu FT-2000 with PEP "Performance Enhancement Program" Upgrade.

The Yaesu FT-2000 has been a bestselling HF Transceiver since its introduction almost three years ago. The ability of downloadable firmware up-grades by the Yaesu Factory make this 100 or 200 Watt HF & 6M rig one of the most up to date pieces of equipment available to the Radio Amateur.

With the introduction of their latest release the "PEP" or Performance Enhancement Program" the FT2K is without question the very best value base HF on the market today.

For more information on what the PEP upgrade delivers see: www.hamradio.co.uk/pdf/Yaesu_PEP_Enhanced_Version.pdf

**The FT-2000 & FT-2000D (200W version) are available from ML&S.**

- The Yaesu FT-2000 was the best selling HF Base Transceiver in 2007.
- The Yaesu FT-2000 was the ONLY radio used on the 3B7C St Brandon Island during 2007.
- There were NO FAILURES during 18 days of continuous 24 hour operation during 3B7C.
- ML&S sold more FT-2000's than any other dealer in the UK.
- ML&S always has the FT-2000 on permanent demo with large stocks of the 100 & 200 versions.
- Peter Hart said: "SON OF FT-1000MP, aimed at the serious DX and contest operator".

### FT-2000 Accessories

**Got a Yaesu FT-2000 or FT-950?**
**Add a DMU-2000 Data Management Unit**

- Spectrum Scope with Limited Bandwidth Sweep feature
- Audio Scope/Oscilloscope Display Page
- Swept-Frequency SWR Page
- Memory Channel List
- World Clock withGreyLine Page
- Rotator Control Page
- Log Book Feature

**DMU Price: £CALL**

**SP-2000** External Speaker with 2 inputs & filters. ..... £139.95
**MD-200A8X** Desktop Deluxe Microphone, sounds amazing with the FT-2000! ..... £189.95
**MD-100A8X** Desktop Microphone ..... £119.95

**CW Filters for Sub-Receiver**
YF-122C (500Hz) CW Filter ..... £115.95
YF-122CN (300Hz) CWN Filter ..... £126.95
**FH-2** Remote Control Keypad ..... £42.95

**RF External Tune Kits**
3 versions available.160m Band Kit "A". 80/40 Band Kit "B". 30/20m Band Kit "C" ..... **NOW IN STOCK £359.95**

**The Ultimate Accessory!**
**Quadra System VL-1000** 1kW HF Linear Amplifier, PSU & Auto ATU Always available from stock ..... £3599.95

**NEW Yaesu FT-VX-8. ML&S £349.95** Latest 6/2/70 Handie with Bluetooth, APRS and optional GPS.

NEW Yaesu VX-3E. ML&S £144.95 Micro Handie 2/70 with scanner. Complete with Li-ion battery, charger & antenna.

**Yaesu FT-60R. ML&S £142.95** Latest twin band handie complete and ready to go.

**Yaesu VX-6R. ML&S £199.95** Yet another 2/70 handie from Yaesu.

**Yaesu VX-7R. ML&S £234.95** The UKs best selling Triple Band Handie.

**Yaesu FT-7800E. NOW ONLY £199.95**
Bar make the tea it'll give you 2m/70cm @50W/40W. FREE YSK-7800 Remote Kit!

**Yaesu FTM-10R. ML&S £239** A small compact dual band 2m/70cm transceiver with high power output of 50W on 2m and 40W on 70cm, (adjustable power levels of 50/40W, 20/20W, 5/5W). Receive range from 0.5–1.8MHz, 76–108MHz, 137–222MHz and 300–999MHz.

**Yaesu FT-8800. ML&S £289.95** Similar to the FT-7800 but can receive on 2 & 70 simultaneously.

**Yaesu FT-8900. ML&S £329.95** High-power FM on 10m, 6m, 2m & 70cm. When your local repeater is busy, slip onto 10m & work DX!

**FT-1802. ML&S £109.95** 2m FM Mobile. 5-50W output.

### *Yaesu FT-897D*

High Power version of the FT-897. Use as a transportable, (20W) or as a base/mobile (100W)
**Latest batch straight from the factory! Call for lowest price and special "Bundle" offers**

**£624.94**

### *Yaesu FT-857D*

The Ultimate HF Mobile Installation!
Plus ATAS-120D 40m-70cm Auto Antenna
Bundle Price: £CALL
(Rig only: £543.95)

**£543.95**

### *Yaesu FT-817ND*

The world's only all-band portable transceiver
**Only £439.95 with FREE CSC-83 Carry Case worth £19.95**

*All ML&S FT-817ND's include;*
2 Years warranty, metal hydride batteries, charger, mic, etc.

**£439.95**

## *FT-950 HF Base Transceiver*

**Only £1099 Available from stock**

### Yaesu's "Midship Radio"

Many of you grabbed the new Yaesu FT-950 HF & 6M from us at the end of November. Once again Yaesu identified a position in the market and hit it spot on. When Peter Hart said it was "An eye catching radio with some very nice features" and "it represents extremely good value" he wasn't kidding. If you don't need dual receive or internal PSU like its Dad, (the FT-2000) then check out the FT-950.

*All FT-950s supplied by ML&S are latest PEP factory versions!*

## Real Time Virtual Radar
**NEW MODEL NOW INCLUDES AIRBAND and FM Receiver!**

***SBS-1eR*** Portable Low-cost Mode-S/ADS-B receiver.

**RRP: £499.95 SPECIAL INTRO PRICE £469.95**

NEW SBS-1eR MODEL

The ***SBS-1eR*** Pocket Radar now includes an Airband and FM receiver and is a portable cost effective Mode-S / ADS-B Receiving Instrument designed for commercial, training and aviation enthusiasts. Supplied complete with antenna and BaseStation Virtual Radar software. The ***SBS-1eR*** Pocket Radar allows you to track ADS-B aircraft on a PC- simulated radar screen and identifies and displays Mode-S equipped aircraft.

## Perseus VLF-LF-HF Receiver

**PERSEUS is a VLF-LF-HF receiver based on an outstanding direct sampling digital architecture.**

only **£699.95**

Unlike lower class direct sampling receivers, the PERSEUS RF analog front-end has been carefully designed for the most demanding users. PERSEUS can also be operated in a wide band mode as a 10KHz - 40MHz spectrum analyzer with more than 100dB dynamic range in a 10KHz resolution bandwidth. PERSEUS is a Software Defined Radio and relies on PC software applications to carry out the demodulation process.

**See www.hamradio.co.uk for more details on all of these items ... and much, much more!** E&OE

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## ML&S carry the largest stock holding of Icom equipment in the UK!

## ICOM COUNT ON ML&S!

ALL AVAILABLE EX-STOCK

### Icom HF products

| | | |
|---|---|---|
| IC-718 | Basic HF Radio, 12V, 100W output | £449.95 |
| IC-703 | Ideal M3 Licence holder 10W HF+6m radio | £539.95 |
| IC-706mk11G | 100W HF/6m + 2/70 Multimode Mobile | £739.95 |
| IC-7200 | Mr T's choice for tough HF/6M Operation | £779.95 |
| IC-7000 | Full DSP, TFT Screen, 100W HF/6m + 2/70 | £939.95 |
| IC-7400 | 100W HF/6M/2M Base, full DSP, Auto ATU | £1199.95 |
| IC-756Pro111 | Run out of this excellent HF Transceiver | £1799.95 |
| IC-7600 | 100W, Twin RX, Huge Display. No psu | £3369.95 |
| IC-7700 | Superb 200W HF/6M Base, PSU/ATU | £Call!! |
| IC-7800 | Icom's Flagship radio has gone up again | £Call!! |
| IC-PW1Euro | 1kW Fully automatic HF/6m Linear Amp | £Call!! |

### Icom V/U Products

| | | |
|---|---|---|
| IC-E92ED | As above c/w D-Star fitted & splash–proof | £369.95 |
| IC-E208E | Brilliantly easy to use 2/70 remote-head | £269.95 |
| IC-E2820 | Proper dual band, dual display, remote etc | £395.95 |
| IC-E2820+D | Supplied with UT-123 D-Star board | £539.95 |
| IC-910H | Multimode 2/70 Base Station | £1249.95 |
| IC-910X | As above but with optional 23cm UX-910 | £1449.95 |

### Icom Receivers

| | | |
|---|---|---|
| IC-R9500 | Flagship Base Receiver, 50kHz-3335MHz | £Call!! |

## PC Controlled Receivers from ICOM

### Icom IC-PCR1500 & IC-PCR2500

All Windows XP & Vista Controlled via USB with four models to choose from:

| | | |
|---|---|---|
| IC-PCR1500 | 10kHz-3300MHz All Mode | £389.95 |
| IC-R1500 | As above but with remote head | £449.95 |
| IC-PCR2500 | Twin Receiver version of PCR-1500 | £509.95 |
| IC-R2500 | As above but with remote head | £559.95 |

## KENWOOD LISTEN TO THE FUTURE WITH ML&S!

### Kenwood HF Products

| | | |
|---|---|---|
| TS-480SAT | Remote head HF/6m 100W inc ATU Transceiver | £749.95 |
| TS-480HX | 200Watt version of above, no auto-ATU | £849.95 |
| TS-2000E | 100Watt all mode HF/2/6M with auto-ATU etc | £1479.95 |
| TS-2000X | As above but fitted with 10Watts on 23cm (all mode) | £CALL |

### Kenwood V/U Products

| | | |
|---|---|---|
| TH-F7E | The only 2/70 FM Handie with SSB/CW WB Receiver | £229.95 |
| TM-V71E | First Class 2/70 FM Mobile with remote head | £289.95 |
| TM-D710E | The only 2/70 FM Mobile/Base with APRS/TNC etc | £429.95 |
| TM-D710E+AvMap Bundle. Personal Navigator for GPS located APRS | | £Call!! |

## ICOM Price: TBA Available (hopefully) end 2009!

## NEW IC-9100 All-Rounder

### HF through to 23cms Base Transceiver

V/UHF Satellite + HF/50MHz bands + D-STAR DV mode

- HF/50MHz 144/430(440)MHz & 200MHz coverage
- SSB, CW, RTTY, AM, FM & DV modes
- 100W on HF/50/144MHz, 75W on 430(440)MHz, 10W on 1200MHz
- 32-bit floating point DSP & 24-bit AD/DA converter
- Double superheterodyne with image rejection mixer
- Optional 3kHz/6kHz 1st IF (roofing) filters (for HF/50MHz bands)
- Satellite mode operation
- Optional D-STAR DV mode operation

**Click on our website to see a video from Tokyo Hamfair August 2009!**

## KENWOOD TS-2000X

The new price is a whopping £1999.00

**ML&S: £Call for special price**

For those of you that really want a one stop solution to HF though 23cm all mode operation, the TS-2000X is the rig for you. Twenty five years ago this type of frequency operation would have filled a shack – you can now have it all in one neat desktop package.

## NEW PRODUCTS FROM ML&S

### MyDEL VENTUS G730 GPS-LOGGER

**This USB memory stick sized unit is a fascinating pocket device with multiple commercial and personal uses for individual movement tracking. It's very light, extremely easy to use and logs your route automatically. It also adds your GPS location to digital pictures. It presents the route you have taken in 3D via Google Earth™ on your PC and it can export in different formats.**


**An example:**
At the start of your walk, car or cycle ride turn on the G730 and when you finish your journey, turn it off. Once home plug the G730 into your PC, open the software, click on two icons and the route and pictures you have taken are viewed on Google earth/maps.

The G730 records your speed, altitude, distance etc., even showing how long you have stopped for during your journey. You can even use your digital images taken on route for future reference. How good is that!

Accuracy is to within 5 metres and you get up to 18 hours continuous use after a 2 hour charge via your USB port on your PC. Use the MyDEL VENTUS GPS-logger for cycling, rambling, jogging, skiing, trekking, sailing etc.

### MyDEL Ventus WX-831

***Introducing the next level of professional weather stations***

This new much improved wireless Weather Station is built to a very high standard and even includes O-Ring seals on battery compartments that are mounted externally. The quality of external hardware is built to last for years and really moves the game on when it comes to "Professional Weather Stations"

**RRP £169.95.**
**Introductory offer of only £99.95.**
Options: Additional wireless temperature monitors: £24.95.
PSU to run the WX-831 from 240V: £19.95

**ML&S are the sole UK distributor for the Ventus G730 and W-831**

**See www.hamradio.co.uk for more details on all of these items ... and much, much more!** E&OE

Used equipment sitting at home gathering dust?

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Having many years of experience offering specific finance packages for our customers, we can now offer various options on payment, including 36 and 60 months on selected products. Please note that interest is calculated from the date of the original agreement at 19.9% APR. Minimum purchase available for finance is £350.

**Finance Example** IC-E2820 with UT-123. Discounted price of £519, £52 deposit, then 36 x £16.86p/m. TAP £658.96, APR 19.9%. E&OE.

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National Hamfest

# Palstar See Web for the LOWEST prices!

## PALSTAR AT-500
## 600 Watt PEP Antenna Tuner

Covering 160 to 6 Meters, the AT-500 features a differential tuning capacitor with 2 stators and 1 rotor, a precision ceramic body roller inductor, and a 4:1 ferrite current balun for balanced line feeds.

The AT-500 utilises only 2 controls to operate for tuning, providing maximum ease of use in a manual tuner. A small-sized roller inductor operates all the way up to 6 Meters, while a relay-switched add-on inductor allows 160 Meter operation. The AT-500 also features Pastar's active Peak and Peak Hold dual cross-needle metering, chem-film treated aluminum metalwork and durable powder coated finish on the front panel and top cover. You'll have a tuner that will grace your shack for years to come.

**SPECIAL PRICE - THIS MONTH ONLY: £329.95**

## Full range of Palstar now in stock. See www.hamradio.co.uk

| | |
|---|---|
| **AT-Auto** Automatic 1500 Watt ATU | £1179.95 |
| **AT-1KP** 1200W Antenna Tuner | £369.95 |
| **AT-1500DT** 1500W Differential Antenna Tuner | £449.95 |
| **AT-2K** (2000W) Antenna Tuner | £399.94 |
| **AT-4K** (2.5kW)Antenna Tuner | £735.94 |
| **AT-5K** (3.5kW) Antenna Tuner | £1079.95 |
| **BT-1500A** Balanced Antenna Tuner | £659.95 |
| **ZM-30** Antenna Analyser | £359.95 |
| **PM-2000AM**Power/SWR Meter | £149.95 |
| **Palstar Dummy Loads** | |
| **DL-1500** (1.5KW) | £109.95 |
| **DL-2K** (2kW) | £229.95 |
| **DL-5K** (5kW) | £359.95 |
| **Palstar Receiver** | |
| **R30A Receiver** Palstar R30A, fitted Collins filters for SSB & AM | £549.95 |
| **MW550P** Active preselector & ATU for AM & 160M reception | £279.94 |
| **SP30** Matching Desk Speaker | £69.95 |
| **AA30** Active Antenna Matcher 300kHz-30MHz | £99.95 |

# The World's BEST ANTENNA TUNERS from ML&S

**FACT not FICTION: Did you know that ML&S sell MORE of the excellent LDG Auto Tuners than any other dealer outside the U.S.A.?**

## LDG Auto Tuner Range

| | | |
|---|---|---|
| AT-100pro | Desktop tuner covering all frequencies from 1.8-54 MHz | £189.95 |
| AT-200pro | Designed for new generation of rigs | £209.95 |
| AT-1000Pro | 1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ohms | £499.95 |
| AT-897 | Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too! | £179.95 |
| IT-100 | New version of the AT-7000 | £149.95 |
| YT-100 | NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control | £169.95 |
| Z-817 | Ultimate autotuner for QRP radios, including the Yaesu FT-817D | £119.95 |
| Z-100Plus | Ultimate autotuner for Yaesu FT-817D | £139.95 |
| Z-11Pro | Portable compact & tunes 100mW to 125W | £154.95 |
| RCA-14 | 4-way DC Breakout Box | £49.95 |
| KT-100 | Dedicated tuner for Kenwood radios | £169.95 |
| RBA-1:1 | Probably the best 1:1balun out there | £34.95 |
| RBA 4:1 | Probably the best 4:1 balun out there | £34.95 |
| TW-1 & TW-2 | Talking Wattmeters! TW-1 HF 0-2kW TW-2 6/2/70 250W | £129.95 each |
| DTS-4 + 4R & DTS-6 + 6R | Remote Antenna Switchers. 1.5kW 1-54MHz. Either 4 or 6 way | £69.95 + £34.95 / £87.95 + £43.95 |
| NEW FTL- Meter | Jumbo size meter for your FT-857/FT-897. LDG's new version of the its popular Yaesu meter is the FTL-Meter. It's a highly readable 4.5 inch meter face with calibrated scales for signal strength or disc on receive; power out, SWR, Mod, ALC or supply voltage on transmit. Each function is selected from the radio's meter menus.RRP: 79.95 INTRO PRICE: £67.95 | |

## MyDEL CG-3000

ML&S: £279.95

**With 200W and 200 memory channels.**

- Tunable frequency: 1.8 - 30 Mhz with long wire antenna from 8 meters
- Input impendence: 50 ohms
- Input power: 10 - 200W PEP
- SWR: <2:1
- Power supply voltage: 12V +/- 10%
- Current consumption: <0.8A
- Auto tuning time: Approx. 2 seconds (first time tuning) Less than 1 second (return to memory frequency)
- Memory channels: 200
- Weight: 1.8 KG
- Size: 310 x 240 x 72mm (L - W - H)

**NEW! Remote control for the CG-3000 and CG-5000. £39.95**

CG-3000 shown with optional remote switch.

## CG-5000MkII

**At last! 600W PEP High Speed Remote Tuner from MyDEL**

Specifications:

- Tuneable frequency: 1.8 - 30Mhz with long wire antenna from 8 meters
- Input impendence: 45-55 ohms
- Input power: 10 - 600W PEP
- SWR: <2:1
- Power supply voltage: DC 13.8V
- Current consumption: <1.5A
- Memory channels: 800
- Auto tuning time: 0.5-6 seconds (first time tuning), less than 0.2 second (return to memory frequency)
- Weight: 3 Kg.
- Size: 385mm x 280mm x 110mm (L - W - H)

ML&S: £549.95

## MyDEL Power Supplies

### New MyDEL PS-30SW11

Latest high performance switch mode PSU. Die-cast Alloy chassis, full over-voltage protection and short circuit design. **RRP £119.95.**

**Introductory offer only £69.95**

| | | |
|---|---|---|
| SPS-8250 | 25A continuous, fully metered power supply | £79.95 |
| MP-9626 | 120A, 13.8V DC power supply | £299.95 |
| MP-8230 | 13.8V DC, 25A power supply | £69.95 |
| MP-925 | Linear 25-30A, 13.8V DC power supply | £99.95 |
| MP-9600 | 60A switch mode power supply | £179.95 |
| MP-6A | 13.8V DC, 6A power supply | £29.95 |

## MyDEL CG SB-2000 USB Radio Interface

NEW PRODUCT

This small self contained beautifully styled box weighing only 400 grams really is a one stop solution to your data and radio control. It employs a CAT/CIV interface as standard and supports CAT with RS232 protocol.

The MyDEL CG SB-2000 Interface connects to your PC via USB and Sound Card and connects to your radio via Custom leads.

Once connected and configured you have Computer Control via USB and decoding via your soundcard using HamRadio Deluxe or other packages.

**Intro price of only £99.95** High quality ready-made leads for most rigs available at only £18.95.

## Mini VNA PC Controlled Antenna Analyser

The mRS miniVNA is a compact 100kHz to 180MHz antenna analyser interface that is operated via a PC powered by a single USB connection. You can see at a glance where the antenna is resonant, what the SWR and the return loss is. The best (minimal) SWR frequency is automatically found and displayed. An optional internal RS232 connection is also available.


ML&S: £259.95

**See www.hamradio.co.uk for more details on all of these items ... and much, much more!** E&OE

# The Alinco DJ-G7E

## Tri-band hand-held transceiver

When *PW's* editor asked me to review the Alinco DJ-G7E, I was very keen to try it. Why? Quite simply that the Alinco DJ-G7E is totally different, not only does it operate on the 144MHz (2m) and 430MHz (70cm) bands but also on the 1.3GHz (23cm) band too!

It's many years since I last saw a 1.3GHz hand-held on the market in the UK, let alone one that also provides 144 and 430MHz. If that's not enough, the Alinco DJ-G7E can also receive frequency modulation (f.m.) and wide band (w.b.f.m.) on a wide range of v.h.f. and u.h.f. frequencies together with a.m. on medium and short wave frequency bands!

### More Than A Hand-Held

The Alinco DJ-G7E is a lot more than a 1.3GHz hand-held. It also transmits on both the 144 and 430MHz bands, where no doubt it will see the greatest use by most operators. However, unlike many dual-band handhelds, the Alinco DJ-G7E can operate simultaneously on two bands so that you can listen on one band whilst transmitting on another. This will make the radio particularly suitable for satellite operators.

### Immediately Impressed

When I received the transceiver, I was immediately impressed by how light it is for what appears a sturdy rig. With the DJ-G7E, Alinco have struck the right balance between size, weight and sturdiness. It fitted into my hand better than many other hand-helds that I've tried. Usefully, the rig can be stood vertically on flat surface, occupying about 60 x 30mm of desk space. In this position it never fell over during the review period!

### Basic Operation

From the very start of the review process, I found the basic operation of the DJ-G7E remarkably intuitive for such a feature-rich transceiver. The main **On**/**Off** switch is controlled by a button on the left side that's pushed in for about a second to switch on

On the top panel, the left and right pair of concentric controls handle **Tuning** and **Volume** for the main and sub-bands respectively. In each case, the top control handles tuning, whilst the bottom control handles volume.

On the keypad, the **Main** button toggles between the three Amateur bands, while the **Sub** button toggles between the three Amateur bands and other parts of the radio spectrum that have been stored (e.g. h.f.).

Transmit and receive are possible from the **Main VFO**, while the **Sub VFO** is for receiving use only. To go to a specific frequency is simply a case of selecting the appropriate v.f.o. and typing in the frequency on the keypad and pressing the **Ent** button.

The Alinco DJ-G7E also has a huge choice of memories. Each can store all the details you need, including frequency, tone frequency, CTCSS, shift settings (more on this later) and a name.

### Some Configuration

To get the best out of the Alinco DJ-G7E, it requires some configuration. However, the time spent carefully studying the instruction manual and experimenting with the various settings really does pay off.


***Clean lines and a clear display, make the Alinco DJ-G7E a must-have radio, that not only operates on two independent bands, but can run in Duplex mode, transmitting on one band, while receiving on the other.***

The manual explains the structure of the multi-level menus – and crucially – that the rotary controls on the top of the rig can also be pressed down towards the main body of the transceiver. This reminded me a little of the stereo balance controls on old car radios.

Going through the configuration phase is critical for setting power output, squelch, channel steps (on both the main and **SUB VFO**s) and a host of other settings. Most configuration starts with pressing the **FUNC** button (bottom left on the front of the rig).

## Output Power

With the supplied battery the DJ-G7E has four levels of output on the 144MHz band between 300mW and 5W and between 300mW and 4.5W on 430MHz. On 1.3GHz there are just two levels, namely 300mW and 1W.

The choice of power levels was more than adequate for my needs and I tended to stick to either the lowest or highest power setting. Incidentally, I was also pleased to note that the case of the DJ-G7E stayed cool, even when operating high power for several minutes at a time.

## Operating 1.3GHz Simplex

My first contact using the transceiver was actually on 1.3GHz simplex, just a few minutes after being handed the rig for review! It was a short one-way contact to another Amateur whose dual-band transceiver also included receive only on 23cm. My friend had never tried listening on the 1.3GHz and the audio report was excellent. Unlike the DJ-G7E, his handheld could not transmit on 23cm, so a two-way contact was not possible.

In common with other 1.3GHz gear from the main manufacturers, the DJ-G7E doesn't operate in the top 25MHz of the 23cm band between 1300 and 1325MHz. The UK band plan allocates this to television repeater outputs, so I really don't see this in any way as a drawback.

I suspect that Raynet operators will find the Alinco DJ-G7E particularly useful as shorter wavelengths like 1.3GHz actually travel further into tunnels – because of the ducting effect – than 144 and 430MHz.

## Repeater Operation

Before operating through repeaters, there 's some important configuration to be done. First, the CTCSS, repeater offset and tone burst need to be configured separately for each band.

Unlike the Japanese/USA (T) version, the European (E) version of the Alinco DJ-G7E is **not** pre-programmed to use repeater offsets in the relevant parts of the bands. So switching between simplex and repeater operation will be a particularly important facility for many purchasers. Unfortunately, the instruction manual didn't describe this clearly. In the end I contacted the distributors – via the Editor – to obtain clear instructions for this function.

The distrubutors replied promptly and I was then armed with clear instructions. To use the repeater offset frequencies, I had to ensure I had the correct receive frequency selected, before pressing **Function**, **Main** (**A**). I could then use the top knob to select the offset I required.

If I had wanted to go from negative repester shift to positive shift (or vice versa), I had to press **Main** (**A**) one more time. **Note:** pressing the **Main** (**A**) button will cycle through **Shift +**, **Shift -** and **Shift Off**. When I had completed the process,I had to press the **Function** key one more time.

I really think Alinco have made this far too complicated for a basic facility that most 'E' version purchasers will frequently use. In years gone by rigs would have accomplished this by a simple switch – but on the other hand they weren't water resistant like the Alinco DJ-G7E!

Once in repeater mode, I found using CTCSS low frequency audio tones was a much simpler way of accessing repeaters than by using the tone-burst facility. Firstly, it did not require two buttons to be pressed (push-to-talk [PTT] and then the monitor button at the same time) and secondly I wasn't blasted with an audible 1750Hz tone-burst. In fact, in normal day-to-day use, I found CTCSS was by far the easiest to use.

I doubt anyone would use the tone-burst facility, unless the local repeater was not equipped for CTCSS, or if they were in a strange area and didn't know the correct CTCSS tone frequency. I found I could access the Bournemouth local repeater– **GB2SC** – some 3km away across town, on the lowest power setting using the supplied antenna.

## Using 1.3GHz Repeaters

Large parts of the UK are a long way from a 1.3GHz/23cm voice repeater – there are currently none in GD, GI, GJ, GM, GU and GW and no coverage in many parts of England. So I would certainly suggest checking at **www.ukrepeater.net** to assess whether you are in an area where coverage may be possible.

Even if you are within the coverage area of a 1.3GHz repeater, some such as **GB3FN** at Farnham use horizontal polarisation, so results with a vertically polarised antenna, such as the one fitted to the DJ-G7E, may disappoint. Most UK 1.3GHz repeaters use a 6MHz split, with the repeater input being between 1291.000 MHz and 1291.375MHz, although

***Colin G6MXI enjoying using the triple-band Alinco DJ-G7E at a local Hamfest.***

Colin Redwood G6MXL pauses from preparing *What Next?* and the *PW* QRP Contests to evaluate an amazing new Alinco rig.


***Small it may be, but the DJ-G7E manages to pack many features into the rig which not only covers the three Amateur bands of 144, 430, and 1296MHz, it manages to be a wide-band, multi-mode receiver too!***

there are some differences and one uses a split of 20MHz. Fortunately, the Alinco DJ-G7E can be configured to cope with these offsets.

As I'm well out of range of any of the UK 1.3GHz voice repeaters, I wasn't able to check this aspect of the operation in practice. However, I was able to make a number of checks with the assistance of a 1.3GHz base station to satisfy myself that the Alinco DJ-G7E was indeed operating as expected on 23cm in this respect.

## Much More!

The Alinco DJ-G7E is much more than a 1.3GHz hand-held as it also operates on both the 144 and 430MHz bands, where no doubt it will see the greatest use by most operators. I was therefore determined not to be blinded by the 1.3GHz capability and check out the facilities on the 144 and 430MHz bands.

## On Air Reports

I joined in my local club 144MHz net, working 10 stations over various paths and distances up to about 20km (12.5 miles) using a small omni-directional external antenna. On low power even the more distant stations could still copy me, reports to me varied between S-3, R1 in one case on a very obstructed path and '5&9'.

Changing to high power resulted in reports between 5&3 and 5&9. Generally the stations made no specific comments on the audio, although a few were complimentary. No adverse comments were received in any respect.

I didn't encounter stations that I could hear and not work and vice versa. I was pleased with these results from a group of Amateurs who know my voice well. Between them, my friends would have quickly told me if anything was wrong!

## Supplied Antenna

The supplied antenna is about 160mm long. It has an SMA plug on the base that screws into the top of the Alinco DJ-G7E. I noted that the antenna needed to be screwed in quite tightly to obtain best performance.

If new purchasers intend to operate the Alinco DJ-G7E with an alternative antenna, they'll need to purchase a suitable adaptor from PL-259 or BNC to SMA. I would suggest using a flexible feeder, such as RG58, for at least the first metre or so, as with stiffer feeder such as RG213, there's a risk that the feeder could throw the Alinco DJ-G7E to the floor.

## Band II Performance

Performance on the broadcast Band II w.b.f.m. was in several respects better than other Amateur Radio hand-helds I've tried previously. Sensitivity on the Alinco DJ-G7E seemed at least as good as on a small portable travel radio of approximately the same size that I used for comparison. However, when I connected a small outside 50/144 and 430MHz triple-band, vertical antenna via an SMA adaptor, I was even able to enjoy listening to a number of French f.m. broadcast stations. These were over 200km away across the English Channel, some fully quieting for several hours during a period of ducting.

Received audio through the built-in speaker was good at normal listening levels, with the bass (lower audio frequencies) very much better than the travel radio that I used for comparison.

At very low audio levels (e.g. for private listening when trying not to disturb others in the same room), there was

**Product:** Alinco DJ-G7E 144/430/1200MHz triple band f.m. transceiver

**Company:** Made in Japan by Alinco (Nevada supplier)

**Pros:** Unique. Has 1.3GHz transmit and receive, together with full duplex on 144/430/1200MHz operation for satellites. Also has broadcast a.m. coverage of medium wave and shortwaves, and v.h.f. broadcast Band II coverage. Good on-air performance. Water resistant. Small. Rugged.

**Cons:** Complex to configure. Instruction manual could be clearer.

**Price:** £359.95 plus P&P £8 (24 hour delivery UK Mainland)

**Supplier:**
My thanks for the loan of this handheld go to **Nevada Radio, Unit 1, Fitzherbert Spur, Farlington, Portsmouth, Hampshire PO6 1TT.**
Tel: **023 9231 3090**
E-mail: **sales@nevada.co.uk**
Website: **www.nevadaradio.co.uk**

*The top panel of the rig with the twin concentric controls, the SMA socket for the triple-band antenna connection and the headphone/microphone socket with its waterproof gasket and retaining screw removed.*

a significant level of hiss which masked somewhat the otherwise excellent audio. Increasing the volume to normal listening levels helped the perceived overall signal-to-noise ratio, but in quiet passages in radio programmes the hiss was still noticeable. Despite this, I found the maximum volume level adequate for all my needs.

## Amplitude Modulation

The Alinco DJ-G7E receives medium wave amplitude modulation (a.m.) broadcast signals on a built-in antenna. Broadcasting stations on h.f. can also be received. Alinco rightly point out in the instruction book that this is best achieved using an external antenna. I connected an external 14MHz dipole antenna and was pleased with the results.

## Four & Six Metres

Although the Alinco DJ-G7E is capable of receiving signals in the 50MHz (6m) and 70MHz (4m) bands, I was a little disappointed with the results. A number of strong tones were audible, which were absent when I listened using my 50MHz base station and antenna for comparison. However, the Alinco DJ-G7E uses 51.65MHz and 50.75MHz as first intermediate frequencies (i.f.s) for the main and sub-bands, which may explain these odd signals.

## Satellite Operation

The Alinco DJ-G7E can transmit on one band whilst receiving on another. This makes it particularly suitable for operation through f.m. satellites in the manner I described in the September 2009 *What Next?* column. Incidentally, I found it helpful to configure 5kHz channel spacing so that I could take into account Doppler shift during a pass.

The use of the dual memory bank was also helpful, so that I could put both the 144MHz uplink and 430MHz downlink frequencies into the same memory. I even took this one step further and put a series of pairs of frequencies into adjacent memory channels, so that I could minimise the amount of 'twiddling' during a pass.

Using my Arrow 146/437-10 dual-band hand-held beam antenna, I was rewarded on my first attempt with audible signals on the 430MHz downlink, despite the satellite pass being only 10° above a **very** obstructed horizon. There's certainly no problem with 430MHz receive sensitivity!

On a subsequent pass, which was well above the horizon, signals were easily readable. Helpfully, the small size of the Alinco DJ-G7E meant that I could pop it into a shirt pocket until I could hear some activity.

To prevent feedback (if headphones aren't used) during


*The drop-in charger for the DJ-G7E tri-band rig features an l.e.d. that goes out when the battery is fully charged.*

this activity, it's possible to mute the receive sub-band whilst actually transmitting on the main band and revert to listening on the sub-band automatically when the push-to-talk (p.t.t.) is released. I was also pleasing that I could operate the Alinco DJ-G7E single-handed, so that I could hold the antenna in my other hand.

## Image Rejection

Using just the supplied flexible whip, the Alinco DJ-G7E didn't suffer from the imaging problems that I've encountered with some other Amateur Radio transceivers. Alinco have certainly improved this aspect over the years and results were very much better than the Alinco DJ-V5E hand-held I looked at about eight years ago.

## Water Resistance

The Alinco DJ-G7E saves some space and maintains its water resistance, by employing a special 4-pole 3.5mm screw-in water resistant jack socket on the top panel. While in principle this seems like a good idea to me, it does mean that a special adaptor unit is needed to enable traditional plugs to be used with non-Alinco headphones, microphones or when operating using data modes. This adaptor is available as an optional extra and wasn't included with the Alinco DJ-G7E supplied for this review.

## Supplied Accessories

In the UK the Alinco DJ-G7E is supplied with the flexi-whip antenna, clips and a Lithium-Ion rechargeable battery and a base battery charging unit with associated power supply unit. While charging is in progress a red light emitting diode (l.e.d.) glows in the charging unit. Alinco claim that charging typically takes three hours. Despite this, I found that with a virtually new battery the time taken was even less.

Alinco have thoughtfully provided several holes through which the charger can be screwed on to a flat horizontal surface. I think some operators will find this useful if they're

operating the transciever with an external antenna while it's on charge.

I was also impressed with the capacity of the battery and, of course, being Lithium-Ion, it can be topped up when partially discharged with no 'memory' issues to worry about.

## Optional Accessories

A number of optional accessories are becoming available for the Alinco DJ-G7E. I think many Amateurs would regard the Plug Conversion Cable, Soft Case and an adaptor to allow an external antenna to be used with the Alinco DJ-G7E and probably a spare battery, as highly desirable.

The UK version doesn't come with an empty battery case (this is an optional extra). External microphones and ear-pieces are also available and they use the special water resistant connector.

## Overall Excellence

Overall, I think that the Alinco DJ-G7E is an excellent rig. The unique set of features is backed up by good transmit and receive performance on all three Amateur bands. I have no doubt that being able to have full duplex QSOs through a satellite using a single, portable hand-held rig will appeal to many Amateurs.

The inclusion of 1.3GHz will also appeal to those living in areas served by a 23cm voice repeater and to those wanting a quiet band in which to hold QSOs or conduct experiments and also to Raynet users.

The Band II w.b.f.m. audio quality, together with medium and short wave a.m. reception, makes the Alinco DJ-G7E a very attractive option for those looking to minimise the amount of equipment they take with them on a camping or boating holiday. The water resistance is a bonus and complements its use in such conditions.

To cram so much into such a small rig, means that this is a complex rig to configure and operate and I think that the instruction manual could be improved – particularly in describing some of the basic operations such as repeaters. Once it's mastered though, I really couldn't fault the performance and if you always like to use the rig in one particular manner, it can be configured to suit.

Ideally, I would also have preferred to have the two sets of concentric knobs on the top to be separated a little further. Perhaps the left-hand one could swap places with its l.e.d. to give a little more finger space between the two sets of controls – but now I'm starting to nit-pick and I'm sure this is much more easily said than done on this excellent transceiver!

## Unique In The Market

At a price of £359.95, the Alinco DJ-G7E isn't a cheap hand-held but it has a combination of features that makes it unique in the market place. As far as I'm aware, no other manufacturer currently offers a 1.3GHz handheld on the UK market and few others provide full duplex for satellite operation on 144 and 430MHz. If either of these features is important to you, then I have no hesitation in recommending the Alinco DJ-G7E.

I'm quite amazed that Alinco have been able to put so many useful features into such a compact radio, and deliver good performance at the same time. I'm also grateful to Nevada for the loan of the review DJ-G7E. ●

## Specifications

| | |
|---|---|
| TX/RX Frequency Range | 144.000 - 145.995MHz |
| TX/RX Frequency Range | 430.000 - 439.995MHz |
| TX/RX Frequency Range | 1240.000 - 1299.995MHZ |
| Receives | AM/FM/TV(analog) broadcasting bands |
| Antenna Impedance | 50Ω SMA) |
| Supply Voltage | 7.4V DC using EBP-73 Li-Ion battery pack |
| External Supply Voltage | 4.5 to 16V DC (external regulated) |
| Ground | Negative ground |
| Current Consumption TX 144MHz | 1.6A (approx) |
| Current Consumption TX 430MHz | 1.8A (approx) |
| Current Consumption TX 1280MHz | 0.8A (approx) |
| Current Consumption RX | 200mA (approx) |
| Battery save (1:4) approx. average | Dual 56mA/Single 50mA |
| Temperature Range | -10C to 45°C (per CE) |
| Frequency Stability | +2.5ppm (-10C to +45°C) |
| Dimensions | 60x115x30mm (exluding projections) |
| Weight | 296g (includes antenna and EBP-73 battery) |
| **Transmitter** | |
| Output Power (13.8V DC) | 144MHz & 430MHz 5/2/0.8/0.3W, 1200MHz 1/0.3W |
| Output Power (EBP-73) | 144MHz 5/2/0.8/0.3W<br>430MHz 4.5/2/0.8/0.3W<br>1200MHz 1/0.3W |
| Output Power (4 x AA cells) | 144MHz 2W<br>430MHz 1.5W<br>1200MHz 0.5W |
| Modulation mode TX | F1D/F2D/F3E (RX only WFM/AM) |
| Spurious emission | -60dB or less |
| Maximum frequency deviation | ±5kHz |
| **Receiver** | |
| System | Double-conversion superhetrodyne (NFM, AM)<br>Single-conversion superhetrodyne (WFM) |
| If Frequencies (1st/2nd) | Main-band<br>FM 51.65MHz / 450kHz<br>Sub-band AM/FM 50.75MHZ / 450kHz<br>Sub-band WFM 10.7MHz |
| Sub-band receiver (Best values) | |
| AM (10dB S/N) | Lower than 50MHz -1dBμ<br>50MHz and above -6dBμ |
| FM (12dB SINAD) | 30-470MHz and above -15dBμ<br>470MHz and above -7dBμ |
| WFM 76-470MHz | 76-470MHz -6dBμ<br>470MHz and above -3dBμ |
| Selectivity | AM/FM -6dB 12kHz or more / -60dB 35kHz or less<br>WFM -6dB 130kHz or more / -60dB 300kHz or less |
| Audio output power | 400mW (8Ω / 10% THD) |

**Mike Devereux G3SED**, Managing Director of Nevada comments: The review looks thorough and very fair. I will be feeding back comments on the repeater operation for the European E version to Alinco, to see if we can get that made easier to use on future productions. Once again, many thanks for the courtesy copy of the review. Regards to everyone at *PW*. **Mike.**

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- Synchronous Detector with selectable side-band
- Line-in/out
- 700 randomly programmable memories for all frequencies
- Clock, sleep timer, alarm function
- 3.5 mm headphone output (earphones not included)
- Telescopic antenna for FM and SW reception
- Internal ferrite bar antenna for AM reception
- Power source: 4AA batteries (not included)
- Display Indication: Time, frequency, stereo, sleep, alarm, lock, battery, memory page, memory, time zone, week-day, wide narrow, signal strength, synchronous detector, SSB, RDS
- Speaker type: Wide range 1x 60 mm
- External antenna jack SW, FM, Aircraft Band
- Batteries 4 x 1.5 V (LR6, AM3, AA); 4 AA rechargeable NI-MH
- Dimensions: 6.614" x 4.13" x 1.1" and 168 x 105 x 28 mm (W x H x D)
- Net weight: 345 g
- Accessories: owner's manual, warranty card, protective pouch, AC adapter/charger

**£99.95**
£10 P&P

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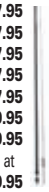
**MRQ525** 2m/70cm, 1/4 wave & 5/8, Gain 2m 0.5dB/3.2dB 70cm Length 17" PL259 fitting commercial quality..... **£19.95**
**MRQ500** 2m/70cm, 1/2 wave & 2x5/8, Gain 2m 3.2dB/5.8db 70cm Length 38" PL259 fitting commercial quality..... **£24.95**
**MRQ750** 2m/70cm, 6/8 wave & 3x5/8, Gain 2m 5.5dB/8.0dB 70cm Length 60" PL259 fitting commercial quality..... **£34.95**
**MRQ800** 6/2/70cm 1/4 6/8 & 3 x 5/8, Gain 6m3.0dBi/2m 5.0dB/70 7.5dB Length 60" PL259 fitting commercial quality..... **£39.95**
**GF151** Professional glass mount dual band antenna. Freq: 2/70 Gain: 2.9/4.3dB. Length: 31"..... **£29.95**

## Mobile Colinear Antennas

*Ever wanted colinear performance from your mobile?*
**MR3-POWER ROD** ★ Freq: 2/70cm ★ Gain: 3.5/6.5dBd ★ Length: 100cm ★ Fitting: PL259..... **£29.95**
**MR2-POWER ROD** ★ Freq: 2/70cm ★ Gain: 2.0/3.5dBd ★ Length: 50cm ★ Fitting: PL259..... **£24.95**

## AM-Pro Mobile HF Whips (with 3/8 base fitting)



**AM-PRO 6** metre *(Length 4.6' approx)*..... **£17.95**
**AM-PRO 10** metre *(Length 7' approx)*..... **£17.95**
**AM-PRO 17** metre *(Length 7' approx)*..... **£17.95**
**AM-PRO 20** metre *(Length 7' approx)*..... **£17.95**
**AM-PRO 40** metre *(Length 7' approx)*..... **£17.95**
**AM-PRO 80** metre *(Length 7' approx)*..... **£19.95**
**AM-PRO 160** metre *(Length 7' approx)*..... **£49.95**
**AM-PRO MB6** Multi band 6/10/15/20/40/80m can use 4 Bands at anyone time *(Length 250cm)*..... **£69.95**

## ATOM Multiband Mobile Antennas

**ATOM-AT4** ★ Freq: 10/6/2/70cm ★ Gain: (2m 1.8dBd) (70cm 3.5dBd) ★ Length: 132cm ★ Power: 200w (2/70cm) 120w (10/6m) ★ Fitting:PL259..... New low price **£49.95**
**ATOM-AT5** ★ Freq: 40/15/6/2/70cm ★ Gain: (2m 1.5dBd) (70cm 3.5dBd) ★ Length: 129cm ★ Power:200w (2/70cm) 120w (40/6m) ★ Fitting:PL259..... New low price **£59.95**
**ATOM-AT7** ★ Freq: 40/20/15/10/6/2/70cm (5 bands at once) ★ Gain: (2m 1.8dBd) (70cm 3.5dBd) ★ Length: 200cm ★ Power: 200w (2/70cm) 120w (40/6m) ★ Fitting: PL259..... New low price **£69.95**

## Tarheel Motorised Mobile

**Little Tarheel II** 3.5-54MHz 200W max length 48"... **£349.95**
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**Tarheel 75A** 7-34MHz 250W max length 8ft..... **£429.95**
**Tarheel 100A** 3.4-30MHz 1.5Kw max length 10.4ft.. **£449.95**
**Tarheel 200A HP** 3.4-28MHz 1.5Kw max length 12ft..... **£479.95**
**Tarheel 300A** 1.7-30MHz 250W max length 11.4ft... **£449.95**
**Tarheel 400A** 1.7-30MHz 250W max length 12ft..... **£479.95**

## SPX Multiband Mobile Antennas

***All these antennas have a unique flyleaf & socket to make band changing easy! Just plug-n' go!***
**SPX-100** ★ Portable 9 Band Plug n' Go HF mobile antenna ★ Freq: 6/10/12/15/17/20/30/40/80m ★ Length: 1.65m retractable to 0.5m ★ Power: 50w ★ Fitting: 3/8 or PL259 with adapter included..... **£44.95**
**SPX-200S** ★ Mobile 6 band Plug 'n Go HF mobile antenna ★ Freq: 6/10/15/20/40/80 ★ Length: 130cm ★ Power:120w ★ Fitting: PL259..... **£49.95**
**SPX-300** ★ Mobile 9 band Plug 'n Go HF mobile antenna ★ Freq: 6/10/12/15/17/20/30/40/80m ★ Length: 165cm ★ Power: 200w ★ Fitting: 3/8 Thread..... **£59.95**
**SPX-300S** ★ Mobile 9 band Plug 'n Go HF mobile antenna ★ Freq: 6/10/12/15/17/20/30/40/80m ★ Length:165cm ★ Power:200w ★ Fitting: PL259..... **£64.95**

## Single Band End Fed Base Antennas

**2 metre** ½ wave (Length 52") (Gain 2.5dB) (Radial free)..... **£29.95**
**4 metre** ½ wave (Length 80") (Gain 2.5dB) (Radial free)..... **£44.95**
**6 metre** ½ wave (Length 120") (Gain 2.5dB) (Radial free)..... **£49.95**
**6 metre** ⅛ wave (Length 150") (Gain 4.5dB) (3 x 28" radials)..... **£59.95**

## Single Band Vertical Colinear Base Antenna

D-STAR All colinears D-Star compatible



**BM33** 70 cm 2 X 5'8 wave Length 39" 7.0 dBd Gain..... **£44.95**
**BM45** 70cm 3 X 5'8 wave Length 62" 8.5 dBd Gain..... **£54.95**
**BM55** 70cm 4 X 5'8 wave Length 100" 10 dBd Gain..... **£79.95**
**BM60** 2m 5'8 Wave, Length 62", 5.5dBd Gain..... **£54.95**
**BM65** 2m 2 X 5'8 Wave, Length 100", 8.0dBd Gain..... **£79.95**
**BM75** 2m 3 X 5'8 Wave, Length 175", 9.5dBd Gain..... **£99.95**

## Vertical Fibreglass Colinear Antennas

*New co-linear antennas with specially designed tubular vertical coils that now include wide band receive! Remember, all our co-linears come with high quality. N-type connections.*

D-STAR All colinears D-Star compatible

**SQBM105 Mk.2** Dual Bander Radial FREE!)....**£39.95**
(2m 2.0dBd) (70cm 4.5dBd) (RX:25-2000 MHz) (Length 28")
**SBQBM100 Mk.2** Dual Bander..... **£49.95**
(2m 3dBd) (70cm 6dBd) (RX:25-2000 MHz) (Length 39")
**SQBM110 Mk.2** Dual Bander (Radial FREE!)...**£59.95**
(2m 3dBd) (70cm 6dBd) (RX:25-2000 MHz) (Length 39")
**SQBM200 Mk.2** Dual Bander..... **£54.95**
(2m 4.5dBd) (70cm 7.5dBd) (RX:25-2000 MHz) (Length 62")
**SQBM223Mk.2** Tri Bander..... **£69.95**
(2m 4.5dBd) (70cm 7.5dBd) (23cm 12.5dBd) (RX 25-2000MHz) Length: 62"
**SQBM500 Mk.2** Dual Bander Super Gainer..... **£69.95**
(2m 6.8dBd) (70cm 9.2dBd) (RX:25-2000 MHz) (Length 100")
**SQBM800 Mk.2** Dual Bander Ultimate Gainer..... **£129.95**
(2m 8.5dBd) (70cm 12.5dBd) (RX:25-2000 MHz) (Length 5.2m)
**SQBM1000 MK.2** Tri Bander..... **£79.95**
(6m 3.0dBd) (2m 6.2dBd) (70cm 8.4dBd) (RX:25-2000 MHz) (Length 100")

## Slim Jims

**SJ-70** 430-430MHz slimline design with PL259 connection. Length 1.00m with N-TYPE socket..... **£19.95**
**SJ-2** 144-146MHz slimline design with PL259 connection. Length 2.00m with SO-239 socket..... **£24.95**

## HB9CV 2 Element Beam 3.5dBd

**HB9-70** 70cm (Boom 12") ..... **£24.95**
**HB9-2** 2 metre (Boom 20")..... **£29.95**
**HB9-4** 4 metre (Boom 23")..... **£39.95**
**HB9-6** 6 metre (Boom 33")..... **£49.95**
**HB9-10** 10 metre (Boom 52")..... **£69.95**
**HB9-627** 6/2/70 Triband..... (Boom 45")..... **£69.95**

## Halo Loops

**HLP-2** 2 metre (size approx 300mm square)..... **£19.95**
**HLP-4** 4 metre (size approx 600mm square )..... **£29.95**
**HLP-6** 6 metre (size approx 800mm square)..... **£39.95**
*These very popular antennas square folded di-pole type antennas*

## Yagi Beams (fittings stainless steel)

**YG4-2C** 2 metre 4 Element (Boom 48") (Gain 7dBd)..... **£29.95**
**YG5-2** 2 metre 5 Element (Boom 63") (Gain 10dBd)..... **£49.95**
**YG8-2** 2 metre 8 Element (Boom 125") (Gain 12dBd)..... **£69.95**
**YG11-2** 2 metre 11 Element (Boom 185") (Gain 13dBd)..... **£99.95**
**YG3-4** 4 metre 3 Element (Boom 45") (Gain 8dBd)..... **£59.95**
**YG5-4** 4 metre 5 Element (Boom 104") (Gain 10dBd)..... **£69.95**
**YG3-6** 6 metre 3 Element (Boom 72") (Gain 7.5dBd)..... **£64.95**
**YG5-6** 6 metre 5 Element (Boom 142") (Gain 9.5dBd)..... **£84.95**
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## Crossed Yagi Beams (fittings stainless steel)

**XYG5-2** 2 metre 5 Element (Boom 64") (Gain 7.5dBd)..... **£89.95**
**XYG8-2** 2 metre 8 Element (Boom 126") (Gain 11.5dBd)..... **£109.95**
**XYG13-70** 70 cm 13 Element (Boom 83") (Gain 12.5dBd)..... **£79.95**

## ZL Special Yagi Beams (Fittings stainless steel)

**2 metre 5 Element** (Boom 38") (Gain 9.5dBd).... **£49.95**
**2 metre 7 Element** (Boom 60") (Gain 12dBd)..... **£59.95**
**2 metre 12 Element** (Boom 126") (Gain 14dBd). **£99.95**
**70 cm 7 Element** (Boom 28") (Gain 11.5dBd)..... **£39.95**
**70 cm 12 Element** (Boom 48") (Gain 14dBd)..... **£49.95**
*The biggest advantage with a ZL-special is that you get massive gain for such a small boom length, making it our most popular beam antenna*

## G5RV Wire Antenna (10-40/80m) (Fittings stainless steel)

| | HALF | FULL |
|---|---|---|
| **Standard** (enamelled) | **£19.95** | **£24.95** |
| **Hard Drawn** (pre-stretched) | **£24.95** | **£29.95** |
| **Flex Weave** (original high quality) | **£29.95** | **£34.95** |
| **Flexweave PVC** (clear coated PVC) | **£34.95** | **£39.95** |
| **Deluxe 450 ohm PVC** | **£44.95** | **£49.95** |

**Double size standard** (204ft)..... **£49.95**
**TS1** Stainless Steel Tension Springs (pair) for G5RV..... **£19.95**

## G5RV Inductors

Convert your half size G5RV into a full size with just 8ft either side. Ideal for the small garden
**G5RV-IND**..... **£24.95**

## Mini HF Dipoles (Length 11' approx)

**MD020** 20mt version approx only 11ft ..... **£49.95**
**MD040** 40mt version approx only 11ft ..... **£54.95**
**MDO80** 80mt version approx only 11ft..... **£59.95**
(slimline lightweight aluminium construction)

## Trapped Wire Di-Pole Antennas (Hi grade heavy duty Commercial Antennas)

**MDT-6** FREQ:40 & 160m LENGTH: 28m POWER:1000 Watts..... **£79.95**
**MTD-1** (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts... **£69.95**
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**MTD-3** (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts..... **£129.95**
**MTD-4** (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts..... **£69.95**
**MTD-5** (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts..... **£119.95**
*(MTD-5 is a crossed di-pole with 4 legs)*

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**MFJ-926** remote Mobile ATU 1.6-30MHz 200W ..... **£439.95**
**MFJ-927** Compact with Power Injector 1.8-30MHz 200W ..... **£256.95**
**MFJ-928** Compact with Power Injector 1.8-30MHz 200W ..... **£199.95**
**MFJ-929** Compact with Random Wire Option 1.8-30MHz 200W ..... **£219.95**
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**MFJ-993B** 1.8-30MHz 300W SSB/150W CW ATU ..... **£259.95**
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**MFJ-998** 1.8-30MHz 1.5kW ..... **£679.95**

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**MFJ-902** 3.5-30MHz 150W mini travel tuner ..... **£104.95**
**MFJ-902H** 3.5-30MHz 150W mini travel tuner with 4:1 balun ..... **£124.95**
**MFJ-904** 3.5-30MHz 150W mini travel tuner with SWR/PWR ..... **£134.95**
**MFJ-904H** 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun ..... **£154.95**
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**MFJ-971** 1.8-30MHz 300W portable tuner ..... **£119.95**
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**MFJ-941E** 1.8-30MHz 300W Versa tuner 2 ..... **£144.95**
**MFJ-948** 1.8-30MHz 300W deluxe Versa tuner ..... **£164.95**
**MFJ-949E** 1.8-30MHz 300W deluxe Versa tuner with DL ..... **£184.95**
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**MFJ-974B** 3.6-54MHz 300W tuner with X-needle SWR/WATT ..... **£194.95**
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**MFJ-229** UHF Digital Analyser 270-480MHz ..... **£219.95**
**MFJ-249B** Digital Analyser 1.8-170MHz ..... **£264.95**
**MFJ-259B** Digital Analyser 1.8-170MHz ..... **£279.95**
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**LDG Z-817** 1.8-54MHz ideal for the Yaesu FT-817 ..... **£119.95**
**LDG Z100 Plus** 1.8-54MHz the most popular LDG tuner ..... **£139.95**
**LDG IT-100** 1.8-54MHz ideal for IC-7000 ..... **£149.95**
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**AV-1000** (1.8-160/430-450/800-930/1240-1300MHz) (Power to 400W) ..... **£79.95**

## Power Supplies

**PSU-2** (small high quality 2amp) ..... **£14.95**
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**POWER-MITE-NF** (22amp switch mode with noise offset) ..... **£69.95**
**POWER-MAX-25-NF** (22amp switch mode with noise offset & cig socket) ..... **£89.95**
**POWER-MAX-45-NF** (38amp switch mode with noise offset & cig socket) ..... **£119.95**

## Portable Telescopic Masts

**LMA-S** Length 17.6ft open 4ft closed 2-1" diameter ..... **£79.95**
**LMA-M** Length 26ft open 5.5ft closed 2-1" diameter ..... **£89.95**
**LMA-L** Length 33ft open 7.2ft closed 2-1" diameter ..... **£99.95**
**TRIPOD-P** Lightweight aluminium tripod for all above ..... **£44.95**

## Antenna Rotators

**AR300XL** VHF/UHF ..... **£79.95**
**AR-35X** Light duty UHF\VHF ..... **£109.95**
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**RC5-3** Heavy Duty HF inc pre set control box ..... **£679.95**
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**MB-1** 1:1 Balun 400 watts power ..... **£29.95**
**MB-4** 4:1 Balun 400 watts power ..... **£29.95**
**MB-6** 6:1 Balun 400 watts power ..... **£29.95**
**MB-1X** 1:1 Balun 1000 watts power ..... **£39.95**
**MB-4X** 4:1 Balun 1000 watts power ..... **£39.95**
**MB-6X** 6:1 Balun 1000 watts power ..... **£39.95**
**MB-Y2** Yagi Balun 1.5 to 50MHz 1kW ..... **£39.95**

## Duplexers & Antenna Switches

**DX-720D Duplexer** *Port 1: HF + 6 + 2m (1.6-150MHz). *Port 2: 70cm (400-460MHz). *Connection: Fixed 2 x PL259 & 1 x PL259 ..... **£24.95**
**MX-72 Duplexer** *Same spec as DX-720D but with PL259 fly leads ..... **£34.95**
**MX-627** HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz) ..... **£49.95**
**CS201** Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts PL259 fittings ..... **£14.95**
**CS201-N** Same spec as CS201 but with N-type fittings ..... **£19.95**

## Antenna Wire & Ribbon

**Enamelled copper wire** 16 gauge (50mtrs) ..... **£19.95**
**Hard Drawn copper wire** 16 gauge (50mtrs) ..... **£24.95**
**Equipment wire** Multi Stranded (50mtrs) ..... **£14.95**
**Flexweave** high quality (50mtrs) ..... **£29.95**
**PVC Coated Flexweave** high quality (50mtrs) ..... **£39.95**
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**450Ω Ladder Ribbon** heavy duty USA imported (20mtrs) ..... **£17.95**
*(Other lengths available, please phone for details)*

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**RG58 best quality standard** per metre ..... **35p**
**RG58 best quality military spec** per metre ..... **60p**
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**30 amp red/black cable 30 amp** per metre ..... **£1.25**
*Please phone for special 100 metre discounted price*

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**RG58** Standard 6mm coax cable ..... **£24.95**
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**20ft Heavy Duty Swaged Pole Set**
These heavy duty aluminium (1.8mm wall) have a lovely push fit finish to give a very strong mast set
**1.25"** set of four 5ft sections ..... **£29.95**
**1.50"** set of four 5ft sections ..... **£39.95**
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**2.00"** set of four 5ft sections ..... **£59.95**

**If we advertise it – we stock it!**

## Patch Leads

**STANDARD LEADS**

**1m RG58** PL259 to PL259 lead ..... **£3.95**
**10m RG58** PL259 to PL259 lead ..... **£7.95**
**30m RG58** PL259 to PL259 lead ..... **£14.95**

**MILITARY SPECIFICATION LEADS**

**1m RG58** Mil spec PL259 to PL259 lead ..... **£4.95**
**10m RG58** Mil spec PL259 to PL259 lead ..... **£10.95**
**30m RG58** Mil spec PL259 to PL259 lead ..... **£24.95**
**1m RG213** Mil spec PL259 to PL259 lead ..... **£4.95**
**10m RG213** Mil spec PL259 to PL259 lead ..... **£14.95**
**30m RG213** Mil spec PL259 to PL259 lead ..... **£34.95**
**1m H100** Mil spec PL259 to PL259 lead ..... **£5.95**
**10m H100** Mil spec PL259 to PL259 lead ..... **£19.95**
**30m H100** Mil spec PL259 to PL259 lead ..... **£44.95**
*(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)*

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**36" T & K Bracket** *(complete with U Bolts)* ..... **£49.95**
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## Tony Nailer's

# technical for the terrified

Tony Nailer G4CFY, now looks at often forgotten items, as he discusses the purpose and choice of passive components


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Arrowsmith Court,
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Broadstone,
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E-mail: tony@pwpublishing.ltd.uk


My interest in radio started in 1960, when 'proper' transistors were rare and expensive items, and when receivers and transmitters used valves, and when a.m. and c.w. were all the rage. At the time most enthusiasts were still using ex-government wartime receivers, though many transmitters were home-brewed. The ex-military equipment was often in poor condition after being stored in extremes of heat, cold and dry or wet environments.

Often there were problems with transformers and electrolytic capacitors in power supplies, or with waxed-paper axial capacitors used in radio frequency (r.f) and intermediate frequency (i.f.) stages. The newly acquired equipment, when connected directly to 250V mains would often make a loud hum before producing smoke as the transformer burned out! Even if the transformer was not faulty, often the electrolytic capacitors would have depolarised and could explode.

Renovating the equipment usually necessitated replacement of the complete power supply, as well as all the waxed-paper coupling and de-coupling capacitors. At that time London's Lyle Street and Tottenham Court Road were crowded with shops selling surplus ex-military components, many in sealed plastic bags. So there were plenty of replacement new parts – if you could afford the trip to London.

I learnt, like everyone else, that capacitors were usually mica in high-*Q* oscillator, r.f. and i.f. stages. But coupling and de-coupling capacitors in those stages were usually waxed-paper, and audio stages and power supplies often used electrolytic types.

Resistors of the time, were carbon rods painted and marked in a 'body–tip-spot' colour sequence, or with body plus two 'rings' for value and a separate ring for tolerance. Usually they came in a range with just six values in each decade (the E6 series. ***Ed***).

Resistors in power supplies were usually long carbon rods with wire round the ends soldered to 'silvering', which had somehow been attached to the carbon rod. These carbon-rod resistors would often have gone high in value, unless they'd been overloaded when, of course, they would be very low values.

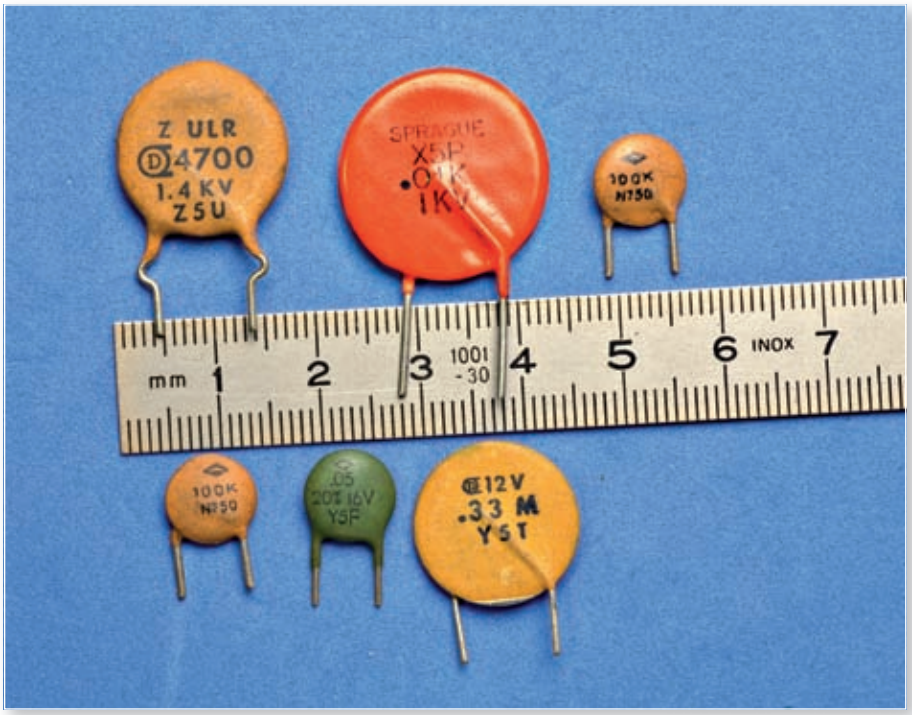
## The 1960 Onwards

In the 1960s, ceramic capacitors appeared as well as paper dielectric capacitors moulded with a sort of plastic cover, or in tubular aluminium cans with rubber ends. Resistors became smaller and changed to a three-ring value coding plus a separate ring for tolerance.

The commonly available resistors were with 12 values in each decade, and referred to as the E12 series. Carbon-film and then metal-film resistors rapidly replaced the previous types. The new military-standard resistors used an E24 series with a five-ring coding for value and tolerance.

Electrolytic capacitors also steadily became smaller, then with the increased use of transistors and lower operating voltages, they became tiny compared to their predecessors. A wide variety of plastic compounds started to be used as the dielectric in capacitors, which led to a profusion of different types becoming available. Polypropylene axial type capacitors took over as de-coupling components in valved equipment and ceramics became popular for coupling in all types of equipment.

By then, Japan had begun to lead the world in mass-market cheap portable radios, which were full of ceramic and electrolytic capacitors. Though some high quality equipment often used Mylar dielectric capacitors in audio stages, and mica capacitors in high-*Q* stages.




***The capacitors shown here include Z5U, X5P, Y5F, Y5T, and two unknown types with N750 coefficients. The two larger ones above the ruler are high-voltage ceramic types.***

During the 1970s new ceramic materials were developed with high dielectric constant, (referred to as 'high-k'), which increased the capacitance value for a given plate area. This led to progressive miniaturisation of the size of these components.

In the late 1970s I worked at a company in Poole, which designed and manufactured marine transceivers and navigation equipment, as well as car radios. One of the engineers had trouble with a digital synthesiser he was developing and traced the problem to some green coloured capacitors using a high-k Y5P ceramic dielectric. Apparently, this material was a partial semiconductor with voltage-variable resistance and capacitance effects.

## Present Day

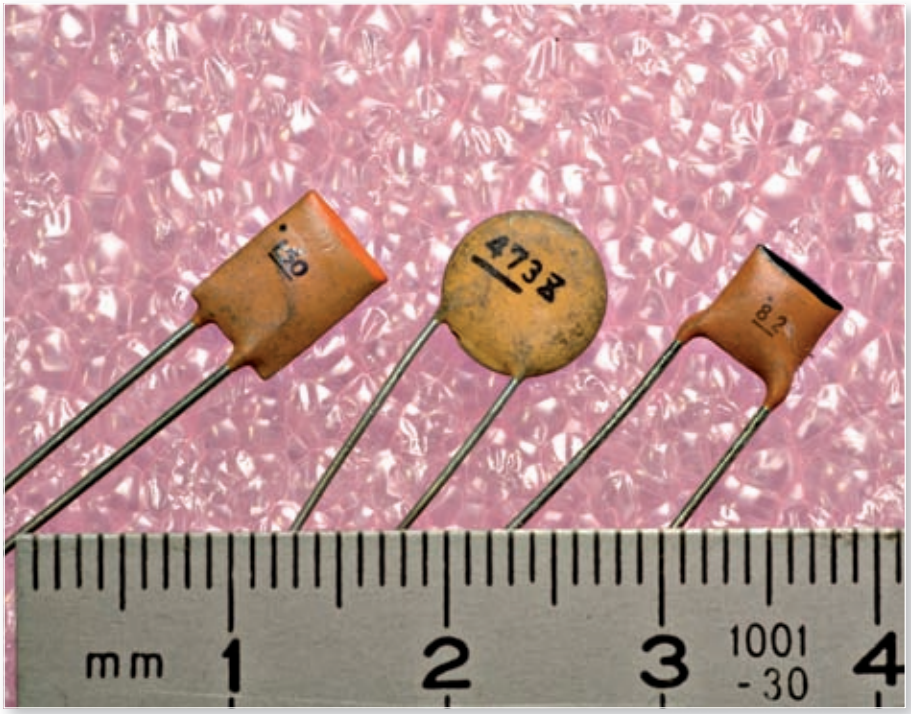
Coming up to the present day, really low-loss high-k materials have been developed for use in radio equipment, working up to 3GHz. These components are mainly in chip form and often at a high cost. Other variants of ceramics have been developed for the low-cost surface mount 'chips' needed for the mobile 'phone market.

Originally, the medium and high-k (and high-loss) ceramics were used only on capacitance values of 1000pF (1nF) and above. However, the continued pressures on cost and size has caused these ceramics to be used at progressively lower capacitances.

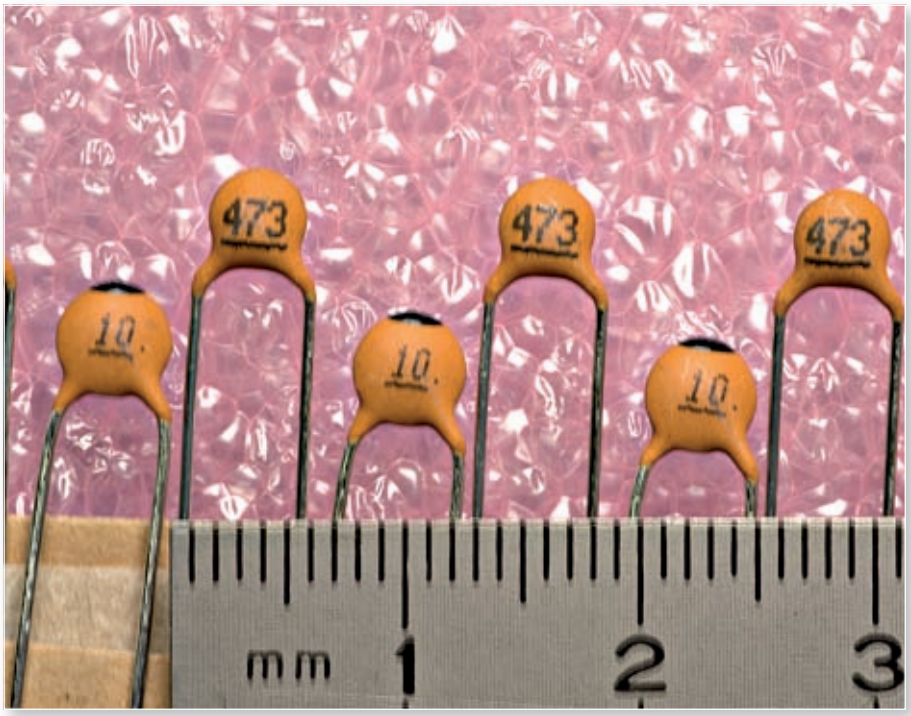
I started Spectrum Communications in 1978, and during that time, we've produced r.f. equipment mainly for 50, 70, and 144MHz as well as synthesiser conversion EPROMs, speech processors and recently some test equipment.

Generally, I've used quarter-watt (0.25W) carbon-film resistors and a few metal-film high wattage types. Capacitors in the range 1–100pF, for tuned circuits, have been low-k with medium and high-k units above 1nF used for coupling and de-coupling. Mylar-film and then polyester boxed capacitors have been used in audio frequency circuits.

During my five years as an author for *PW,* I've started to develop equipment for the high frequency (h.f.) bands of 1.8–30MHz. However, I've often found that theory doesn't match practice when developing bandpass filters for h.f., especially when capacitance values 120–820pF are required. Mica capacitors cost as much as £1.50 each and some polystyrene ones are now about £1 each so, I've avoided these in favour of the cheaper ceramic types.




***Shown here is a 150pF, N150 ceramic plate capacitor, with its orange edge, a 47n medium-k type (marked '473') and on the right, an NPO 82pF capacitor (marked '82').***

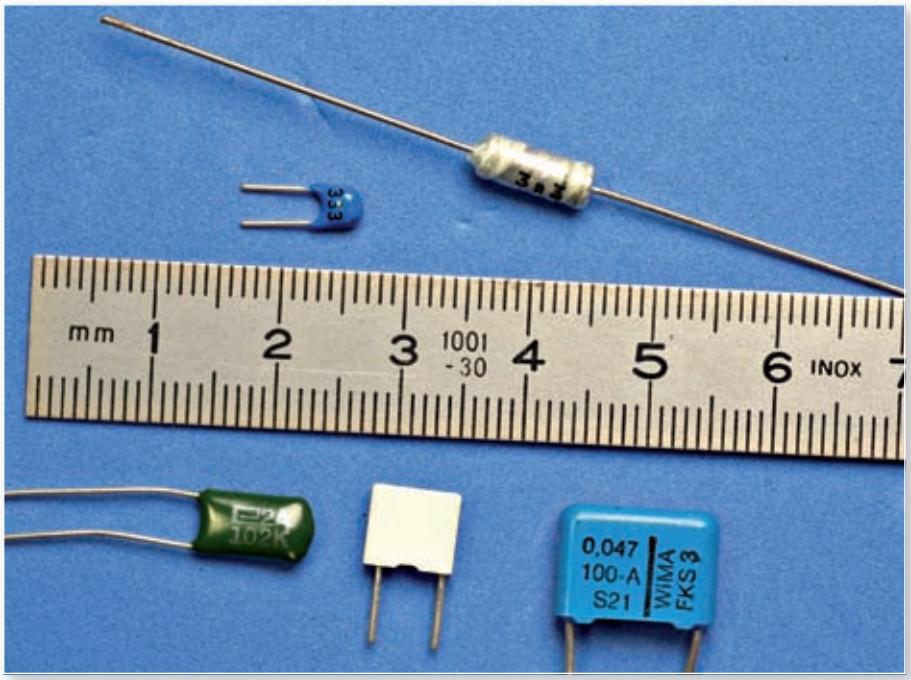



***Supplied on their own bandoliers, here you can see some NPO 10pF (marked '10'), and high-k 47n (marked '473') ceramic plate capacitors.***

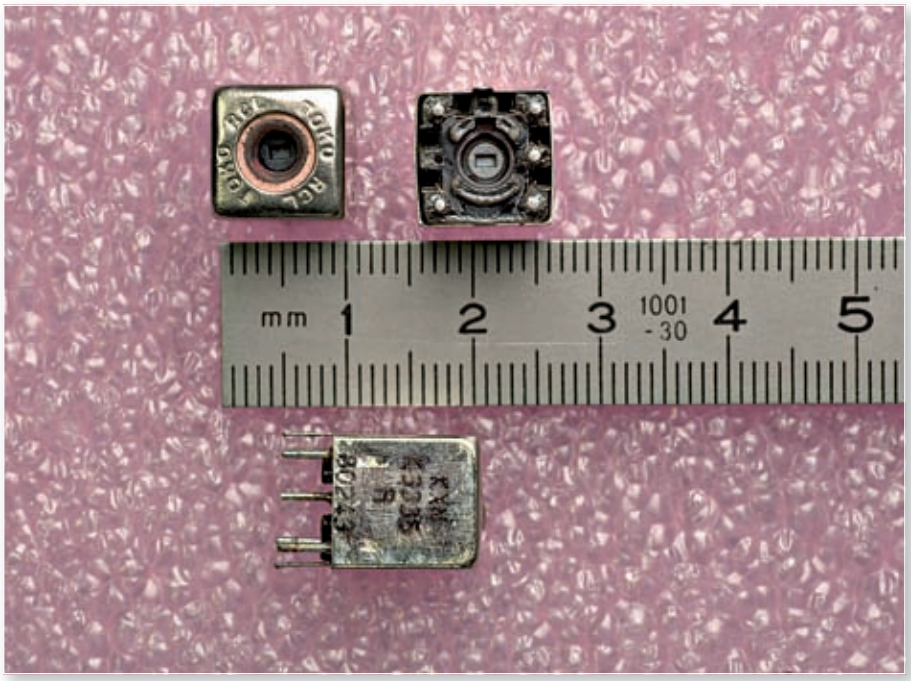
During 2009 a couple of articles in *PW* have drawn my attention back to the various types of dielectric, in particular to the temperature coefficients of the various ceramic types.

One author referred to the type with a negative 150 parts per million characteristic, (N150) marked with an orange edge. In the July issue the **Rev. George Dobbs G3RJV** referred to the negative-positive-zero (NPO) types with a black edge.

On searching my store racks, I found that the majority of capacitors, from one to 100pF, as expected, were NPO types. But from 120pF upwards, I had a mixture of NPO, N150, unmarked types and even one type marked N3300.




*Several coupling and de-coupling types are shown here: a blue multi-layer ceramic (probably NPO), a tubed polystyrene (top right), and epoxy coated mylar (lower left), a small boxed polyester, and a large boxed polycarbonate type (lower right).*




*The original TOKO 10K and 10E series of variable inductors, which are no longer manufactured, will, in Spectrum Communications projects, be replaced with a logical sequence of similarly housed variable coils, thus ensuring continuity of projects.*

## Component Availability

The low-k material type 'P' has a linear temperature coefficient, it's high-stability, has low loss, and is suited to tuned circuits and filters and coupling or de-coupling in h.f. circuits. Unfortunately, a search of all my wholesale suppliers in the UK revealed that none of them stocked **reasonably priced** low voltage, low-k, NPO types above 220pF and even these were only in six values in each decade.

There is the Phillips 2222 683 series of low-k 100V devices with values up to 470pF although present prices are as much as 35p each. These capacitors could go part way to solving the problem, but at a cost!

The medium-k type, usually Y5P, dielectric has a non-linear temperature coefficient and is not suited to tuned circuits or filters. The losses are not low and they're only suited for coupling and de-coupling. High-k dielectric has an even worse characteristics but it produces a physically small capacitor, which is ideal for coupling and de-coupling.

My researches then revealed that the world of surface mount capacitors had brought us the benefits of multilayer ceramics using a dielectric called 'COG'. This material is not as good as type P, but it falls into the NPO category, has low loss and is better than medium-k types. These are available up to 10nF, although from the UK suppliers they're even more expensive than the Phillips series.

My quest for a solution led to a search via the Internet for NPO capacitors, type P, as high as possible in value then type COG, all with a 5mm lead spacing. Eventually I found a company in Taiwan able to supply type P discs from 120pF to 470pF and COG type multilayer dipped units from 560pF to 820pF.

## Suitable Applications

The NPO type don't necessarily solve the problem for h.f. tuned circuits and filters. This is because of the characteristics of many inductors, which are affected by temperature and generally have positive coefficient in the region 100–250 parts per million (ppm) per °C.

To obtain a temperature-stable tuned circuit or filter it's necessary to combine the positive coefficient coil with a negative coefficient capacitor. It's then likely that I'll also need to purchase some low-k type P and COG devices with a negative 150 ppm per °C over the range 120–820pF.

Capacitors with an NPO characteristic will be perfect for circuits with little or no inductance, such as feedback devices, timing circuits, and crystal oscillators. But N150 type capacitors will be most useful to resonant circuits and to attempt to balance temperature coefficients. Both r.f. and i.f. stages and in particular variable frequency oscillators, will benefit from the N150 types. For audio and low frequency r.f. circuits the boxed polyester capacitors with values form 1nF to 470nF are ideal.

## Capacitor Coding

Next, there's capacitor coding and ceramic, polystyrene, and mica capacitors with values of capacitance from 1–82pF usually just have the number. Values from 100–820pF are either marked with just the number

or may be in the form where the third digit is the number of zeroes, like resistors.

So, a 270pF capacitor can be marked either as 270 or as 271. These types of capacitors from 1000pF (1nF) to 100,000pF (100nF) may be marked in pF with the 3-digit code, so 2200pF is 222. Or it may be marked as 2n2, similarly 100,000pF may be marked as 104 or 100n.

Polyester block capacitors are marked on the top or side of the box, with values from 1–82nF as 1n to 82n. Values from 100nF (0.1uF) to 470nF (0.47uF) may be written as 100n to 470n or as $\mu$1 to $\mu$47.

The old Mullard polyester capacitors marked like a 'Liquorice allsorts' have a five-colour band system. Starting at the top, the first two are numbers, the third the number of zeroes, just like a resistor. The fourth band down is tolerance, usually green for 5%, white for 10%, or with a 4-band component 20%. The fifth band or body colour is the unit's voltage rating. Brown is 100V, red is 250V and yellow is 400V.

## What About Resistors?

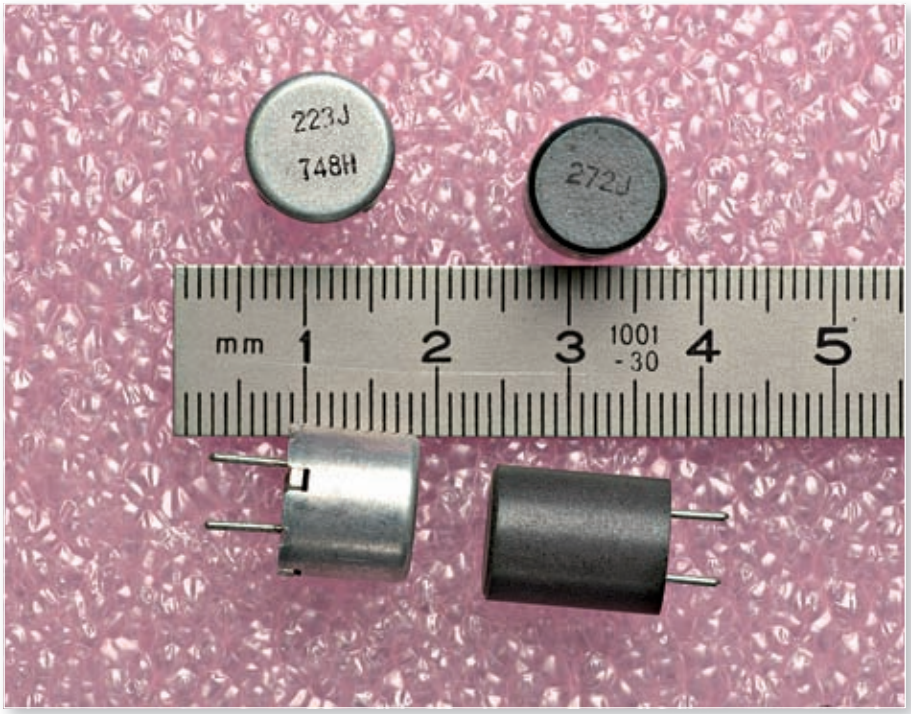
Not a lot has happened to these devices, except of course they've shrunk a little. The carbon or metal-film types are tracks helically-cut around the body of the device. This causes the resistor to have a series inductance value of, in the order of maybe 20nH on a 0.25W device, and as much as 80nH on a 3W device.

The 0.25W types are extremely cheap and the worst tolerance commonly available is 5%. Carbon-film types are cheaper than metal-film resistors but there's usually little to justify the use of the metal-film in low wattage resistors for use in amateur equipment. Higher power resistors do benefit by being metal-film type and 2–3W metal-film devices are often half the size of a carbon-film 1W device.

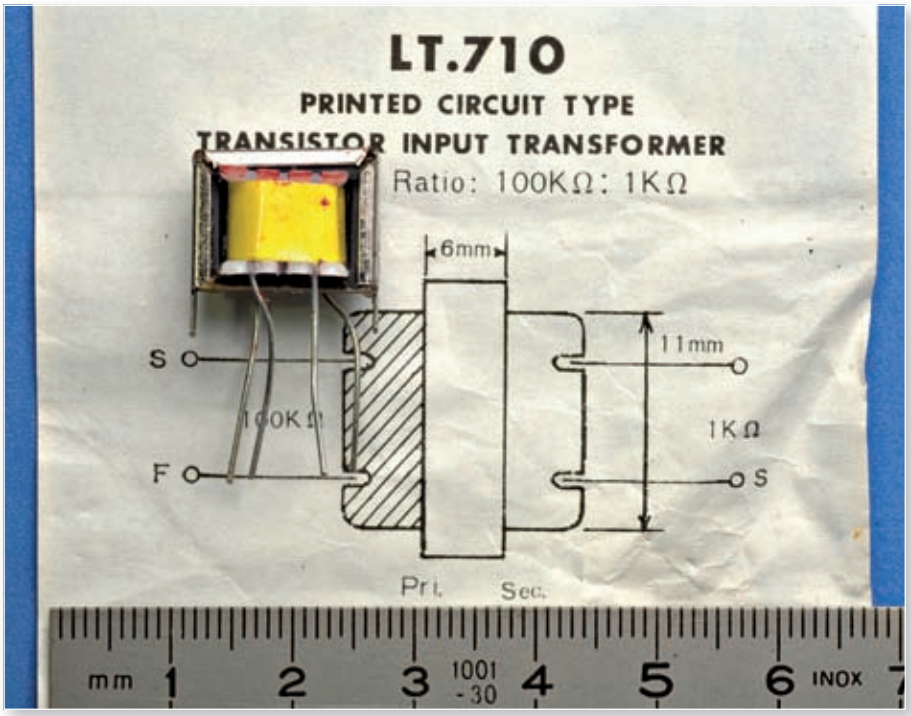
## Coils For IF & RF

The TOKO type 10K and 10E series of 10mm coils have been the mainstay of the constructor's world, perhaps since as far back as 1980. Unfortunately, TOKO ceased production of these types several years ago and only a few stockist have them but at high prices.

Spectrum Communications is now importing a new range of 10mm coils with values from 1.2$\mu$H to 45$\mu$H




*When fitted in a ferrite case, the inductors may have values in the hundreds of millli-Henries. These types are suitable for use within audio circuits only.*

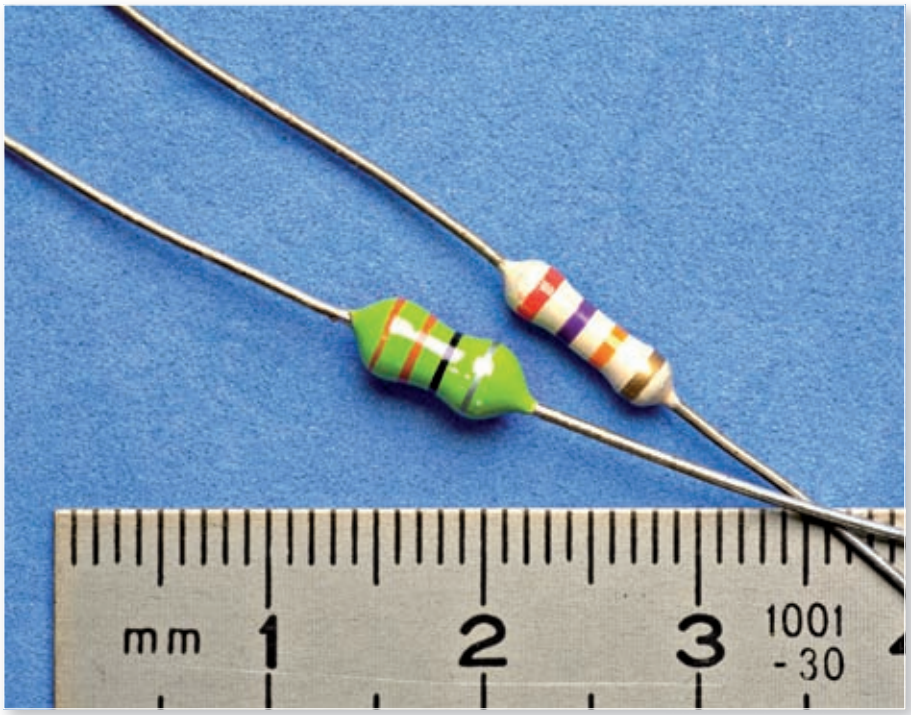



*A small audio transformer (marked 'LT710'), is typical of driver and output transformers used in transistor circuitry.*

to supply a need for coils used at frequencies of 1–30MHz. Rather than using the unenlightening TOKO markings, I've adopted a simple coding to include the inductance value and to show if taps are high impedance or low impedance. So, for example, a 5.3$\mu$H coil with low impedance taps is designated 5u3L. A similar coil with centre tapped primary and high impedance secondary is 5u3H.

At frequencies from 30–200MHz the 10mm TOKO coils type MC120 are ideal as variable inductors and they are still in production with values from 40nH to 440nH. There are also similar devices from suppliers in the UK, such as TFC in Sussex. Hopefully supplies will be assured for many years to come!

High-*Q* fixed-value inductors characterised for r.f. work are available in both axial and radial form. Suitable axial types such as BC and LBC made by EPCOS are available in the range




*A 33µH axial inductor, compared with a low-wattage 27kΩ resistor and may be mistaken for a resistor, if you're not vigilant!*

of 1µH to 100mH. Radial types such as the TOKO 7BS are available in the range of 0.1µH to 1mH and in the TOKO RB and RH types from 0.1µH to 1.5H. These are particularly useful for r.f. blocking in audio input stages, and in supply rails, as well as in passive audio and r.f. signal filtering.

## Toroidal cores

Then, of course, there are the toroidal cores but **don't panic.** These come in ferrite and dust-iron versions with different grades suitable for specific frequency ranges. The ferrite type is normally used for the lower r.f. range in transformers, for r.f. chokes, cable chokes and also as cores for wide-band transformers. Dust-iron is used for inductors, generally to 30MHz. Above that frequency the values are so small that air cored coils are better for fixed inductors.

Dust-iron toroidal cores are usually marked with a colour band, which signifies the operating range. Ferrite cores don't seem to have any marking at all! Dust-iron types are rated in µH per 100 turns and ferrite types mH per 1000 turns. A relatively straightforward formula can be used to determine the number of turns required on a particular core to achieve the desired inductance.

Unfortunately, I've found, with the aid of my inductance bridge, that the resulting inductance is often in error by up to 20%. This is an error that's due to the self-inductance of the chosen wire gauge, which is not taken into account in the calculations. So, I need to undertake tests using various wire sizes with the same number of turns on a particular toroidal core to determine the effect and then create a formula to take this change into account.

## Low Frequency transformers

Isolation and low frequency transformers suitable for data are quite common, having been developed for telephone and exchange equipment and for use in computer modems. Chokes using ferrite cores are now widely used in switch mode power supplies.

Some years ago, there were articles for an amplitude modulated (a.m.) transmitters, using ferrite-cored home-wound modulation transformers (the *PW* Chatterbox and *PW* Beaver, both in 1991. ***Ed.***). Recently, when I designed a transmitter for that mode, I initially attempted to use a ferrite core too.

I examined many types of core, including rods, toroids, and RM ring cores, but unfortunately all versions failed to operate successfully at normal voice frequencies. Tests using a wide range oscillator proved all versions worked well at hundreds of kilohertz and it became clear that all common ferrite cores are unsuitable for audio. It is likely though, that cores used in toroidal mains transformers should work well in modulation transformers.

Low power audio transformers are now little used, but input (LT710) driver and output transformers (LT726) are still available from several suppliers. I use the blue driver transformer LT44, available from Maplin and others, both in demodulators in a number of projects, where the component acts as a high impedance load at audio frequencies and filters out any r.f. from previous stages.

## The Conclusions

Generally, 0.25W carbon-film resistors can be used in all low current circuits, but for higher current and higher dissipation, I recommend the use of metal-film types to keep the size down. Capacitors though, are the tricky devices!

For frequency determining networks and tuned circuits, use Low-k NPO type with black edge, or Low-k N150 type with orange edge, in values 1–330pF. I use multilayer COG NPO and N150 types from 470pF to 1nF and I recommend boxed polyester 1nF to 470nF.

Coupling and de-coupling capacitors can be virtually any type of disc ceramic, except in high power r.f. de-coupling where high r.f. currents would cause overheating. Instead, I'd recommend using high-voltage ceramic types up to about 100nF in these positions to prevent overheating. Otherwise use boxed polycarbonate 250V and 500V rated types.

In audio circuits, I always avoid the use of ceramic capacitors as they can introduce noise and upset the d.c. conditions of operational amplifiers (op amps). Polyester block capacitors have incredibly low loss and hence are low noise and will not upset the d.c. conditions of op amps.

The wide variety of inductors allows many solutions to different needs. Ferrite toroids work well for r.f. filtering. Dust-iron toroids and axial and radio fixed value inductors in low-pass, band-pass, and high-pass filter, and in tuned circuits. Variable 10mm 10K coils like TOKO and Spectrum ranges for tuned circuits to 30MHz and TOKO MC120 series for tuned circuits 30-150MHz. Air cored coils are preferred for use in r.f. filters for power levels over 1W. ●

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Review

# The Telecom 64-HK

## 50–70MHz Dual-Band Linear Amplifier


*Sitting on top of its padded interior smart aluminium carry case, that's used to transport the Telecom 64-HK 50–70MHz dual-band linear amplifier.*

**Company:** Waters & Stanton PLC (UK importers)

**Pros:** The amplifier effortlessly provides 500W output on both the 50–52.0MHz and 70–70.5MHz bands with minimal drive requirements. The built-in safety features will protect the amplifier from serious damage.

**Cons:** The slow switching time when going from receive to transmit causes significant problems for digital mode (JT6M, FSK441) and c.w. operators.

**Supplier:**
**Waters & Stanton PLC,**
**Spa House,**
**22 Main Road,**
**Hockley, Essex SS5 4QS.**
**Tel:(01702) 206835 / 204965,**
**Fax:(01702) 205843.**
**E-mail: info@wsplc.com**
**Website: www.wsplc.com**

I was very interested when **Rob G3XFD** the Editor offered me the opportunity to review a new dual-band solid-state linear amplifier. The Telecom 64-HK amplifier runs 500W output on 50 and 70MHz and as I'm very active on both those bands I was very keen to put it through its paces.

The amplifier arrived in an aluminium flight case with internal protective foam. This is a thoughtful method of protection and is a great way to protect the amplifier when being used for portable activity.

### Broadband Amplifier

The 64-HK is a broadband solid-state amplifier covering the two bands and doesn't require any adjustment to be made by the user. It's a high gain unit and may be driven to the full 500W output with only 4W drive.

The amplifier is a desktop package, measuring 270mm (W), 420mm (D), 105mm (H) and is completely self-contained. It has a built-in switch mode power supply unit (p.s.u.) that operates from 100-240V AC. This is great when operating portable with an unstable generator or even from a fixed station that has a 'sagging' mains supply.

At switch-on, an internal microprocessor carries out a number of self-checks of the control and protection circuitry. The protection includes p.s.u. over-voltage, high drive level, high output v.s.w.r. and high temperature all of which will automatically inhibit amplification.

Two large fans keep the amplifier module within the correct operating temperature and two smaller fans provide cooling for the switched mode power supply unit. This p.s.u. operates at 48V and produces 16A when the amplifier is running at 500W output. This indicates that the linear amplifier is operating with 65% efficiency.

The front panel meter can be switched between functions and monitors either the output power or output v.s.w.r. Panel mounted l.e.d.s warn against over drive, over temperature, high v.s.w.r. and also indicate when the amplifier is 'on air'.

### Amplifier Connections

The amplifier requires a push-to-talk (p.t.t.) input, which is essentially an earth-on-transmit from your transceiver or switching system. It uses a rear panel-mounted

Our v.h.f. specialist author David Butler G4ASR tries out a new dual-band 50–70MHz linear amplifier.

RCA (phono) socket so the user will require a p.t.t. lead terminated in a standard phono plug.

Also mounted on the rear panel are two female N-type connectors. One is used for the drive input from the station transceiver and the other is the output connector to the antenna. You will therefore require that the patch lead from your transceiver and the antenna coaxial cable are both terminated in Male N-type plugs. No mains lead is provided* and you'll need a cable terminated with an IEC plug.

** Waters & Stanton confirm that the mains lead is normally supplied and apologise for the omission.* ***Editor.***

## Test Results

To test the amplifier I connected two calibrated Bird 43 power meters, one to measure the input drive level (with a 10W element) and the other to measure the output power (with a 1kW element). Having made the necessary connections it was then time to fire up the amplifier and see how it performed on both the 50 and 70MHz bands.

My results are shown in the table, **Fig. 1** and show some disparity between the output power levels indicated on the Bird-43 power meter and the 64-HK front panel meter. I was using a new calibrated 1kW element that covered the frequency range 50-125MHz and was pretty confident from experience that my power measurements were correct.

Operating on the 50MHz band I required a drive level of 2W to achieve an output of 400W, although the Telecom 64-HK indicated only 340W output. Up on the 70MHz band I required a drive level of 3W to achieve 400W output, although the 64-HK meter indicated 250W output.

In the UK the maximum power output allowed on the 70MHz band is 160W and I needed around 650mW drive to achieve this. As an approximation I could achieve 500W output on either band with a nominal 3.5W drive.

I did have an issue regarding the required drive level. The amplifier I tested only required 2W drive to produce 400W output on the 50MHz band. Many transceivers currently available run considerably more power than this and often cannot be reduced below the 5W level.

Stations using a transverter, typically on the 70MHz band, will encounter a similar problem especially as less than 1W drive is required to provide the UK 160W output level. In my opinion it might have been better to reduce the gain of the amplifier by padding the input so that 10W was the nominal drive level.

I then wanted to see if there was any significant temperature rise when using 100% duty cycle modes such as frequency modulation (f.m.) or JT6M digital modulation. The 64-HK amplifier has a large muffin fan that's rotating all the time and increases in speed as the output power increases. The noise level when in receive mode is fairly unobtrusive, which is good for a desk top unit. Additional fans (there's a total of four) turn on under microprocessor control if the amplifier or power supply temperature rises above a predetermined level.

I set the amplifier for 400W continuous carrier into a dummy load. After 4.5 minutes the additional cooling fans came on, increasing the ambient noise level – but not significantly. I kept the amplifier at the 400W level for 10 minutes with no obvious signs of temperature rise. The air outlet on the front panel didn't appear to get hot at all. This is very good result.

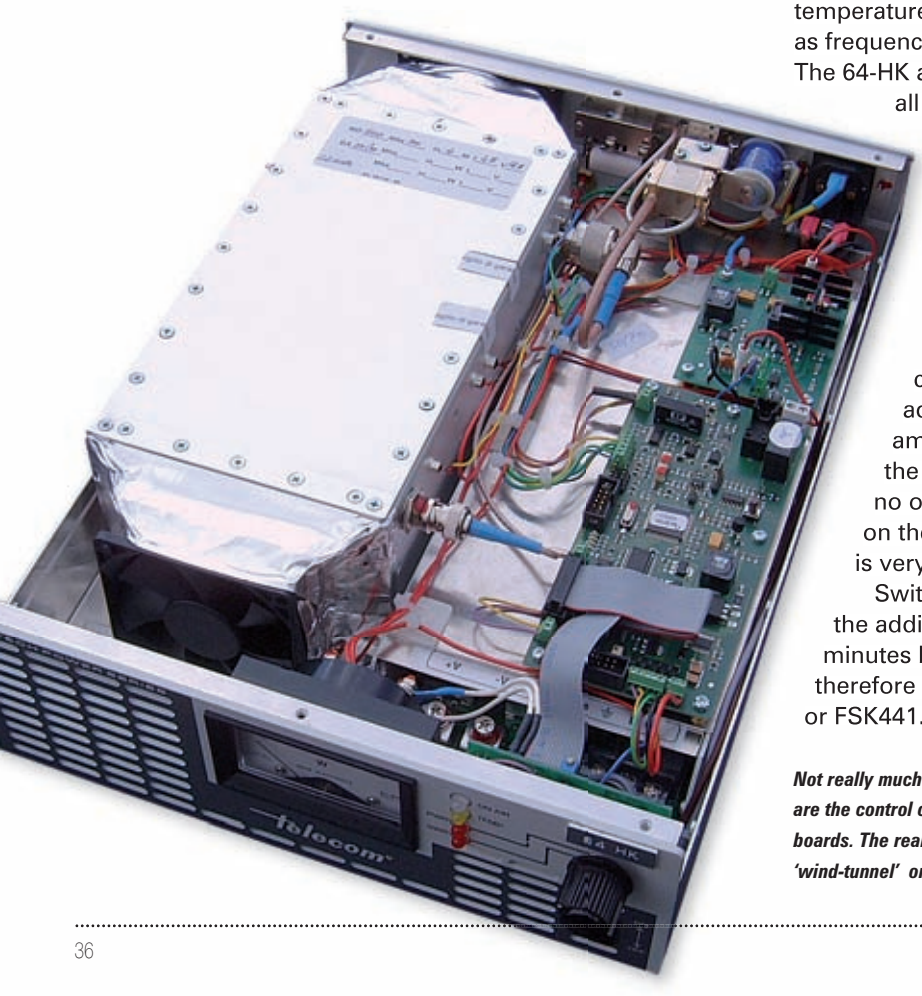
Switching back to receive I was pleased to note that the additional p.a. cooling fans remained on for two minutes before switching off. This solid-state amplifier is therefore ideal for 100% duty cycle modes such as JT6M or FSK441.

**Figure 1. Output Power Measurements**

| 50MHz Power Meter | Bird-43 | Built-in |
|---|---|---|
| 1W drive = | 200W output | 140W |
| 2W drive = | 400W output | 340W |
| 3W drive = | 500W output | 460W |

| 70MHz Power Meter | Bird-43 | Built-in |
|---|---|---|
| 1W drive = | 300W output | 170W |
| 3W drive = | 400W output | 250W |
| 4W drive = | 500W output | 350W |

**Note:** The manufacturers recommend that high quality plugs, cable and connections are used with this high power amplifier.




***Not really much to see inside, the two printed circuit boards that can be sees are the control circuitry. The PSU is contained in its screened box under these boards. The real 'heart' of the amplifier, its p.a. stages are contained in the 'wind-tunnel' on the far side of the chassis.***

## Specifications

| | |
|---|---|
| **Model:** | **64-HK** |
| Frequency Range: | 50-52MHz and 70 -70.5MHz |
| Nominal Input Power: | 2.5W |
| Maximum Output Power: | 500W |
| Gain: | 23dB |
| Maximum Output v.s.w.r.: | 1.7:1 |
| Power Supply: | Built In 100-240V AC |
| Input & Output Connectors: | N-type Female |
| PTT Connector: | RCA - Phono Socket |
| PTT Switching: | Earth on Transmit |
| Protection: | PSU Over Voltage, Over Drive, Over Temperature, Output VSWR |
| Meter: | Selectable Output Power / V.S.W.R. |
| Operating Temperature: | -10°C to +50°C |
| Size (W/H/D): | 270mm, 105mm, 420mm |
| Weight: | 7kg |
| Carry Case: | Aluminium Case with Protective Foam |

Next, I made an observation regarding the panel meter. This meter can be switched to indicate either output power or v.s.w.r. The meter however is only calibrated in Watts from 0 - 500W and when switching to v.s.w.r. it doesn't indicate any meaningful reflection coefficient.

## Operational Issues

There was one significant issue with the amplifier I was reviewing and this involved the time taken to changeover from receive to transmit. When earthing the p.t.t. line there's a noticeable 'kerchunk' as both the open-frame input and output relays operate. It's only a second or so but it's more than enough to clip the first few letters when using c.w. and the first syllable when operating on voice. There was absolutely no way that the amplifier could be used with a transceiver operational in voice control (VOX) mode.

The problem also means that the amplifier cannot be used easily for any of the digital modes such as JT6M or FSK441 where your computer automatically controls the transmitter on-off switching periods. The amplifier needed manual switching from the transceiver to allow sufficient time for the relays to settle down before consciously speaking into the microphone or operating the morse paddle.

If you do try operating in VOX mode (as most Morse or digital-mode operators do) then you will discover that your transmitter operates into an infinite v.s.w.r. before the switching cycle is completed. I think that the 64-HK 500W amplifier would definitely benefit from high-speed sealed switching relays.

In my opinion – and this isn't a criticism of the amplifier per se – is the use of dual-band amplifiers in a station that can operate on both the 50 and 70MHz bands. There's no such thing as a dual-band 50/70MHz transceiver and although there are some dual-band beam antennas available, the majority of DXers will possess separate antenna systems.

Therefore you can only effectively use this dual-band amplifier on one band at a time. And then when wanting to move to the other band, you'll have to unplug both the drive connection and antenna connection and re-plug them up to another transceiver and antenna. It would be nice for dual-band amplifiers to have dual inputs and dual outputs!

*As you can see from this shot, the PSU has its own dual fans to ventilate hot air when running. The larger fan to the right is for the p.a. stage ventilation. Signals in and out of the amplifier, go via good quality N-type sockets.*

You can, of course, achieve the necessary band switching with two external, manually-switched 4-port coaxial switches – but it would be nice to have it all included within the amplifier in the first place.

## User Manual

The user manual is reasonably well written, although it contains a small number of typographical errors. It has all the installation and operational information we require but it doesn't contain any trouble-shooting details. Mistakenly, it also mentions on a number of occasions that the band 70.100–70.200MHz is allocated in the USA. Unfortunately, this is completely incorrect.

## Italian Made

The amplifier is designed and manufactured in Italy by **Falcon Radio** (actually based in Spain) and distributed in the UK by **Waters and Stanton PLC**. My thanks go to Jeff Stanton G6XYU, who arranged for the loan of the Telecom 64-HK amplifier, which costs £1995 inclusive of VAT.

There are similar models, the 2M-HK and 70-HK that provide 500W output on the 144MHz and 430MHz bands and the 23CM-150 that provides 150W output on the 1.3GHz band. ●

# The Mega Electronics PCB Hobby Kit

*Members of Poole Radio Society crowd round to see what's in the large box that Phil G3XBZ brought in.*

The British-based Mega Electronics Company has announced the launch of a low-cost, compact and easy to use kit, to produce high quality printed circuit boards (p.c.b.s) for the hobby market. The company have been supplying this type of equipment to a wide range of users for over 30 years and now brings this expertise to the hobbyist.

All of the equipment supplied is manufactured at their factory in Cambridge. By following the comprehensive instructions supplied, Mega claim that the system will work every time. **Rob G3XFD** the Editor suggested I might like to try it out – and I agreed!

The review kit arrived safely in a cube shaped cardboard box measuring 600mm long x 520mm wide x 440mm high. Although bulky in appearance, it's not that heavy, but just mind your fingers and knuckles when going through doorways! Although it's not heavy, moving the packaged kit around is a lot easier with two people.

## Opening The Box

On opening the box and removing the top layer of protective cardboard and foam, the contents of the kit were revealed. Virtually all the components were held in foam, which had been shaped to support the kit during transit or storage. With all the equipment and foam packing removed the spillage tray was the last item to be taken from the base of the packing box.

The instructions for use were supplied in two ways, the first being six pages of A4 paper and the second a short video disk (DVD). The written instructions were easy to read, being well spaced with bold printing. The DVD version had an audio commentary to explain the various stages of making the p.c.b. I found it useful to use both versions during the review. A single page of A4 listed all 26 items to be found in the kit, including the packing box! Most impressive!

Before starting to make a p.c.b. I briefly tested each of the electrical items, to ensure they functioned correctly. This is I feel is always good practice.

## Suitable Project

After asking several members of my local radio club (**Poole Radio Society**) I decided to produce a p.c.b. for an audio frequency (a.f.) radio frequency (r.f.) – a.f./r.f. – generator as a suitable project as a first test. Details of the project are published in the *ARRL Handbook*.

The design uses a single-sided p.c.b. with components that have leads. I felt that this would be a fair test for the

*Revealed – the comprehensive contents of the p.c.b. production kit from Mega Electronics.*

*With twin ultra-violet tubes the exposure box can cope with p.c.b.s bigger than those found in most projects.*

*Wearing suitable protective covering Phil starts work developing the first p.c.b.*

Phil Ciotti G3XBZ is a keen constructor and tries out a useful and innovative p.c.b. production kit.

*The trial p.c.b. lost within the mesh frame that holds the p.c.b. within the bubble-etching tank.*

*Into the tinning solution for a few minutes.*

p.c.b. kit itself, whilst having a useful piece of test equipment at the end of the review.

## Artwork Problems

According to Mega the main reason most problems creating p.c.b.s occur due to poor artwork contrast and exposure of the photo resist to ultraviolet (UV) light. My first requirement, therefore, was to produce a high contrast image printed onto the film provided in the kit.

There are two types of film available, one for use with inkjet and the other for laser printers. Ten sheets of A4 sized film are provided for each type of printer. My own computer set-up consists of a laptop and a Lexmark scanner/printer, so I was interested to see the results using equipment at the budget end of the market.

A point to bear in mind, when printing the artwork, is that it has to be done mirror image in a number of instances. This can be easily achieved in the print setup menu. When I was satisfied with the artwork quality printed on a sheet of paper, I was ready to progress to the final print on inkjet film, which proved very successful.

## The Photo-Resist

The p.c.b. material supplied is coated with five micron positive working photo resist and has a protective black film to prevent unwanted daylight exposure. (1 micron is 1 millionth of a metre). There are three single-sided and two double-sided boards measuring approximately 200mm x 150mm each and I'd recommend that these are kept in a dark place until required for use.

The UV exposure unit was switched on for four minutes, to warm the tubes, before the board was placed in the unit. Incidentally, an amusing timer – in the shape of a red London bus – is provided to assist in making precise exposure times. It has a large liquid crystal display (l.c.d.) readout, indicating minutes and seconds, with an audio beep when the countdown is complete.

With the UV tubes warm the artwork and the board were then placed on the glass with the tension pad, and the lid closed. The timer was set for three minutes – this time applies to the boards supplied in the kit only. Other manufacturers boards will require adjustment to the timing.

When the board was removed it showed a yellow pattern of the required artwork. Instructions are given for producing a double sided p.c.b., if required.

## Developing The Board

Next, it was time to develop the board. The developing process removes the unwanted photo resist to leave a green image on the board. I placed the board in the spillage tray and gently used the SN110 applicator (supplied in the kit), in a circular motion, to remove the resist.

The applicator was similar to some types of shoe polish that you can buy and was used in the same way. When the sponge was pressed onto the board, a small amount of developer was released and spread across in gentle rotating movements. After this stage was complete the board was washed in water and dried. During this operation I wore the lab coat and a pair of rubber gloves for protection (both supplied in the kit). The kit's spillage tray was cleaned using paper kitchen towel, ready for the next step.

## Ferric Chloride

While mixing the ferric chloride solution, I again wore the protective clothing and the goggles. It is **not a good idea** to wear your `Sunday best' when handling the etching solution as splashes will occur and ferric chloride stains very badly.

*Safety glasses back on to start drilling the p.c.b. using the supplied drilling setup.*

I then transferred the etching solution from the bucket to the bubble etching tank using the supplied syphon. Finally, the tank was topped up, with water, to the required level.

The board was placed in the etching tank's mesh basket and lowered into the etchant until the lid of the tank reached the advised correct position. With the timer set for six minutes, I switched on, both, the bubble tank and timer together.

After the preset time elapsed I switched off the tank, and removed the board from the mesh. Next, after rotating the board through 180° it was replaced and the process repeated for another six minutes.

Finally, the bubble tank was switched off and the etched board removed for inspection. A thorough look at the tracks revealed a successful process had taken place. All of the circuit tracks and pads were bold in appearance, without any unwanted 'whiskers' of unetched copper or signs of over-etching. As I was satisfied with the results, the board was then washed in water and dried.

## Drilling Equipment

Provided in the hobby kit is drilling equipment, consisting of a drill stand complete with magnifying glass and a high speed drill. The drill is of the same style as that found in the majority of hobbyist's workshop and comes with a range of accessories.

Of particular interest is a set of p.c.b. drill bits with their sizes clearly marked on the plastic housing. Incidentally, there are multiples of the more common sizes used.

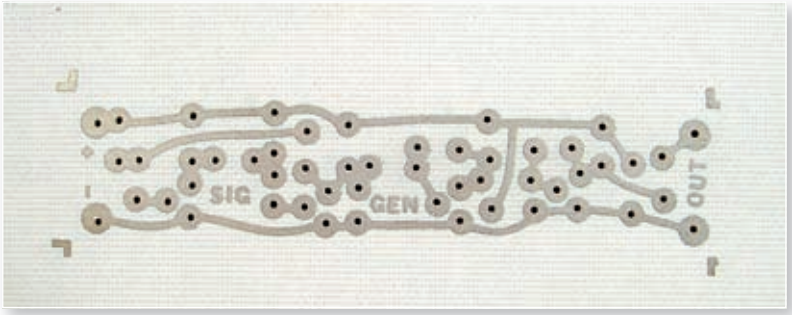
I chose to use a 0.8mm drill, which would allow the leads of the components to pass through the board easily. With the drill secured in the stand – at the required height – and the magnifying glass adjusted to the correct angle, drilling began.

I found that I needed to clear the drilling area occasionally, as the view was obscured by the material from the drilled holes. I also needed to tape the magnifying glass to its adjustable holder, as it tended to rotate during the drilling process. After the drilling process was complete, I looked at all the holes and found that they were clean without any burrs on either side.

## Removing Resist

To remove all the remaining resist left on the board, the SN120 strip applicator was used in the same manner as the developer. On squeezing the foam pad the stripping agent was released, and carefully spread over the board, in a circular motion. In a short space of time, all signs of the resist were removed, leaving the copper tracks and pads clean.

Then, the board was again washed in water and dried. Next, using the supplied Scotchbrite pad, the copper circuit traces were cleaned to a bright and shiny appearance.




*The finished p.c.b. before trimming to size.*

## Tinning Crystals

The tinning crystals are contained in a brown bottle with a screw cap. A plastic measuring jug, borrowed from the kitchen, was used to add the cold water at the start of the mixing process. Hot water was then added to top-up the liquid to the correct level and the screw-cap replaced and tightened. A thorough shake ensured the contents were well mixed.

For the best results, the kit instructions recommended that the tinning solution is used at room temperature. To this end, the solution was poured from the brown bottle into the plastic tinning container and left to cool.

When cool the p.c.b. then had to be placed in the bottom of the solution with the circuit traces facing upwards. The container was gently rocked occasionally to ensure even coverage and after five minutes the board was removed and inspected.

I was pleased with the results from this process. Again to complete this stage, it then had a thorough wash, first in hot water and then in cold. Rubber gloves were worn during this process.

## Clean Up Time!

With the p.c.b. successfully completed, it was time to clean and tidy up. The ferric chloride was syphoned from the etching tank, back into its mixing bucket and the lid firmly shut. The tank itself was then cleaned and dried, removing any splashes or drips.

The tinning solution was poured back into the brown bottle with the aid of a small funnel. Finally the spillage tray received its cleaning treatment.

So, when drawing to the close of this review article, the question has to be asked, "does this p.c.b. hobby kit perform as the manufacturer's intentions?" Having produced a simple p.c.b., by following the comprehensive instructions, I can say that the answer is a definite `yes'. I feel that the result I experienced was due to the high quality of all the components supplied in the kit.

A pair of long reach plastic tongs, however, would be a great asset in placing and removing boards from the mesh basket, during the etching stages. They would have prevented soiling of the lab coat sleeves, especially when removing the board after etching.

As stated in the instructions, the ambient temperature will have an effect on the timings of the various stages. So, when using the applicators a gentle approach is best, stopping occasionally, to keep an eye on progress.

One tip, which came from my wife **Chris**, is to use talcum powder in the rubber gloves, it makes them very much easier to put on and remove later. I wish I'd thought of that!

The p.c.b. hobby kit would be a useful asset to any club where many boards need to be produced for projects. Provided the kit is well looked after, it should provide great satisfaction to the user for many years. ●

| | |
|---|---|
| **Company:** | Mega Electronics Ltd. (manufacturers). |
| **Product:** | The Mega Electronics Hobby PCB production kit. |
| **Pros:** | Everything supplied to make your own p.c.b.s. Good quality components and clear instructions. It really does work well. |
| **Cons:** | The need of long reach plastic tongs. |
| **Price:** | £445 inc. p&p. |
| **Supplier:** | My thanks for the loan of the review kit go to **Mega Electronics Limited, *Mega House*, Grip Industrial Estate, Linton, Cambridge CB21 4XN.** |
| **Tel:** | **(01223) 893900** FAX: **(01223) 893894** |
| **Website:** | **www.megauk.com/** |
| **E-mail:** | **nicola@megauk.com** |

**Additional information from Mega Electronics**

As we were going to press, Mega Electronics contacted us to invite readers to contact them for different variations of the kit. For example, if the drill unit isn't required, there will be a saving of approximately £50. Please contact Mega Electronics direct for further details. **Editor.**

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## The Rev. George Dobbs'

# carrying on the practical way

This month the Rev. Gorge Dobbs G3RJV looks at a favourite classic – the Colpitt's type regenerative receiver.

*"Perfection is achieved, not when there is nothing more to add, but when there is nothing left to take away."* **Antoine de Saint Exupery**

Welcome to *Carrying on the Practical Way* (*COTPW*) where I'm remembering many years ago, while we were on an early trip to Ireland, driving from Dublin to Galway seeing a sign marked 'Athlone'. "We must go and see Athlone," I said to my wife **Jo** – and any readers familiar with old domestic radios will know why!

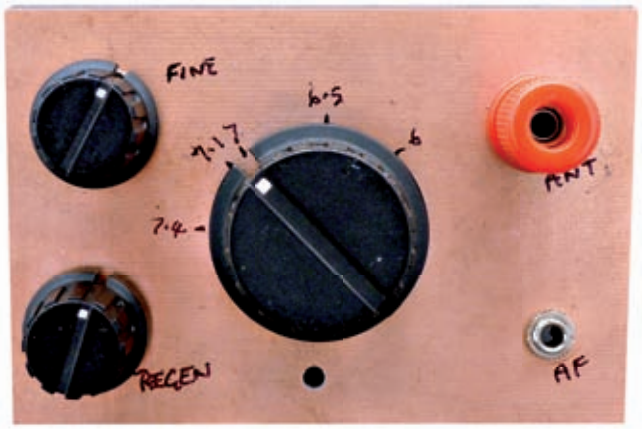
In valved radio days the tuning dials were marked with the locations of the more powerful broadcast and utility stations. Between 1931 and 1975 the **Raidió Teilifís Éirean**'s (RTE) Athlone transmitter was a powerful broadcast station and ran up to 100kW in the 1950s.

The transmitter's antenna towers can still be seen from the Athlone ring road. The Athlone transmitter could be heard as far away as Moscow and many old radio sets in Europe had an 'Athlone' dial position marked near the end of their tuning scales.

Our detour proved to be a good decision, for we decided to take lunch in the centre of Athlone, which sits astride the beautiful River Shannon. Walking into a large hotel in the centre of the town we found a wedding party in full occupation and, in the typical Irish manner, they invited us to join them in their fine buffet lunch. What can beat radio nostalgia and a free lunch!

My own interest in the short wave bands began with my grandmother's huge valved radio that had a long wire antenna going to a pole in the garden and, naturally, Athlone marked at the appropriate place on the dial. It also had several short wave bands that my cousin **Peter** and I carefully tuned to find radio stations and listen to broadcasts from exotic locations.

That experience eventually led to short wave listening on home-made radios and the building of a whole series of regenerative receivers. Over




***Just three controls to the regenerative receiver, mounted on a single piece of p.c.b. material.***

50 years have passed since then and as regular *PW* readers will know, I still enjoy playing with regenerative receiver circuits. They require a little care and skill in their use – but for a modest number of component parts they are capable of surprisingly good results.

## Regenerative's Heart

The heart of a regenerative receiver is an oscillator circuit with not quite enough loop feedback to maintain oscillation. The oscillator will use some method to control the feedback to a point just below continuous oscillation, to receive a.m. stations and just above oscillation for c.w. or s.s.b. signals.

A sine wave oscillator with insufficient feedback to sustain oscillation becomes a sharply tuned band-pass filter with high gain at the oscillator frequency. Thus, the circuit has high amplification (gain) and narrow band-width (selectivity) at the chosen frequency; two highly desirable properties for a short wave receiver.

Many regenerative receivers are based on the Armstrong oscillator circuit, named after **Edwin Armstrong** and shown in **Fig. 1a**. Naturally, the original circuit used a valve but this example shows a transistor and the inductor, L1, and its parallel capacitor form a tuned circuit to determine the oscillator frequency. The feedback signal to maintain oscillation is provided by L2 at the transistor collector which is loosely coupled to L1.

The inductor, L2, is often called the 'tickler coil' and in fact the whole circuit is sometimes called the 'tickler oscillator'. The connections on L2 in

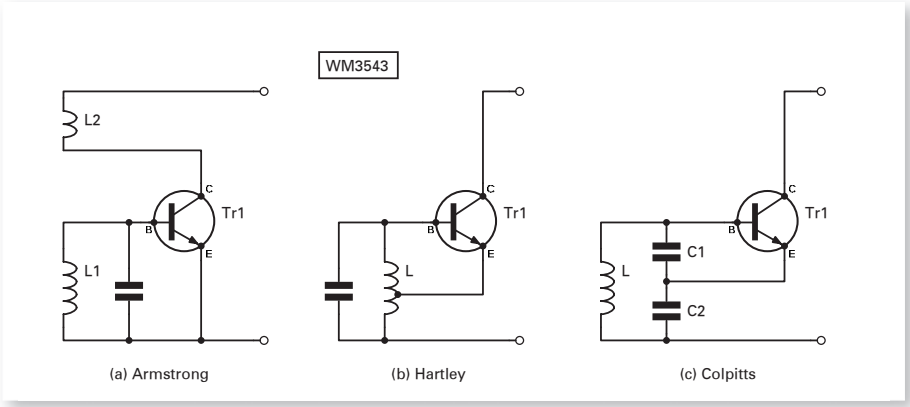



***Fig. 1: The three different forms of introducing feedback to create regenerative circuits. The Armstrong method uses two phased coils, the Hartley, uses just one coil, but with an inductive tapping point. While still using a single coil, the Colpitts method, uses a capacitive tapping system of regeneration.***

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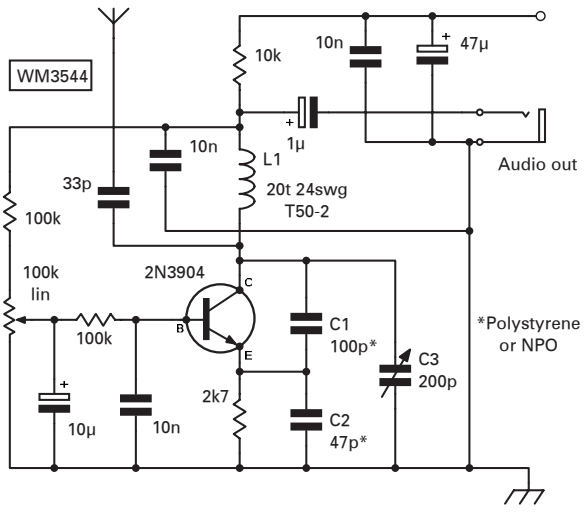


***Fig. 2: The final version of the Colpitts regenerative receiver has the frequency determined mainly by the combination of L1, C1, 2 and 3. and tuning may be critical for s.s.b. or c.w. use.***

relation to L1 are important and the windings must be in phase to provide the positive feedback that triggers oscillation. The chances are that if an Armstrong regenerative receiver does not work, reversing the connections on L2 (or L1) will solve the problem!

In the November 2007 edition of *COTPW* I described a regenerative receiver based on the Hartley Oscillator. Devised by **Ralph V. L. Hartley** and patented in 1915, the Hartley oscillator is shown in Fig.1**b**. In this circuit the feedback path is between the emitter and base of the transistor, and the tuned circuit inductor (L) is tapped to provide the feedback path for the oscillator to function.

The position of the Hartley oscillator feedback tap is quite critical and – depending upon the implementation of the circuit – it's usually a quarter to a third of the total number of turns from the ground end of the coil. Although less common than the Armstrong regenerative receivers, the Hartley oscillator version can give good results.

Another of those pioneering electronic engineers, **Edwin H. Colpitts**, patented the Colpitts oscillator in 1918. The skeleton circuit of a Colpitts oscillator is shown in Fig.1**c**. Again the feedback loop is between the emitter and the base of the transistor. This time the feedback path is via capacitance rather than inductance. The capacitors C1 and 2 form a capacitive divider and the relative values of C1 and 2 control the amount of available feedback signal at the base of the transistor.

In most versions of the circuit the value of C2 is less than that of C1. The Colpitts oscillator is perhaps the least frequently used in regenerative receivers. Although the Colpitts circuit is my favourite r.f. oscillator in many radio designs, I don't recall having used it in a regenerative receiver. However, I've seen a few examples so I decided to give it a try!

## Final Version

After a little experimentation, the final version of my Colpitts regenerative receiver is shown in **Fig. 2**. One obvious advantage of the Colpitts circuit is that the inductor L1 is one simple winding. It doesn't require the tickler coil of the Armstrong circuit or the tapped coil of the Hartley circuit. In theory an off-the-shelf moulded inductor could be used for L1, although I would be doubtful about its frequency stability in this application.

Certainly, it would be easy to use plug-in coils with only a single winding with two connection points. A disadvantage is that the series capacitors forming the feedback loop contribute to the capacitance of the tuned circuit and limit the tuning range. This isn't much of a problem at short wave bands but could be a limitation at medium wave frequencies. I suspect this may be why the Colpitts circuit hasn't been popular for regenerative receivers.

The Colpitts circuit used in Fig. 2 is somewhat different from that used in Fig. 1c in that the feedback path is between the emitter and collector. The capacitive divider is formed by the two series capacitors C1 and 2. The tuning capacitor is C3 and take note that this is in series with the inductor (L1), which is at the collector of the transistor.

## The Clapp Oscillator

Technically speaking, a series tuned Colpitts oscillator is usually called a 'Clapp oscillator'. This version was first cited in 1948 by yet another electronics pioneer, **James K. Clapp** who called it "an inductance-capacitance oscillator of unusual frequency stability". In this circuit C1 and 2 act as a signal voltage divider – their capacitance values providing enough positive feedback to the emitter to cause oscillation. The frequency of this oscillation is controlled by the tuned circuit C3 and L1 with C1 and 2 contributing some extra capacitance.

The top of L1 goes via a 10kΩ resistor to the 9V battery supply. The 10nF capacitor at the junction of L1 and the 10kΩ resistor bypasses any radio frequency signal to ground. This is also the point where the audio signal is picked up from the circuit.

I've not shown any audio amplification as I used my bench audio amplifier to increase the audio signal to a viable listening level. Many of the little audio amplifier circuits described in previous editions of this column would serve the purpose as would most of the amplified loudspeakers used with computers.

The regeneration control in this receiver is achieved by altering the bias voltage on the base of the transistor. The 100kΩ linear track potentiometer, with the associated fixed 100kΩ resistors, varies the voltage on the transistor base. For smooth operation the potentiometer does require a linear track – sometimes called 'linear taper'. As the frequency of the oscillator is varied, the regeneration potentiometer will require slight adjustment to keep it either just above or below the point of oscillation.

A useful improvement would be to measure the voltage range required at the base to maintain control of the oscillation point. Fixed resistors could then be added either side of the potentiometer to give a better regeneration control range. The 10µF

capacitor between the potentiometer slider and ground is an old 'dodge' used to lessen any noise from the potentiometer track.

The antenna signals are fed to the collector of the transistor via a 33pF capacitor. The 33pF capacitor worked well with a few metres of wire as an antenna – but the value may require some experimentation to suit whatever antenna is being used. The tuning capacitor in my prototype was a polyvaricon variable capacitor with a value measured as 210pF.

The inductor, L1, is made up from 20 turns of 24s.w.g. wound on a T50-2 core to occupy about three-quarters of the circumference. This gave a tuning range in the order of 5.5 to 7.5MHz which includes the 7MHz Amateur band plus some broadcast station coverage. I found this a rather disappointing coverage – but it's a simple matter to experiment with the number of turns on L1 to achieve other frequency ranges.

The choice of components is not very critical. I used the commonly available 2N3904 transistor but almost any generic *npn* transistor would work in the circuit. **Note:** Remember that we're dealing with a radio frequency oscillator, so it's important to use temperature stable capacitors for C1 and 2 to avoid frequency drift.

Polystyrene capacitors or NPO capacitors are both suitable. The designation NPO indicates negative-positive-zero. The negative and positive temperature coefficients of the component are zero; this means that the capacitance doesn't vary with temperature. If you can lay your hands on any, silvered mica capacitors also work very well in tuned circuits.

## Prototype On PCB

I built the prototype receiver on a piece of scrap printed circuit board (p.c.b.) material. This forms a front panel for the controls with the parts mounted ugly-style on the other side. As a prototype receiver it worked well and I was able to receive many stations.

For the broadcast stations using amplitude modulation (a.m.) the regeneration control is set just below the point of oscillation. The c.w. and s.s.b. stations on the 7MHz band required the regeneration to be set just above the point of oscillation as this adds the required carrier signal to those stations to provide the 'beat' note.

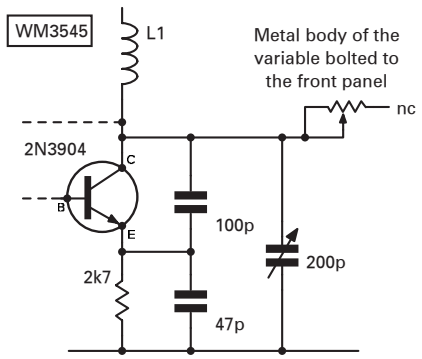


*Fig. 3: Adding the unusual fine tune control of an otherwise unconnected variable resistor to the receiver circuit of Fig. 2, makes tuning much less critical.*

The tuning control really needs a slow motion (reduction) drive to tune individual stations with ease. To help, I added the simple bandspread control shown in **Fig. 3** and it may appear to be an odd circuit. It uses a metal cased potentiometer that must be bolted to the front panel. The track of the potentiometer acts as one side of a capacitor, the other side being the font panel.

As the slider of the potentiometer is varied the amount of track is electrically varied causing a small change in capacitance. This method only gives a few kilohertz of frequency change but that's usually enough to allowing tuning of individual stations.

My main problem with the receiver was my own fault as the piece of p.c.b. used in the construction was really too small, **Fig. 4**. In use, the receiver suffered from some hand capacitance effects and this meant that after adjusting the controls, moving my hand away from the front panel resulted in frequency shift.

The construction method needed either a larger panel or a complete metal enclosure to minimise this effect. Incidentally, I suspect the hand capacitive problem was probably more apparent than with Armstrong or Hartley type circuits I've used in the past.

My prototype projects suggests that a Colpitts regenerative receiver is a very viable circuit. Perhaps it's a little more critical than other types of circuit but the results are encouraging. It's very satisfying that relatively few components and a short length of wire can conjure radio signals from the air – and that's what regenerative receivers are all about! ●

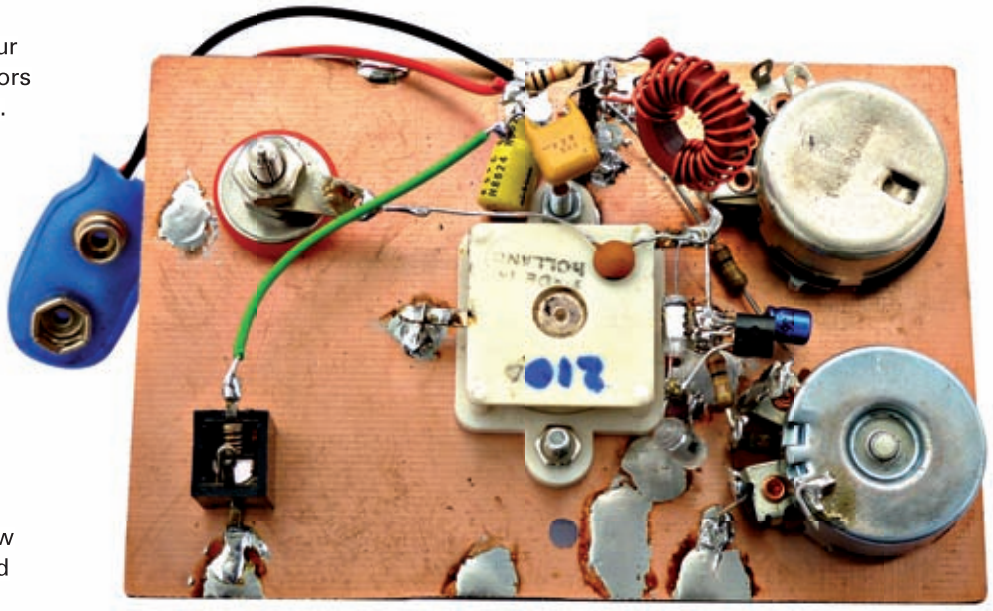

*Fig. 4: Looking at the reverse side of the 'chassis' with the antenna socket top left, the fine-tune top right, the regeneration control at the bottom right and the audio output to the 3.5mm socket bottom-left.*

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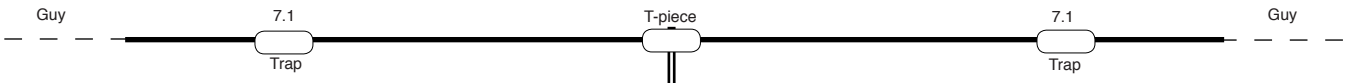


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Feature

# Amateur Radio at School Part 2

***Introduction: Tom Read M1EYP** is Head of Mathematics at **Brownhills Maths & Computing College**, Stoke-on-Trent. In Part 1 (PW April 2009), Tom described how he identified QCA developments in the Year 7 curriculum as an opportunity to put Amateur Radio into secondary education. Here, Tom continues the story of how timetabled lessons were used to train eight new young Radio Amateurs. **Editor**.*

***Andy, now M6AJE, exchanging a greetings message.***


***Bob Murphy 2E0RHM (winner of Dyson raffle) with son Deiniol M6ACE.***

***Henna & Leia carrying out their practical v.h.f. contact assessment.***

Having covered the necessary basics of using analogue receivers, short wave listening (s.w.l.), signal reports, the high frequency (h.f.) spectrum and antennas, it was at last time to get stuck into the central elements of the Foundation Licence course. I made the decision to concentrate for the next few weeks on the practical assessments. I felt that covering these ahead of the more formal teaching towards the examination papers would provide a good grounding for that later work.

The practical assessments would take time. Although a class size of eight is rather tiny in a secondary school, I would still need to sit down with each student, individually, and assess them on each activity. With twelve disciplines on each Foundation Practical Record of Achievement form, that still meant a programme of 96 individual assessments for me to undertake after teaching and demonstrating the skills required.

## Classroom Management

There was then the 'classroom management' issue to consider. What would seven students be doing while I gave my undivided attention to one? With such a scenario occurring at least 96 times, I needed a way to keep my pupils occupied. The answer? Display work – or 'C moments' as it is sarcastically described by some people in my profession! Hardly original, hardly innovative, but effective!

So, the routine for a few weeks of Friday afternoon sessions was to demonstrate a practical aspect to the whole group. I would then break off and assess individual pupils, while the others got out the pencils, crayons, scissors, glue and felt-tips!

The practical work was rewarding, fun and effective as part of the students' learning process. Sense was made of concepts discussed in previous lessons, and getting on the air to exchange a greeting messages took on more importance and focus.

I think most – if not all – of my students enjoyed the 'appreciation of Morse' tasks more than any other. It was also the task they found most difficult! A couple of students had to repeat both the receiving and sending elements before I was able to sign off that section of the record sheet.

Nonetheless, the youngsters really enjoyed trying to spell out their names on the straight key (another item

In the second and final article, Tom Read M1EYP describes how Amateur Radio was successfully introduced to his school.

from the estate of **Shirley Smith MW0YLS**, (SK). For a bit of fun, I then introduced them to the Mini Palm Paddle I use for my own **Summits On The Air** (SOTA) activities. The children loved using the paddle, but I decided I wouldn't try to teach them iambic keying!

*Lost in clouds at the summit of* **The Cloud** *G/SP-015.*

## On The Air

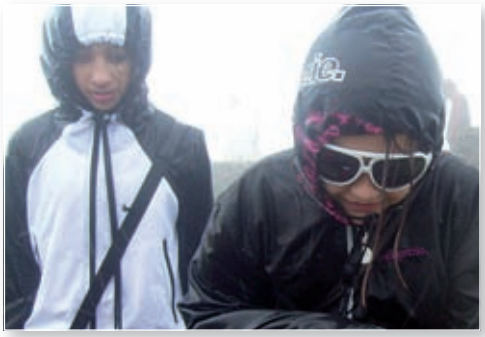
For the 'practicals', which require that the students demonstrate two-way radio contacts, I used the Icom IC-7400 and roof-mounted vertical for v.h.f., and the Yaesu FT-817 with a 3.5MHz (80m) dipole for h.f. Several stations in Stoke-on-Trent and the West Midlands became regular callers to these practicals, and some then sent through direct QSL cards to the children.

On h.f., I was grateful for the support of my fellow SOTA enthusiasts, who were available on 3.5MHz s.s.b. to work my pupils. As the weather improved through the Spring term, the students developed a taste for outdoor portable operating. If the weather was nice on a Friday afternoon, you could guarantee, "Can we go outside Sir?"

With the practical assessments complete – and some nice posters and display items about Amateur Radio to add a 'different tone' to the Maths Department corridor(!), it was time to get serious about the examinations. Several weeks were then spent undertaking more traditional style lessons as we worked through the chapters of the *Foundation Licence Now* textbook.

*Humayun M6HKX/P braving the miserable weather.*

These lessons were enhanced, courtesy of Powerpoint slides and other resources given to me by **Phil Archer G6AKK**. Phil is a friend from the **Macclesfield & District Radio Society**, and was the tutor when my son **Jimmy** took the Foundation course.



*Henna M6MIR/P & Leia M6LLL/P well wrapped up again the clouds and rain.*

## Funding Exam Fees

I then began to consider how best to think of funding the Foundation Examination fees. The school's exam budget catered for GCSEs, BTECs, etc., but not the Year 7 enrichment curriculum. Indeed, the radio project was the only subject in the enrichment programme that led to an external examination and qualification. Such a course in a radio club, or even as an extra-curricular school activity, would simply request the fees from the participants.

However, as Amateur Radio was now part of the curriculum, and in a school serving one of the most deprived wards in the UK, I felt uncomfortable about asking parents for £20! Especially so early into their son/daughter's secondary education – and for something they may never have heard of! However, I was confident I could find a way of raising the £160 that was needed.

On my way to school one day, I was listening to BBC Radio 4, and to **Sir James Dyson** discussing concerns over opportunities for invention and technical innovation in British schools. Very much encouraged, and as soon as I could, I E-mailed him to describe the curriculum changes, the approach of Brownhills Maths & Computing College, and my activity. Almost immediately I received a response from one of the senior staff at Dyson, and the offer of a brand new Dyson Ball vacuum (RRP £279) to raffle or auction!

The donation from Dyson was a fantastic gesture, which I readily accepted. Furthermore, with the **Norbreck Rally** coming up at Blackpool (at which I was already booked in to exhibit with SOTA), I had a great opportunity to sell a fair few tickets. Raffle tickets also sold well amongst my staff colleagues at Brownhills, and more than enough money was raised to cover the exam fees, with enough 'in the bank' in the event of a student requiring a retake, or to go towards next year's fees.

The winning ticket was drawn in a school assembly, and the new Dyson went to **Bob Murphy 2E0RHM**, from Stockport.

## Exam Anticipation

The date of the examination was set as Friday June 19th 2009 and great anticipation and excitement set in amongst the students. As close as a fortnight before the exam, I was only certain of two of my students getting the required 18 correct answers out of 25 to gain the pass.

However, during those two weeks, the level of commitment and focus in the revision was outstanding from every single one of my pupils. By the day of the exam, I was convinced they would all pass. And pass they did!

The papers were marked by my maths department colleague **Dr Ivan Podhraski**, who was the First Named Invigilator for the examination. One lad ran things a little close with a mark of 19 out of 25, but all the rest scored comfortably with 20 and above. And after all, that was the plan.

At the outset of this idea, I figured that I really should be able to get 11/12 year old kids to the required standard for two reasons. Firstly, I had a whole school year to play with, and secondly, I am an experienced teacher!

What I wasn't prepared for were the screams of excitement from the four girls when they were handed their results sheets. They were immediately on their feet, in a huddle, jumping up and down and screaming the place down!

The following week was given over to registering and logging onto the Ofcom website, and printing out the licences. All the pupils tried to choose an M6 callsign with a suffix of choice, and all but one were successful.

However, one of the Charlottes had a problem with the site, and I had to resolve the matter by telephoning Ofcom. This resulted in her callsign being issued without choice of suffix – although the callsign had an M3 prefix, and Charlotte was

**Table 1**

The new licensees are:

| | |
|---|---|
| **Charlotte Potter** | **M3YUR** |
| **Humayun Khayer** | **M6HKX** |
| **Leia Foulkes** | **M6LLL** |
| **Andy Ellis** | **M6AJE** |
| **Charlotte Rowe** | **M6CYA** |
| **Jordan Hughes** | **M6JLH** |
| **Henna Mir** | **M6MIR** |
| **Lewis Platt** | **M6LDP** |

*Charlotte Potter M3YUR, Leia Foulkes M6LLL, Henna Mir M6MIR, Charlotte Rowe M6CYA.*

*Andy Ellis M6AJE, Lewis Platt M6LDP, Jordan Hughes M6JLH and Humayun Khayer M6HKX.*

delighted to have a 'prestige' callsign! (See **Table 1** for names and callsigns)..

I was delighted that the students had all been successful. They'd developed and gelled well as a group. As well as their achievements in the radio course, they had developed co-operative working skills, teamwork, negotiation, challenge and experimentation, all of which are objectives of the enrichment curriculum.

By this stage, I had received the excellent news that I could run the radio enrichment project again in the following academic year, with a new cohort of Year 7 pupils, and possibly some Year 8 students who wish to take part. The main change I intend to make is to speed up the whole course and sit the examination earlier, giving more opportunity to get on the air at school.

For the eight new licensees from the first course, I intend to make my classroom – and the school station – available to them at lunchtimes. This is so they can continue to enjoy the radio if they are not set up at home.

## A SOTA Trip

So what conclusion was all this leading to? Well, it simply had to be that little obsession of mine, SOTA! A minibus was booked, staff colleagues cajoled into joining the outing and on Friday July 3rd 2009, we set off for *The Cloud*, the hilltop in South Cheshire, SOTA reference G/SP-015.

Unfortunately, we were treated to 'traditional' British summer weather – not the ideal first taste of hilltop portable operating! Very light drizzle accompanied the walk up to the summit, and this wasn't too bad.

At the summit I set up a SOTA Beam (3-element Yagi) and FT-817, assisted by my son Jimmy M3EYP (16). He was at a loose end having completed all his GCSE examinations, and met me up there to lend a hand.

After packed lunches, the pupils began taking it in turns to call "CQ SOTA" using their shiny new callsigns for the very first time. Again, we were well supported by the SOTA fraternity, who were on 144MHz f.m. in numbers to contact my students.

Five pupils managed to 'qualify' the summit by making the requisite four contacts. However, three pupils were left stranded on three, one and one respectively as I was forced to abandon the activation prematurely due to the sudden worsening of the weather. It didn't matter though. Even those that didn't make four QSOs had made a least one, and so made their amateur radio debuts, and claimed *The Cloud*,G/SP-015 as a SOTA Unique, even if without the point in the points table.

Back down at the minibus, it was a scene full of bedraggled Amateurs, with everyone completely soaked! Even those of us with full mountain waterproof gear hadn't been spared, such was the ferocity of the downpour that hit us.

Spirits were not dampened though, and in the vehicle the back row of girls were singing as the minibus pulled back into the school car park! In subsequent days, the activation logs were added to the database on the SOTA website, and a celebration presentation and buffet was held with parents visiting to learn more about their child's achievements.

## Continued Support

I expect the amount of involvement in Amateur Radio from now on will vary between these students. But, of course, I'll continue to support them in their hobby and they have derived a great deal out of their year following an enriched curriculum.

*Leia and Henna adjusting an atenna for minimum v.s.w.r.*

*Jordan and Humayun listening in to GB3VT repeater.*

My attentions have already turned to planning for a new group of students for the 2009-10 academic year. This included a bit of 'hard sell' when Year 6 pupils visited from their feeder primary schools in the summer term!

The full list of people who have helped the students and/or myself, and to whom I say "thank you" is too vast to include here, but I would like to place on record my particular gratitude to the following: **Shirley Smith MW0YLS** (SK), whose radio equipment is kindly loaned from her estate for the school course: **Dave Wilson M0OBW**, **Kath Wilson M1CNY**, **Dave Evans GW4GTE**, **Richard Newstead G3CWI**, **Jimmy Read M3EYP**, **David Reynolds G3ZPF**, the **RSGB**, **Dyson Ltd.**, and **Jenny Crowther-Green** (Assistant Headteacher in charge of Enrichment curriculum at Brownhills). ●

## Colin Redwood's

# what next?

Colin Redwood G6MXL provides 'first step' information in his regular series and takes a practical look at i.f. filters.

Welcome to *What Next?* (*WN?*) where this month I'm looking at the intermediate frequency (i.f.) filters, which are often available as optional accessories for many transceivers. I'm going to consider their purpose and specifications, how to fit them, and what benefits can be expected.

Filters used at i.f. are band-pass filters designed to let through just as much of the wanted signal as is required for communications, while attenuating unwanted signals. This means that we hear less interference from stations on frequencies adjacent to the one we are trying to listen to. Many receiver designs include more than one i.f., so they may have more than one i.f. filter.

Fitting a good set of i.f. filters can turn an average receiver into a good or really good receiver. In the current economic climate, we can't all afford to go out and buy new rigs with all the latest gismos fitted. Yet fitting a filter or two costing from about £40 to £150, can really make a huge difference, allowing operating on our crowded bands to be much easier. They also assist us to hear weak signals above strong signals from stations on adjacent frequencies.

## What Difference?

So, just what difference does a filter make? On c.w. (Morse) signals using a filter will go a long way to reducing the sound of other signals, either side of the c.w. signal you are trying to hear. The improvement can be quite dramatic.

If you want to hear a demonstration of the effectiveness of filters, point your browser at **http://www.youtube.com/watch?v=bU6_dS1A30k** The effect of fitting i.f. filters on s.s.b. signals is not so dramatic, but nevertheless the improvement can still be very worthwhile, particularly on a crowded band with lots of interference (QRM).

## Optional Accessory

If you have a transceiver that's more than five to 10 years old, then there's a pretty good chance that it will originally have been supplied with a number of optional intermediate frequency filters. Why is this? Quite simply: in the days before Digital Signal Processing (DSP) became standard for middle and top of the range transceivers, to try and squeeze the optimum performance from a transceiver, you needed separate i.f. filters for s.s.b. and c.w. reception.

To include these i.f. filters with a transceiver from new, would add up to £200 to the overall cost of a transceiver that might be say £800 to £1500 new. For a keen s.s.b. operator, fitting i.f. filters specifically for c.w. would add an extra cost to the final price of the transceiver that could not really be justified and vice versa for the c.w. operator.

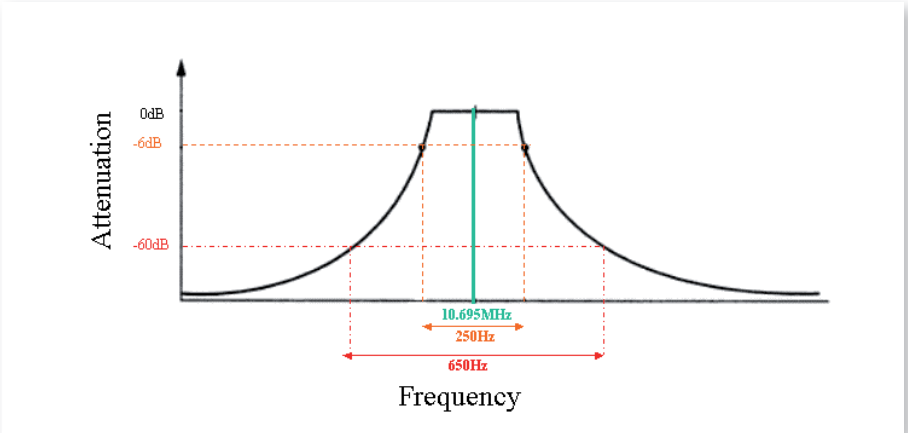



*Fig. 1: The main parameters of the i.f. filter described in the text including the 250Hz pass bandwidth and the 650Hz attenuation bandwidth.*

**Colin Redwood G6MXL**
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Even today, many cheaper rigs are often sold without a full range of i.f. filters as standard. Examples of these include Yaesu's popular FT-817, FT-857 and FT-897 transceivers, Kenwood's TS-480HX and TS-480SAT transceivers and Icom's IC-703, IC-706, IC-718 transceivers. Fortunately, suitable i.f. filters are obtainable as optional extras either from the manufacturer or from third parties.

## Filter Parameters

If you are thinking of purchasing an optional i.f. filter, it's worth understanding a little bit about them. If you do some research on the filters available for your transceiver, you'll find that a number of parameters are quoted. To help, I've explained the usual ones below with reference to **Fig. 1**.

## Centre Frequency

The centre frequency identifies which i.f. stage the filter is intended for. For example this might be 10.695MHz.

## Pass Bandwidth

The pass bandwidth (sometimes called the nose) defines the maximum width of a signal that filter is designed to let through. So, a c.w. filter might for example have a pass bandwidth of 250Hz. Accompanying this parameter will be the maximum attenuation of the signal at this bandwidth (usually -6dB). **Note:** i.f. filters are often referred to by their pass bandwidth (250Hz in the example).

A narrow pass bandwidth of around 250Hz to 500Hz will be ideal for a c.w. operator. For s.s.b. operators, filters with a pass bandwidth of 1.8kHz to 2.5kHz are better suited to handling speech and data.

## Attenuation Bandwidth

The attenuation bandwidth (sometimes called the skirt) defines how wide a signal will be to be attenuated by typically -60dB. For a c.w. filter this might be 650Hz for example. And -60dB is the equivalent of going from S9 to S1 – so this is a really significant reduction of signals beyond 325Hz either side of the centre frequency.

## Shape Factor

The shape factor of a filter is the ratio of the bandwidth at -6dB to the bandwidth at -60dB. In the case of the example filter above we are looking at 250Hz to 650Hz.( I make that about 1:2.5).

In his book *Secrets of RF Circuit Design*, the late **Joe Carr K4IPV**, suggests that a shape factor of greater than 1:3 is not worth considering for "serious" receiver uses. He regards shape factors between 1:1.5 and 1:1.9 as "high quality", and between 1:1.9 and 1:3 as "middling, but useful". So, the example filter described above could be considered a useful filter for the c.w. operator.


*Fig. 2: The www.mods.dk website showing some of the many Icom items listed.*

## What's Installed Already?

Now that we understand a bit about i.f. filters and their parameters, it's tempting to just switch on the

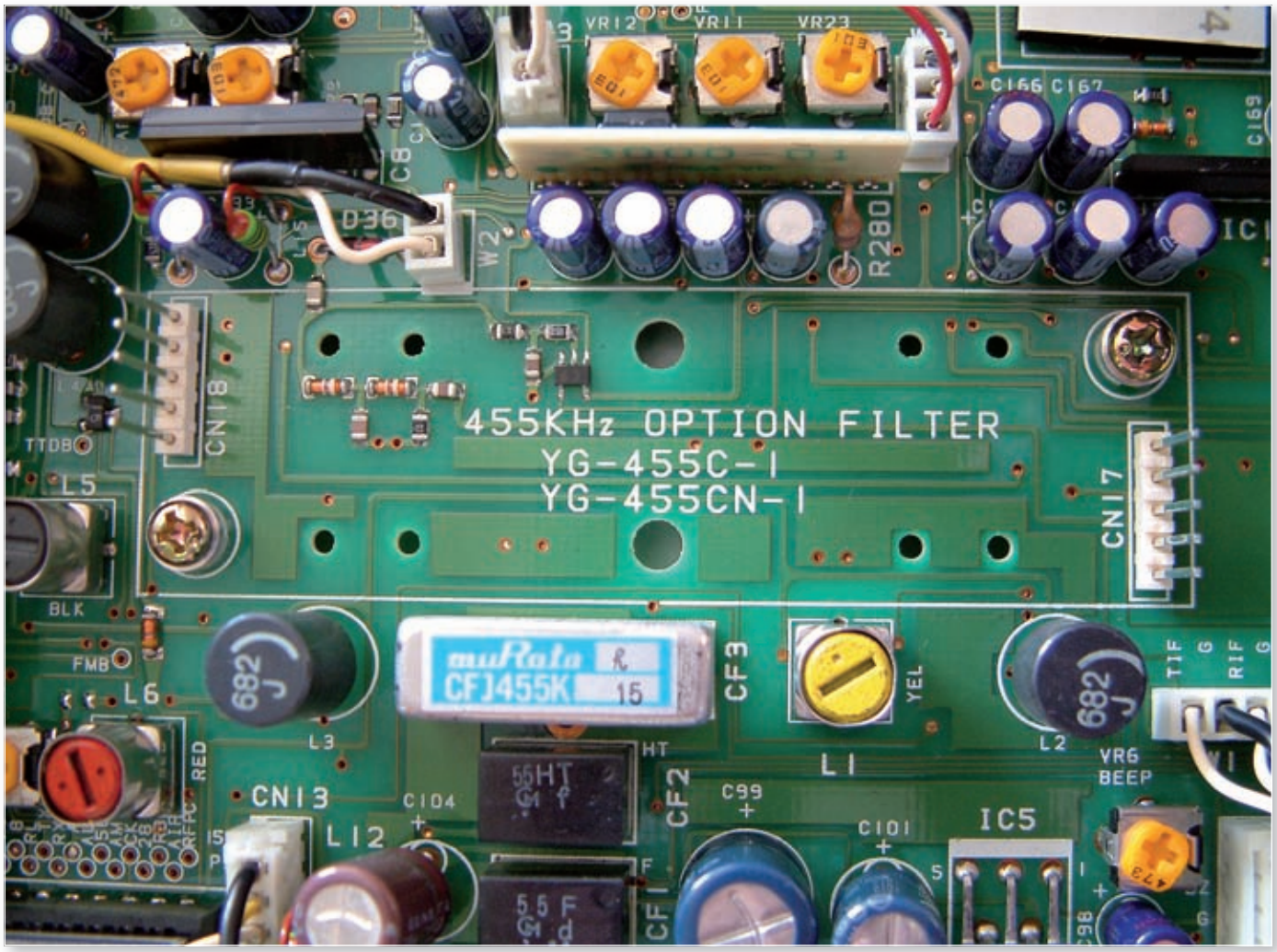


*Fig. 3: The Kenwood TS-690SAT transceiver with the bottom flap lifted to show space to fit a c.w. i.f. filter with a centre frequency of 455kHz. Note the screws ready to be used to hold the plug-in filter in place.*

transceiver and see which i.f. filters are available. This approach may be fine for many transceivers, but for others, in addition to installing the i.f. filters, the i.f. filters have to be enabled within menu controls. So, it makes sense to check that whatever i.f. filters have physically been installed, have actually been configured.

The starting point is to read the operating instructions that came with your transceiver. If you don't have them, it's certainly worth getting hold of them. Operating instruction manuals can occasionally be found at rallies.

Another good place to try shopping is eBay and you might be able to find operating instructions. For those a little cautious about using eBay, I would suggest that spending £5 to £10 on a transceiver instruction manual, is not a particularly risky transaction.

An alternative approach is to have a look for the manual on the internet. **www.mods.dk (Fig. 2)** has over 4,000 brochures, operating manuals and service manuals available to download. The number of free downloads that can be made is limited to one manual per person every four days. Contributors, either by supplying new brochures, manuals and photos or by making financial donations via PayPal and get VIP membership, which allows up to five manuals to be downloaded per day.

## Older Transceivers

As well as obtaining i.f. filters from your favourite Amateur Radio dealer or from third parties, the usual second-hand sources can be useful in finding filters for older transceivers. As i.f filters weigh little, mail-order (even from abroad) is certainly worth considering. Again, eBay is also a useful source.

Make absolutely certain that you are buying the right filter for your transceiver! If the reference number isn't absolutely the same as in your instruction manual, it might not fit.

## Fitting Filters

I would suggest that *WN?* readers start by reading the instructions for their transceiver. To fit an i.f. filter will almost certainly involve removing a cover. So I advise that you make sure that the rig is completely unplugged the from the mains. If the rig operates from internal batteries, you should also remove them before doing anything else.

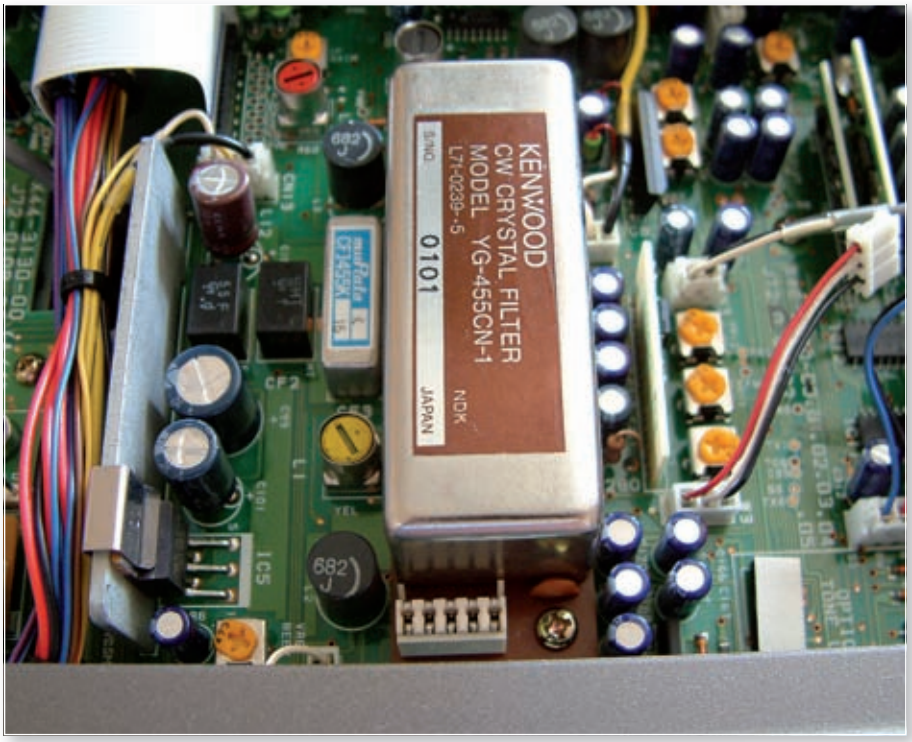


*Fig. 4: The same Kenwood transceiver as Fig. 3 with a c.w. i.f. filter fitted. (The same arrangements apply to the manufacturers TS-450/TS450SAT and TS-690 models).*

Following the instructions, remove the cover. For some transceivers this may mean removing the top cover, for others it may mean removing the bottom cover or a small flip-up lid. Be careful with any leads linking the main printed circuit board (p.c.b.) with top-cover mounted loudspeakers or other items mounted on the cover. Identify which filters are already fitted, and which positions are available for optional i.f. filters **(Fig. 3).**

The filters are usually fitted by pushing them into an existing socket and there are often a couple of screws to hold the newly fitted filter in place **(Fig. 4)**. However, with some older transceivers, filters may need to be soldered in place. This may involve more dismantling of the transceiver than with more modern rigs. Some transceivers (e.g. Kenwood's TS-480HX and TS-480SAT) have space for i.f. filters on a separate removable board for easy installation.

The covers should then be replaced. Once fitted, there may be some configuration needed, to let the transceiver's microprocessor know that the i.f. filter had been fitted and what type of filter it is. Again, refer to the instruction book for the transceiver to make sure that you know what to do.

Whilst the procedures I've described may sound complicated, fitting i.f. filters really is surprisingly easy. I fitted one to my transceiver in just a few minutes. As with many things in life, it pays to take time, understand what you are doing, and work methodically.

## Any Drawbacks?

Whilst I wouldn't call them drawbacks, there are some things that need to be considered when operating with a narrow bandwidth filter in place. For example, you'll need to tune more slowly in order not to miss a weak station. Sometimes it also pays to tune around with the filter switched out and then switch it in as you find a station that you want to work.

Using very narrow filters can give a strange 'ringing' characteristic to the final audio sound. It can also make signals sound a little like they have come from underwater sonar! This may take some getting used to.

A particularly narrow s.s.b. filter may affect reception of data signals such as SSTV, which is quite a wide-band signal. For these reasons I would make sure that it's possible to switch out of circuit the narrowest filter you have.

I hope readers will be encouraged to consider fitting i.f. filters to get the best out of their transceivers. Having fitted a couple in my transceiver, I can certainly hear the difference and recommend the benefits to *WN?* readers! ●

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**David Butler's**

# vhf dxer

Share your news, views and reports with fellow readers. Reports to David by the last Saturday of each month please.

This month David G4ASR has reports of exceptional Sporadic-E openings on the 50, 70 and 144MHz bands.

Your reports of openings during the first two weeks of July showed a remarkable similarity to that experienced during the previous month. Sporadic-E (Sp-E) propagation was yet again exceptional, with numerous openings being reported on the 50, 70 and 144MHz bands.

The 50MHz band could easily have been mistaken for any of the popular h.f. bands! There were contacts being made into five continents; Africa (TZ6EI Mali), Asia (JA6SBW Japan), Europe (HV5PUL Vatican City), North America (V29JKV Antigua) and South America (OA4TT Peru).

The 70MHz band proved very popular with some tremendous long distance contacts being made into Crete (SV9CJO), Greece (SV1DH), Madeira (CT3HF) and the Canary Islands (EA8BPX). The 144MHz band didn't miss out either with some terrific Sp-E QSOs being made into the African continent with stations over 3000km distant.

However these conditions didn't last for ever and by the end of the third week of July it was obvious that Sp-E propagation was very much on the wane. This was particularly true of the 70 and 144MHz bands, as these higher frequencies are the first to suffer towards the end of the Sp-E season. The 'magic-band' continued to soldier on with daily 50MHz openings being reported right through to the end of the month. All in all it was still a very lively period on the v.h.f. bands!

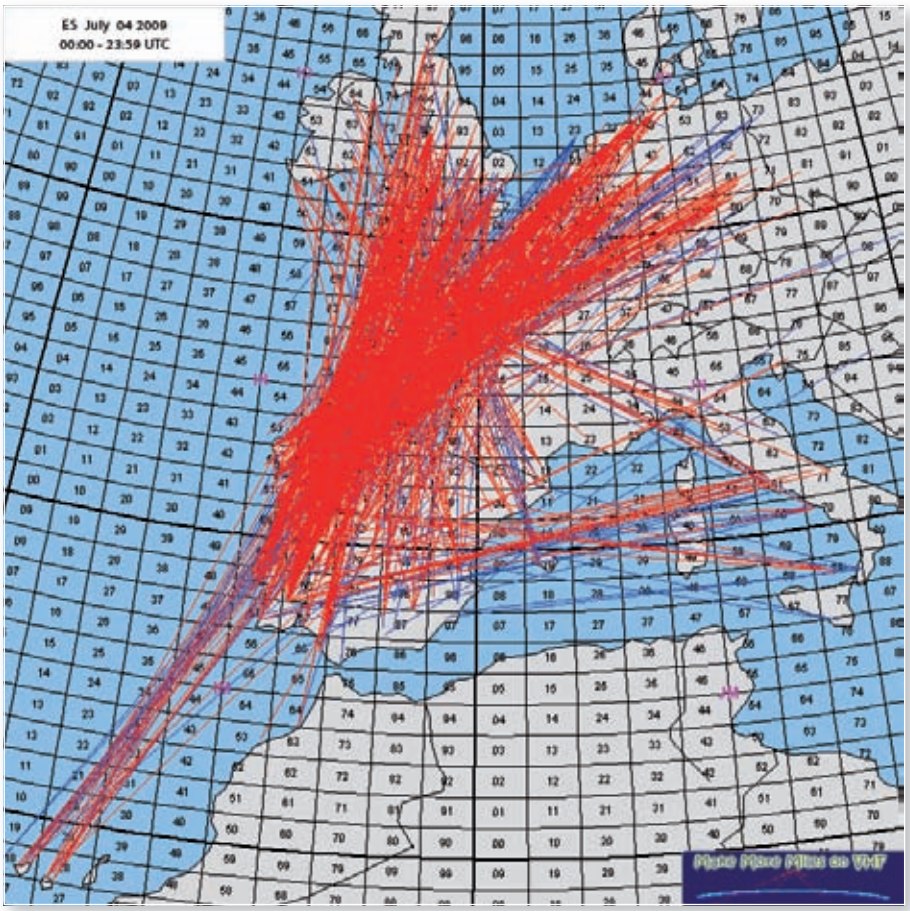


*Fig. 1: Large Sporadic-E clouds mainly over north-western France gave great opening on the 50, 70 and 144MHz bands over the month.*

## The 144MHz Band

July kicked off with a series of four 144MHz Sporadic-E openings within the first week of the month but then it all came to an abrupt halt for 10 days before the final two events were reported on July 16th and 17th. In common with the previous month the majority of 144MHz Sp-E openings during July were in a southerly direction towards the Canary Islands (EA8), Madeira (CT3), Spain (EA), Portugal (CT), Gibraltar (ZB), Morocco (CN) and Melilla (EA9).

The first Sp-E event of the month was a very small 'spotty' opening reported on July 1st around 1300UTC. The event was of short duration with CT1HZE (Portugal IM57) being the only 144MHz station worked from southern England.

An excellent opening to Croatia (9A), Italy (I), Greece (SV) and Crete (SV9) occurred between 1440-1545UTC on July 3rd. Right at the beginning of the 144MHz opening, operators in south-west England and south Wales reported contacting the s.s.b. station of IH9GPI. Although this station comes under the jurisdiction of Italy it is actually located on Pantelleria Island (JM56), in the African continent, just 70km from the coast of Tunisia.

**Sid Smith-Gauvin GJ0JSY** (Jersey IN89) reports that he worked the station of IH9GPI at 1446UTC just as the 144MHz band was opening at his QTH. Running a Yaesu FT-225RD transceiver, 120W and a 17-element double-quad beam, Sid went on to contact the s.s.b. stations of IK0RWX, I7CSB, SV9CVY, 9A2RD, 9A5CW and 9A9SF before the band faded out at 1524UTC.

At my QTH (Herefordshire IO81) I had just worked the station of SV9GPV (Crete KM25) on 70.200MHz when I swapped over to the 144MHz band to immediately contact SV9CVY in the same locator square, some 2900km distant. That QSO was then followed

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with a 144MHz s.s.b. contact with SV3CYM (Greece KM08) at 2451km before I returned to the 70MHz band, immediately working the station of SV9CJO (Crete KM25).

Working Greek stations on the 144MHz band are very rare events from my QTH as the distances involved are not optimum at all. So, I was particularly pleased to work Crete and Greece on the 144MHz band as I was only using one 9-element Vargarda Yagi, having removed three similar Yagis earlier in the year to make way for a stacked array of two 7-element Yagis on the 70MHz band.

The next 144MHz Sp-E opening was reported on July 4th and it was absolutely fantastic. Can you imagine what happens when you mix a massive Sp-E opening lasting nearly four hours with v.h.f. National Field Day when hundreds of competitive stations are active throughout the UK and other parts of Europe? It was absolute bedlam!

The v.h.f. field day contest commenced at 1400UTC just in time for the portable 144MHz stations to settle down before two lengthy openings that occurred between 1510-1600UTC and 1725-1955UTC. Take a look at the diagram, **Fig. 1** and you will see that the 144MHz band was open to the Canary Islands (EA8), Morocco (CN), Portugal (CT) and Spain (EA).

## Contest QRM

**David Johnson G4DHF** (Lincolnshire IO92) remarks that the QRM from contest stations operating around 144.300MHz was really fierce and that it very much affected the QSO and completion rate. Never the less it was still the best Sp-E opening from his QTH in many years. Running an Icom IC-7000 transceiver, a GS35B amplifier and four 2.2λ Yagis he contacted four EA8-stations, 15 CT-stations and 14 EA-stations! David mentions that he has been active from his location for 12 years and yet he has only ever worked into the Canary Islands once and that was via tropo propagation.

To work four EA8 stations in one


*Fig. 2: One contact on June 8th, the 4688km path of the contact between EA8AVI and UT5CJW.*

Sp-E event was absolutely fantastic. David's s.s.b. contacts included EA8YT (IL18) at 3018km, EA8AVI (IL28) 3025km, EB8BRZ (IL27) 3032km and EA8TJ (IL18) for best DX at 3034km. The station of EA8AVI was audible for several minutes and David heard him work one or two Danish (OZ) stations so the distances must have been quite remarkable, circa 3400km! However, even that is not as far as a recent Sp-E report in June by the station of EA8AVI. The diagram, **Fig. 2**, shows the 4688km path between the 144MHz stations of UT5JCW (Ukraine KN64) and EA8AVI (Canary Islands).

**Francisco Costa CT1EAT** (Portugal IM68) had great fun in the openings with the 144MHz band open at his QTH for nearly five hours. Running an Icom IC-7400 transceiver, 100W and a 17-element Yagi he made s.s.b. contacts with stations in Ireland (EI), Netherlands (PA), Italy (I), Croatia (9A), and Slovenia (S5) and, for best DX of the event, the Danish station of OZ9EDR at 2406km.

There was also a terrific amount of UK activity and Francisco reported making QSOs with 52 G-stations, two GI-stations, five GW-stations and 12 GM stations. The latter included MM0GZZ (2023km), GM1VKI (2031km), GM8OEG (2081km) and GM4ZUK/P at 2138km.

**Allan Duncan GM4ZUK/P** (Aberdeenshire IO86) was operating on the 144MHz band from his usual portable site at 455m a.s.l. on top of *Cairn O'Mount*. Allan reports that he was delighted to make 34 Sp-E contacts with stations located in Portugal, Spain and the Balearic Islands, particularly as he was located quite a long way north in the UK.

All of Allan's s.s.b. contacts were more than 1800km distant with 20 QSOs being made over paths in excess of 2000km. His longest distance contacts made between 1727-1951UTC were with the stations of EA7BEL (IM77) at 2216km, CT1HZE (IM57) 2232km, CT1FJC (IM57) 2254km, EA7TL (IM66) 2278km and EA7BYM (IM66) for best DX during the contest at 2288km. With a contest scoring system of one point/kilometre the 68,902 points amassed by the Sp-E contacts alone surely came in very handy!

## Not So Fortunate!

I wasn't so fortunate at my QTH. At the beginning of the first opening around 1520UTC I made an excellent s.s.b. contact with the 144MHz station of CN8LI (Morocco IM63) at 2026km distant. Then **Marion –** my wife **–** reminded me that we were going out. Doh!

Two days later on July 6th a brief 15 minute opening was reported around 1820UTC to the Romanian stations of YO4GJH (KN35), YO5CFI (KN16) and YO6OBK (KN26). Not many stations caught this opening as it just crept into the southern counties of England, the main lobe landing in Belgium and France.

A major Sp-E opening lasting nearly two and a half hours was reported during the evening of July 16th. Right at the beginning of the event at 1650UTC the 144MHz band was open

to Malta (9H) but within minutes the propagation swung to the south with s.s.b. contacts being made through to 1915UTC with stations in Portugal (CT), Spain (EA), Gibraltar (ZB), Ceuta & Melilla (EA9) and Morocco (CN) and then to the south-west into Madeira (CT3) and the Canary Islands (EA8). And that's four DXCC countries in the African continent!

**Joe Butt G0JJG** (Suffolk JO02) was fortunate to be active during the opening on July 16th. He was using a Yaesu FT-1000MP transceiver driving a transverter and a 4CX350 tetrode amplifier into an 11-element Yagi at 10m above ground level. Between 1738-1830UTC he made seven s.s.b. contacts with the stations of CT1EAT (IM68), CT1EEB (IN50), CT1EWA (IM59), CT1FFU (IM59), CT1HSN (IN61), CT1HZE (IM57) and EA7TL (IM66).

Joe also worked five stations in the Canary Islands, EA8YT (IL18) at 3004km, EA8BPX (IL18) 3008km, EB8BRZ (IL27) 3014km, EA8TJ (IL18) 3020km and EB8AYA (IL18) also at an amazing 3020km. Fortunately he managed to record three of his QSOs and these have been uploaded to **www.youtube.com/user/g0jjg** so take a listen and be surprised at just how strong these 144MHz stations were.

**Lyn Leach GW8JLY** (South Glamorgan IO81) mentions that this was the best opening of the year at his QTH near Cardiff. Running a Kenwood TS-2000 transceiver, 200W and a 9-element Yagi Lyn contacted the s.s.b. stations of CT1EAT, CT1EEB, CT1END, CT1EPC, CT1EWA, CT1FFU, CT1FJC, CT1HZE, CT1WO, CT1ZX, CT2IOV, EA1ASC, EA7AHA, EA7BYM, EA7EE, EA7TL, EA9IB, EB8BRZ and EA8BPX for best DX at 2806km distant. The station of ZB3B was heard but unfortunately no QSO could be completed.

**Ron Pincho ZB3B** (Gibraltar IM76) was active during the Sp-E opening using a Yaesu FT-857 transceiver running 50W into a 5-element Cushcraft Yagi. Ron reports that between 1727-1823UTC he contacted the UK stations of G0JJL (IO83), G0UWK (IO83), G4APJ (IO83), G4CBW (IO83), G4HGI (IO83), G4KWQ (IO92), G6HIE (IO90), G7RAU (IO90), GI4SNA (IO64) and GW7SMV (IO81).

The final Sp-E opening of the month was reported around 0825UTC on July 17th by stations in south-west England. The only DX worked was the station of EA9IB (IM85) located in the Spanish enclave of Melilla in North Africa. And that opening brought to an end the 2009 Sp-E season for the 144MHz band.

## The 144MHz Sporadic-E Season

The 144MHz Sp-E season this year occurred during the summer months of May, June and July. The first event of 2009 was a short opening on May 17th and the last, another brief opening, on July 17th. During this nine week period there were a total of 22 separate openings spread over 18 days, so you really needed to be on the ball to catch many of them. Only one opening was reported in May (on the 17th), 14 in June (occurring on the 1st, 6th, 7th, 9th, 11th, 14th, 20th, 21st, 22nd, 24th and 28th) and 7 in July (1st, 3rd, 4th, 6th, 16th and 17th).

Probably the most prolific openings occurred on June 11th between 1140-1400UTC to Portugal and Spain, on July 4th between 1510-2000UTC to Portugal, Spain, Balearic Islands, Gibraltar, Morocco and the Canary Islands and on July 16th between 1650-2000UTC to Portugal, Spain, Balearic Islands, Gibraltar, Morocco, Melilla, Madeira and the Canary Islands. Even the least observant readers will notice that all these openings were to the same geographical areas.

And that is what made the 2009 season so different from other years. Instead of openings to the east or south-east of the UK – as so often occurs – this year the majority of openings were either due south or south-west of the UK. Indeed out of 22 separate openings only seven events were reported to Czech Republic (OK), Hungary (HA), Italy (I), Bosnia-Hercegovina (E7), Croatia (9A), Slovenia (S5), Bulgaria (LZ), Romania (YO), Serbia (YU), Greece (SV), Crete (SV9) and Malta (9H).

## Deadline Time

That's it again for this month and what another DX-filled month it was! Although the summer Sporadic-E season is now over I have noticed in recent years that uncharacteristically there has been an upsurge in Sp-E activity on the 50MHz band during October.

Keep a look out also on the 144 and 430MHz bands for autumnal tropo openings towards the end of September and throughout October. Good luck, and if you do hear or work any DX stations on the v.h.f., u.h.f. or microwave bands, then please send me your reports – or any other news – to reach me before the last Saturday of the month. **73 David G4ASR.**

### More Information

The Sporadic-E diagram that I've shown in this column comes with permission from the **Make More Miles on VHF** web site. And if you're at all interested in making DX contacts on any of the v.h.f. bands you really should take a look at this leading v.h.f. site: **http://www.mmmonvhf.de/**

On the pages you'll find a propagation monitor that displays the current solar activity, maximum usable frequency (m.u.f.), and pan-European Sporadic-E and meteor scatter activity. More interestingly there are pages devoted to recent propagation events, particularly Sporadic-E. You'll find maps of recent openings and up to date reports of who's worked what. There's even one page that displays an interactive map showing the progression of a recent Sp-E opening contact by contact. It really gives you an insight into how such an event develops. In addition you will also find details of DXpeditions, QSL information, news and a v.h.f. forum.


### Other Information

You can find solar activity gauge displays the K-Index, A-Index and Flux values fetched from DK0WCY data **http://www.dk0wcy.de/** updated every hour.

There's also m.u.f. data that's updated every hour and is derived from the excellent *LiveMUF* program, written by **Dave Edwards G7RAU**, to be found at: **http://g7rau.demon.co.uk/**

The current state of Sporadic-E activity across Europe is derived from the 'DX-Robot' **http://www.gooddx.net** by **Allard Munters PE1NWL** and is updated every 5-minutes.

Finally European meteor scatter activity is displayed based on live data from contributors to the Radio Meteor Observing Bulletin **http://www.rmob.org/**

# club news

Please remember to include full details of your club, E-mail and telephone contact details and the postcode of your meeting venue - it helps potential visitors to find you!

**Send all your club info to**

PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: newsdesk@pwpublishing.ltd.uk

## AYRSHIRE (Scotland)

**Kilmarnock & Loudoun ARC**
**Graham MM0GHM**
**Tel: (0780) 2954 739**
**E-mail: mm3gdc@btinternet.com**
**www.klarc.org**
We meet every 2nd and 4th Tuesdays at the clubhouse at E. Ayrshire Internal Transport, 36a Main St., Crookedholm, Kilmarnock KA3 6JS

## BEDFORDSHIRE

**Shefford & DARS**
**David Lloyd. Tel: (01234) 742757**
**www.sadars.org.uk**
The Shefford and District Amateur Radio Society meets every Thursday at the Community Hall, Ampthill Road, Shefford, SG17 5BD (next to the Chip shop). See web site for our full programme.

## BERKSHIRE

**Reading & DARC**
**Pete Milton. Tel: (01189) 695697**
**www.radarc.org**
The Reading & District Amateur Radio Club meets on the second and fourth Thursday of the month at Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Berkshire RG5 4LY. Mid-september sees commencement of the Advance Licence Course run by Alison Johnson G8ROG, details from g3ngx@radarc.org

## CAMBRIDGESHIRE

**Huntingdonshire ARS**
**Gerald G8AKL.**
**Tel: (01487) 740794**
**E-mail: hunts.hams@yahoo.co.uk**
**www.hunts-hams.co.uk**
Huntingdonshire ARS meets at the Medway Centre, Medway Road, Huntingdon PE29 1SF. Meetings are from 7.30pm until 10pm on the 2nd & 4th Thursday of the month.

**Peterborough & DARC**
**G4EHW**
**www.radioclubs.net/padarc**
Meets on 4th Wednesday of the month at Southfields Community Centre, Stanground, Peterborough. PE2 8RZ. Directions and full details on website.

## CHESHIRE

**Chester & DRS**
**Barbara Green**
**Tel: (07957) 870770**
**E-mail: barbara@rutland.go-plus.net**
**www.chesterdars.org.uk**
The Chester & District Radio Society meets on Tuesday evenings at the Burley Memorial Hall, Common Lane, Waverton, Chester CH3 7QN.

**Halton RC**
**Sam**
**Tel: (01928) 714231**
**www.g7wfs.sytes.net/hrc/index.htm**
The Halton Radio Club meets in The Play Centre, Norton Hill, Windmill Hill, Runcorne WA7 6LJ every Thursday from 7.30 to 9.30pm. There's plenty of parking and full disabled access.

**Macclesfield & DRS**
**Adie Dodd. Tel: 0795 7765511**
**www.gx4mws.com**
The Macclesfield & District Radio Society meets every Monday at the Pack Horse Bowling Club, Westminster Road, Macclesfield SK10 3AT at 8pm. Licence courses are run year round and visitors are always welcome.

**Stockport RS**
**David Simcock. Tel: 0161 456 7832**
**E-mail: secretary@gx4mws.com**
**www.stockportradiosociety.co.uk**
The Stockport Radio Society meets on the first and third Tuesdays at their new location of: Walthew House, Shaw Heath, Stockport SK2 6QS

**Warrington Amateur Radio Club**
**Paul Carter.**
**E-mail: g7odj@warc.org.uk**
**www.warc.org.uk**
The Warrington Amateur Radio Club meets every Tuesday at 8pm at the Grappenhall Youth and Community Centre, Bellhouse Lane, Grappenhall, Warrington WA4 2SG.

## CORNWALL

**Cornish RAC**
**Steven G7VOH**
**Tel: (01209)844939**
**E-mail: g7voh@btinternet.com**
**www.cornishradioamateurclub.org.uk**
The Cornish Radio Amateur Club meets at the Church Hall, Church Road, Perranarworthal, Truro TR3 7QE on the first Wednesday of every month at 7.30pm. There is also a Computer Section that meets at the same venue and time on the second Monday of every month, except December.

**Newquay and District ARS**
**Joe Bell**
**Tel: (01726) 891557**
**E-mail: joe_bell@btinternet.com**
**www.btinternet.com/~kevin.francks/index.html**
The Newquay and District ARS meets every other Thursday at Treviglas Community College, Bradley Road, Newquay. TR7 3JA with either arranged talks on the evening or just a general chit chat amongst members. Also the club offers training towards the Foundation Exam on club nights and then the opportunity to take the Foundation Exam.

**Poldhu ARC**
**Keith Matthew.**
**Tel: (01326) 574441**
**E-mail: g0wys@yahoo.co.uk**
**www.gb2gm.org**
The Poldhu Amateur Radio Club meets at The Marconi Centre, Poldhu Cove, Nr Mullion, Cornwall TR12 7JB. Tel: 01326 241656.

## COUNTY DOWN

**Bangor and District ARS**
**Mike. Tel: 028 4277 2383**
**www.bdars.com**
The Bangor and District Amateur Radio Society meets on the first Thursday of every month in 'The Boathouse', Harbour Car Park, Groomsport BT19 6JP at 8pm.

## COUNTY DURHAM

**Bishop Auckland RAC**
**Mark Hill. Tel: (01388) 745353**
**http://barac.m0php.net/**
The Bishop Auckland Radio Amateur Club meets every Thursday at 8pm in the Village Community Centre, Stanley Crook, Co. Durham DL15 9SN. Tuition for Foundation, Intermediate and Advanced licences is available. The club is registered as an RSGB exam centre.

**Great Lumley AR&ES**
**David Barclay. Tel: 0191 3888113**
**E-mail: m0bpm@btinternet.com**
The Great Lumley Amateur Radio & Electronics Society meets in the Community Centre, Front Street, Great Lumley, Chester-le-Street, Co. Durham DH3 4JD on Wednesday nights from 7 to 9pm.

## DERBYSHIRE

**South Normanton Alfreton and District ARC**
**A J Higton. Tel: (01773) 783658**
**E-mail: Snadarc@aol.com**
**www.snadarc.com/**
The South Normanton Alfreton and District Amateur Radio Club meets in the Village Hall, Community Centre, Market Street, South Normanton, Derbyshire DE55 2EJ.

## DEVON

**Exemouth ARS**
**Mike G1GZG**
**Tel: (01395) 274172**
**E-mail: micael.newport1@btinternet.com**
The club meets on the 1st and 3rd Wednesdays of each month at 'The Scout Hut', Marpool Hill, Exmouth Devon EX8 1TD.

**Exeter ARS**
**Phil 2E0PCJ**
**Tel: (01392) 877413**
**E-mail: philcjays@aol.com**
The Exeter Amateur Radio Society meets on the 2nd and the 4th Monday at 7.30pm in the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter EX2 5RP. Tuition for Foundation, Intermediate and Advanced licence is available. The club is registered as an RSGB examination centre.

**Torbay ARS**
**Dave Helliwell.**
**E-mail: g6fsp@tars.org.uk**
**www.tars.org.uk**
The Torbay Amateur Radio Society meets Fridays at 7.30pm in the Teignbridge District Scout Headquarters, Wolborough Street, Newton Abbot, Devon TQ12 1JR.

## DORSET

**Blackmore Vale ARS (BVARS)**
**Nick Perrin**
**Tel: (01747) 838936**
**E-Mail: bnperrin@theiet.org**
**www.radioclubs.net/bvars/**
BVARS meets in The Youth Club, Coppice Street, Shaftesbury Dorset SP7-8PF each Tuesday evening at 7.30pm. The Club callsign is G4RBV. The main meeting is the second Tuesday of the month and details of events and full details of the Club can be found on the website.

**Bournemouth RS**
**John. Tel: 07719 700 771**
**www.brswebsite.org.uk**
The Bournemouth Radio Society meets on the first and third Friday of each month at the Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. Meetings take place in Room 5 at 8pm and members assemble in the bar from 7.30pm. Visitors are always welcome.

**Poole Radio Society G4PRS**
**'Tex' G1TEX**
**Tel: 07966 460 552**
**www.g4prs.org.uk**
Meetings are every Friday at 19:30 for 20:00 at the The Old Chapel Hall, Cabot Lane, Creekmoor, Poole BH17 7BX, the second meeting of each month is the formal evening, all others are basically shack and Natter nights. After the recent successful Intermediate course, training begins again in September.

## DUMFRIES & GALOWAY (Scotland)

**The Wigtownshire Amateur Radio Club**
**Ellis Gaston**
**Tel: (01776) 820413**
**Web: www.gm4riv.co.uk**
The club meets every Thursday from 19:00 Hrs at the The Aird Unit, Stranraer Academy, Stranraer, DG9 8BQ, South West Scotland.

## EAST SUSSEX

**Brighton RC**
**Reg Moores. Tel: (01273) 503869**
The Brighton Radio Club meets on the second and fourth Tuesdays of each month at the Vallance Community Centre, Conway Court, Sackville Road, Hove BN2 3WR at 7.30pm. Anyone wishing to know more are welcome to come along to a meeting, entrance is free.

**Hastings E&RC**
**Gordon Sweet.**
**Tel: (01424) 431909**
**E-mail: gordon@gsweet.fsnet.co.uk**
**www.herc.uk.net** or
**http://g4cus.mysite.wanadoo-members.co.uk/**
The Hastings Electronics & Radio Club meets on the third Wednesday at the Taplin Centre, Upper Maze Hill, St Leonards on Sea TN38 OLQ at 7pm.

## ESSEX

**Braintree & DARC**
**Keith. Tel: (01376) 329279**
**www.badars.org.uk**
The Braintree & District Amateur Radio Society meets on the first and third Monday of the month in The Clubhouse, Braintree Hockey Club, Church Street, Bocking CM7 5LJ.

**Colchester RA**
**www.g3co.ccom.co.uk**
The Colchester Radio Amateurs meets at 7.30pm on alternate Thursdays at St Helena School and The Colchester Institute, Sheepen Road, Colchester, Essex CO3 3LE. Members and non-members welcome.

**Chelmsford ARS**
**Martyn Medcalf**
**Tel: (01245) 469008**
**E-mail: info2007@g0mwt.org.uk**
**www.g0mwt.org.uk**
The Chelmsford Amateur Radio Society meets on the first Tuesday of each month in the Marconi Sports & Social Centre, Beehive Lane, Great Baddow, Chelmsford, Essex CM2 9RX at 7.30pm. - All welcome. August 4th "Where do our wavelengths come from?" - The work of the IARU by Peter Chadwick G3RZP. Sep. 1st "D Star" by Murray Niman G6JYB and Clive Ward G1EUC.

**Loughton & Epping Forest ARS**
**Marc Litchman. Tel: 020 8502 1645**
**E-mail: info@lefars.org.uk**
**www.lefars.org.uk**
The Loughton & Epping Forest ARS meet Friday fortnightly at All Saints House, Romford Road, Chigwell Row, Essex IG7 4QD between 7.45 and 10pm. All visitors will be made most welcome.

**South Essex Amateur Radio Society**
**Dave (G4UVJ)**
**Tel: (01268) 697978**
**E-mail: southessex.ars@btinternet.com**
**www.southessex.ars.btinternet.co.uk**
Local Network: 145.225MHz
Meets: Meet at 8pm on the second wednesdays of each month at South Benfleet Primary School, High Rd, South Benfleet, Essex SS7 5HA. (Entrance: 51°33'10.45N 0°33'39.65E), (Opp. Smiths Wood Yard). All welcome. Meetings are: July 26th we're holding the Waterside Farm Railway Special Event Station.

## FIFE (Scotland)

**Glenrothes & DARS GM4GRC**
**D Francis MM0DYX.**
**Tel: 01383 823878**
Meet Wednesdays at the Football Pavillion, Station Rd. Thornton Fife KY1 4AX. Club Chairman Ken GM3YBQ runs course at all licence levels.

## GLOUSCESTERSHIRE

**Cheltenham ARC G5BK (CARA)**
**Derek G3NKS.**
**Tel: 01242 241 099**
**E-mail: g3nks@blueyonder.co.uk**
**www.caranet.co.uk**
The club meetings are held on the first Friday of each month, starting at 8p.m. at Prestbury Library, The Burgage, Cheltenham, Gloucestershire, GL52 3DN.

**Forest of Dean Amateur Radio Group**
**Adrian Lane M3TVF**
**Email: adrian@fodarg.com**
**www.fodarg.com**
We will be meeting every Tuesday night as from now at 19:30 hours at Ruardean Sports & Social Club, Ruardean Hill, Drybrook, Gloucestershire GL17 9AS. Anyone with an interest in any aspect of radio or electronics is welcome.

**Gloucester Amateur Radio and Electronics Society**
**Anne 2E1GKY/M3GKY**
**Tel: (01452) 548478 (After 10am)**
**E-mail: hamreed@blueyonder.co.uk**
**www.g4aym.org.uk**
Meet at Churchdown School, Winston Road, Glos. GL3 2RB, every monday evening at 7-30pm until 10pm except for Bank Holidays when we operate from a local escarpment. Monday Oct 5th Talk by Brian G4CIB on LUNDY, 12th Sale of Junk and Books, 19th Operating Club Equipment, 26th Informal Evening.

## GWNEDD (Mid-Wales)

**Merion ARS**
**John Tel: (07824) 562656**
**Email: tawelfan@talk21.com**
**http://meirionars.multiply.com/**
Meirion amateur radio society meet on the first Thursday of each month at The Royal Ship Hotel in Dolgellau Gwynedd LL40 1AR at 19.30. Visitors and new members are very welcome. Regular talks, all the details for meetings and special events can be seen on the club website.

## HAMPSHIRE

**Andover Radio Amateur Club.**
**Martin M0MWS. Tel: (01980) 612070**
**E-mail: martinsmith@kukltd.co.uk**
**www.arac.co.uk**
The Andover Radio Amateur Club meets on the first and third Tuesdays in the month at the Club venue in The Village Hall at Wildhern, SP11 0JE. Map Ref SU350510 at 19:30 hours.

**Fareham & District ARC**
**Alastair Sinclair.**
**Tel: 01329 235397**
**E-mail: secretary@fareham-darc.co.uk**
**www.fareham-darc.co.uk/**
The Fareham & District Amateur Radio Club meets on Wednesdays evenings from 7.30pm in the Fareham Sailing & Motor Boat Club, The Boathouse, Lower Quay, Fareham. PO16 0RA

**Farnborough & District Radio Society (FDRS)**
**Derek G3OFA**
**E-mail: mail@fdrs.org.uk**
**www.fdrs.org.uk**
Meets every 2nd and 4th Wednesday in the month at 7:30 for 8:00 pm in the Farnborough Community Centre, Meudon Avenue, Farnborough, Hampshire, GU14 7LE Visitors and new members are always most welcome. July 22nd Construction Contest and Junk Sale.

**Horndean & District ARC**
**Stuart Swain. Tel: (02392) 472846**
**E-mail: stuart.swain@hotmail.co.uk**
**www.hdarc.co.uk**
The Horndean & District Amateur Radio Club meets on the first and fourth Tuesdays each month in the Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants PO8 9SF at 7.30pm. Visitors are always very welcome. The will be running a Foundation Licence course and exam in October in the Waterlooville area. Pre-registration is essential, and more details can be obtained from Stuart.

**Isle of Wight Radio Society**
**Tony Pegg. Tel: 01983 868 978**
**E-mail: tony.pegg1@btinternet.com**
**www.g3sky.co.uk**
The IWRS meets every Friday evening 7.00pm-10.pm at Haylands Farm,Salters Rd. Ryde PO33 3HU. Visitors very welcome.The club runs courses for Foundation, Intermediate and advanced licenses. The club is registered as an RSGB exam centre.

**Itchen Valley ARC**
**Charlie M0WYM**
**Tel: (02380) 439560**
**E-mail: secretary@ivarc.org.uk**
**www.ivarc.org.uk**
The Itchen Valley ARC meets on the second and fourth Friday of each month at The Scout Hut, Brickfield Lane, Chandlers Ford, SO53 4DP, doors open 7.30 pm. See website for our programme, visitors welcome. Join our club net on 145.550, Thursday evenings at 8.30 pm. The club is a registered as an RSGB examination centre.

**Lymington Community Association Radio Club**
**Keith G8MZF Tel:(01590) 672337 (*work*)**
**(02380) 849395 (*evenings*)**
**Email: lymcomass@aol.com**
The club meets at Lymington Community Centre, New Street/ Cannon Street, Lymington SO41 9BQ, on friday nights. Talk-in on the night on or near 145.550 club call M0LCC. All are welcome. Start time hopefully 7.30pm bar open from 7.00pm. Plenty of free parking nearby.

## HERTFORDSHIRE

**Verulam Amateur Radio Club (St Albans)**
**Norman. Tel: (07773) 628912**
**E-mail: g1bsz@aol.com (sec)**
**www.radioclubs.net/verulam**
The club normally meets every 3rd Tuesday of the month 800pm at Aboyne Lodge School.Etna Road, St Albans, AL3 5NL. New members and visitors are always very welcome. Regular talks, events, Foundation, Intermediate courses exams are held. Club nets also take place every Sunday 12.00noon 40m (7.150MHz), then 14.00pm 2m (145.375) and on Tuesday 19.45pm 160m (1.975) then 20.00pm 2m (145.375). For further information about the club and events please see the website.

**Stevanage & District ARS**
**John. Tel: (01462) 459254**
**Secretary E-mail:**
**jmccutcheon@freeuk.com**
**www.sadars.org/**
The Stevenage and District Amateur Radio Society meet every Tuesday 7.30pm, at the Stevenage Resource Centre, Chells Way, Stevenage, SG2 0LT. Regular talks and demonstrations. Registered centre for Foundation/Intermediate/ Advanced exam courses (40+ passes last year). Club Net last Friday of month 7.30pm on 145.450MHz. All welcome, see website for further details.

## HUMBERSIDE

**Hull & District ARS**
**Keith Shaw.**
**Tel: 01482 217776**
**E-mail m3shw@yahoo.co.uk**
**raymond penny Tel: 01482 376835**
**E-mail penibs@penibs.karoo.co.uk**
Hull & DARS meet every friday night at 1930 – 2200 at the walton street leisure centre, goathland close, walton street hull, East Yorks HU3 6NG.

## JERSEY

**Jersey Amateur Radio Society GJ3DVC**
**Rob Luscombe (secretary) 2J0RZD.**
**Tel: 07797 923916**
**E-mail: gj3dvc@gj3dvc.org.je**
**www.radioclubs.net/gj3dvc/**
The Jersey Amateur Radio Society meets every Friday at 7.30pm at The German Signal Station, Rue Baal, La Moye, St. Brelade, Jersey, JE3 8HQ, also on a Wednesday evening from time to time to maintain, alter and improve the shack, antennas etc. and also for club training. Coffee and car parking available, visitors are always welcome, shack rental available. See our website for further information.

## KENT

**Bredhurst RATS**
**www.the-brats.co.uk**
The Bredhurst Radio Amateur & Transmitting Society meets on Thursdays at the Parkwood Community Centre, Rainham, Gillingham, Kent ME8 9PN at 8.30pm. If you are interested in joining the club, write to: Membership, The BRATS c/o The Club Room, The Parkwood Community Centre, Long Catlis Road, Rainham, Gillingham, Kent, ME8 9PN.

**Hilderstone Radio & Electronics Club**
**Mike Howland**
**E-mail: g4mix@waitrose.com**
**www.g0hrs.org.uk**
Meetings now at The Science Block, Chatham House School, Chatham Street, Ramsgate, CT11 7PP on 2nd and 4th Friday of the month at 7-30pm.

**Bromley & DARS**
**Graham**
**E-mail: bdars@grahamc.net**
**www.bdars.org**
The Bromley & District Amateur Radio Society meets in The Victory Social Club, Kechill Gardens, Hayes, Kent BR2 7NH (off B265, Hayes Lane, Bromley) on the third Tuesday of the month at 7.30pm.

## LANARKSHIRE (Scotland)

**Mid-Lanark ARS**
**Dennis. Tel: 07505529335**
**Email: mm0dnx@yahoo.co.uk**
**www.mlars.org.uk/**
The Mid-Lanark ARS meets on Friday evenings at the Newarthill Community Education Centre, 288 High Street,

Newarthill, Motherwell ML1 5JU. Visitors and new members are very welcome. The club has HF and VHF shacks for use on club evenings. Courses for foundation, intermediate and full licences are also run at the club. See web site for details of our upcoming meetings.

## LANCASHIRE

**Oldham RC**
**Christopher Cunliffe**
**Tel: 07749347142**
**E-mail:**
**secretaryoarc@btinternet.com**
**www.oarc.org.uk**
The Oldham Radio Club meets on Thursdays at Royton Air Training Corps, Hillside Avenue, Royton, Oldham OL2 6RF at 7:30pm.

**Ellenroad RC**
**David. Tel: (01706) 358650**
**E-mail:**
**info@ellenroadradioclub.org.uk**
**www.ellenroadradioclub.org.uk/info.htm**
The Ellenroad Radio Club (ERC) meets every Monday evening from 7 to 9pm at the Ellenroad Steam Museum, Elizabethan Way, Newhey, Rochdale OL16 4LG. The museum houses the UK's only fully-working cotton mill engine, complete with its 220ft high chimney. Newcomers are always welcome.

**Morecambe Bay ARS**
**Martin Hazel. Tel: (01524) 848193**
**Email: martin@mbars.internationalham.com**
**www.mbars.internationalham.com**
Morecambe Bay Amateur Radio Society meet at the Trimpell Sports and Leisure Club, Out Moss Lane Morecambe, every Tuesday evening from 1930. They also have a new website at all of their events calendar for the next year is to be found there.

**Thornton Cleveleys ARS (G4ATH, & G6GMW)**
**John. Tel: (01253) 399377,**
**E-mail: m3waz@hotmail.co.uk**
**www.tcars.org.uk**
Meet monday evenings at the Frank Townend Center, Kensington road, Cleveleys, Lancashire FY5 1ER starting from around 7.30pm. October 12th the Annual General Meeting is to be held, 19th A video of Old Radios.

## LEICESTERSHIRE

**Loughborough & District ARC**
**Chris Walker. Tel: (01509) 504319**
**Email g1etz@aol.com**
**www.radioclubs.net/ladarc**
Loughborough & District Amateur Radio Club meets at the Glenmore Community Centre, Thorpe Road, Shepshed, LE12 9LU on a Tuesday evening from 7.30pm. The clubs programme of events can be found on our websites. Visitors and new members most welcome.

## LINCOLNSHIRE

**Franklin ARC**
**Brendan.**
**Tel: (01754) 820204**
**E-mail:**
**bren.sykes@btinternet.com**
We meet the last Wednesday of every month at the Victoria Inn Wainfleet Road Skegness Lincolnshire PE25 3RG. @19:30hrs. We also have regular nets, on the 1st and 3rd Tuesday of every month on 145.550± @20:00hrs. Registered as an RSGB examination center for courses run by G0OTH Robert. We are organizing special events, field days and our own rally (See Rallies Section) this year so listen out for us, our call sign is M0FRC.
**Lincoln Short Wave Club**
**Pam Rose Tel: 01427 788356**
**E-mail: pamelagrose@tiscali.co.uk**
**www.g5fz.co.uk**
The Club meets every Wednesday 8 p.m. at the BSA Social Club, Village Hall Lane, Aisthorpe, Lincoln, LN1 3SJ and some Saturday mornings in the shack for Foundation/Intermediate course tuition and to air the club callsigns G5FZ and G6COL.

**Spalding & DARS**
**Graham Boor. Tel: 07947764481**
**E-mail: secretary@sdars.org.uk**
**www.sdars.org.uk**
The Spalding & District Amateur Radio Society meets at the Castle Sports Swimming Complex, Spalding PE11 1QF on Fridays at 7.30pm.

**Stenigot "Chainhome" Amateur Radio Club**
**Steve Burke M5ZZZ.**
**Tel: (01507) 600202**
**E-mail m5zzz@btinternet.com**
**www.stenigotchainhomearc.co.uk**
Meetings are held on the third Friday of the month commencing 19.30 at Gayton le Marsh Village Hall, Gayton le Marsh, Lincolnshire. LN130NW.

## LONDON

**Cray Valley Radio Society**
**Bob Treacher.**
**Tel: 020 8265 7735**
**www.cvrs.org**
The Cray Valley Radio Society meets on the first and third Thursdays of the month at the Progress Hall, Admiral Seymour Road, Eltham, London SE9 1SL at 7.30pm for 8pm.

**Edgware & District Radio Society**
**Michael G4RNW.**
**Tel: 020 8950 0658**
**E-mail: michael.stewart5@ntlworld.com**
Edgeware &District radio Society meet at the Watling Community Centre, 145 Orange Hill Road, Burnt oak, Edgware HA8 0TR.

**Radio Society Harrow**
**Linda Casey**
**Tel: 020 8386 8586**
**Email: lcasey@imperial.ac.uk**
**www.g3efx.org.uk**
The Society meets on friday at 20.00 on the 2nd and 4th weeks of every month, at The Elsie Fisher Room, St Lawrence Centre, St. Lawrence Church, 2, Bridle Road, Eastcote, Pinner HA5 2SJ. All welcome! We also run exam courses - see website for details

**Southgate ARC**
**David Sharp**
**Tel: 01992 422622**
**E-mail: david.sharp1@tesco.net**
The Southgate Amateur Radio Club meets on the second Wednesday of the month at Hazelwood Lawn Tennis and Squash Club, Ridge Avenue, Winchmore Hill, London N21 2AJ at 7.30 for 8 pm.

**Wimbledon and District ARS**
**Jim Bell M0CON**
**Tel: 020 8874 7456**
**E-Mail: jamesm0con@o2.co.uk**
**www.gx3wim.org.uk**
The Wimbledon & District Amateur Radio Society welcomes new comers to our meetings whether they are licensed or not. We hold our meetings the second and last Friday of each month at Martin Way Methodist Church, Buckleigh Avenue, Merton Park, London SW19 9JZ. The church is on the corner of Martin Way and Buckleigh Avenue.

## THE LOTHIANS (Scotland)

**Cockenzie & Port Seton ARC**
**Bob Glasgow.**
**Tel: (01875) 811723**
**E-mail: gm4uyz@cpsarc.com**
**www.cpsarc.com/news.php**
The Cockenzie & Port Seton Amateur Radio Club meets in the Thorntree Inn (Lounge Bar), High Street, Cockenzie, East Lothian EH32 0HP from 7pm till late. Organised talks are held in the Port Seton Community Centre, South Seton Park, Port Seton, East Lothian EH32 0EE. Timings 18:30 to 21:30hrs.

**Lothians Radio Society**
**Tony Sigouin.**
**Tel: 07739742367**
**E-mail: enquiries@lothiansradiosociety.com**
**www.lothiansradiosociety.com**
The Lothians Radio Society meets on the second and fourth Mondays of the month in the Royal Ettrick Hotel, 13 Ettrick Road, Edinburgh EH10 5BJ from 7pm. Membership costs £12 per year and includes a free BBQ every June!

## MERSEYSIDE

**Wirral & District ARC**
**Tom. Tel: (07050) 291850**
**E-mail: secretary@wadrac.com**
**www.wadarc.com**
The Wirral & District Amateur Radio Club meets at the Irby Cricket Club, Mill Lane, Irby CH61 4XQ on the second and fourth Wednesdays of each month. Other Wednesdays are informal (D&W) meetings at a local hostelry.

## NORFOLK

**King's Lynn ARC**
**Ray Dowsett, MBE**
**Tel: (01553) 671307**
**E-mail: ray-g3rsv@supanet.com**
**www.klarc.org.uk**
King's Lynn Amateur Radio Club meets every Thursday at the Scout HQ, Chequers Lane, West Winch, King's Lynn, PE33 0NY off the A10 at West Winch at 7.30pm.

**Norfolk ARC**
**Mark Taylor. Tel: (01362) 691099**
**E-mail: narc@g0lgj.co.uk**
**www.norfolkamateurradio.org**
The Norfolk Amateur Radio Club meets every Wednesday at the Eaton CNS School, Eaton Road, Norwich, NR4 6PP, where it meets weekly,from 7-10pm, usually in 6th form centre at front of school, every Wednesday from 7-10pm.

**North Norfolk ARG**
**Tony Smith**
**Tel: (01263) 821936**
**E-mail: g4fai@btinternet.com**
**www.radioclubs.net/nnarg/**
The North Norfolk Amateur Radio Group meets in the Radio Hut at the Muckleburgh Collection Military Museum, Weybourne, North Norfolk NR25 7EG on Wednesdays and Thursdays from 10am to 4pm and some Sundays from 1 to 4pm. New members always welcome.

## NORTHAMPTONSHIRE

**Kettering & District Radio Society**
**Lorna Froggatt.**
**Tel: 0153 676 2523**
**E-mail:**
**LornaSteveLorna@aol.com**
The Kettering & District Radio Society meets each Tuesday from 7 to 9pm in the winter at The Lilacs Pub, Church Street, Isham, Northants NN14 1HD and in the summer at the Carpetbagger Aviation Museum, Sunnyvale Farm Nursery, Harrington NN6 9PF. Foundation, Intermediate and Advanced courses are held regularly.

## SHROPSHIRE

**Salop ARS**
**Richard Golding.**
**Tel: (01743) 356195**
The Salop Amateur Radio Society meets in The Telepost Club, Railway Lane, Abbey Foregate, Shrewsbury SY26BT on Thursday between 8 and 10.30pm.

**Telford & District ARS**
**Mike Street.**
**Tel: (01952) 299677**
**E-mail:**
**mjstreetg3jkx@blueyonder.co.uk**
**www.tdars.org**
The Telford & District Amateur Radio Society meets on Wednesdays at the Little Wenlock Village Hall, Malthouse Bank, Little Wenlock. Telford TF6 5BG at 8pm.

## NOTINGHAMSHIRE

**Worksop Amateur Radio Society (W.A.R.S.)**
**'Daz' Spence. Tel: (01623) 747314**
**Email- g3rcw@qsl.net**
**www.qsl.net/g3rcw/**
Meets every Tuesday at 7:00 pm. Our cubhouse is located at 59 - 61 west street, Worksop, Nottinghamshire. S80 1JP. Exams and courses run frequently for all licence levels. Licensed bar & hot food available on club meet nights. Membership fee for the year is £10.

## SOMERSET

**Mid Somerset Amateur Radio Club**
**Shaun M0RTS/G1IOK**
**E-mail: m0rts@hotmail.co.uk**
Shaun has reformed the Mid Somerset Amateur Radio Club which unfortunately folded in 1997. The new club now meets on the 2nd tuesday of every month at: Peter Street Rooms, Peter Street, Shepton Mallet BA4 5BL at 7:00pm.

**North Bristol ARC**
**Dick Elford. Tel:(01454) 218362**
**E-mail: g0xay@aol.com**
**www.nbarc.org.uk**
North Bristol ARC meet Fridays at 7.30pm at SHE7, Braemar Crescent, Northville, Filton Bristol BS7 0TD. We carry out training for all the Radio Amateurs examination, and our next training course is to be for Intermediate exams.

**South Bristol ARC**
**Len Baker. Tel: (01275) 834282**
**E-mail: g4rzy@msn.com**

**www.sbarc.co.uk**
The South Bristol Amateur Radio Club meets every Thursday evening at Novers Park Community Centre, at the rear of 122-124 Novers Park Road, Filwood, Bristol BS4 1RN

**Yeovil ARC**
**Steve G7AHP**
**E-mail: steve@g7ahp.co.uk**
**www.yeovil-arc.com/**
The Yeovil Amateur Radio Club meets at the Red Cross Centre, Grove Avenue, Yeovil BA20 2BE (on the corner where Grove Avenue meets Preston Road).

**Weston-super-Mare Radio Society (WSMRS)**
**Kirstie M3UWI**
**Tel: (01934) 613094**
**Email:- Kirstiejones1@msn.com**
**www.radioclubs.net/wsmrs/**
Meets every Monday at the Devonshire Road social club BS23 4LG at 8pm. Main meeting including talks/Guest speakers every 3rd Monday of the month.Training in all levels of Licence available.

## SOUTH GLOUCESTERSHIRE

**Thornbury and South Gloucestershire ARC**
**Tony. Tel: (01454) 417048**
**E-mail: tonytsgarc@sky.com**
The Thornbury and South Gloucestershire Amateur Radio Club meets in the United Reformed Church Hall, on the corner of Chapel Street and Rock Street, Thornbury BS35 2BA at 7.30 - 9.30pm.

## SOUTH WALES

**Barry ARS**
**Glyn Jones.**
**Tel: (01446) 774522**
**E-mail: glyndxis@talktalk.net**
**www.bars.btik.com**
The Barry Amateur Radio Society meets on Tuesdays from 7.30 to 10.30pm in the Sully Sports & Social Club, South Road, Sully CF64 9TG.

## SOUTH YORKSHIRE

**Axholme Radio Club**
**John Fennell. Tel: (01427) 872522**
**E-mail: g4hoy@tiscali.co.uk**
The Axholme Radio Club meets at Hollytree Farm, Westend Road, Sandtoft, Epworth DN9 1LB on Wednesdays at 10amm to 4pm, Thursdays at 7 - 9pm and Saturdays from 10am - 4pm (other times by arrangement).

**Sheffield ARC**
**Trevor Wood**
**Tel: 0114 2216947**
**E-mail: trevorwood6@yahoo.co.uk**
**www.sheffieldarc.org.uk**
The Sheffield Amateur Radio Club meets at the SYPTE Social Club, Greenhill Main Road, Sheffield S8 7RH every Monday at 7.15pm. All three types of classes are held for the Foundation, Intermediate and Advance levels of licensing.

## STAFFORDSHIRE

**Tamworth Amateur Radio Society**
**Colin Marks. Tel: (01827) 700893**
**E-mail: colin.marks2@ntlworld.com**
The Tamworth Amateur Radio Society meets every Thursday at 7.30pm at St Francis Church, Masefield Road, Leyfields, Tamworth B77 8JB.

## SUFFOLK

**Bury St Edmund's ARS**
**George Woods G3LPT.**
**Tel:01359 259518**
**Darren Coe G7SDC**
**Tel: (01284) 701732**
**storno@yahoo.co.uk**
**www.radioclubs.net/bsears/**
The Club meets on the third Wednesday of the month (except August and December) at the Culford school, Culford, Bury St. Edmunds, Suffolk IP28 6TX at 7.30PM. Visitors are welcome. Please see our web site for further details.

## SURREY

**Coulsden Amateur Transmitting Society**
**Steve Conway G7SYO**
**Tel: (01737) 353517**
**E-mail: steve.conway@landg.com**
**www.sthost.co.uk/webspace/cats/**
Regular meetings are held on the second Monday in each month at-: St. Swithun's Church Hall, Grovelands Road, Purley, Surrey CR8 4LA at 20:00 to 22:00hrs. On the first Saturday of month at 1715 Crescenta Valley / CATS Net on Echolink Normally via MB7IPL node on 145.2875 MHz.

**SRCC - Surrey Radio Contact Club**
**Ray Howells G4FYY**
**Tel: 0208 644 7589**
**www.g3src.org.uk/**
The club meet 1st and 3rd monday evenings of each month at Trinity School, Shirley Park, CROYDON, CR9 7AT with meetings starting at 7.45p.m.

**Sutton & Cheam RS**
**John Puttock. Tel: 020 8644 9945**
**E-mail: info@scrs.org.uk**
**www.scrs.org.uk**
The Sutton & Cheam Radio Society meets on the third Thursday of the month at 7.30pm in Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey SM1 2EY. In addition to monthly meetings, licence training courses are held at regular intervals in Banstead Surrey.

## TYNE & WEAR

**Angel of the North RARC**
**Nancy Bone. Tel: 0191 477 0036**
**E-mail: nancybe2001@yahoo.co.uk**
**www.anarc.net**
The Angel of the North Radio Amateur Radio Club meets every Monday 7 to 9pm at Whitehall Road Methodist Church Hall at the corner of Whitehall Road and Coatsworth Road, Bensham, Gateshead NE8 4LH. The entrance to radio club room is through door at the side of building next to the car park. The car park entrance is on Whitehall Road.

**Tynemouth ARC**
**Tony Regnart G8YFA**
**Tel: 0191 280 1981**
**E-mail: mail@g0nwm.com**
**www.g0nwm.co.uk**
The Tynemouth Amateur Radio Club meets each Friday from 7 to 9pm at St. Hilda's Church, Stanton Rd, North Shields, Tyne & Wear NE29 9QB. It's known locally as 'the church near the fire station'.

## WARWICKSHIRE

**Coventry Amateur Radio Society**
**John Beech G8SEQ.**
**Tel: 079 58777 363**
**www.coventryradio.org.uk**
Coventry Amateur Radio Society meets most Fridays at 2030hrs in St Bartholomew's Church Hall, Brinklow Road, Binley, Coventry CV3 2DT. Further details on CARS activities can be obtained from the Secretary – John G8SEQ

## WEST MIDLANDS

**Aldridge & Barr Beacon ARC**
**Ted Roberts**
**Tel:(01922) 614169**
**E-mail: albertg0kfs@raynet-uk.net**
**www.radioclubs.net/aldridgearc**
The Aldridge & Barr Beacon Amateur Radio Club is a daytime club and meets at the Aldridge Community Centre, Middlemore Lane, Aldridge, Walsall WS9 8AN on the first and third Monday of every month at 2pm to 4pm. They have a long wire and a v.h.f. antenna for radio operation using the club callsign M0GRX.

**Midland AX25 Packet Radio Users Group**
**Miles.**
**Tel: (01384) 254199**
**www.maxpak.org.uk**
The Midland AX25 Packet Radio Users Group, MaxPak, meets on the first Monday of the month at The Sir Robert Peel, 104 Bell Lane, Bloxwich, Walsall WS3 2JS.

**South Midlands RS**
**Don. Tel: 0121 458 1603**
South Midlands RS meet in the West Heath Community Centre, Condover Rd., West Heath Birmingham B31 3QY. macrh 13th and 20th are construction evenings. 223rd is a 'ragchewing' evening.

**Stourbridge and District ARS**
**John. Tel: (01562) 700513**
**www.g6oi.org.uk**
The Stourbridge and District Amateur Radio Society meets on Monday evenings, except for Bank Holidays at The Radio Shack, Old Swinford Hospital School, Heath Lane, Stourbridge, West Midlands DY8 1QX at 8pm. We have Open Shack Nights - Tea/Coffee always available, along with an opportunity to get on the air or just a natter with whoever attends

**Sutton Coldfield RS**
**Rob 2E0ZAP**
**Tel: (01827) 288 483**
**E-mail: spirit.guide@hotmail.co.uk**
**www.hamradio.piczo.com**
The Sutton Coldfield Radio Society Meets on the second and fourth Monday of the month at 7.30pm (no meeting on bank holiday Mondays) in the Sutton Coldfield Rugby Club, 160 Walmley Road, Sutton Coldfield, West Midlands B762QA.

**Wythall Radio Club**
**Chris Pettitt**
**Tel: (07710) 412 819**
**E-mail: g0eyo@wythallradioclub.co.uk**
**www.wythallradioclub.co.uk**
The Wythall Radio Club is based at Wythall House, Silver Street, Wythall, near Birmingham B47 6LZ. They meet every Tuesday at 8pm and meetings are informal and friendly.

## WEST SUSSEX

**Horsham ARC**
**Andrew Vine**
**Tel: (01483) 272456**
**http://www.harc.org.uk/**
The Horsham Amateur Radio Club meets on the first Thursday of the month at The Guide Hall, Denne Road, Horsham, West Sussex.

**Worthing & DARC**
**Roy or Joyce.**
**Tel: (01903) 753893**
**www.wadarc.org.uk**
The Worthing & District Amateur Radio Club meets every Wednesday at 8pm in the Lancing Parish Hall, South Street, Lancing, BN15 8AJ. There's a free car park at the rear and full disabled access. Visitors are always welcome.

## WEST YORKSHIRE

**Denby Dale Amateur Radio Club**
**Gerald, G3SDY.**
**Tel: (01484) 602905**
**www.g4cdd.net/**
The Denby Dale club meat at Pie Hall, Denby Dale, Huddersfield HD8 8RX. October 7th Mini-rally, surplus sale and flea market. 21st Annual General Meeting.

**Pontefract & District Radio Club**
**Colin**
**Tel: (01977) 677006**
**E-mail:**
**info@pontefractradioclub.org**
**www.pdars.com**
The Pontefract & District Radio Club meets every Tuesday from 7pm and Thursday from 8pm at the Carleton Centre, Carleton Grange, Carleton Road, Pontefract, West Yorkshire WF8 3RJ.

## WIGTOWNSHIRE (SW Scotland)

**Ellis Gaston 01776 820413**
**www.gm4riv.co.uk**
Wigtownshire ARC meet weekly at The Aird Unit, Stranraer Academy, Stranraer DG9 8BQ. Visitors always most welcome

## WILTSHIRE

**Trowbridge & District AR**
**Ian Carter.**
**Tel: (01225) 864698**
**E-mail: ian.l.carter@btinternet.com**
**http://uk.geocities.com/tdarc@btinternet.com**
The Trowbridge & District Amateur Radio Club meets at Southwick Village Hall, Southwick (nearest postcode is BA14 9QN).

## WORCESTERSHIRE

**Worcester RAA**
**Martin Carter**
**Tel: (07976) 917987**
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The Worcester Radio Amateurs Association meets on the second and fourth Tuesday at the Hallow Scout HQ, off Main Road, Hallow, Worcester WR2 6PP. Visitors, as always, will find a warm welcome at the new clubhouse, as will potential new members.

### Club Secretaries

Please remember to include full details of your club, E-mail and telephone contact details and the postcode of your meeting venue - it helps potential visitors to find you!

## Graham Hankin's

# in vision

**Graham Hankins G8EMX**
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Graham Hankins G8EMX reports on the BATC's 60th birthday 'bash' and admits to forgetting his cake!

Well, the **British Amateur Television Club** was determined to celebrate its 60th Anniversary in style. Having held its past two Bienniel General Meetings in a village hall near Cambridge, the club decided early last year that it must return to a more central location for its birthday event, find a much more attractive venue and attempt to motivate as many members as possible to attend.

So a well-appointed hotel near Daventry was chosen for a Saturday evening social and dinner arranged. There was also a huge cake baked to be cut on the day!

What was the day like? As well as can be expected these days, as the times of hundreds of visitors squeezing past exhibitors and crowding into lecture streams are probably over. **Chris Smith G1FEF**, the editor of the *CQ-TV*, the BATC's magazine had worked hard with the printer to publish the anniversary edition on the Friday before the event.

When I arrived around mid-day Sunday, I counted around 60 members in the afternoon lectures, and traders and ATV demonstrations in an adjoining room. There was also an 'Outside Broadcast' van on display in the car park plus a smaller car relaying the event into a nearby ATV repeater.

## Plenty Of Space

There was plenty of space to walk around the exhibition room as most visitors were listening to a lecture. I had missed 'A History of Outside Broadcasts' and 'Narrow Band TV' but was keen to hear 'Analogue repeaters in a digital world' to be presented by **Mike Sanders G8LES**, 'The Club Streamer Project' by Chris Smith and BATC chairman **Trevor Brown G8CJS** talking on 'The BATC at 60 – the next 60?' (his question mark, not mine hi!)

To my surprise, Mike Sanders chose not to talk on analogue and digital repeaters, but instead on how the BATC could increase its membership – somewhat of a change of plan. I thought, not imagining he could suggest anything new. And sorry Mike, but you didn't. Well, after many years on the BATC committee, not new to me, anyway.

Mike opened by pointing out that the RSGB was enjoying an increase in its membership and many new licences were being issued. He then asked "Are lots of new radio amateurs coming into ATV?" His answer of "No!", seemed at odds with the occasional BATC membership reports of more 'cyber' members (people opting for their magazines by E-mail) and those joining from the BATC streamer project – of which more later.

Next, Mike, created some audience participation as he went on to explore why ATV may not attract the newcomer. He mentioned that h.f. communications will always okay, usually providing a contact somewhere in the world. But this is certainly not the case with ATV.

He then posed the question "Is ATV too hard for beginners?" This is a question, that I've answered in this column, the pages of *CQ-TV* and at committee meetings. My answer is: "Yes it is!" There are no simple kits, or ready-built transmitters and receivers readily available any more. There are always the websites, some in the UK but mostly in Germany, but why are there no kits being sold at rallies, or advertised in – of all obvious places – *CQ-TV*?

Mike then went on to suggest working with video clubs, making technical documentaries, working more closely with local Amateur Radio clubs in general. That's great, if you can find the manpower willing to do some liaising with clubs, as I have in the past. You'd think, would you not, that in 60 years the BATC should have done more of that already?

As many of you may have realised, I am not an avid user (watcher) of the BATC's internet streaming project. In my opinion, **this is not ATV**, at least not by my definition anyway! But the project was the next lecture; it was announced that, unfortunately, the lectures could not be streamed because the room that was available didn't have an internet connection, even though the club booked the room on the basis that one was available!

## Popular Project

Anyway, the project was proving popular and the national RSGB News is now carried on the stream. Chris G1FEF was the software designer and has improved the design and the visitors' chat facility. It was stated that the BATC has gained 200 new members via the streamer, with its server (a quad-core 2.66GHz processor, 8GB of 800MHz RAM and two 250GB hard drives) located in London's Docklands.

Delivering his 'BATC at 60 – the next 60' lecture, Trevor Brown reviewed the club from simplex ATV, then the first ATV repeaters and speculated that the future was probably digital. Well Trevor, it certainly will be in the broadcast world, but Digital ATV? This, I feel, isn't going to happen for some time as the kit is still expensive.

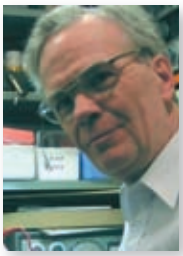
Trevor then invited questions from the floor. Some awkward individual suggested that the club was neglecting the r.f. side of the hobby! (There are no prizes for correctly guessing that person's name!).

The audience was reminded that the club originated as a video club, it was some years later that r.f. was ever mentioned. Fortunately, at least one other person was not satisfied by this rather dismissive response, and said so, quite firmly!

## Cutting The Cake

But on the less contentious matters. All birthdays conclude with the cutting of the cake! **John Thornton-Lawrence GW3JGA** and **Howard Parker G8GUN** , two senior members of the BATC, were given the honour of wielding the knife (there were some comments about 'Crocodile Dundee' at the time).

After the ceremonial slice had been separated, a queue formed as everyone had been promised a piece; I duly drove home with mine, forgot about it until a week later! Well, they do say cake matures, and I have lived to tell this tale... ●



## Harry Leeming's

# in the shop

This month Harry Leeming G3LLL's friend has a faulty FT-480 and he advises us how we can avoid damaging equipment.

Welcome to *In The Shop* (*ITS*) where I have recently been very pleased to be E-mailed by '**Tony**', one of my old customers, who I hadn't heard from for years. Tony had a problem with his Yaesu FT-480 144MHz multi-mode rig. The rig was dead on transmit and receive, but all the light emitting diodes (l.e.d.s) on the multicoloured bar graph indicator were glowing.

The fault the rig had developed is quite a common problem on the FT-480, and indicates that for some reason the logic has 'crashed' and then locked up. However, the FT-480 doesn't contain a back-up battery, so if this fault occurs, simply disconnecting it from the power supply unit (p.s.u.) for an hour or so will normally affect a cure.

To save time I advised 'Tony' to disconnect the rig, put the back-up switch (on the rear) to the 'off' position), and then switch the FT-480 on and off a few times with no power connected. This did the trick and Tony E-mailed me back to say that all was well.

## Digital Displays

**'Joe'** E-mailed me with a picture of the very nice frequency counter that he'd just purchased, and asked, "Where do I connect it to on my FT-101Z?" Unfortunately, I had to disappoint him by replying that the simplest answer was to say that he couldn't! There seems to be a lot of confusion; digital frequency counters are not the same as digital displays intended for fitting to receivers and transmitters, and whilst they share some characteristics, they don't perform the same task.

A digital frequency counter, as its name implies, counts the number of pulses that pass through an electronic 'gate' in a set time, see **Fig 1**. The input signal is shaped into pulses, and applied to the gate. The gate is opened for a pre-set time by a pulse coming from the crystal oscillator. This can be running at say 10MHz, but is divided by the divider stage to give a pulse that is say, one, a tenth, or a hundredth of a second long. If for instance, the gate is open for one second, and the frequency to be measured is at 1MHz, a million pulses will be counted, and the counter will read 1,000,000.

If the frequency range switch is altered so that the gate is only open for 0.1 seconds, the instrument will then only count 100,000 pulses in the time, but to avoid confusion the decimal point will be shifted one place. A reading of 1MHz would still be shown, but the resolution would then be only be ±10Hz as opposed to ±1Hz previously. However, the circuitry behind the digital display in a rig such as the FT-101ZD, isn't quite so simple!

A block diagram of the frequencies generated by the FT-101ZD is shown in **Fig. 2**. It will be noted that the first intermediate frequency (i.f.), the frequency which incoming signals are converted to) is 8.987MHz. To achieve this conversion the output of a switched crystal oscillator is mixed with the output of the variable frequency oscillator (v.f.o.) to generate a 'local signal'. This 'local signal' is approximately 8.987MHz higher in frequency than the station the operator wishes to tune to, the exact frequency depending on whether upper or lower sideband or the c.w. mode is selected.

It's this 'local signal' that must be fed into the digital display unit, along with the information as to what mode the rig is switched to. This enables the counter to then carry out quite complex calculations, so that it can display the exact frequency that the rig is tuned to. **Note:** A normal frequency counter does not have the necessary logic incorporated to enable it to do this calculation.

A digital display unit has to be matched to a particular set of frequencies, and so while it may be possible to exchange displays between rigs that use identical i.f.s,

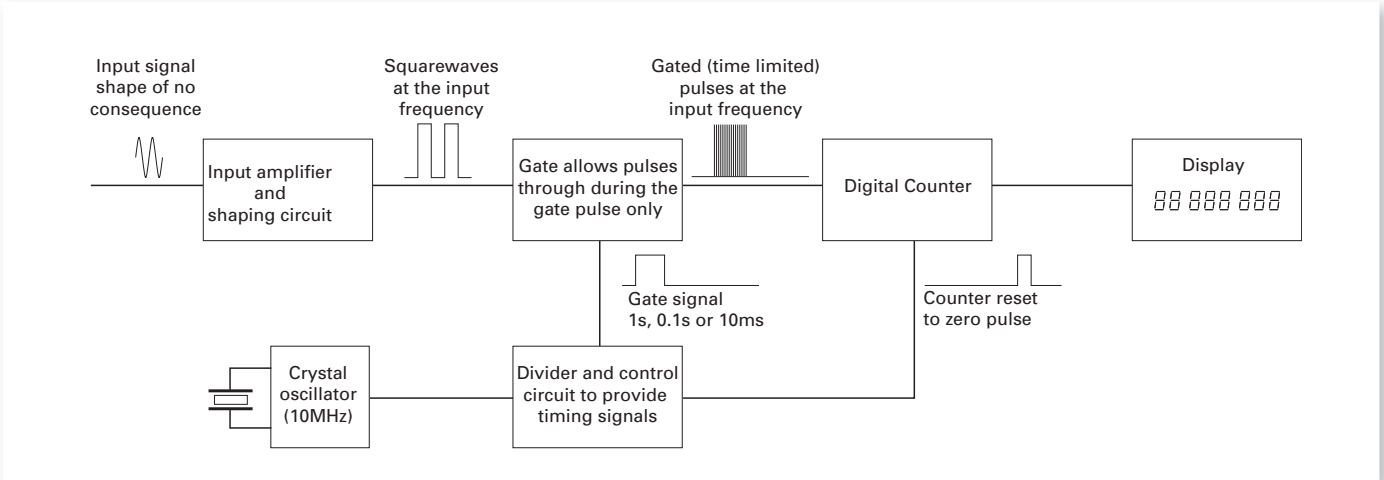



*Fig 1: The basic workings of a digital frequency counter is counting and displaying the number of input cycles for a fixed time period. But a transceiver will often use the same oscillator to cover many bands making a simple counter of little use.*

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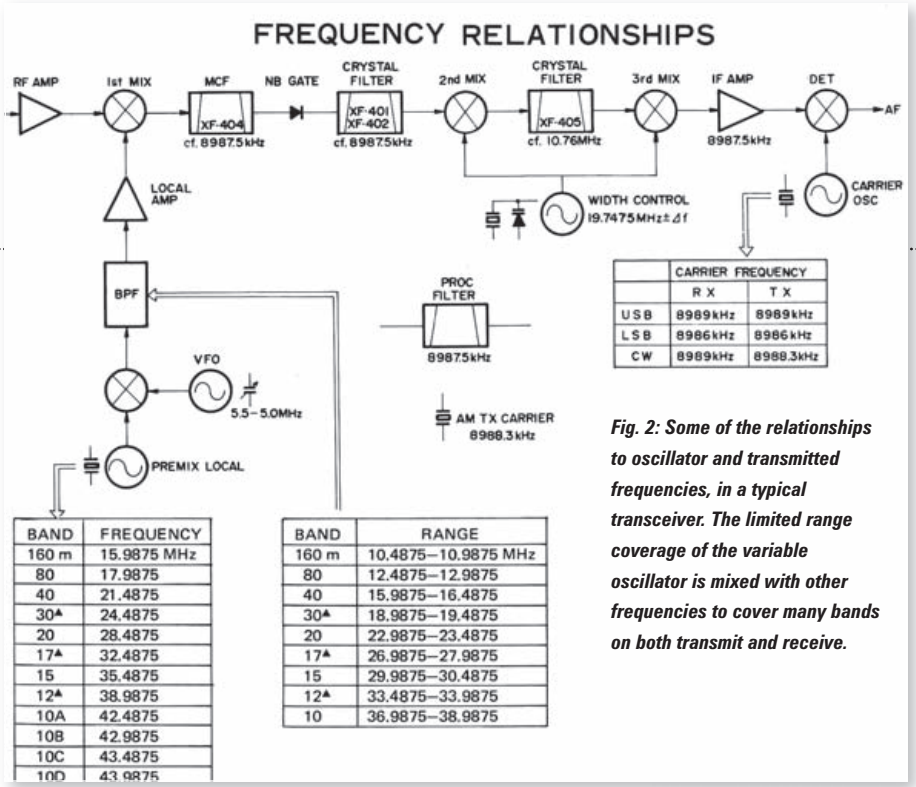



*Fig. 2: Some of the relationships to oscillator and transmitted frequencies, in a typical transceiver. The limited range coverage of the variable oscillator is mixed with other frequencies to cover many bands on both transmit and receive.*

and other internal frequencies, in general, only a dedicated display unit can be used. A general purpose frequency counter such as the one 'Joe' had obtained is an extremely useful piece of test equipment, but that's an other story.

## Heavyweight Commercial Equipment

Have you ever had the chance to look at commercial equipment, such as a ship's high frequency (h.f.) transmitter? If you have – it may have surprised you that while it was probably not much more powerful than that used by many Radio Amateurs, it was obviously very much heavier.

Equipment that is used for an essential service, and is required to be switched on for long periods of time, has to be reliable and needs to be built with generously rated components. On the other hand Amateur Radio rigs are built to much less demanding standards and it would seem that the designer's presume that the user will appreciate this, and not over-run them.

To remain competitive, the manufacturers of Amateur Radio equipment had been forced to produce equipment that's okay if it's carefully used, but which doesn't have any allowance built in for mis-use. Incidentally, out of curiosity, I looked up the specification of a rig with separate p.s.u., which was made in 1969. I then compared it with one made 10 years later, which ran the same power, and used the same type of power amplifier (p.a.) valves.

I found that the total weight of the rig made in 1979 – including p.s.u. – was the same as that of the p.s.u. alone in the earlier rig. So now dear reader – you know why the mains transformer burns out quickly if a 'short' occurs when the wrong fuse is fitted!

Unfortunately, in some cases the designer, the advertising department and the guy who writes the operating manual, all seem to live on different planets and this can cause grief! In fact, I used to tell customers who owned solid state 100W h.f. rigs, that single sideband (s.s.,b.) at full power was perfectly satisfactory. However, I warned them at the same time that they shouldn't exceed 25W in a continuous mode, such as frequency modulation (f.m.), for more than a few minutes. They, of course, then looked at the instruction manual and read the statement, "100W for a maximum of 30 minutes" and ignored my advice!

Some owners got away with it, but quite a few ended up with either blown p.a. transistors, or burnt-out chokes in the p.a. low pass filter. Perhaps their mis-match at the antenna was a little high, or perhaps their antenna loading was a bit reactive, but pushing anything to the limit leaves no margin for error. This is why commercial equipment is large, heavy and 'over engineered'. If you want to wreck your rig and shorten its life, let it get red hot by running full power in a continuous mode, otherwise keep the power down if you are using f.m. radio teleytype (RTTY) or any mode with a higher level of duty cycle.

Many operators think that they **should be able** to use their standard equipment with high duty cycle modes for these tasks, and are surprised when equipment that had previously been reliable, starts giving trouble. So, what's the problem? To answer the question let's take a look at the equipment we use.

Equipment that's quite happy when used for a few hours a day, in a five minute transmit session, and then a five minute receive cycle, gets very much hotter if it's left on transmit for a long time, or is left switched on for weeks. It's just not made to stand up to this type of service.

Reliable continuous packet operation, is best left to a converted ex-private mobile radio (PMR) base station rig. If Amateur Radio equipment is used, it should be run at reduced power. News broadcasters providing the GB2RS service would be best advised to drive a high power linear at well under the UK's 400W limit to keep everything cool.

## Field Day Failures

Surprise surprise, quite a number of repairs came into the shop after field days! Generators would go wild, producing too much voltage. Operators also often got excited about gaining points when trying to tune up equipment that they weren't familiar with. I didn't mind lending a trap dipole, but the loan of equipment is best left to those who have deep pockets and more faith in human nature than I have!

When packet radio first became popular, my repair business perked up no end, as there was an epidemic of 144MHz rigs, all with blown audio


*Fig. 3: Although very effective as a pure frequency counter, the Black Star Meteor 600 counter cannot directly display the frequency that a transceiver's dial is set to.*

output integrated circuits (i.c.s). The failure of h.f. rigs also kept me busy, sorting out the same problems whenever Amtor or PSK31 operation increased in interest.

Normally, when we're connecting to a single loudspeaker, the polarity of the leads doesn't matter at all. If however, you connect your rig to an external unit that's earthed, or has a connection to the same power supply as the rig, there could be problems. Probably that could occur if the polarity of the lead isn't checked because there's a 50% chance of short circuiting the rig's audio output and destroying the i.c. Even with the polarity set correctly, if the jack plug is inserted into the packet unit or computer while the lead is connected to the rig, the audio i.c. will still be shorted out.

The short circuit can happen as the plug is pushed into the socket when the tip of the jack plug will touch the earthed outer contact of the socket. However, the simple way to prevent a short is to wire a resistor in series with the live data lead – at the plug where it connects to your rig.

The value of the resistor doesn't matter much, as long as it is higher than about 4Ω. In fact, in many cases it may be advantageous to fit something in the range of 50kΩ or more so as to reduce the signal level. If an extension speaker is used for data modes, the resistor can be soldered to the + terminal of this, and take your connection to your data equipment from here, but do check that you have wired the cable screen to the correct terminal.

## Flashed Over!

**'Pete'** brought his antenna tuning unit (a.t.u.) to me, with the complaint that when he tuned up connected to the 300Ω feeder of his G5RV antenna, the tuning capacitors flashed over. He said, " I'm only running 400 watts, and it's supposed to be rated at 1kW". Looking inside the a.t.u., I noted the rather small capacitors, and suggested that we have a careful re-read of the specification. "Rating 1kW at 1:1 s.w.r. with a 50Ω load" it stated very clearly. But wait a minute – if the load is 50Ω, and the s.w.r. is 1:1, you don't really need an a.t.u. So, who's leg are they pulling?

If the maximum power output of your linear is 400W, and the load is a non-reactive 50Ω, the output to the antenna from the a.t.u. will be about 140V at nearly 3A. (140 x 3 = approx 400W). If however, that (due to a high s.w.r.) the load presented to the a.t.u. is 1000Ω, for the same power the a.t.u. would have to handle over 600V. This is about equivalent to the voltage developed by an 8kW linear at 50Ω and it leaves food for thought eh?

'Pete' could, of course, have used a balun so as to provide a more correctly balanced output for connecting to twin 300Ω or open wire feeders. **Note:** To safely handle 400W with a 300Ω output load, the insulation and the wiring of balun would need to be made to withstand 350V at just over 1A. What happens, however, if the s.w.r. is 10 to 1, which a G5RV antenna has every chance of offering on some bands?

In Pete's case, depending on the length of the feeder, and the impedance of the antenna, the load on the balun could be anything from below 30 to over 3000Ω. In the former case with a 30Ω load, the balun would then have to handle 110V at nearly 4A, and so unless it was very conservatively rated, built on a large core and wound with thick wire, it would overheat.

In the latter case, to deliver 400W into 3000Ω would require a voltage in excess of 1kV, at 400mA, so unless it was rated at several kilowatts, there would be every chance of the insulation on the balun breaking down.

The moral here is to use an a.t.u. or a balun, **rated at many time**s the power being used, when a multi-band antenna that's not designed to give an s.w.r. of less than 2 to 1. If you do hear sparking noises from your a.t.u., or notice that your balun is getting hot – stop transmitting before you cause any more damage!

The actual impedance presented to the a.t.u. or balun, will depend on the antenna feeder length. So, as a stop-gap measure, you may still be able to operate satisfactorily on a band that's causing problems, if you experimentally, increase or decrease the length of the antenna by around a tenth of a wavelength, (let's say 3.5m or 10 – 15ft. on 40 metres), but in the end the best approach is to upgrade the a.t.u. or balun. ●

**Problems:** I like to hear about problems with older equipment, particularly pre-1990 Yaesu rigs. Please E-mail me, (add some radio related term in the subject heading, to differentiate against spam), or write and enclose a stamped addressed envelope. Remember that electricity is dangerous, if you're not familiar with safety precautions **you must never work** on your equipment whilst it is plugged into the mains. (Switching off at the wall socket does not necessarily make equipment safe).

## Carl Mason's

# hf highlights

Share your news, views and reports with fellow readers. Reports to Carl by the 15th of each month please.

This month Carl Mason GW0VSW has some (probably good!) news about the next solar cycle!

With propagation on the h.f. bands somewhat erratic at the moment, it has been good to see the higher bands springing into life recently with some reasonable 'if short' DX openings. We are all aware that we're currently around the bottom of Solar Cycle 23 and after a brief search on the internet I found an interesting site at **http://solarscience.msfc.nasa.gov/SunspotCycle.shtml** which explains exactly what sunspots are and gives a history on predictions and how they are made.

The good news for us is that a panel of experts has reached a decision on the prediction for the next cycle and agreed that the solar minimum for Cycle 23 occurred in December 2008. This is still **a prediction** and no doubt will be updated over the next few months – but it does indicate that band conditions should improve from now on and that the DX opening on the h.f. bands will become more regular and stable.

The panel also came to the conclusion that the next solar cycle will be of below average intensity with a maximum sunspot number of 90. Given the predicted date of the solar minimum and the predicted maximum intensity, solar maximum for Cycle 24 is now expected to occur in **May 2013**. You can read more on this interesting subject at the NOAA/Space Weather Prediction Centre **www.swpc.noaa.gov/index.html** and **www.swpc.noaa.gov/info/Cycle23.html**

## The DX News

On to some DX news now and to East Timor OC-148 in South East Asia where **Goncarlo Metalo** 'Al' **CT1GPQ** will be active until October 3rd. Al is there as part of a medical team and plans to operate mainly c.w. with some s.s.b. and RTTY when time permits on 7 and 10MHz with a dipole and on 14 and 18MHz using square loops. The QSL route is via **Antonio 'Toze' Guerreiro CT1GFK** who will also be the pilot station and can be reached at **star@algarvedx.com** while updates and an on-line log search will be available at **http://algarvedx.com**

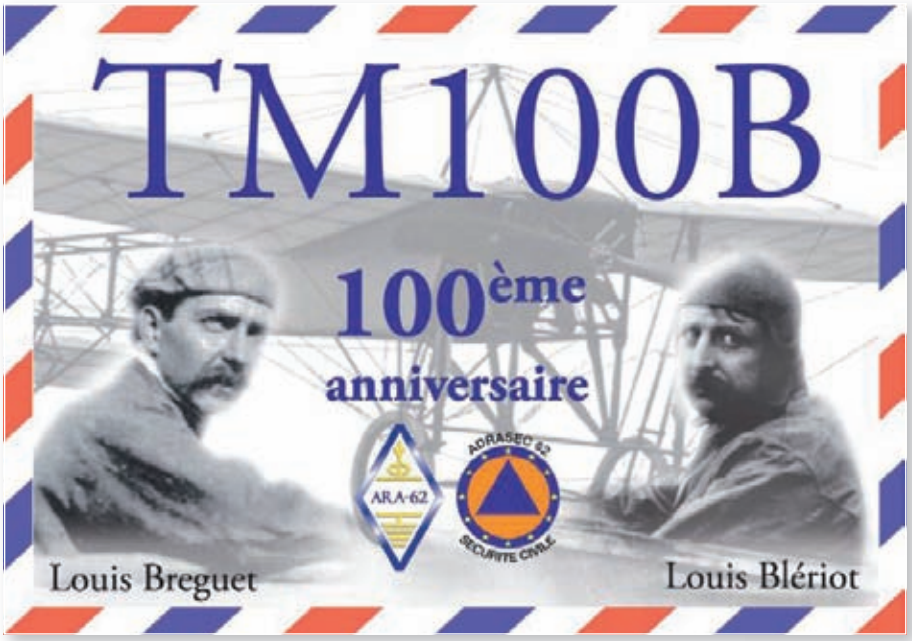
You can also keep a look out for **Chris Megaw VK4FR** who works for the Australian Armed Forces and is currently stationed in Dili until early October. Chris uses the call **4W6FR** in his spare time using s.s.b. and digital modes.

The French Overseas Community of Mayotte AF-027 is a very densely populated island in the Indian Ocean and **Manfred 'Willi' Przygode DJ7RJ** has received the call **TO7RJ** to be used from the island between September 22nd and October 21st. We can expect Willi to operate with c.w. and s.s.b. during his stay on all h.f. bands, and he'll also use the call **FH/DJ7RJ** between October 21st and 25th, before he leaves the island.

Saint Pierre and Miquelon is an archipelago of eight French islands, situated south of Newfoundland in the North Atlantic Ocean and it's from here that **Tim Grant M0TDG** and **Martin Atherton G3ZAY** plan to operate from Miquelon NA-032 as FP/home call between the on September 24th and 27th. They will use c.w. and s.s.b. on most h.f. bands but low band operation will be subject to airline baggage limits and equipment availability! Martin will also be trying to activate McNutt's Island NA-126 off Nova Scotia's southwest shore on September 29th. You can QSL via their home calls.

To South America now and Chile, a country lying on a long narrow strip of coast wedged between the Andes mountain chain and the Pacific Ocean. The **Radio Club Rancagua CE4RG**, formerly known as Radio Club of Chile, was established on July 22nd 1936 and is celebrating its 73rd anniversary this year. Club members have been using the special event callsign **CE73RG** for 73 days since July and will continue to operate with this until October 3rd on 3.5, 7, 14, 18, 21, 24 and 28MHz using c.w., s.s.b. and PSK. The QSL is via **Gustav Velasquez R CE4WJK**, **Post Office Box 470**, **Rancagua**, **Chile**.

Closer to home in France, the special event call **TM9CDX** will be




1909 and **GB100SS 'Sky Sheppey'** run by the **Redway Raynet** team. This station celebrated 100 years of British Aviation and the part played by the pioneers of early flying on the Isle of Sheppey where The **Royal Aero Club** and **Short Brothers Ltd** at Shellbeach, Leysdown opened the very first 'flying ground' in 1909.

One contact that does deserve special mention was with **Jonathan** (Jon) **Bastin 2E0DBD/P** from Swindon, Wiltshire who had a bit of a pile-up going when Martin heard the call. Jon and his colleagues in 'Team Thunderbox' were operating a green station, solar and wind powered, on the Marlborough Downs.

You can read more about the group's activities on their website at **http://teamthunderboxactivities.blogspot.com/2009/05/going-green.html** Other 3.5MHz s.s.b. QSOs included OP0HQ (Belgium) 0504, TM0HQ (France) 0507, DF1KBN (Germany) 0528, HB9HQ (Switzerland) 0531, PA/OT7X (Netherlands) on Schouwen Duiveland Island EU-146 at 0612, SM6FJY (Sweden) 2120, OH0Z (Aland Islands) EU-002 at 2134 and GM2T on the Isle of Tiree EU-008 at 2205UTC.

aired until September 19th marking the 31st Convention of the **Clipperton DX Club**, which is being held in Strasbourg this year and further details can be found at **www.cdxc.org** (QSL via F5CWU).

## Other News

The website for the Conway Reef DXpedition, planned for the October 1st to 10th, is now up and running at **www.conwayreef2009.de** Reports from **Jan Harders DJ8NK** indicate that everything is still on schedule and all the paperwork is completed, the flights are booked, the catamaran chartered and all the hardware is ready and waiting in store.

The reef (OC-112) was activated for the first time in April 1989 by **3D2CR** and 20 years after that event a member of the original 3D2CR team – **Hawa Hannappel DK9KX** – will return, weather permitting, with six other operators to the island where operation is planned on all h.f. bands using c.w., s.s.b., RTTY and PSK.

Conway Reef is a small sandbank centrally located between Fiji and New Caledonia. Access to the reef is only possible by boat charter and the crossing – which is about 640km (400 miles) – takes about three days sailing from Suva, which is roughly Northeast of the reef. It's a very expensive DXpedition as everything needs to be taken with the team including food, shelter and provisions.

The reef is uninhabited and has little vegetation or animal life on it and its isolated location has gained it worldwide DXCC status and is ranked 19th on 'The Most Wanted DXCC entities' list. If all goes to plan this will be a good chance to get a rare entity in your logbooks.


## Your Reports

On to your reports next and we begin with the log of **Martin Addison 2E0MCA** in East Finchley, North London. He was using a Yaesu FT-2000 and 50W to a Sandpiper mono-band vertical. Martin says "Another month passes by and quite a busy one it has been, though conditions have remained poor. I've had days when it seemed like no one could hear me and worried when it happened – as I had just uploaded the latest EDSP software upgrade for the FT-2000!

"Then on the very next day you hear activity and get picked out of a pile-up on the very first call, so the propagation was very up and down. While others bemoan the lack of DX, I'm happily grabbing special event stations. There have been several interesting calls with an aviation theme recently, including **TM100B** celebrating **Louis Bleriot**'s crossing of the English Channel on July 25th

## The 7MHz Band

On 7MHz Martin logged MU0GSY on Guernsey EU-114 at 0637, OL9HQ (Czech Republic) 0649, OZ/PA7PA (Denmark) on Lango Island EU-172 at 0650, EI2JD, Ireland) EU-115 at 0654, OE1A (Austria) 0657. Next came PA6Z (Netherlands) on Groerree Island EU-146 at 0708 (QSL via PA9M), OZ0FR (Denmark) 0722, F4FFH (France) 0732, IU4HQ (Italy) 0734, 9A0HQ (Croatia) 1925, Z30HQ (Macedonia)

*John Wakefield M0XIG sent in a picture that was taken of him operating the special event GB1TT.*

1936. Finally, Martin worked RG9A (Asiatic Russia) 1947 QSL via UA9XC, IS0/OM8A (Sardinia) EU-024 at 2216, SP7VC/1 (Poland) 2228 and RK4FWX (European Russia) at 2230UTC.

Also on the band and running QRP c.w. once again, was **Eric Masters G0KRT** in Worcester Park, Surrey who used his Yaesu FT-817 at just under 5W to a W3EDP antenna. Eric ended up working S51DX (Slovenia) 0314, RK3IM (European Russia) 0317, DL8TG/P (Germany) 1005, LY2F (Lithuania) and SP2LNW (Poland) at 2223UTC.

## The 14MHz Band

On 14MHz and still using QRP Eric managed DL4MAQ (Germany) 0326, UX7U (Ukraine) 0704, S51P (Slovenia) 0713, RA3AN (European Russia) 1022, HA8LK (Hungary) 1114 and SM5IMO (Sweden) at 1328UTC.

In Hampshire **John Wakefield M0XIG,** operating **GB1TT,** contacted over 400 stations with their special call. They were operating from Toothill, in Romsey, but said that, "overall the conditions were not so good and I think this may have been due to the low sunspot activity and the electrical storms in the UK and across Europe at the time. I ended up operating alone and like most of the UK at the time was hit with bad weather and at one point I had to stop for an hour due to high s.w.r. This appeared to be due to heavy rain though after about an hour I was able to resume operating.

"I had a contact with a station in HB9ASQ (Switzerland) at 1600 who stated that there were only two stations in the UK he could hear and one of those was mine! A slightly unusual phenomenon for me was the fact that I managed to contact a number of local stations on 14MHz which included stations from the Isle of Wight, Romsey, Portsmouth and Winchester."

This year John's station consisted of a Yaesu FT-1000MP, Acom 1000 amplifier running between 300 and 400W and a Comet H422 four-band dipole on a tripod, approximately 5m above the ground in a 'V' configuration. Other 14MHz contacts included TL7A (Central Africa Republic) 0709, CU7CG (Azores) EU-003 at 0848, VE3XN (Canada) 1113, KP4BJD (Puerto Rico) 1120, RX9WN (Asiatic Russia) 1134, RA1OGA (European Russia) 1145, (Kazakhstan) 1157, W1BV (USA) in Darien, Connecticut at 1210. Finally, there were ZD7VC (St. Helena) AF-022 at 1934 and PY5ZBU (Brazil) 1955UTC.

In Chelmsford, Essex **Martyn Medcalf M3VAM** continues to evaluate his Comet CHA-250BX antenna and even with the poor conditions added s.s.b. stations S51ZZ (Slovenia) 0917, OZ4Z (Denmark) 0951, ES7FQ (Estonia) 1342, DK7RF (Germany). At 1455 he worked RN3AHL (European Russia) and 1709, CT3FT (Madeira Island) AF-014. At 1948, EI0CL (Ireland) 1949, I2ROO (Italy) 2005, US6EX (Ukraine) at 2113 and finally EC8ADW (Canary Islands) AF-004 at 2023UTC using an Icom IC-746 and 10W.

Finally the large s.s.b. log of Martin 2E0MCA lists contacts with special event station PA123OLS (Netherlands) where "OLS" stands for "Oud Limburgs Schuttersfeest", which is an annual shooting match between 160 shooting clubs (Citizen Force) from the Dutch and Belgium provinces of Limburg at 0724. (QSL via PE1NCP). Then came OE4BHF (Austria) at 0807, then AO5R (Spain) a contest call at 0810 (QSL via EB5GG). Then came F6DRP (France) at 0822, HA8IB (Hungary) 0829, IK2YCW (Italy) 0834, ES5RW (Estonia) 0836, OZ1JVX (Denmark) at 0848. Next came 9A3B (Croatia) at 0906. Then came CS28MCF (Portugal) for the 28th Faro Moto Meeting at 0912 QSL via CT1EHX, DK8OL (Germany) 0921.

Martin then worked ON100PES/P (Belgium) at 1341, which was a special call by the Radio Amateurs of Haspengouw, the Trudo Radioamateurs Club-TRC, celebrating two scientific events. The first marked the 100 years since **Adrien de Gerlache** led the first Belgian expedition to the Antarctic on board the *Belgica* (1897-1899). Additionally, on February 15th this year, the **Princess Elizabeth Antarctic Research Station** became operational and the first of its kind to be built with 'Zero Emissions'. (QSL via ON4TRC).

Finally, Martin worked EA6AZ (Balearic Islands) EU-004 at 1525 and J49A (Crete) EU-015 at 1543UTC.

## Signing Off

That's it again for another month and even with the bands in poor shape there has still been a lot to work with plenty of contest, island and special event activity!

As usual my thanks to all our reporters for their logbooks and to **Mauro Pregliasco I1JQJ/KB2TJM** editor of the 425 DX Newsletter for all the DX information. Until next time I wish you all good DX. 73, Carl GW0VSW. ●

**Carl Mason GW0VSW**
2, Golwg-y-Bryn,
Woodland Road,
Skewen,
Neath Port Talbot,
SA10 6SP
Tel: 01792 501176
E-Mail: gw0vsw@btinternet.com

# TRADERS TABLE

**The equipment for sale on this page is secondhand or ex-demonstration**

**Disclaimer**

**Advertisements from traders for equipment that is illegal to possess, use or which cannot be licensed in the U.K, will not be accepted. While the publishers will give whatever assistance they can to readers or buyers having complaints, under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.**

## SHORTWAVE SHOP LTD

*01202 490099*

**TRANCEIVERS**

ICOM IC718 Ex Demo.....£399
ICOM T8 TriBand.....£100
ICOM IC-701 inc Matching PSU.....£295
ICOM IC-207 2m/70cms.....£130
YAESU FT-8000 2m/70cms.....£130
YAESU FT 730R.....£95
KENWOOD TS-50 HF.....£350
ALINCO DJ-V5.....£200
ALINCO DJ-195.....£100
ALINCO DJ-S11.....£75
ICOM M11 Marine H/H.....£75
ICOM PMR 446x2Water Resist/w.charg.....£200
STANDARD HX260E Marine H/H New.....£99

**RECEIVERS**

ICOM IC-R10 with ACC.....£190
ICOM IC-R20 Ex Demo.....£275
JRC NRD-545 with Wideband converter.....£799
YAESU FRG-100.....£149
YAESU VR500.....£145
YAESU VR5000.....£395
AOR AR8600 Mk II INC EM8200.....£495
BEARCAT UBC-800XLT Ex Demo.....£235
BEARCAT UBC 278 BASE EX DEM.....£139
UNIDEN 180XLT.....£99
AMI DIGI SAT RX ASR WS201.....£129
SANGEAN AT818.....£85
GRE PSR 225.....£159
GRE PSR 216.....£75
ALINCO DJX3.....£70

**ACCESSORIES**

ICOM AH7000 DISCONE.....£85
GLOBAL AT1000 ATU.....£60
KPC-2 TNC.....£85
PACCOMM TINY-2.....£85
TNC 320.....£POA
AEA PK-88 PACKET CONTROLLER.....£35
MFJ 1278B DATA CONTROLLER.....£55
WATSON W25SM PSU.....£59
DATONG ANF NOTCH FILTER.....£55
DAIWA CN620A 1kw POWER/SWR.....£65
DAIWA PS-120M 10A PSU.....£50
MFJ 948 TUNER.....£75
MFJ 1020C ACTIVE ANT.....£69
KENWOOD MB11 MOUNT.....£POA
MFJ 986 3k TUNER.....£185
WELZ SP-220 SWR/PWR METER.....£65
PM-2000 2Kw Pwr Meter.....£70
SAKA 8" TFT LCD TV Ex Dem Reduced.....£75
KENWOOD LF 30A LOW PASS FILTER.....£30
ICOM BC133 (2 of) Drop In Charger inc PSU£OFFERS

## NEVADA

*023-9231 3090*

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KENWOOD TS850 HF WITH FILTERS.....£599

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ALINCO DJX2000 W/ACCESSORIES.....£259
ALINCO DJX30 WIDEBAND SCANNER.....£139
AOR AR MINI SCANNER.....£199
BEARCAT 120XLT 100MEM AM/FM.....£79
BEARCAT 860XLT SCANNER.....£99
ICOM R3 HANDHELD SCANNER.....£299
ICOM RX7 WIDEBAND SCANNER.....£185
RADIOSHACK PRO82 H/H SCANNER.....£50
YAESU VR120 HANDHELD SCANNER.....£99
YUPITERU MVT7100 H/H SCANNER.....£129
YUPITERU MVT9000 H/H SCANNER.....£179

**RECEIVERS**

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YAESU VR5000D COMMS RECEIVER.....£435

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NEVADA ND01 PORTABLE DAB.....£25
PANASONIC RFD3 DAB RADIO.....£29

**ACCESSORIES**

BNOS 144 LINEAR AMPLIFIER.....£159
DIAMOND CX210 2WAY ANT SWITCH.....£15
DIAMOND CX401 4WAY ANT SWITCH.....£32
JIM M75 SCANNER PREAMPLIFIER.....£54
KENWOOD MC85 MICROPHONE.....£79
KENWOOD PS30M 20A POWER SUPPLY.£110
KENWOOD SP31 SPEAKER W/FILTERS.....£99
PALSTAR PS15 12-15A POWER SUPPLY.....£40
TIMEWAVE 59+ DIGITAL NOISE FILTER..£159
TIMEWAVE 599ZX DIGITAL NOISE FILTER£249
TOYO SA450 ANTENNA SWITCH.....£17
UNIROSS CHARGER & BATTERIES.....£12
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YAESU FP757HD POWER SUPPLY.....£49
YAESU MH35A2B SPEAKER MIC.....£19

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ETON E100 PORTABLE RADIO.....£59
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ETON SOUND 50 iPod DOCK.....£39
ICOM R5 HANDHELD SCANNER.....£165
MAYCOM AR108 AIRBAND/MARINE H/H..£54
PURE EVOKE 1XT DAB RADIO.....£75
PURE TEMPUS 1XT DAB RADIO.....£49
ROBERTS RD41 DAB RADIO.....£99
TEAM ROADCOM CB RADIO.....£89

# WATERS & STANTON
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Revex P-300E 12V 30A (max) Over Volts/ Current Protected PSU..... £79
WinRadio WR-G313i 9kHz-30MHz All Mode PCI Internal Computer Controlled Communications Receiver ..... £479
Kenwood IF-232C RS 232 Interface for Kenwood transceivers..... £59
Microset PT-1012 13.5V 10A (12A max) Stabilized PSU with Cigar Lighter Socket.... £49
Yaesu CT-58 Quadra Lead interface cable for FT-100..... £19
Icom IC-A3E Airband H/Held + NAV/COM 50ch Alphanumeric..... £180
Eton Mini-300 AM, FM-stereo and 6 shortwave bands (49, 41, 31, 25, 19 and 16 meters) .. £35
Roberts R-862 HF/VHF receiver AM/WFM 0.15-0.281 / 0.522-1.62 / 4.6-21.95 / 87.5-108 MHz 3 VDC (2*R6 / AA)..... £49
AOR AR-3000A 100kHz-2036MHz All Mode Communications Receiver 400Ch. 12V + psu..... £499
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MFJ MFJ-903 6m ATU 200W SSB (100W FM) ..... £49
Watson W-620 1.6-200, 118-530MHz SWR/ PWR meter 200W ..... £69
Optoelectronics Optolinx TTL to RS-232 Interface (supports 4 devices)..... £65
Trio TM-211E 2m FM Mobile Transceiver with Adjustable Head 1750Hz 25W..... £69
GRE PSR-255 26-512MHz ( with gaps ) FM only Hand Held Receiver 50Ch. 6 x AA cells ..... £39
Yaesu FT-790R 70cm All Mode Portable Transceiver 1W 8x C Cells or 12V DC with MMB-11 Mount..... £149
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Icom IC-PCR1500 10kHz-3300MHz All Mode PC Controlled Receiver with USB, CDROM 12V + psu ..... £319
ADI AT-200 2m FM Hand Held Transceiver with

# WATERS & STANTON
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NiCd Battery, Charger & Speaker Mic..... £59
Alinco DJ-V17 2m FM Palm Transceiver 5W, DTMF keypad & CTCSS..... £89
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Microset PT-110 12V Stabilized 10A PSU with Over V / A protection..... £69
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Optoelectronics Model40 "Scout" 10MHz-1.4GHz Frequency Counter + Reactive Tune & 400ch..... £199
Yaesu VX-7R-S 6m,2m,70cm FM "Silver" Transceiver + 5W, Full CTCSS, Wide RX & WIRES..... £185
AOR AR-2000 0.5-1300MHz AM,FM,WFM Hand Held Receiver 1000Ch. ..... £119
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Icom SP-7 Mobile/Base 5W 8ohm Speaker. £29
Kenwood TH-D7E 2m,70cm FM Palm Held Transceiver + Wide RX & TNC ..... £149
Icom IC-775DSP HF Base Transceiver + Gen. Cov. Twin RX, ATU & DSP filtering 200W mains ..... £1,299
Icom IC-R20 0.150-1305MHz All Mode Hand Held Reciever 1050ch Alpha with Full Duplex, 260min Rec & USB socket..... £199
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Kenwood TS-2000 HF,6m,2m,70cm All Mode Transceiver + Gen.Cov., Auto ATU & DSP. £999
Yaesu FT-8900R 10m, 6m, 2m, 70cm FM Mobile Transceiver 50W,35W Full Duplex + Remote Head ..... £219

# RADIOWORLD
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CUB Optoelectronics MINI Counter..... £119.95
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Kenwood TR-251E 144-146 MHz..... £120
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Yaesu FT-41R Handheld Transceiver..... £120
Standard C-156E 2m Handheld..... £125
AOR ARD9000 Digital Voice Interface..... £129
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LDG AT-7000 Auto Tuner..... £129
Magellan GPS 315 Receiver..... £129
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Kamtronics KAM Multimode TNC..... £140
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Daiwa CNA-1001..... £149
Icom PS-60..... £149
M/Mods 144/100..... £149
MFJ-784 DSP Filter..... £149
MFJ-974B 6 - 80 Meter Balanced Line Antenna Tuner..... £149
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FT-290RMKI 2m Multi mode..... £150
Kenwood PS-52 DC Power Supply..... £159
Optoelectronics mini scout..... £159
PS-33T Kenwood 13.8V 20.5A PSU..... £159
Yaesu FT-790..... £159
Kenwood TS-271E..... £165
ICOM IC-2200H 144–146..... £175
Yaesu FV-901DM VFO..... £175
Bearcat UBC-9000 Scanner..... £179
Yaesu FT-8500 dual band mobile..... £179
Yupiteru MVT-7300 Scanner..... £179
AOR AR-8000..... £189
Kenwood TM-G707E Dual Band Mobile..... £189
Yaesu VX-7R black Tri-Band Handy..... £189
AOR AR-2002 Receiver..... £199
IC-E208 2m / 70cm FM Mobile..... £199
Yaesu FV-101DM Digital Memory VFO..... £199
Kenwood TR-9000 2m Multi mode..... £220
Yaesu FT-480R 2m Transceiver..... £220
UBC-800XLT mobile scanner..... £229
DR-635E Alinco 2m/70cm FM Dual Band Mobile T.... £230
Kenwood TH-D7E Dual Band Handheld..... £240
ICOM IC-290H - 2M MULTIMODE TRANSCEIVER..... £249
Icom IC-490E 70cms Mobile..... £250
Icom IC-R3 Hand held Scanner..... £250
IC-R3 Icom Scanner..... £250
Yaesu FT-290MkII 2m Multi-mode transceiver..... £250
IC-R20 Icom Scanner Wideband..... £259.95
Kenwood TR-751E 2m Multi-mode transceiver..... £275
Ten tec RX-320 PC COMMUNICATIONS RECEIVER.. £275
Yaesu FT-690R II..... £275
Yaesu FT-690R II 6m transceiver..... £275
Yaesu FT-707S HF Transceiver..... £275
Yaesu FTV-901R 2m / 6m Transverter..... £275
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Eton E1 "The finest portable in the world"..... £299
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Icom IC-R1500 Receiver..... £349

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TEL: 01403 785600. FAX: 01403 785656.
**www.langrex.co.uk**

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**UK SUPPLIER** of Calogic SD-8901 quad-fet DBM. IC supplier of JB style air-spaced variable capacitors 10pF min. 50 to 350pF (Max). Box No. 809, PW Publishing Ltd, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

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**TWIN 4CX250B** 2m Linear amplifier. Home brew from circuit diagram. No sensible offers refused. Yaesu FT-847 with mic, manuals and all filters, £850.
Tel: Alvin G6DTW 01372 270268 (Ashtead, Surrey).

**UNIDEN UBC-72XLT** unused. Accs manual, £75. FT-840, good working order, appearance boxed, manual, £400. MFJ-941E, good working order, instruction leaflet, £75. Icom IC-740, complete repairs/spares, £200 or £600 the lot. Carriage at cost.
Tel: John G3OAZ 01256 465126 (Basingstoke).

**YAESUFT-101ZD Mk3** FM with service manuals, £250. FT-736, 2m, 6m, 70cm, £450. Prefer buyers to collect. Tel: Tibbert 01248 722041 (Anglesey).

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## WANTED

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**DRAKE R7/R7A** and or boards. Tel: 01258 821061 (Sturminster Newton).

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**HEATHKIT DX-100U** Any condition considered. Tel: 01692 538794 (North Walsham).
E-mail: g3wce@grimblepoos.co.uk

**OLD HALF INCH FERRITE RODS** must be half inch, 12.7mm, in diameter and be six inches long or more. Will pay very good money for the rods. Tel: Peter Tankard 0114 2316321 between 9am and 9pm (Sheffield).

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# Bargain Basement order form

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Signature..... Security number

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Switch issue number (if on card) .....

Start date of card..... Expiry date of card.....

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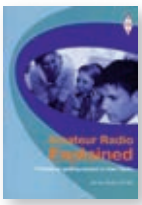

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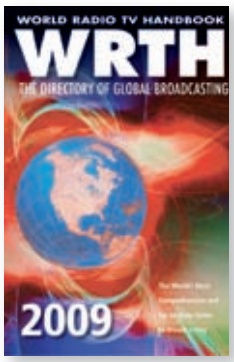


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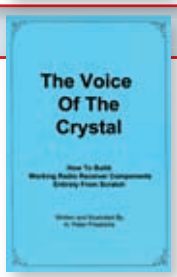


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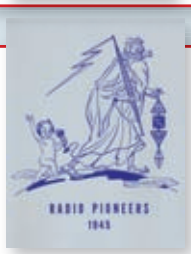


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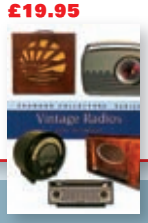


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## Rob Mannion's

# topical talk

The formation of new clubs and radio frequency attenuation through modern window glass.

As keen Amateur Radio Club members ourselves, both **Tex Swann G1TEX** and I were delighted to learn that **Adrian Lane M3TVF**'s efforts have led to the formation of a new club in the Forest of Dean, in Gloucestershire. Adrian's letter (*Letters* this month) confirms that they are 'up and running', which cheered me up because over the years I've been with *PW*, some well known clubs have closed for various reasons.

One of the more common reasons leading to clubs disbanding, has been the loss of a suitable venue. Occasionally, I've learned that clubs – having been at the same venue for many years – have had to move because a building is being re-developed, etc. In some case, because the majority are elderly, the club has closed and the remaining members then meet informally in each other's homes.

In other cases I've been very saddened to hear that clubs have closed because the Chairman, Hon. Secretary, Treasurer, etc., having held the positions for many years, wished to stand down for various reasons. Then, because nobody else would join the committee, the club closed. Personally, I think it's a very great shame when this happens as it's usually avoidable!

In fact, I know of a friendly club (although it's not threatened with closure!) where the current Chairman has only been a member of the club for a year or so. Despite this, he's a relatively young, very keen and very experienced Radio Amateur who has brought his enthusiasm with him. His example is a good one and I feel that many clubs have probably missed the opportunity of recruiting fresh new blood on to a committee – mainly because the relative newcomers are perhaps shy and the older members are hesitant to ask them.

Over the past few years I've noticed a steady increase of new – and relatively young – faces on the club committees. I've found this to be very encouraging and one or two clubs have recruited youngsters under the age of 20, a rarity perhaps but these young people seem to shine with enthusiasm and reflect the encouragement of older club members.

I feel strongly that those of us who are in the Amateur Radio 'Senior' category **must be prepared** to fully encourage younger people onto our club committees and into respected positions within the hobby. Indeed, I think that some of the young people featured in **Tom Read M1EYP**'s article *Amateur Radio at School Part 2*, may be ideal candidates in a few years time. They may well forget the hobby for a while as other priorities of life take over – this is a natural trend – but some of them will return to the hobby.

Once the Amateur Radio seed is sown it can sometimes lie dormant for a long time. I can back this statement up by the number of Amateurs re-kindling their activities after a break of many years who contact *PW* for help and advice. Furthermore, several Amateurs who have returned to the hobby after a break – are now serving on club committees.

So, I think we should all do our very best to encourage keen people such as Adrian Lane M3TVF and others, who are willing to give their energy, enthusiasm and perhaps the most importantly – their time – to help keep our vital clubs 'up and running'.

## Signal Detraction

Occasionally, Tex G1TEX and I find that an article that comes our way for publication in *PW* is really fascinating in a rather a different way – and *Signal Detraction* by **Peter Saul G8EUX** (published in the September issue of *PW*) certainly fits in this category! However, judging by the number of E-mails and telephone calls I've received – a number of readers have discovered the problems that Peter G8EUX highlighted in his most interesting and well researched feature.

Although I've not – knowingly – actually come across the 'signal detraction' properties of modern domestic double glazing myself – I know that it has occurred in aircraft fitted with metallised layers for electrical heating (de-icing/misting) purposes. However, I've no doubt we'll be hearing more on the subject!

**Rob Mannion G3XFD/EI5IW**

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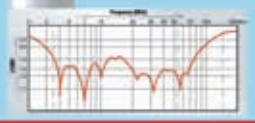

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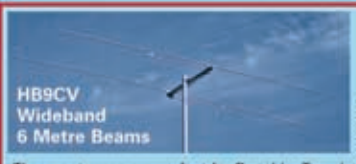


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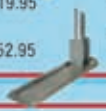

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- Five Voice Message memories, with the optional DVS-6 unit
- Large Multi-colour VFD (Vacuum Fluorescent Display)
- Optional Data Management Unit (DMU-2000) permits display of various operating conditions, transceiver status and station logging.
- Optional RF µ-Tune Ultra Sharp Preselector System for 160 m, 80/40 m and 30/20 m Bands

### Optional, YAESU Exclusive, Fully-Automatic -Tuning Preselector System!

***Fully automatic, Ultra-sharp, External µ-Tuning Preselector (optional) features a 1.1" (28 mm) Coil for High Q***

On the lower Amateur bands, strong signal voltages can impinge on a receiver and create noise and intermod that can cover up the weak signals you're trying to pull through. YAESU engineers developed the µ (Mu) Tuning system for the FT DX 9000/FT-2000, which is now available as an option for the FT-950. There are three modules available, the MTU-160, MTU-80/40, and MTU-30/20); these may be connected externally, using the optional base kit, with no internal modification required.

When the µ-Tuning module is engaged, the VRF system is bypassed, but the fixed Bandpass Filters are still in the received signal path.

### Optional External Data Management Unit (DMU-2000) Provides Many Display Capabilities

***Enjoy the ultimate in operating ease by adding the DMU-2000!***

Enjoy the same displays that are available with the FT DX 9000 and FT-2000: Band Scope, Audio Scope, X-Y Oscilloscope, World Clock, Rotator Control, Extensive Transceiver Status Displays, and Station Logging Capability. These extensive functions are displayed on your user-supplied computer monitor.

Shown with after-market keyer paddle, keyboard, and monitor (not supplied).

DMU-2000
Data Management Unit (option)

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Specifications subject to change without notice. Some accessories and/or options may be standard in some areas. Frequency coverage may differ in some countries. Check with your local Yaesu dealer for specific details.

YAESU
*Choice of the World's top DX'ers*