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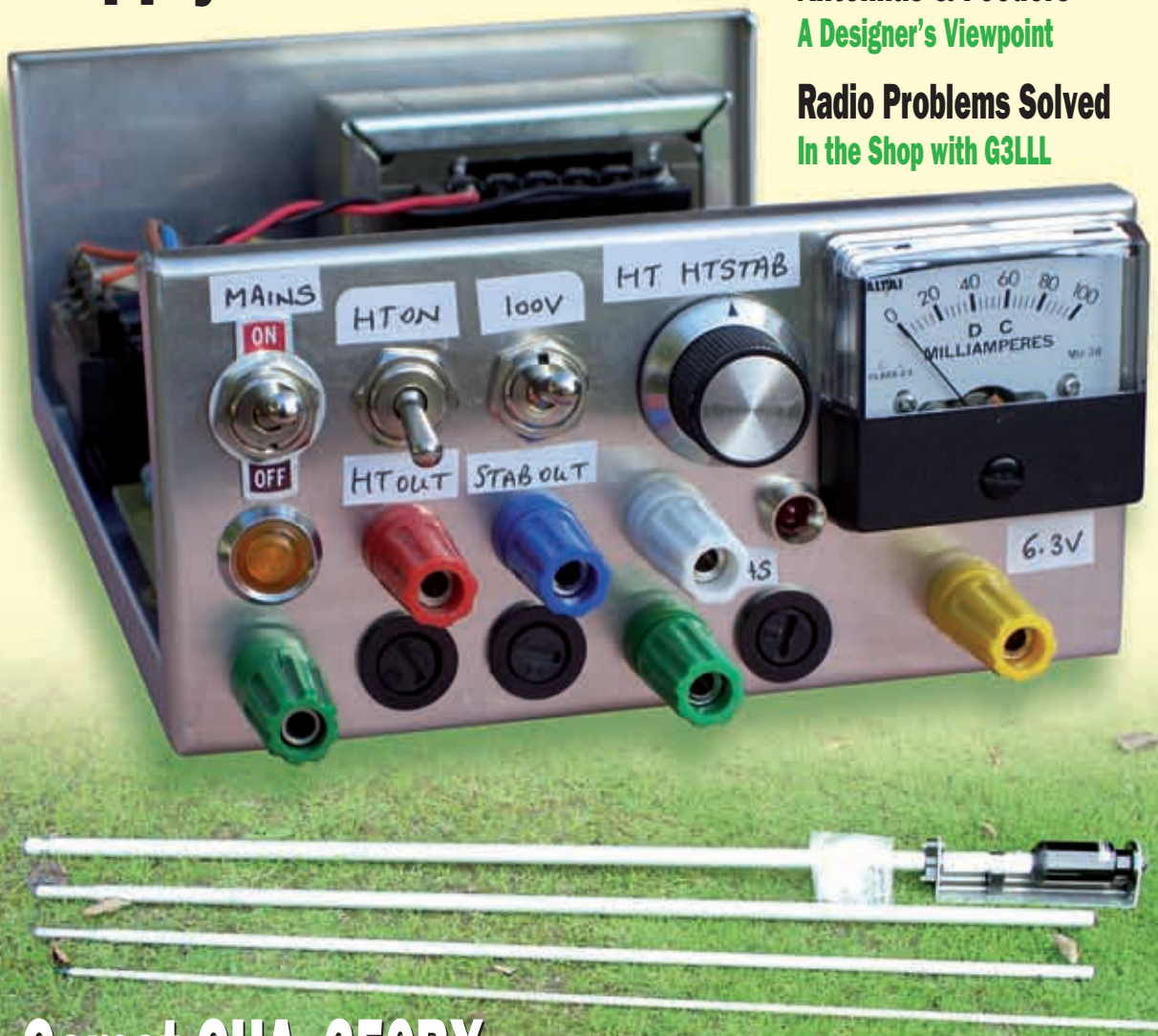

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*Freq range 144-146MHz, 430-440MHz Tx
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Software Defined Transceiver

Nothing Else Comes Close!

FlexRadio SDR-1000

£6,000 in hardware form - £995 as above! What a choice!

If you have heard my recent talks you will understand how exciting this SDR-1000 software defined transceiver is. Just load the FREE software, connect up the SDR-1000 transceiver to a suitable soundcard and you are ready to go. It will transform your enjoyment. There are regular FREE updates for customers to download. Call our sales desk for a FREE demonstration CD and operate the radio on your PC using a supplied 80m RF sound file. The FlexRadio SDR-1000 would cost you around £6,000 in hardware form! Part Exchange welcome. Peter Waters G3OJV

The Concept:

All modulation and demodulation takes place in your PC. IF filtering and other DSP processes also take place in the PC. Ancillary controls such as AGC, ALC, audio processing, control functions, metering and displays are likewise done within your PC. And everything can be updated FREE as new software versions appear.

SDR-1000 comprises transceiver (100W or 1W) software and PC control cable connector. You need to add a suitable PC professional soundcard like the Delta-44 and 3.5mm stereo connecting leads (soundcard leads and PC speaker adaptor lead kits recommended) plus any Yaesu 8-pin microphone.

Check These Features!

Rx - 12kHz to 65MHz
Tx - 1.8MHz to 52MHz (Ham)
Power - 1W - 100W (500mW 6m)
IMD - 99dB
MDS - 130dBm (14MHz 500Hz)
Modes - SSB CW AM FM
*Realtime Panadapter
*Click on Spectrum Display Tune
*Filter shape factors 1.05:1
*No ring filters down to 25Hz
*AGC after brick wall filter
*Graphic Equaliser & Compander
*Variable bandwidth Tx filter
*Iambic Memory Keyer

Prices

SDR-1000 100 Watts	£995.00	**Delta-44** Soundcard	£99.00
SDR-1000 1 Watt	£649.00	**Yaesu MH-31B8 mic.**	£39.95
SDR-1000 Receiver	£649.00	**Shuttle VFO Knob**	£99.00
Auto ATU	£199.00	**Soundcard leads**	£24.95
		PC speaker adaptor lead	£4.95

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WiNRADiO

* *Unmatched in value and performance*
* *Choose from either internal PCI module (i) or external module (e)*
* *Software included and requires Windows 98 or later with PC speed 500MHz or above*

PCI version

External version

No hardware design can match them at anywhere near this price!
Uses your exising PC soundcard.

Welcome to the exciting world of SDR where the power of your PC outperforms anything a hardware design could achieve!

WR-G303 Features

HF 9kHz-30Mhz Dual Conversion SSB FM AM
Real-time spectrum analyser; Plug and Play installation, 2nd IF totally SDR; Easily updated, Simple USB connection; 3 scan modes; S-meter reading S-points - dBm or uV; Triple AGC speeds or manual; Extensive memory feature; Dual real-time spectrum scopes; Bandwidths of: 0.5, 2.5, 3, 4, 6, and 12kHz; SSB sens. typically: 0.3uV; AM Sens: 0.9uV.

Specification

Mode: AM AMN AMS SSB CW NFM
Tuning steps: 1Hz **Image reject**: 60dB
IP3: +5dBm@20kHz **MDS**: -135dBm
Phase Noise: -148 dBc/Hz @ 100kHz
RSSI Accurate: 5dB **RSSI Sensitivity:** 1uV
Scan Speed: 40chs per sec
IFs: 45MHz; 12kHz **Stability:** 10 ppm 0-60C
Antenna: 50 Ohm. **Supply:** 12VDC Unit or PCI

WR-G313 Features (Upgraded WR-G303)

Additionas and uprated specification are: Test & Measure features; Bandwidths variable 1Hz - 15kHz; 600 Ohms line output; SSB sens. typically: 0.25uV.

Specification (As WR-G303 except the following)

Image reject: >70dB **IP3:** +8.5dBm@20kHz
RSSI Accurate: 2dB **Dynamic Range**: 95dB
Stability: 0.5 ppm 0-60C

WR-G305 Features

HF-UHF 9kHz-1800MHz Dual Conversion SSB FM AM
Real-time spectrum analyser; Plug and Play installation, 2nd IF totally SDR; Easily updated, Simple USB connection; 3 scan modes; S-meter reading S-points - dBm or uV; Dual Loop variable speed AGC; Manual IF gain; Unlimited memory; Audio filter: Dual real-time spectrum scopes; Multifunction squelch; Graphi hit count; Bandwidths of: 0.5, 2.5, 3, 4, 6, 12 and 220kHz; SSB sens. typically: 0.3uV; FM Sens: 0.7uV.

Specification

Mode: AM AMN AMS SSB CW NFM
Tuning steps: 1Hz **Image reject**: 60dB
IP3: 0dBm@20kHz **MDS**: -135dBm
Phase Noise: -148 dBc/Hz @ 100kHz
RSSI Accurate: 5dB **RSSI Sensitivity:** 1uV
Squelch: Level, noise, voice, CTCSS, DCS
Scan Speed: 60chs per sec max
IFs: 109.65 MHz;12kHz **Stability:** 10 ppm 0-60C
Antenna: 50 Ohm. **Supply:** 12VDC Unit or PCI

WR-G315 Features (Upgraded WR-G303)

HF-UHF 9kHz-1800MHz Dual Conversion SSB FM AM
IF Shift & Notch Filter, 2nd IF totally SDR; IF spectrum record, Noise Blanker; Bandwidths of: variable 1Hz - 15kHz; SSB sens. typically: 0.25uV; FM Sens: 0.5uV.

Specification

Dynamic Range: 90dB
Scan Speed: 500chs per sec @1kHz steps
Stability: 0.5 ppm 0-60C

Prices

WR-G303i	HF PCI module	£385.95	**WR-G305e/WFM/PD**	HF-UHF Ext. USB & Pro-Demod	£599.95
WR-G303i/PD	HF PCI module & Pro-Demod	£458.95	**WR-G313i**	HF PCI module	£699.95
WR-G303e	HF External USB	£454.95	**WE-G313i/180**	HF PCI module	£869.95
WR-G303E/PD	HF Ext. USB & Pro-Demod	£528.95	**WR-G313e**	HF External USB	£809.95
WR-G305i/WFM	HF-UHF PCI module	£469.95	**WR-G313e/180**	HF External USB	£999.95
WR-G305i/PD	HF PCI module & Pro-Demod	£458.95	**WR-G315i/WFM**	HF-UHF PCI module	£1499.95
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WR-G305e/PD	HF Ext. USB & Pro-Demod	£528.95	**WR-DNC3300**	3300MHz down converter	£174.95

Previous model for illustration only

Software Defined Receiver £19.95!

NEW SoftRock-Lite v6.2

These are single band designs in kit form
They will outperform many current transceivers and receivers
This is the future of Ham Radio - Experience it NOW!

Here is your chance to experience the power and performance of Software Defined Radio at a crazy price. These designs work with the receiver section of the Power SDR software used by the FlexRadio SDR-1000. You get:
*** Digital readout * Full DSP * Variable IF filtering 20kHz - 25Hz * SSB CW AM FM * Comprehensive metering and AGC etc. Uses your regular PC soundcard.**

**Software CD provided*
**Requires PC - with SoundCard*
**PCB size 38.1 x 38.1mm*
**Supply 9-12V*
**Build Time - approx 3 hours*

Prices

SOFTROCK-Lite-160m	160m Kit	£19.95
SOFTROCK-Lite 80m	80m Kit	£19.95
SOFTROCK-Lite-40m	20m Kit	£19.95
SOFTROCK-Lite-30m	30m Kit	£19.95

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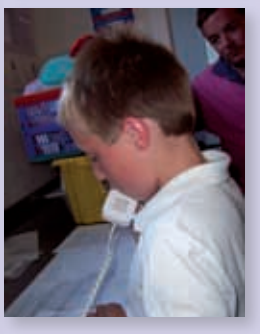

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Cover Subject
This month, why not try your hand at building a valve power supply unit from Stef Niewiadomski's design? If you're looking for a new antenna make sure you read Roger Cooke G3LDI's review on the Comet CHA-250BX and don't miss Practically Yours – 75 years of Heritage & History.

Design: Steve Hunt
Photographs: Stef Niewiadomski, Roger Cooke G3LDI

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Welcome! Each month Rob introduces topics of interest and comments on current news

Keylines

Rob G3XFD introduces another issue of great radio reading as PW continues its 75th year of publication.

Now that the 'Licence for Life' system is with us, the process I recently foretold has started. Regular readers will know I've mentioned that, as we don't 'make money' for the regulator, we must be prepared to look after ourselves in the best way possible. In my opinion this means that we should all (wherever possible) support the hobby in the best way possible. The primary way we can support the hobby within the UK (this may change if our various nations go their separate ways in the future) is to support our national society.

Although I'm a member of the RSGB, I'm aware that many of our readers consider *PW* as being some sort of 'an alternative' to the national society. However, anyone considering that *PW* can even begin to consider itself as being an alternative to the RSGB is very mistaken indeed!

Our much loved magazine is an 'extra' ingredient, enabling us to enjoy a wonderful hobby as effectively as possible. It's a 'fun' publication. It's also aimed at helping those who have just started out in the hobby and Amateurs who've been active for many years, infact, *PW* offers a welcome to everyone. My approach is to make the magazine informal, informative and to provide a really 'good read'.

The RSGB, on the other hand, has extra responsibilities and is there to represent the hobby nationally on our behalf. Without a strong society – especially now as the regulator begins the hand over of the responsibilities to those in the hobby – we could certainly find ourselves in murky water.

Generally speaking, I can say that I have many very good friendships with a number of RSGB Regional Reps and other staff. However, I am aware that the RSGB has had an almost tangible 'not invented here' (NIH) attitude towards anything other than the society itself. Despite this we must look past the NIH attitude (it seems to be fading into the background I'm pleased to say) as we march together into the 21st century. If those of us, who enjoy the freedom our hobby offers – with its numerous privileges – don't stick together the growing 'mountain' of problems and pitfalls represented by EMC, planning problems and so on with the added, problems of the 'politically correct ' (PC) approach and the ever-growing layers of bureaucracy, could damage our pastime.

On a more personal level, I've also sensed a rather ambivalent attitude towards *PW* from the RSGB. In the past, (I think it was meant to be helpful but wasn't!) the standard RSGB 'script' regarding *PW* went something like this, 'We find *PW* is useful for us by being on the bookshelves'. In other words, the RSGB 'official line' was that we could be useful to them at times! However, as a member of the RSGB myself - and a dedicated Amateur with over 50 years in the hobby – I hope that in future the RSGB will consider *PW* to be a fellow 'institution', which is also helping to promote our hobby. The RSGB can protect our hobby against the bureaucracy but if we don't stand together the seemingly indifferent attitude of the Government's agencies to the non-revenue earning Amateur Radio service – could cause us long-term problems.

The UK needs a strong national society, supported by everyone in the hobby. In return the national society must take full account of everyone else in Amateur Radio. The magazine I've edited for nearly two decades is not an 'also ran' – it's part of the hobby and can offer much support.

Special 75th Anniversary Callsign

By the time this issue of *PW* is on the bookshelves, I hope to have the process of requesting a special GB callsign issued to celebrate *PW*'s 75th anniversary year under way. Obviously, GB75PW would be ideal but apparently there are restrictions. However, even though I don't know what Special Event Notice of variation will be issued to me – I'm hoping to air the callsign on various occasions, up to the 28 days allowed, during 2007. Incidentally, several readers suggested the idea (I was already working on it myself) so I'm sure there'll be some pre-arranged QSOs!

Most Special event stations seemed to be inundated with long lists of others stations wishing to confirm a QSO and although I shall be pleased to work as many others stations as possible – I shall also enjoy a 'chatty' QSO. A special QSL card – to be designed by our Art Department, will be issued. I look forward to ta king to as many of you as possible. More information as soon as I receive it!

Happy New Year!

Finally, I'm afraid that we were all so wrapped and incredibly busy preparing the January issue that I forgot to wish you all a very happy Christmas! I hope you did enjoy your Christmas and I would like to take this opportunity to wish our readers – wherever they are – a happy new year on behalf of everyone at *PW*!

I hope the New Year brings us all the opportunities to enjoy our hobby with as much freedom as possible. I've made two new year's resolutions – the first is to complete a transceiver kit waiting in my shack and the other is to build myself a 14MHz delta beam I've been promising myself for several years! Best wishes to you all!

Rob Mannion G3XFD/EI5IW

Send in your thoughts and win a voucher!

letters

Send your moans, groans and even praise when it's due to the editorial address or E-mail: pwletters@pwpublishing.ltd.uk

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**

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

Star Letter

Modern Morse & Wireless

● **Dear Rob**

First, a belated thanks for the news feature in the December 2006 issue of *PW*, regarding the transceiver given to **King Edward VII School** in Melton Mowbray, Leicestershire. I also congratulate everyone associated with the magazine on the occasion of the 75th anniversary year of *PW*.

I really like the bold new cover format. In a way it's sort of 'retro' and reminds me of the magazine cover style from many years back - yet today (with the emergence of many advanced mobile wireless technologies) the word wireless has shaken off its 'polished, veneered wooden cabinet' image and perhaps has now ousted 'radio' as the modern noun to name anything that communicates without a direct physical connection (I'm struggling not to use the word radio here to emphasise my point!). Be sure to keep the format, it really does work.

As a keen yachtsman I had read accounts of the rescues involving Morse code in the papers and several magazines, including *PW*. Despite being discontinued for maritime communications **Morse is still widely used** by various types of beacons as a means of identification of a beacon against it's chartered position.

In general, there are two main types; a buoy employing a flashing light to send a single character and a RACON (Radar Transponder Beacon), which when 'swept' by a radar signal, responds with a single character burst of Morse. This appears on the radar display, showing a Morse character along the axis of the Plan Position Indicator (PPI) in the direction of the beacon. Of course, these are all automatons, which then reminded me of something I spotted a few years back whilst working in the mobile telephone industry!

In the 1990s, Nokia introduced a new handset, which apart from offering many technical improvements, also offered the novel method of using Morse Code to key out 'SMS' or the more long winded 'Connecting People', to alert the user to the receipt of a Text Message.

Whilst many telephone users realised that it was the sound of Morse code, surprisingly few were able to read it. Those of use who could were clearly in a very special club indeed! Mildly amused that someone had gone to the trouble to build this feature into the phone's software, I thought little more of it until a few months later when I realised that many other things around the offices would regularly 'key up' in Morse!

First, there were the card entry swipe readers, used to control access to the various offices and technical sites around the network. Swiping your card through one of these resulted in a reassuring 'A' (presumably for Access) if you were allowed through, or a firm 'S' (Stopped?) if your card did not hold the entry privilege for that area. Having spotted this, others followed!

The FAX machine had a repertoire of single character Morse letters, depending upon what was being done to it. Eager to secure its position in the hierarchy of office machinery, the newer and vastly more complicated photocopier would compete for attention by keying out a whole vocabulary of Morse to announce a successful collation of a pile of copying or to advertise that it had suffered a paper jam!

Even when visiting one of the mess areas for a drink you could not escape Morse! Select a Cappuccino coffee and on its delivery the vending machine would cheerily greet you with a Morse character or two! Everyone else seemed to be oblivious to the daily cacophony of Morse all around them.

By this stage I was starting to fear that I had been working too hard! Then one night, after installing an external Zip drive on my home computer it all came to a head. Having switched off the computer late in the evening I turned of the room light, until to find that a flashing light caught my peripheral vision. Deep inside the Zip drive, visible through its blue translucent case, there was an l.e.d. Repeatedly flashing the message 'ISUROCKS' (Iowa State University?).

Different products, different manufacturers but they had one common theme - the use of Morse code. But why the Morse? The origins almost certainly lie with the types of people that form the development teams and technical management responsible for the design of the products. Amateur Radio has infiltrated many parts of society - from Kings to commoners, professors to technicians - and industry is no exception.

Look inside any large technical organisation and I suspect that we'll find many roles, (often carrying great responsibility and influence) are filled by Radio Amateurs, active, 'closet' or otherwise who - by way of sending a wry message to other members of that 'special club' I mentioned - have embedded Morse into thousands of everyday items. Is Morse code dead? Listen and watch carefully and you'll find it's everywhere! Seasons greetings to all the team and wishing you all a very successful 2007. Keep up the good work.

Ron G4GXO
Cumbria Designs
Penrith,
Cumbria

Thank you Ron! You cheered up a thoroughly miserable, dark December Friday for me as I prepared the letter for publication. Please join me in Topical Talk (page 81) for further comments. ***Rob G3XFD***

letters

Fighting EMC Problems

● **Dear Rob**
In regard to the new TV problems letter (from **Paul Johnson 2E0ENZ** in the December issue of *PW*), this is another tip of the iceberg consumer problem of 'them and us', in this case TV manufacturers and the end user. If not enough research and development funding is spent by factories to comply with European Union EMC regulations, then the user buys an unsuitable product. The Latin expression "Caveat emptor" (buyer beware), as mentioned in previous readers' letters, very much applies here to the Radio Amateur as a customer, to avoid interference from a TV and accessories affecting our communications at home.

Likewise, as mentioned elsewhere in *PW*, it's also our responsibility the other way round, to help protect other TV viewers. My suggestion to alleviate a possible interference problem before buying and taking delivery of a new l.c.d. or plasma screen TV, is to take with you into the store, a hand-held 144MHz rig and wave it very closely all around the sets on display. Better still if the hand-held has wide-band h.f. receive as well, to be on the safe side make sure you listen in that part of the spectrum.

While testing, try to ignore shop electrical background noise. Even if the casing/external housing of the TV isn't radiating too much, additional mush and interference could still be injected into the mains from an internal unsuppressed switch-mode power supply, which would be a worrying issue.

To cure a problem with a switch-mode supply in my home some time ago, I inserted a toroidal type low-pass mains filter immediately after the four-way mains socket block that feeds the my (c.r.t.) TV, VHS tape recorder/DVD player and two Freeview boxes.

That remedy totally knocked the stuffing out of an S8 level h.f. noise floor problem, caused by re-radiation through the house mains! Sometimes, you just have to resort to using big hammer techniques! May I wish a noise free, happy new year, to *PW* staff and readers.
Rodney Byne G7OEL
Scunthorpe
Lincolnshire

Some interesting ideas there Rodney!! Please join me on the Topical Talk page (81) for further comment). ***Rob G3XFD***

New Droitwich Standard

● **Dear Rob**
Your publication (In November 2006) of a new Droitwich 198kHz standard and your comments today in the January 2007 Topical Talk, sent me on a trip down 'memory lane'! Some 11 years have passed since the publication of the Locking the Robin to Droitwich project *in PW*, which used the same conversion principle.

I can still remember the pleas, comments and debate that ensued, some at the *PW* stand at the Leicester Show (held in the old Granby Halls in those days)!

It's been eight years now since my version was published (Droitwich Chronicles) and the unit still continues to give excellent service although I've made a number of improvements to the design, which I have found to be of value as follows;

1: Phase meter, this used a CA3140 as a high impedance voltage follower monitoring the control voltage to the 10MHz crystal oscillator. This was most useful for setting up and reassurance that it really was working! It also exposed temperature variations.

2: Temperature compensation. My shack' temp varies by some ±20°C and although lock was not lost, I fitted a varicap and front panel potentiometer and I now 'trim ' the control to centre scale each time. This maintains the full control range and I feel that this should help stability.

3: Output signal quality. Although the unit was capable of acting as the 10MHz timebase for a frequency counter, monitoring the signal at 50MHz showed a poor 'tone'. Adding some extra capacitors to the control line then provided a good 'tone' even at 430MHz. I realise that there is a 'trade off' between long and short term stability to be made here, but worthwhile improvements can be made (especially as a timebase).

With regard to the vexed question re all the other 'special' signals that the authorities kindly add to Droitwich, not too much is published about them and a fully equipped research lab would be needed to unravel them all!

I can say that, during eight years of use, I have not been aware of any real difficulties.

Clearly, life would be much more simple for us all if Droitwich transmitted on 200kHz again with an un-modulated carrier! However, we should remember, that due to the complexities of the signal, propagation effects and the limitations of circuitry, we would not get the accuracy of the original Atomic standard. I will be quite happy to get within several zeroes of it! I can only ponder and speculate what my unit actually does achieve!
Ron Harris GW8DUP
Swansea
South Wales

Thank you Ron! I remember all the 'fun and games' we had trying to get your project published! It was well worth the trouble you went to, as it proved very popular! I hope to have full details on the Droitwich other services, to pass on to readers soon. ***G3XFD***

Callsign G4SKS On Air Again

● **Dear Rob**
The callsign **G4SKS** belonged to my late father, **W H Bradshaw**, DSM ISM, who died of cancer early in 2006. I have obtained his callsign and now hold it together with my own.

It is my intention to operate for a ten day period each year starting with the 1 February (his birthday) until the 11th February (the day he died). I shall QSL on receipt as am not a member of the RSGB. I shall use h.f. only on c.w. and look forward to working his old friends on the two highest operable bands for the time of day.
Regards
Ross Bradshaw G4DTD
Cornwall

Geoff Milne G3UMI Silent Key

● **Dear Rob**
You have mentioned you would like to know about readers who have become Silent Keys and, unfortunately, I have to inform you about my father **Geoff Milne G3UMI**. His funeral took place on 2 November, with family and friends as well representatives from all the clubs and associations he was connected to, including the RSGB, and all the local Radio clubs (he was Editor of their newsletter, previously Secretary, of the **Bromley and District Amateur Radio Society**).
David Milne G6VMI
Reigate
Surrey

My sympathies go to both Ross G4DTD and to David G6VMI on their loss. ***Rob G3XFD***

news & products

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

New GB2CW Co-ordinator

Regular *PW* author, **Roger Cooke G3LDI** contacted the news desk in early December to inform us that he'd had it confirmed that he is the new Radio Society of Great Britain (RSGB) **GB2CW** Co-ordinator. Roger says: "There has been a huge interest in Morse locally and I am now teaching my third year, with seven pupils. The aim is to get them to 30w.p.m. I asked about GB2CW, so I could transmit Morse over the air as a teaching aid."

Roger continues: "The RSGB said that GB2CW had not been activated for three years so have appointed me as co-ordinator. I have to keep head office informed of appointments and transmission schedules."

Well done Roger and the best of luck with the training from all on *PW*.

Severnside Television Group

Fred Rice G7LPP Chairman of the South Bristol ARC, receives a cheque for £50. The money will be added to Club funds used for training of new Radio Amateurs.

The Severnside Television Group (STG) is an RSGB Affiliated Repeater Group, based in Bristol. It was founded in 1986 and runs two ATV Repeaters ; **GB3ZZ**, 1.2GHz (23cm), at Filton, Bristol and **GB3XG**, 10GHz, at Dundry, Bristol. Three years ago, STG began to organise the West of England Radio Rally that's held in Frome, Somerset (the 2007 event will be held on Sunday 24 June).

Every year, the (STG) distributes a proportion of the proceeds from the West of England Radio Rally to local Clubs that help with the event. At the Christmas Party held on 9 December 2006, STG Chairperson **Mrs Viv Green G1IXE** made the presentations as seen in the accompany photos.

For more information on the Sevenside Television Group point your browser at **www.stvg.co.uk** and for details of the West of England Rally **E-mail: rallymanager@westrally.org.uk**

Mrs Liz Cabban GW0ETU, RSGB Regional Manager for North Wales, receives a cheque for £50 on behalf of the GB3FH Repeater Group. Matt Beasant G4RKY of the Repeater Group said that the funds will be used to add a 430MHz repeater, to be called GB3FI, to the existing 50MHz facility (GB3FH) located at Frys Hill, Somerset.

British Amateur Radio Lighthouse Society News

The administration of the **British Amateur Radio Lighthouse Society**, formed by **Steve Bryan G0SGB**, has been passed over to **Ian Wright GW0VML**. Membership is free to all licenced Amateurs and short wave listeners who combine radio and pharology (the study of lighthouses and signal lights - named after Pharos, the famed lighthouse of Alexandria).

More information can be found at: **www.barls-gb.supanet.com**

news snippets

Lifetime Achievement

Mike Dixon G3PFR has been awarded a lifetime achievement award for his outstanding work in support of UK Amateur Microwave radio spanning some three decades to the present day. Mike was chairman and secretary of the RSGB Microwave Committee at various times until the late 1990s when he became the RSGB Microwave Spectrum Manager, representing the interests of microwave operators at IARU, RA (later Ofcom), WARC and other organisational levels.

Mike dedicated himself entirely and unselfishly over this long period to promoting the interests of all UK microwave operators, often to the detriment of his own spare time pursuits. The UK Microwave Group is extremely grateful to Mike for his lifetime contribution and wished him a very happy 'retirement' as he stepped down from office at the end of 2006.

Lifetime Amateur Licence

The new Lifetime Amateur Radio Licence was launched on Friday 1 December. A number of Radio Licensing Centre staff are being seconded to Ofcom for a temporary period to handle the inevitable increase in enquiries after the launch date.

It has now been clarified that the new Terms and Conditions will only apply to those licensees in possession of the new document but it is planned to send out over 60,000 paper copies over the coming few months. Until this document is received, licensees should still operate under the terms of their existing *BR68*.

Licensees wishing to operate under the new Terms and Conditions and who have not received the new document should register on the Ofcom website at **www.ofcom.org.uk/licensing/olc/** They will be allowed to download the new licence once they have received a password in the post. These licences will then remain valid for an initial period of five years or until altered personal details, such as change of address, need to be notified.

news & products

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

A Very Long Series Of VHF QSOs!

Norfolk-based John Tye G4BYV shares the story behind a very long series of QSO he's held with his friend Dennis G8BAV in Derby. It's been going on for years and they have no intention of stopping!

John Tye G4BYV writes: In our G8 days Denis **G8BAV** in Derby and myself in Norfolk started a 430MHz schedules to test the pathway between us. This series of test has been going on over the years and we have now passed the 7000th QSO mark!

To start with, Denis had an all home-brew 144MHz transmitter using a QQV0310 driving QQV0320 tripler into a QQV0320 power amplifier at 30W. The receiver side used a 2DD converter with a HRO working on 28-30MHz as the i.f. His antenna in those days was an 18-element Yagi array. His latest gear is a Yaesu FT-790 with 30W linear amplifier and a 21-element Tonna.

At my end I had a home-brew 144MHz rig with QQV0310 p.a. to a varactor tripler with 5W output. On the receiving side I had surplus PMR front-end converted to 430MHz used with a tunable 28-30MHz. The receiver used for the 28MHz i.f. was an AR88. The antenna I used was 8-over-8 by J Beam (remember how popular they were?) mounted at approximately 10 metres.

I've tried many different antennas over the years and a 13-element K2RIW array has been the best. Nowadays, my gear comprises a home-brewed transverter with 2C39 p.a. running at 50W an MGF 1302 pre-amplifier and a FT-301 used as the 28-30MHz driver transceiver (all very old!).

The distance between us is about 160km (100 miles) and it's not a good path but we always seem to make it! When we started G8s only had 430MHz and above, with no 144MHz but I then went on to get my G4BYV callsign.

Denis, who you know, of course, told you about our QSOs some years ago and you may remember I was the chap who got the prize for the Kenwood balloon trip (I still have the book), the memory of which I still cherish. Finally, Denis and I are looking forward to many more QSOs!

Editorial comment: Well done to John and Denis from everyone at *PW*. Are there any other long series of QSOs on record? If you have a story similar that from G8BAV/G4BYV please share it with us! **G3XFD**

Beginners Microwave Workshop

The Telford and District Amateur Radio Society is pleased to announce a Beginners Microwave Workshop in conjunction with the UK Microwave Group. In May 2006, the UK Microwave Group (UK MWG) started what they hoped would be a way to get more people involved in operating in the microwave bands. The problem in the UK MWG group, as is common in almost all areas of the hobby, is that the age profile of the participating people shifts upwards while the amount of people experimenting in these areas decreases. As part of a proactive approach to this problem the UK Microwave Group decided to lower the entry barrier for people curious about this area of the hobby by initiating a workshop where beginners could be given a head start into what constructing and operating in these bands might be like.

The first workshop ran in May in Sheffield, organised by **Peter Day G3PHO** who is editor of the microwave newsletter *Scatterpoint*. It was a day long event and several lectures on operating, dishes, waveguides and construction were given. During the day there was particular emphasis on construction and an entry point into the hobby was described using cheap surplus equipment from old satellite setups and doppler radar units from things like fire alarms. The event finished on the car park with people using some 10GHz gear to establish contacts. Subsequent events have been held since, including one by Flight Refuelling Amateur Radio Society and another at the Martlesham Round Table. Each event continued with the same objectives.

The TDARS is hosting the next workshop on Saturday 3 March 2007 in Telford. The event is suitable for all newcomers to the microwave bands with no previous experience necessary. If you're interested in trying out the microwave bands but haven't done so or are just getting set up for the bands then this event is a great opportunity to kick start your activities.

The day will be structured around a series of introductory ta ks and practical demonstrations of microwave stations and operation. There will be a number of experienced microwave operators on hand so that all your questions can be answered. Please note the workshop is **not** intended for those already experienced in this part of the spectrum.

It's anticipated that the event will be run, for only a small charge, at the TDARS QTH. More details will be available later in January. Space is limited so please register your interest directly with **Richard Herbert M1RKH** at **microwaves@herbert.gb.com** as soon as possible.

silent key

Don Gibbons EI5IA

John Corless EI7IQ writes a tribute to an Englishman who was much admired within the Amateur radio community in Western Ireland.

The death of Don Gibbons EI5IA, on 25 November, aged 86, cast a shadow on the Mayo Rally, which took place the next day. Don was a prominent member of the Mayo Radio Experimenters Network and served as the club representative to the **Irish Radio Transmitters Society** (IRTS), the national society.

Don was first licensed in 1993 having studied both theory and c.w. over the previous winter in Galway. He was born and lived in the UK for much of his life and was a former RAF Navigator, flying in heavy bombers during the Second World War.

Don was a very distinctive figure with his trademark beard, wry wit and smart dress sense. He joined the fledgling Mayo club (the **Mayo Radio Experimenters Network**, MREN) in 1997 and his membership, being the first Class A licensed member, meant that the new group could apply for a Club callsign from the licensing authorities. (The other members at the time were all Class B licensees.)

Don built up a huge collection of vintage radio equipment over the years and was a close friend of **Gerry Bracken**, another vintage radio enthusiast. His other passion was cars and his collection included a number of sports cars. Don's driving was legendary and he never had any trouble being on time for any event he attended, irrespective of his time of departure!

In the early 1970s, with his late wife, Don built the Kylemore Pass Hotel located between Westport and Clifden in the heart of beautiful Connemara. He sold the hotel in 1979 and moved to Westport. Don was a decent generous man who never uttered a negative word to anyone and was extremely well liked with the Mayo club and the wider hobby. May our friend rest in peace.

John Corless EI7IQ

Rob Mannion EI5IW/G3XFD writes: When I was first welcomed to the MREN, Don EI5IA and I immediately became friends. His distinctive 'Colonel Sanders' type beard and immaculate presence was such he could make anyone feel welcome wherever they were!

He was a remarkable man and at his funeral service at Holy Trinity Church in Westport, I learned much more about my late friend, including the fact that he carried the Union standard, escorting the late Lord Louis Mountbatten during the Indian Independence ceremony in 1947. He was a much valued and loved member of the local community in Westport and I'm proud to have known him.

Construction Success

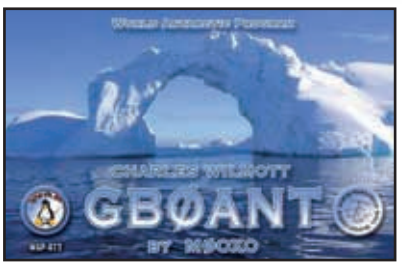
Twenty members of the **Shefford and District Amateur Radio Society** (SADARS) successfully constructed and tested an entirely 'home-brew' construction kit for a sensitive r.f. signal strength meter as their autumn 2006 Club Project. Designed and presented by **Stewart G3RXQ** as a modestly priced and complete kit of parts especially for Club members, this logarithmic unit features ultra-bright l.e.d.s. It's designed around the AD8307AN chip and an LM3914N display i.c. and fits into a neat case, the front panel of which even bears the owner's callsign!

Constructors included absolute beginners and more experienced members, all of whom saw the attraction of such a neat 'sniffer' unit in the shack.

It was with considerable relief that even the 'experts' watched their l.e.d.s flash on one-by-one at power-up, with many an aside about various construction techniques creating hilarity. The results varied with respect to the upper frequency response, with some units achieving 800MHz!

The SADARS meet weekly at Shefford in Bedfordshire and a brochure is available from their **Secretary, G8UOD** at **davide.lloyd@ntlworld.com**

Antarctic Week



Every February, Antarctic Week takes place, which is run and supported by members of the **Worldwide Antarctic Program** (WAP). Stations operate world-wide special event (SE) calls for that week, solely for the purpose of raising awareness for issues on Antarctica and the program through award schemes.

During Antarctic Week 2007, **Charles Wilmott M0OXO** will be using the SE callsign **GB0ANT**, which has a unique reference for chasers of WAP Zone 72. The station will be run from the 19 to 25th February 2007 and he hopes to cater for as many modes as possible on the h.f. bands.

To find out more about Antartic Week take a look at **http://charlesm0oxo.piczo.com/**

club news

Keep your club news coming to pwnews@pwpublishing.ltd.uk and 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!

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Website: www.nadars.org.uk

Members of the Newbury & District Amateur Radio Society meet on the fourth Wednesday of every month. The club has recently relocated to new premises at the Travellers Friend, Public House, Crookham Common, near Thatcham, Berkshire RG19 8EA. If you fancy joining in with their activities why not go along to one of these forthcoming meetings? Jan 24: Surplus Equipment Sale or Feb 28: G3WYW - Yaesu FT-2000.

COUNTY DURHAM
Bishop Auckland RAC
Contact: Mr T Bevan
Tel: (01388) 832948
Website: www.qsl.net/g4ttf

The Bishop Auckland Radio Amateurs Club meet at the Stanley Crook Village Hall, County Durham every Thursday evening at about 1945. The club offer instruction for the Foundation, Intermediate and Advanced licences, so if you live in the area and want to get involved in Amateur Radio why not go along and join in? Visitors and new members are always welcome.

LONDON
Wimbledon & District ARS
Contact: Jim Bell M0CON
E-mail: james@jbell5.wanadoo.co.uk
Tel: 0208-874 7456
Website: www.gx3wim.org.uk

Meetings of the Wimbledon & District Amateur Radio Society are held at 2000 on the first and last Friday of each month at Martin Way Methodist Church, (corner) Buckleigh Avenue, Merton Park, London SW19 9JZ. Visitors are always welcome to the club, whose members say that their new venue has much improved parking, which makes life much easier. Forthcoming meetings include: Feb 9: On Air and construction and Feb 23: Radio Astronomy by Evan Duffield.

news snippets

Dutch Allocation Changes
With effect from 8 December 2006 Dutch Novice licence holders are now permitted to use parts of the h.f. bands. In addition to 144-146MHz and 430-440MHz where all modes and 25W r.f. is permitted, the following parts of h.f. bands are now allocated to Novice licensees:

7.050 - 7.100MHz (all modes/25W)
14.000 - 14.250MHZ (all modes/25W)
28.000 - 29.700MHz (all modes/25W)

World DX Club
International short wave broadcasters have now started their winter frequency schedules.

The World DX Club has published a 12-page pamphlet listing the times and frequencies of their English broadcasts in country order. Over 100 broadcasters are listed and the pamphlet is constantly updated so that the information is as up-to-date as possible when you order.

Copies are available for 50p or two International Reply Coupons from the **World DX Club, 17 Motspur Drive, Northampton NN2 6LY**.

Foundation Microwave Success
The UK Microwave Group has announced that **Andy ('Chaos') Hollings M3POU** and **John Norrington 2E0NOZ** successfully completed the first QSO on 10GHz by a Foundation Licensee when the 10GHz band was released to Foundation Licensees at midnight on Thursday night 30 November 2006. The 10GHz QSO was made over a short distance between the two Amateurs, who used a combination of commercially approved kit (DB6NT) and a G3JVL transverter, which was originally made by the late **G3YJH** and donated by **G8AYY** at the recent Martlesham Microwave Roundtable Beginners Workshop event.

For further information or help with microwave projects, please contact the UK Microwave Group secretary, Ian Lamb via his E-mail at **ianlamb@btconnect.com**

BNC Screw type plug (Small entry) £1.25
BNC Solder type plug (Small entry) £1.25
BNC Solder type plug (Large entry) £3.00
N-Type plug (Small entry) £3.00
N-Type plug (Large entry) £3.00
SO239 Chassis socket (Round) £1.00
SO239 Chassis socket (Square) £1.00
N-Type Chassis scoket (Round) £3.00
N-Type Chassis scoket (Square) £3.00
SO239 Double female adapter £1.00
PL259 Double male adapter £1.00
N-Type Double female £2.50
SO239 to BNC adapter £2.00
SO239 to N-Type adapter £3.00
SO239 to PL259 adapter (Right angle) £2.50
SO239 T-Piece adapter (2xPL 1XSO) £3.00
N-Type to PL259 adapter (Female to male) £3.00
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SO239 to 3/8 adapter (For antennas) £3.95
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Please add just £2.00 P&P for connector only orders

Please phone for large connector order discounts

5ft Poles Heavy Duty (Swaged)

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
1.75" set of four 5ft sections £49.95
2.00" set of four 5ft sections £59.95

Mounting Hardware (All galvanised)

Tripod-2 *(free standing with 2-OD for use with 2" joiner or 1.5" pole inside)* £69.95
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6" Stand Off Bracket *(complete with U Bolts)* £6.00
9" Stand off bracket *(complete with U Bolts)* £9.00
12" Stand off bracket *(complete with U Bolts)* £12.00
12" T & K Bracket *(complete with U Bolts)* £14.95
18" T & K Bracket *(complete with U Bolts)* £17.95
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36" T & K Bracket *(complete with U Bolts)* £29.95
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Double chimney lashing kit *(suitable up to 2 mast)* £19.95
3-Way Pole Spider for Guy Rope/ wire £3.95
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Mast Sleeve/Joiner *(for 1" pole)* £6.95
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Mast Sleeve/Joiner *(for 1.5" pole)* £11.95
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Dog bone insulator £1.00
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Dog bone *(ceramic type)* £1.50
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Cable & Coax Cable

RG58 best quality standard per mt 35p
RG58 best quality military spec per mt 60p
RGMini 8 best quality military spec per mt 70p
RG213 best quality military spec per mt £1.00
H100 best quality military coax cable per mt £1.25
3-core rotator cable per mt 45p
7-core rotator cable per mt £1.00
10 amp red/black cable 10 amp per mt 40p
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30 amp red/black cable 30 amp per mt £1.25

Please phone for special 100 metre discounted price

Baluns

MB-1 1:1 Balun 400 watts power £24.95
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MB-6 6:1 Balun 400 watts power £24.95
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MB-Y2 Yagi Balun 1.5 to 50MHz 1kW £24.95

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DX-720D Duplexer *Port 1: HF + 6 + 2m (1.6-150MHz). *Port 2: 70cm (400-460MHz). *Connection: Fixed 2 x PL259 & 1 x SO239 ..... £19.95
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MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz) £59.95
CS201 Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts SO239 fittings £14.95
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CS401 Same spec as CS201 but4-way £39.95
CS401N Same spec as CS401 but with N-type fittings £59.95

Antennas Rotators

AR-300XL Light duty UHF\VHF £49.95
YS-130 Medium duty VHF £79.95
RC5-1 Heavy duty HF £329.95
RC5-3 Heavy Duty HF inc pre set control box £419.95
AR26 Alignment Bearing for the AR300XL £18.95
RC26 Alignment Bearing for RC5-1/3 ..... £49.95
RC5A-3 Serious heavey duty HF £579.95

Complete Mobile Mounts

All mounts come complete with 4m RG58 coax terminated in PL259 (different fittings available on request).
3.5" Pigmy magnetic 3/8 fitting £7.95
3.5" Pigmy magnetic SO239 fitting £9.95
5" Limpet magnetic 3/8 fitting £9.95
5" Limpet magnetic SO239 fitting £12.95
7" Turbo magnetic 3/8 fitting £12.95
7" Turbo magnetic SO239 fitting £14.95
Tri-Mag magnetic 3 x 5" 3/8 fitting £29.95
Tri-Mag magnetic 3 x 5" SO239 fitting £29.95
HKITHD-38 Heavy duty adjustable 3/8 hatch back mount £29.95
HKITHD-SO Heavy duty adjustable SO hatch back mount £29.95
RKIT-38 Aluminium 3/8 rail mount to suit 1" roof bar or pole £12.95
RKIT-SO Aluminium SO rail mount to suit 1" roof bar or pole £14.95
RKIT-PR Stainless SO239 rail kit to suit 1" roof bar or pole £24.95
PBKIT-SO Right angle SO239 pole kit with 10m cable/PL259 *(ideal for mounting mobile antennas to a 1.25" pole)* £19.95

Antenna Wire & Ribbon

Enamelled copper wire 16 gauge (50mtrs) £16.95
Hard Drawn copper wire 16 gauge (50mtrs) £19.95
Equipment wire Multi Stranded (50mtrs) £14.95
Flexweave high quality (50mtrs) £27.95
PVC Coated Flexweave high quality (50mtrs) £37.95
300Ω Ladder Ribbon heavy duty USA imported (20mtrs) £14.95
450Ω Ladder Ribbon heavy duty USA imported (20mtrs) £17.95
(Other lengths available, please phone for details)

Miscellaneous Items

CDX Lightening arrestor 500 watts £19.95
MDX Lightening arrestor 1000 watts £24.95
AKD TV1 filter £9.95
Amalgamating tape (10mtrs) £7.50
Desoldering pump £2.99
Alignment 5pc kit £1.99

Telescopic Masts (aluminium/fibreglass opt)

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed £99.95
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed £189.95
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed £99.95
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed £179.95
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed £189.95

HF Yagi

HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts £399.95

ADEX-3300 3 BAND 3 ELEMENT TRAPPED BEAM FREQ:10-15-20 Mtrs GAIN:8 dBd BOOM:4.42m LONGEST ELE:8.46m POWER:2000 Watts £329.95

ADEX-6400 6 BAND 4 ELEMENT TRAPPED BEAM FREQ:10-12-15-17-20-30 Mtrs GAIN:7.5 dBd BOOM:4.27m LONGEST ELE:10.00m POWER:2000 Watts **£599.95**
40 Mtr RADIAL KIT FOR ABOVE £99.00

Mini HF Dipoles (Length 11' approx)

MD020 20mt version approx only 11ft £39.95
MD040 40mt version approx only 11ft £44.95
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(slimline lightweight aluminium construction)

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VR3000 3 BAND VERTICAL FREQ: 10-15-20 Mtrs GAIN: 3.5dBi HEIGHT: 3.80m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) £99.95
OPTIONAL 10-15-20mtr radial kit £39.95

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OPTIONAL 10-15-20mtr radial kit £39.95
OPTIONAL 40mtr radial kit £14.95
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EVX6000 6 BAND VERTICAL FREQ: 10-15-20-30-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 5.00m RADIAL LENGTH: 1.70m(included) POWER: 800 Watts £299.95

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) GAIN: 3.5dBi HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts £319.95
80 MTR RADIAL KIT FOR ABOVE £89.00

(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

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(Hi grade heavy duty Commercial Antennas)

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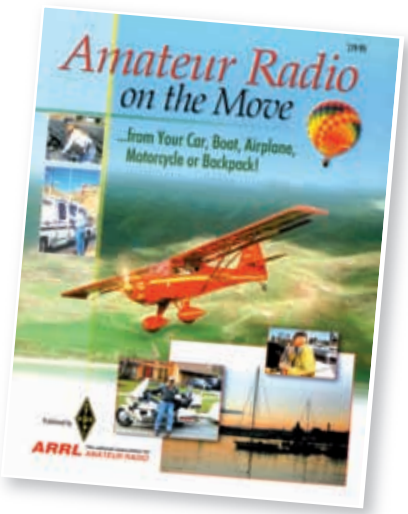
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts £59.95
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts £99.95
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts £49.95
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts £89.95
(MTD-5 is a crossed di-pole with 4 legs)

ALL PICTURES ARE FOR REFERENCE ONLY

Three new titles for 2007

the pwpublishing RADIO BOOKSTORE



Amateur Radio on the Move
1st Edition
Published by the ARRL

Rob G3XFD says: "Enjoying Amateur Radio outside and in the country is one of the pleasures I enjoy very much indeed and many other Amateurs in Europe enjoy it just as much. However, I've always regarded our American friends to be the keenest of 'out door Amateurs' and this book clearly demonstrates just how active they are in this field (forgive the obvious pun!) as the full title is *Amateur Radio on the move ... from your Car, boat, Airplane. Motorcycle or Backpack!"*

"Altogether, this book will give much encouragement to the reader and if you enjoy low power operation (and even if you don't) there are some easy-to-make portable antenna ideas thrown in for good measure. An excellent read, it's full of ideas and projects and is highly recommended."

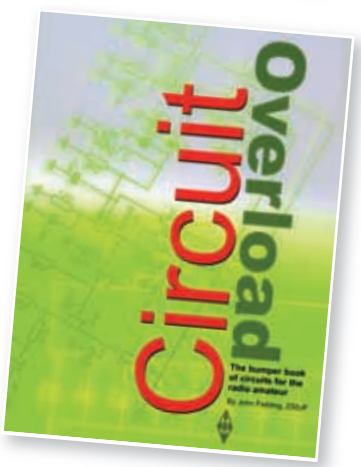
ISBN: 0-87259-945-0
PW Book Store Price: £14.99

Circuit Overload
By John Fielding ZS5JF
Published by the RSGB

Chapters in this 204-page handbook include bread boarding, audio circuits, metering display and control circuits, power supply circuits and test circuits. There's a section with 'miscellaneous circuits' - including a simple intercom and a wind speed indicator (is it safe to go up the mast or work on antennas today?).

This is a book that is described by Rob Mannion G3XFD as being "eminently practical, with an excellent first chapter entitled 'the breadboard' providing a useful introduction to building techniques". Rob says he would not "hesitate to suggest to readers that they buy a copy".

ISBN: 190508620-2
PW Book Store Price: £18.99

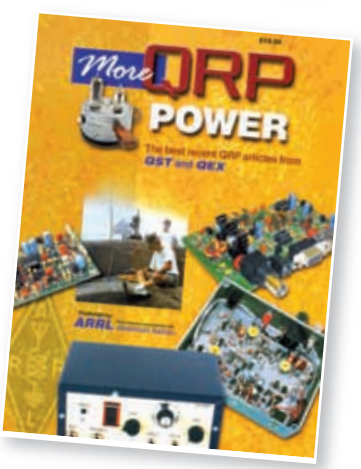


More QRP Power
Compiled by Mark Wilson K1RO
Published by the ARRL

The contents of this A4-sized 206 page book provides coverage on construction practices, transceivers, transmitters, receivers, accessories and the all-important antenna. Of particular interest is the section covering surface mount technology as well those on the construction of cabinets and enclosures. There's even an article on making a small instrument to help wind toroidal cores as well as some easy-to-make antenna ideas.

If QRP operating is your favourite area of Amateur Radio operating or you're thinking about giving it a try this book will encourage you to have a go. Rob G3XFD said after reviewing book "An excellent read, it's full of ideas and projects and is highly recommended".

ISBN:0-87259-965-5
PW Book Store Price: £16.99



For a good selection of Amateur Radio reading turn to pages 76 & 77 of this issue for a full listing of the titles currently available from the Book Store.

What are you waiting for? Place your order today!

To order please use the form on page 77 or call 0870 224 7830

Techniques for frequency modulation and demodulation.

Technical for the Terrified!

This month, Tony Nailer G4CFY describes the techniques required for frequency modulation and demodulation. Tony intends to make sure that any fear you have regarding f.m. techniques disappear quickly!

In previous articles, I've dealt with the reception of Morse (c.w.), amplitude modulation (a.m.) and single sideband (s.s.b.) modes. All these have one thing in common, they vary the amplitude of the signal as part of the conveyance of information.

Although the human voice creates large changes of amplitude in speech, the main manner of the conveyance of information is the tonal changes. In effect we speak using both f.m. and a.m! The a.m. is a result of the mechanism of the way our bodies generating speech and is not necessary to interpreting it.

When generating f.m. on a transmission it's necessary to limit the amplitude variations of the **lower** speech tones prior to **the audio** being applied to the modulator. Likewise, in receiving an f.m. Signal, to overcome the sensitivity of f.m. detectors to a.m., the i.f. signal is amplified tremendously and converted to constant amplitude prior to the detector.

The recovered audio is now a constant level. Even from one Amateur to another, provided their transmitters have the same deviation, they will produce the same audio level at the speaker. Strangely enough, the quality of the audio appears very good despite having only smaller changes in amplitude.

Generating Frequency Modulation

The classic method of producing f.m. is to use a reactance device to 'pull' a crystal in an oscillator up and down in frequency. Such a circuit is shown in **Fig. 1**. The circuit is a Colpitts Oscillator with a varicap diode forming part of the load capacitance for the crystal.

In the featured circuit I have made the feedback capacitors large at 150pF so their combined effect will be 75pF. If the crystal requires (lets say) 30pF to be on correct frequency, then the varicap diode in parallel with the trimmer capacitor must act in series with the 75pF to make 30pF.

Remembering that capacitors in series are calculated by Ct = (C1 * C2) / (C1 + C2). Let the varicap and trimmer capacitor be C1 and the 75pF be C2. The resultant value, Ct, is the required load capacitance of 30pF.

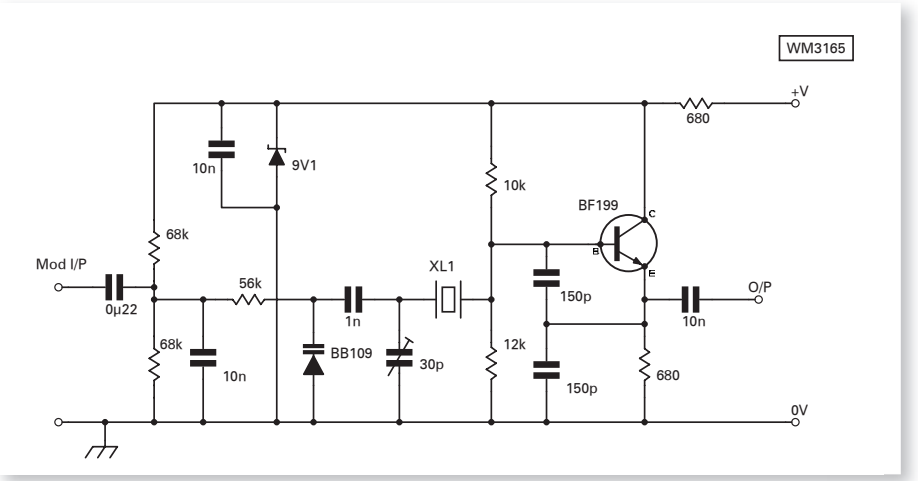


Fig. 1: A simple circuit to generate narrow band frequency modulation (n.b.f.m. Using a variable capacitance diode (varicap).

Using mathematical sleight of hand I find that C1 = (Ct * C2) / (Ct - C2).

Putting the values in gives C1 = (30 * 75) / (75 - 30) = 2250 / 45 = 50pF.

Looking at the data sheet in my 1975 *Siemens Data Book* I note that the BB109 varicap diode has a capacitance about 25pF at 4.5V and I chose equal values of resistor across the supply to provide this. The graph, **Fig. 2**, shows that for a sinewave swing of 3.5V p-p the diode will see a swing of 1V minimum and 7V maximum. This will give 42pF for 1V and 17pF for 7V.

With the trimmer adjusted for the correct crystal frequency, it should be close to 25pF. The effect of the applied audio then will be to swing the loading from 25pF + 17pF = 42pF on a positive peak and to 25pF + 42pF = 67pF on a negative peak.

I would need to try it out to determine what frequency swing such a circuit would achieve, but it would need to be about 280Hz at 8MHz for an f.m. deviation, multiplied by 18, to be 5kHz at 144MHz. It should be capable of this and the audio drive would be adjusted to achieve the required deviation. Incidentally, although the deviation is supposed to be ±2.4kHz in the Amateur service (we are actually using narrow band f.m.), if you use that amount you will be told you are too 'quiet'!

Note: All varicaps are actually reverse biased diodes and only have leakage of a few microamps. This means that the resistor of 56kΩ will not cause any measurable loss of applied swing. The 10nF capacitor acts with the 56kΩ resistor to form a radio frequency (r.f.) low-pass filter which prevents the oscillator signal escaping via the audio path.

The circuit shown in Fig. 1 could be used with a series of frequency multipliers, such as times three, times three and then times two to give 144MHz. For those interested in pursuing that theme, I refer you to Doing It By Design (*PW* July 2006), which explained frequency multipliers.

Demodulating FM

The f.m. signal, like its a.m. counterpart, contains all the elements needed to decode it. The a.m. signal has a carrier and two sidebands to mix with it to recover the audio, whereas the f.m. signal has an average centre frequency and multiple sidebands varying in frequency from the nominal.

Various forms of f.m. detector have existed over the decades, with the Foster-Seeley discriminator being very popular for many years in domestic broadcast receivers. One problem was that amplitude noise would degrade audio quality and the solution was to massively amplify the intermediate frequency (i.f.) signal and successively 'clip' it to remove any amplitude variations.

During the 1970s, linear integrated

circuits (i.c.s) were introduced with several stages of differential amplifiers to achieve the clipping function and the chip usually included a balanced mixer. The signal was split into two paths, with one phase shifted by 90° in relation to the other. The two signals were then fed to the balanced mixer and the audio was extracted.

Two classics among these f.m. demodulator i.c.s were the TBA120, used extensively in television speech sections, and the CA3089 used in domestic and car radios. A suitable circuit of a TBA120 used as a limiting i.f. amplifier and narrowband f.m. (n.b.f.m.) demodulator is shown in **Fig. 3**.

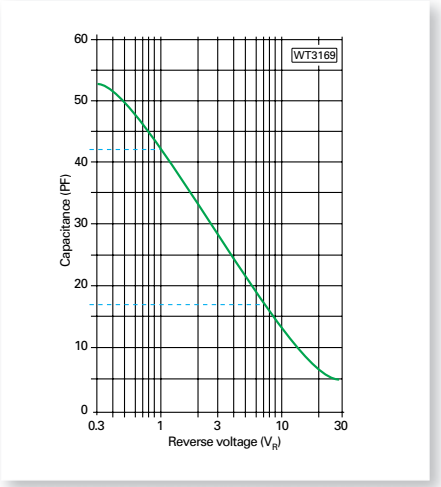


Fig. 2: A graph showing that, for a sine wave swing of 3.5V p-p, the diode will see a swing of 1V minimum and 7V maximum. This will give 42pF for 1V and 17pF for 7V.

Radio & TV Interference

Many transmitting Amateurs have had a problem with interference being caused on nearby domestic radio (BCI) and TV receivers (TVI). Years ago it was somewhat more of a problem than it is now, due to televisions being 'wide open' to r.f. overload from pick-up on the antenna, speaker and mains leads.

Morse and a.m. speech would cause a variety of nuisance effects to a television picture. But worse than this was that the modulator could be reproduced from the TV speaker in a fully comprehensible fashion. The neighbour then knew not only whose transmission it was but who you had been talking to!

And although s.s.b. transmissions were no better (in respect of causing TVI) but the neighbour would only hear 'Donald Duck' noises. Unfortunately, they could often still realise who it was causing the problems!

Modern EMC immunity regulations have forced manufacturers to considerably improve TV receivers performance in respect of out-of-band signals. Despite this, filters may have to be fitted to TV antenna downleads, and to loudspeaker or mains leads, to prevent h.f. signals getting into domestic receivers.

Providing a modern contrast, CB radio, and Radio Amateurs operating on v.h.f. have moved almost exclusively to f.m. (although s.s.b. is much used for long distance contacts). The modern f.m. transmission circuitry employs heavily clipped audio but it preserves the tonal quality.

On the 28MHz (10 metre) band where there's plenty of available space, a.m. is still popular around 29MHz, and n.b.f.m. is employed in the region 29.220 - 29.7MHz.

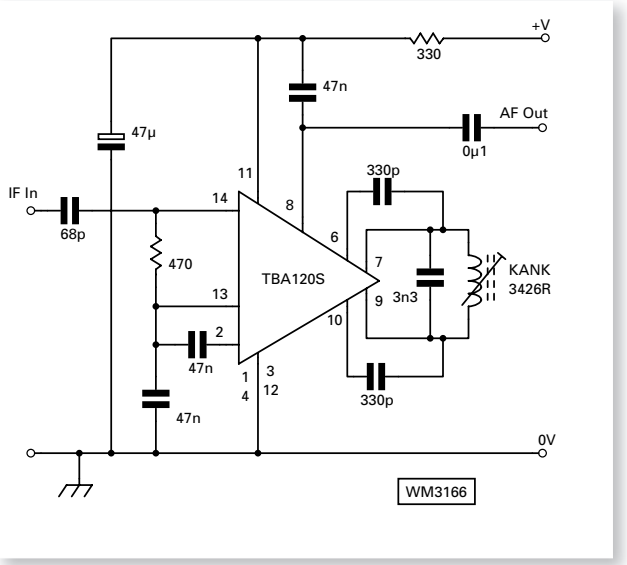


Fig. 3: The TBA120 was a popular i.c. used as a limiting i.f. amplifier and n.b.f.m. demodulator and has featured in a number of Amateur Radio projects.

Illegal CB Rigs

The illegal CB rigs, used extensively between 1976 and 1981, were a.m. transceivers. These - for reasons explained above caused havoc with televisions up and down the country. The (then) Radiocommunications Agency (RA) Radio Investigation Service received literally thousands of complaints from domestic TV users.

The British Government then decided to legalise CB, but at the same time chose n.b.f.m. to overcome the TVI problem. Strangely they decided on a band of frequencies absolutely unique in the World!

Modifying the CB rigs from the old band to the new band was a complicated job. Changing or adding the f.m. mode was relatively easy. The f.m. receive unit could be added by taking off a small amount of signal from the i.f. stages, and feeding it to a circuit as shown in Fig. 3. Then all we had to route the audio back to the main audio amplifier.

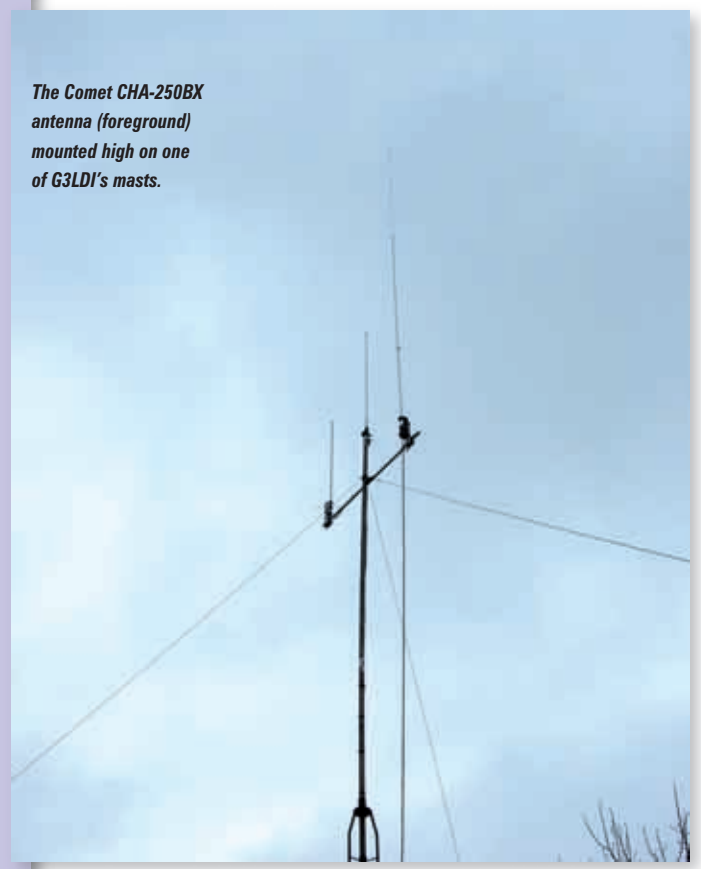
Making a CB able to produce n.b.f.m. on transmit was just as easy. All we had to do was to take some of the amplified audio from the modulation section, clip it and feed it to the varicap diode in the synthesiser!

An Eye Opener?

I hope that this article has been a bit of an eye opener and will encourage those worried about the technical side that it's not that hard! If you wish to correspond regarding this article or previous ones subscribe to the list **pw-g4cfy-on@pwpublishing.ltd.uk** by sending a blank E-mail with the word 'subscribe' in the subject box. When you receive confirmation from the server you can send an E-mail to **pw-g4cfy@pwpublishing.ltd.uk** and your comments will be answered by myself or the *PW* team. Cheerio for now. ●

Tony Nailer G4CFY
To subscribe to my readers' list, send a blank e-mail to: **pw-g4cfy-on@pwpublishing.ltd.uk** with the word subscribe in the subject box. When you receive confirmation from the server you can then send e-mails to **pw-g4cfy@pwpublishing.ltd.uk** and your comments will be answered by myself or the *PW* team.

The Comet CHA-250BX
Broadband GP Antenna



The Comet CHA-250BX antenna (foreground) mounted high on one of G3LDI's masts.

Our local club – the Norfolk Amateur Radio Club - has had an influx of new members over the last couple of years. They've been recruited mostly from local events, shows, science festivals and the like. The age ranges are varied, from as young as 13 to mature adults. However, nearly all have a common denominator and that's a small garden!

To talk about the installation of towers, multi-element beams or even long wires to the small garden owners is a waste of time and they probably regard such luxuries as impossibilities. However, there's a choice of multi-band verticals that can be used in the small garden.

Even so, some multi-band verticals can look enormous with their accompanying radials and loading coils but the vertical I've been testing has only one matching section at the bottom and no radials at all and would be fairly inconspicuous. The only disadvantage of this particular vertical is that it must be mounted about 10m (35ft)* in the air. The antenna is 7.3m (24ft) long, so again it might be difficult to achieve this height. The frequency range is from 3.5 to 50MHz, however, so it's a genuine multi-band antenna. The vertical arrived in a small cardboard box and the complete contents can be seen in **Fig. 1**, as I laid them out on my lawn.

***See reply panel from Nevada**.

No Gaps In Coverage!

The Comet CHA-250X broadband vertical antenna will (amazingly) cover 3.5MHz (80m) through to 50MHz (6m) with no gaps! Transmit range is 3.5-57MHz and receive range is 2-90MHz. with an s.w.r. <1.5:1. This 7.3m long vertical requires no radials and weighs only 3kg (7.1lb).

The antenna consists of five sections of aluminium tubing that slide into each other. The sections are reinforced so that the tubing does not distort when tightening the bolts that hold them together. The bottom

BAND	CHA	EVX
28MHz	5-8	5-8
21MHz	5-4	5-4/5
24MHz	5-7	5-8
18MHz	5-6	5-5
14MHz	5-4	5-3
10MHz	5-8	5-9 + 10db
7MHz	5-3/5	5-9
3.5MHz	5-9 + 10db	5-9

Fig. 2: Table showing performance tests of the review antenna and a comparative system.

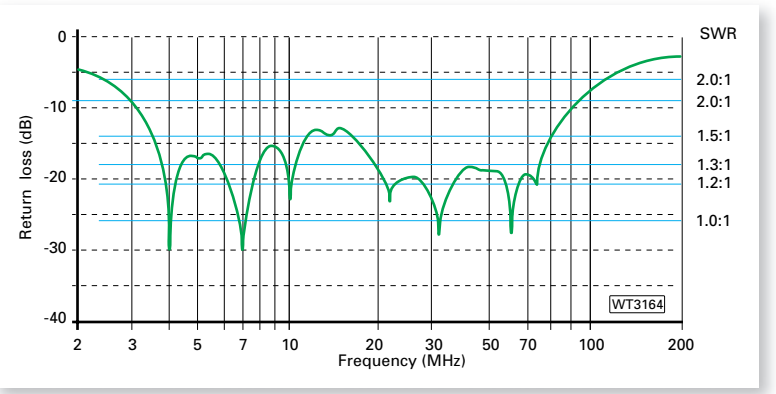


Fig. 3: Graph indicting v.s.w.r. measurements obtained by G3LDI.

Roger Cooke G3LDI has a truly superb antenna 'farm' at his Norfolk QTH and often reviews antennas on the air for *PW*. This time, Roger reports on a broadband antenna he's had for some months - enough time to give the CHA–250BX Broadband GP Antenna a good 'soak test'.

Fig. 1: The antenna before assembly, posed on a freshly trimmed lawn!

section has the 'magic' matching network built-in.

The topmost section is held in with two Allen screw adjustments. Only two simple measurements are required during the easy assembly. The manufactures claim it can handle 250W p.e.p. of s.s.b. and 125W of f.m.

The antenna has an SO-239 input and mounts on a 25 or 50mm(1 to 2in) mast (not supplied) and is rated for 108km/h (67mph) wind survival.

Limited Garden Space

As I've already mentioned, this type of antenna is best suited to Amateurs who have very limited garden space as it enables them to have all-band ability and I was pleased to accept the review commission to help those with lack of garden space.

Assembling the antenna is easy, just two tools are needed, one of which, the Allen key, is provided. There are no post assembly adjustments to make, so it's ideal for the raw beginner.

When assembling the antenna, I would advise using Penetrox (or other suitable graphite based electrically conductive paste) on each tube overlap. This will ensure good conductivity.

The matching network at the base of the vertical add to the weight and 3kg (7lb) of antenna at the top of a pole will make it vulnerable in high winds. However, it's quite easy to guy something like this and I think for a permanent installation, guy ropes are mandatory.

Performance Tests

I was lucky enough to have a Moonraker EVX8000 h.f. vertical here as well, so I did some comparative tests locally with my friend **Dave Johnson G3MPN**, who lives about 12km (8 miles) away.

The table shows the results of these tests. However, I don't suppose any assumptions can be drawn from these results although it was was interesting exercise! Dave mentioned that there seemed to be more QSB on the 'CHA for some reason. Incidentally, we cannot account for the large difference on 7MHz (See **Fig. 2**).

On the air results were similar, not much to choose between the two, except that neither antenna produced 'sock-it-to-them' results! But then they are multi-band verticals and both antennas did what it 'said on the tin', so to speak.

I worked quite a few European stations on both antennas and using the Comet I managed to 'crack' the 5A7A (Libya) pile-up on 7MHz. When I say 'cracked' the QSO, I meant that I worked them after a few calls but there was still quite a number calling him. I also worked a W4 in Florida on 7MHz, the 4O60BH special station (the on air 60th birthday party for keen DXer **Martii Lane OH2BH**), a 5Z4 (Kenya) on 21MHz and called into the Ex-G net on s.s.b. (All other contacts were on c.w). The 'CHA was about 12m (40ft) in the air, and the 'EVX was on a 3m (10ft) pole.

Note: I was following the instructions for both antennas literally, to get the best results! The instructions on the Comet suggested around 12m and the Moonraker recommended a height of around 3m.

The v.s.w.r. was reasonable over the bands tested, and the resultant graph can be seen in **Fig. 3**.

If you are limited for space and need an antenna for multi-band operation, you could consider the Comet CHA – 250BX Broadband GP Antenna as a solution and I thank Nevada for the loan of the review antenna. ●

Product: Comet CHA-250BX Broadband GP Antenna

Company: Nevada (UK Agents)

Contact
Tel: 023-9231 3090 FAX: 023-9231 3091
E-mail: **sales@nevada.co.uk**

Pros & Cons
Pros: Genuine wideband antenna, no gaps in coverage, easy to assemble.
Cons: Will require guying if mounted at height.

Price: £299.95 plus £10 P&P

Supplier
Nevada, Unit 1, Fitzherbert Spur, Farlington, Portsmouth, Hampshire PO6 1TT
Tel: 023-9231 3090
FAX: 023-9231 3091
E-mail: sales@nevada.co.uk

Mike Devereux G3SED, Managing Director of Nevada, comments: Hi Rob,
Thank you for providing a pre-publication copy of Roger G3LDI's review of the Comet antenna. Following our chat today I would like to add the following comments. Despite the manufacturer's recommendation that this antenna be mounted at 9m (30ft) or more, many customers tell us it actually performs very well even when mounted at 12 to 24ft (3.6 to 7.3m). My thanks for the review go to *PW* and Roger G3LDI.

Valve Power Supply Unit

There has been a resurgence of interest in valved circuits recently and many of them use voltages that are not usually available to many experimenters. If you've ever wanted to get into working with valves, then a general purpose power supply is essential to an electronic constructor and experimenter.

Most of us have low voltage supplies suitable for powering transistor based circuits but if the desire to play with valve circuits takes us, then a suitable power supply is probably not to hand. The purpose of this project is to provide in a self contained, compact unit most, if not all, of the voltages needed to power various valved circuits, including receivers and transmitters.

The unit generates current-metered high tension (h.t) of either about 320 or 220V at 100mA. The actual voltage is selectable when making the p.s.u. up. There's also a low current stabilised h.t. voltage, which switchable between nominally 100 and 150V. This stabilised voltage is suitable for supplying oscillator circuits). There's also a negative voltage of about -150V, that's typically used for negative bias in some valve circuits. Finally, there's a 6.3V a.c. heater supply at 1.5A.

Components are still available from various suppliers to build the unit completely from new but the experienced constructor with a decent 'junk box' may have many of the components to hand.

Circuit Description

The diagram, **Fig. 1**, shows the circuit for the complete power supply. The mains input to the unit is switched by S1 and fed to the primary of the h.t. transformer T1. The high voltage secondary of T1 feeds a bridge rectifier

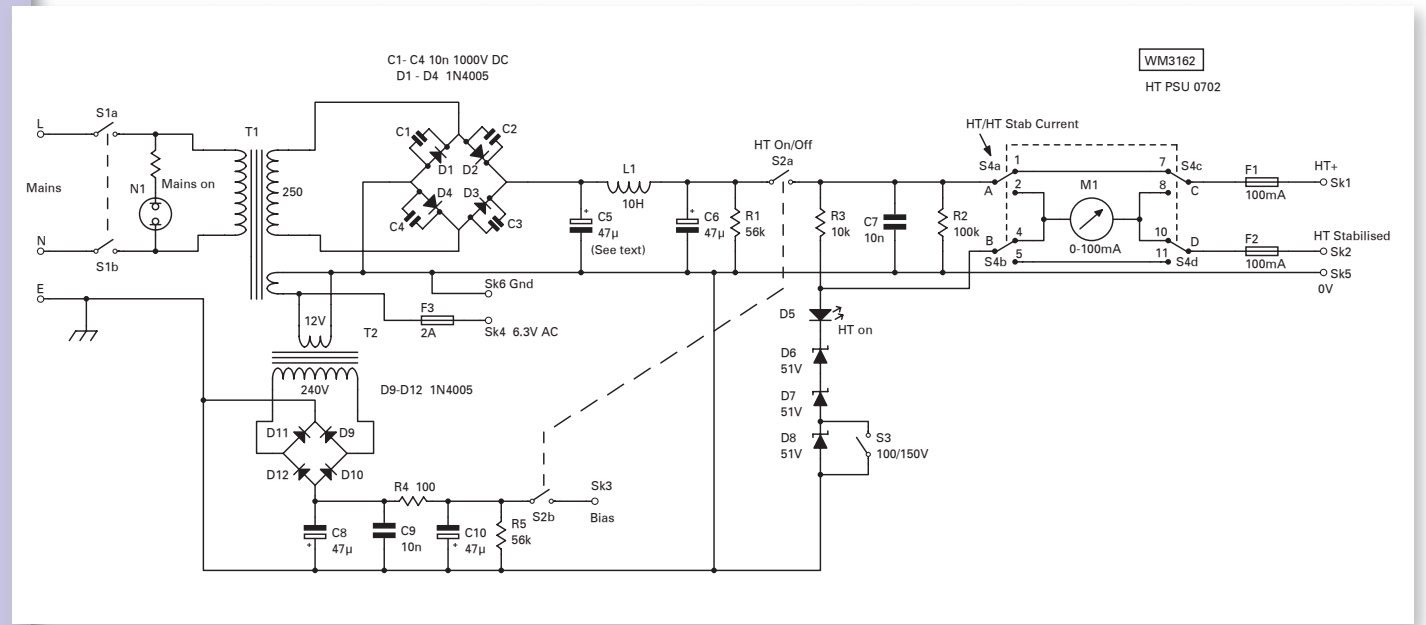


Fig. 1: The circuit of the simple, but versatile high voltage supply.

Stefan Niewiadomski needed a high voltage supply for a valved circuit he was working on. So, he made a universal unit that could suit your needs too!

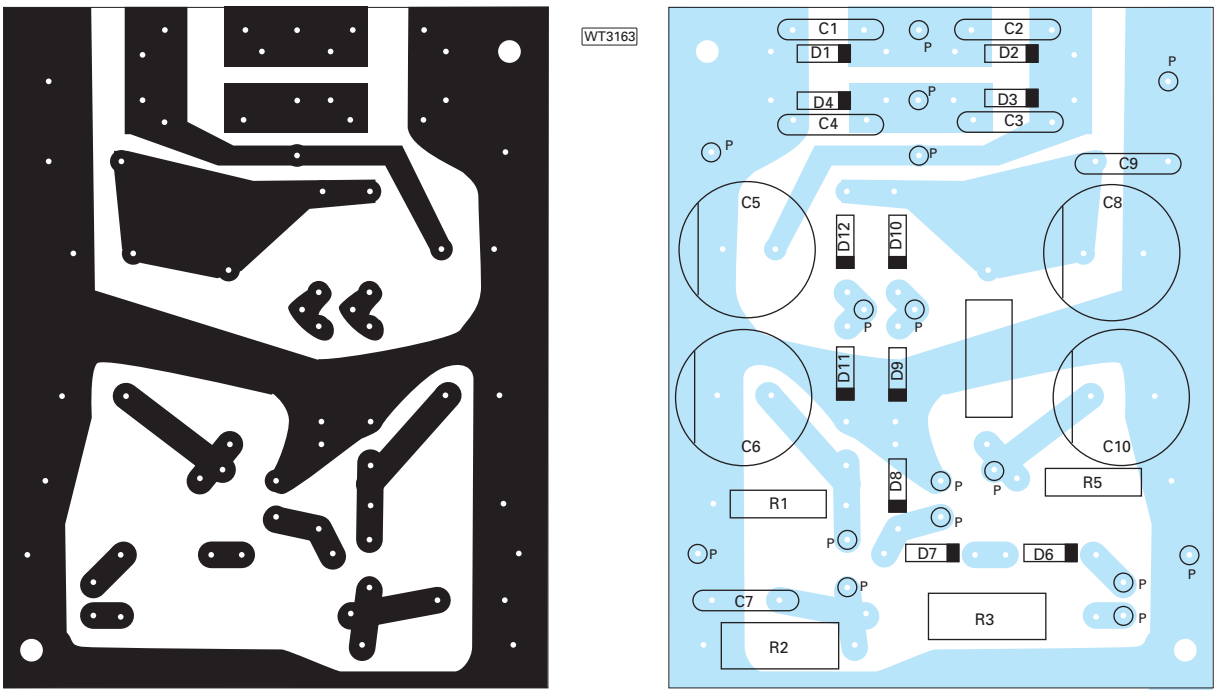


Fig. 2: A suitable printed circuit board, showing the track and component overlay.

consisting of D1-D4, the rectified output of which forms the unsmoothed h.t. supply. High voltage (1000V) capacitors C1-4 protect the diodes from any mains switching spikes.

The components C5, L1 and C6 filter and smooth the h.t. rail. For the safety of the operator, the high power resistor R1 bleeds the charge from C5 and C6 when the unit is switched off. It's at this point when building the unit, you can choose that the capacitor C5 can either be kept in circuit or omitted. With C5 in circuit, the smoothing and filtering arrangement becomes a capacitor input form. In this form, the circuit off-load output voltage is 1.414 times the r.m.s. value of the input. In the case of the stipulated transformer T1, the output is 240V from the secondary (or 340V).

Although the peak is 340V, due mainly to the action of the bleed resistor, R1, the actual output is about 320V with no load. However, if C5 is omitted the smoothing and filtering arrangement becomes a choke input type. This form of supply filtering generates an output voltage of 0.9 times the r.m.s. input. So, from the 240V input from T1, the output is about 220. The p.c.b. layout allows for C5 to be fitted or to be left out. An output of 320V from the unit could be a little high for some valve circuits, especially in receivers, but it could be useful for supplying a transmitter.

To isolate the output, switch S2a switches the h.t. on and off. At the same time, switch S2b switches off the negative bias voltage. Although both high voltages are switched off, the 6.3V heater supply is on. Any switching transients are removed by capacitor C7 and R2 discharges C7 when S2a is open.

The switched h.t. supply feeds panel mounted l.e.d. D5 and a Zener diode chain (D6-8) via resistor R3. To give two values of stabilised voltage (HTSTAB), switch S3 short circuits the lowest Zener diode. In this way the stabilised voltage output can be switched between nominally 100 and 150V.

Switch S4 allows either of the main h.t. or the stabilised outputs to have the output current monitored by the meter M1 with a full-scale reading of 100mA. This switch needs to be a break-before-make type so that the main and stabilised h.t. supplies aren't shorted together when S4 is rotated. To protect against short circuits on either output damaging the unit, 100mA fuses F1 and F2 connect the main and stabilsed supplies to SK1 and SK2 respectively.

Transformer T1 also has a 6.3V winding, which supplies this heater voltage supply to SK4 via a 2A fuse, F3. Another use of the 6.3V winding is that it's also connected to the 12V 'secondary' winding of T2. This transformer is operating 'in-reverse' so that in this application, the 12V winding is used as the primary. The normal 'primary' of T2 (usually connected to 240V mains in a normal application) supplies D9-12 again arranged in a bridge form.

Note that the positive side of the bridge fed from T2 is connected to chassis 0V. In this way a negative d.c. voltage is fed to C8, C9, R4 and C10 that smooths and filters this negative supply, labelled BIAS. This output is fed to the output on SK3. Capacitor C9 filters any mains switching transients from the negative supply. The action of resistor R5 is similar to that of R1, in that R5 discharges capacitors C8, C9 and C10 when the supply is turned off.

Construction

The prototype unit was built using a printed circuit board and housed in a two-piece aluminium case, size 200x152x76mm, Maplin AB15 or similar. The placement of the components is not critical and so tag board construction could be used.

The illustration, **Fig. 2**, shows the p.c.b. track-side and component layout for the board. Mount the components in ascending order of size, taking care to correctly orientate the diodes and the electrolytic capacitors, being especially careful with C8 and C9, which are orientated with their positive terminal

connected to ground. Insert 1mm terminal pins into the holes marked 'P' for the inputs and outputs to the board to facilitate inter-board wiring. I've found these pins preferable to trying to insert wires into the board itself.

As mentioned previously, C5 can be mounted on the p.c.b. or omitted, depending on the d.c. output voltage you require. Both R1 and R5 get a little warm in operation and so are both best raised off the p.c.b. a little to allow air to circulate under them.

I've shown the drilling details of the front panel, **Fig. 3**, that I used in the prototype unit. The front panel layout used is fairly 'tight' and so be careful when marking out and drilling the panel. Make sure you have all the panel-mounted components before you start drilling! The exact dimensions of switches, the neon, sockets, l.e.d., fuse holders and the meter from different suppliers may vary.

I mounted the fuse holders on the front panel of my prototype but if desired these can be located on the rear panel to make more space on the front panel. Hopefully, the fuses won't blow too often and so having them round the back won't be too inconvenient.

The only hole needed in the rear panel allows the mains cable to enter the unit. A rubber grommet should be used, and the cable clamped to the chassis inside the unit so that it can't be accidentally pulled from the outside. The earth wire from the mains cable is connected to the metal chassis via an earth tag.

If you expect to use the unit supplying close to its full load capability, it would be safer to drill a series holes in the case to aid ventilation, especially around T1. These can be seen in the photos of the unit.

Wiring Up the Unit

Thoroughly check the locations and polarity of the component on the p.c.b. and check that all the solder joints are good, with no solder bridges or shorts on the undersides of the board. Wire the p.c.b. to the various front panel mounted components and wire up T1, T2 and L1.

If possible, use an assortment of colours for the output sockets. I used:

Socket	Function	Colour
SK1	HT	Red
SK2	HTSTAB	Blue
SK3	BIAS	White
SK4	6.3V AC	Yellow
SK5, 6	GND	Green

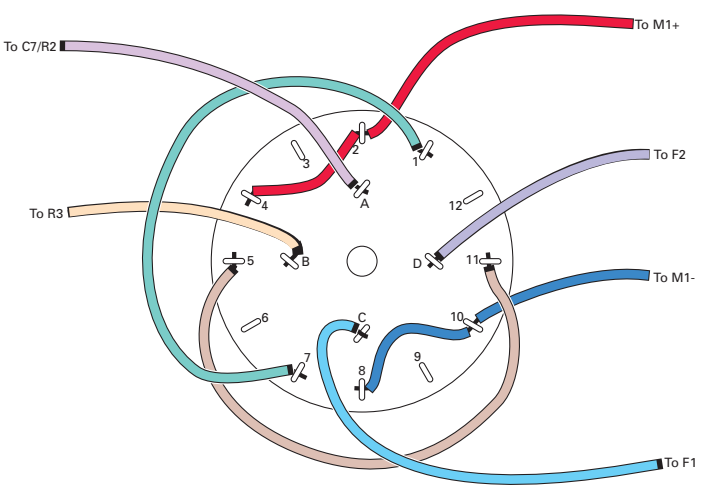


Fig. 3: Wiring the current monitoring switch, S4.

The four-pole, three-way (4p-3w) switch is wired as shown in **Fig. 3** where I've shown the contact numbers on S4. You should follow the drawing carefully to avoid damaging M1.

The switch S4 is most easily wired with the connections between contacts 1-7, 2-4, 5-11 and 8-10 are made first. Then flying leads may be connected to to contacts A, B, C and D. Finally, the meter connections should be made before being mounted on the front panel.

In spite of the switch being a three-way one, it's limited to using only two positions of the three available. The switch has a washer with a protrusion, which sets the number of ways the switch operates. This should be inserted into position 2 for this 2-way application.

The general arrangement of front panel, **Fig. 4**, and of the major components in the case is shown in **Fig. 5**. Again, be sure you have all the components to hand before drilling the case.

Double-check the internal wiring of the unit, especially the mains and h.t. wiring. Note the way the 12V winding on T2 is wired to the 6.3V winding of T1.

Now plug the unit into the mains, switch on with S1 and check that neon N1 and D5 (h.t.) lights. If D5 doesn't light, the chances are that it's wired the wrong way round and may need replacing if it's damaged by reverse voltage. Once this initial stage has been passed successfully, check that the following voltages are present on the output sockets, with respect to the ground terminals (SK5 and 6):

HT	approx +220V (with C5 omitted)
HTSTAB	approx +100V with SW3 set to '100'
HTSTAB	approx +150V with SW3 set to '150'
BIAS	approx -150V
6.3V	approx 6.3V (r.m.s.)

If required, the various supplies can now be loaded to check their regulation under different loads. The h.t. output supply can be loaded up to 100mA, by using a resistor of about 2kΩ. Note that the power dissipated by this resistor will be about 20W, so use a big resistor (or more likely use a combination of say 5W resistors) and be careful not to burn yourself.

The HTSTAB output is designed to supply only about 5mA, though this should be adequate for most applications, so resistors of 22 and 33kΩ will load this output for either the 100V and 150V settings.

A 4.7Ω resistor will load the 6.3V output to 1.5A, but again be careful of the power rating of this load. At around 1.5A, the resistor will dissipate around 15W.

In most uses, the negative BIAS output normally doesn't have to supply a great deal of current but it could be loaded to say 15mA with a 10kΩ resistor.

Using the Unit

The unit is very simple to use. Connect the HT, HTSTAB, BIAS (if used) and 6.3V heater sockets to the circuit being powered using flying leads plugged into the appropriate sockets. Set SW3 to 100V or 150V depending on the needs of the stabilised circuit being supplied.

The meter, M1 can be set to monitor either the h.t. or HTSTAB current being supplied, up to a maximum of 100mA.

Switch on the mains at S1 and check that the reading on M1 isn't excessive. S3 allows all the h.t. supplies to be switched off, while maintaining the 6.3V heater supply. This can be used as a 'stand by' function or as a way of making a quick modification to the powered circuit, without cooling down the valve heaters.

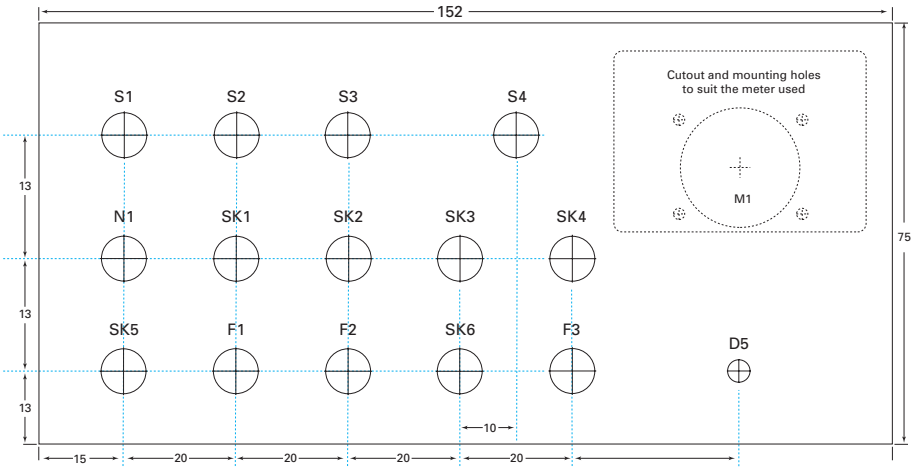
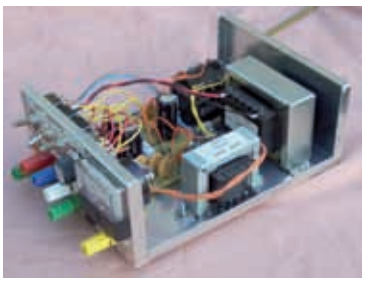


Fig. 4: My suggested layout of the front panel. Make sure that the items all fit in place before drilling.



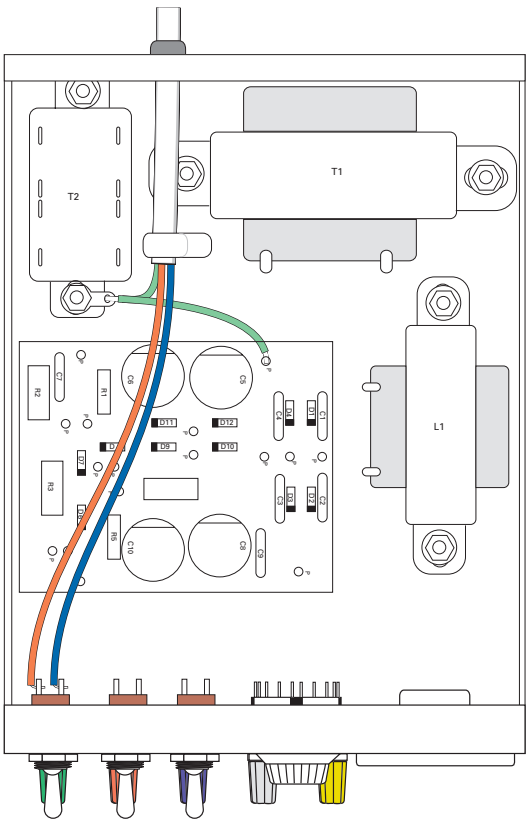


Fig. 5: A suitable layout inside the prototype unit.

Component List

R1, 5	56kΩ 2W carbon film (ESR Components or similar)	
R2	100kΩ 2W carbon film (ESR Components or similar)	
R3	10kΩ 5W wirewound	
R4	100Ω 2W carbon film (ESR Components or similar)	
C1, 2, 3, 4, 7, 9	10nF 1000V ceramic	
C5,6,8,10	47µF 450V radial electrolytic	
T1	'Valve' mains transformer 250V 100mA plus 6.3V 1.5A (Maplin XP27E / N90CC or similar)	
T2	240V primary 12V secondary (used backwards)	
L1	10H @ 100mA choke (Maplin ST28F or similar)	
D1-4, 9-12	1N4005 diode	
D5	Panel-mounting LED and mounting clip	
D6, 7, 8	BZX85 1.3W 51V zener diodes	
N1	Panel mounting mains neon	
S1	Mains on/off double pole toggle switch (Maplin FH39N or similar)	
S2	Double pole, two way toggle switch H.T. ON/OFF (Maplin FH39N or similar)	
S3	Double pole, two way toggle switch HTSTAB 100/150 (Maplin FH39N or similar)	
S4	4 pole, 3 way rotary break before make switch (Maplin FF76H or similar)	
SK1	Banana socket (red)	HT
SK2	Banana socket (blue)	HTSTAB
SK3	Banana socket.(white)	BIAS
SK4	Banana socket (yellow)	6.3V
SK5,6	Banana socket (green)	GND
F1, 2	Fuse holder (20mm) plus 100mA fuse.	
F3	Fuse holder (20mm) plus 2Amp fuse.	
M1	0-100mA panel meter	

Miscellaneous

Knob for S4. Printed circuit board. 1mm terminal pins. Case: 200mm x 150mm x 75mm aluminium 2-piece case (Maplin AB15 or similar), or to suit. Insulated connecting wire. Mains cable, grommet and cable clamp. PCB mounting screws and nuts. Earth tag, screws and nuts.

Modifications

As with any unit of this type, there are many options available in the exact way you build it. As mentioned earlier, C5 can be used or omitted depending on the h.t. voltage you want for your main supply. If the negative bias supply isn't needed, then T2, its bridge rectifier diodes, smoothing components, and SK3 can be omitted. The choice of T2 itself isn't too critical.

If the stabilised supply isn't needed, then R5 and the Zener diode chain can be left off the p.c.b., and S3 won't be needed. Alternatively if only 100 or 150V is needed, S3 can be omitted. If you decide to do without the ability of measuring the output current, then omit S4 and M1.

So, there you have it, a universal high voltage unit for valved work. •

Antennas & Feeders

I recently purchased the 'G2DYM Aerial' business and was instantly interested in learning all about dipoles and trap dipoles. The previous owner of the business had run it for 30 years and really was adamant that these things were aerials and not antennas.

To prove a point I looked up the definition of both words in my copy of The *Oxford Universal Dictionary*, *Illustrated*, Oxford University Press, 3rd Edition reprinted 1974.

Aerial, 1. "Composed of air. 2. Thin as air, ethereal. 3. Light as air. 4. Produced in the air. Etc. Aerial wire, a wire supported in the air for radiating or receiving the waves of wireless telegraphy".

Antenna. 1. "A sensory organ, occurring in pairs on the heads of insects & crustacea. "Two long processes in the male flower of certain orchids. 3. A wireless aerial 1902".

So now we know that 'aerial' on its own is to do with air. Aerial wire is what we call an aerial, on its own. An antenna is really an aerial, not the converse. I hope this is clear!

Editorial comment Thank you Tony: *The term antenna is the PW chosen 'house style' for a system/device radiating radio frequency transmissions!*

Half-Wave Dipole

One of the simplest resonant antennas is the half-wave dipole shown in **Fig. 1**. On my bookshelves I have a great number of radio books, including various editions of the *Radio Communications Handbook* by the RSGB, and several editions of the ARRL *Radio Amateurs Handbook* and subsequently The ARRL *Handbook*. Also *Radio Engineering Handbook* by Terman, *Principles of Radio Engineering* by Glasgow and *HF Antennas for all locations* by Les Moxon.

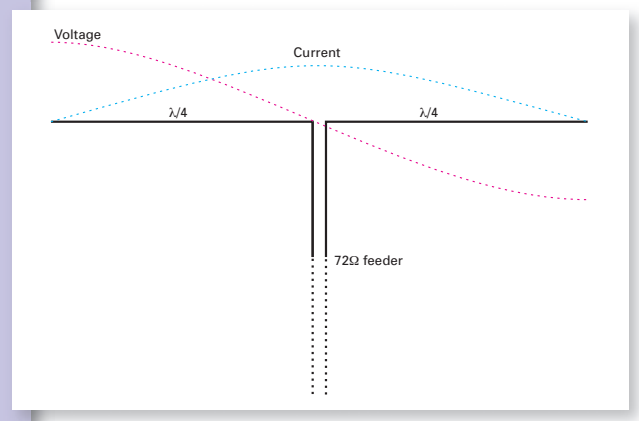


Fig. 1: Half-wave dipole showing current and voltage distribution.

In all editions of the ARRL Handbook there are handy graphs of radiation resistance versus height and also the effect of wire diameter in relation to length for half wave antennas. Copies of two graphs from the 1996 edition of the ARRL *Handbook* are shown in **Figs. 2** and **3**.

In the section on Multi-band Dipoles and Ground Planes in the 5th Edition, RSGB *Radio Communications Handbook*, Les Moxon introduces the following terms:

1. Characteristic impedance Zo.
2. Effective resistance Re, between the ends of the dipole.
3. Radiation resistance Rr. (**See Fig. 4**).

Also given is that $Re = Zo^2/Rr$. Also provided is a table giving length over diameter ratios, characteristic impedance for a quarter wave, end impedance for a half-wave, and centre impedance for a whole wave. However, no information is provided as to how the figures are derived!

None of the other books were of much help either. Some included really complex formulas, which were un-solvable without certain variables, which it would be near impossible to obtain. My friend, **Tex G1TEX** at *PW* had a look through their bookstore and his own books but could do no better than the *Radio Engineering Handbook* by Terman.

Impedance Tables

In the 4th edition of the RSGB *Radio Communication Handbook*, page 13.71 there's a table, which gives the ratio of length to diameter L/d, characteristic impedance Zo and End Resistance Re, for a half-wave and the wire length and diameter. Based on the length I have added the frequency of the dipole.

Readers will note that my calculated value of L/d (with the length in feet and the wire gauge converted to mm) differs from that given by the author by a factor between 1.58 and 2.02. This led me to consider the table as suspect.

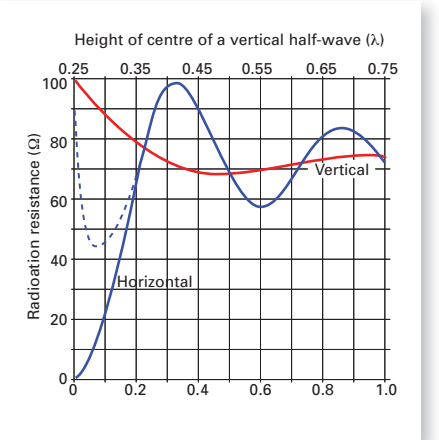


Fig. 2: Graph (reproduced by courtesy of the ARRL) showing the radiation resistance of vertical dipoles at various heights above ground.

In the 5th

Tony Nailer G4CFY looks at antennas from his designer point of view, passing on his years of experience gained with broadcasting systems.

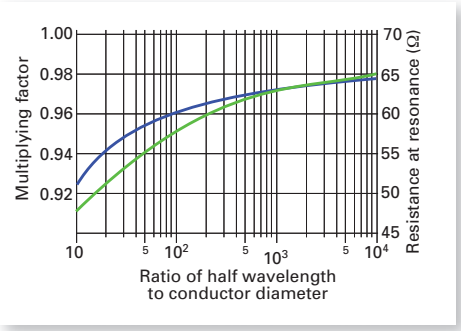


Fig. 3: Graph showing effect of antenna diameter on length for half-wave resonance *(reproduced by courtesy of the ARRL).*

edition of the RSGB *Radio Communications Handbook*, page 12.85 there is a similar table, this time giving End-to-End Impedance Ree, for which I have added the frequency and my own calculated L/d.

Finally, in *HF Antennas for All Locations* there's a graph on page 38 figure 4.13 for a half wave dipole. It's scaled in characteristic impedance Zo against the log of L/r. This produces a straight line, along which the author has marked points "for dipole for 2 metres and 2cm dia, 20 metres and 2cm dia, 20 metres and 12swg, and 80 metres and 18swg."

Again, I reproduce an extract from that graph giving L/d together with frequency and my calculated L/d. This last table at least achieve one entry for L/d, which agrees with mine. The characteristic impedance for the last two tables is about double that of the first table.

Characteristic Impedance

By chance, when leafing through the *Radio data Reference Book* by T.G. Giles G4CDY & G.R. Jessop G6JP, fourth Edition, RSGB, I came across the section on transmission lines.

It dealt with seven different types including twin wire, and coaxial, and a wire above and infinite plate. This last one could be an antenna wire horizontal over a good earth.

We are all familiar with the concept that coaxial cable has a characteristic impedance, such as 50Ω, or 75Ω, or even these days 92Ω. This is defined by the ratio of the diameter 'D' of the inside of the outer braid to the diameter 'd' of the inner core in the relationship and has to take account of the Dielectric factor E of the material between inner and outer.

Zo = 138 log (D/d)/Sqrt(E).

A piece of coaxial cable from my shack measured using a micrometer was 0.12in screen diameter, and 0.035in core diameter. Insulator, polyethylene with an E factor of 2.6

Zo = 136 log (0.12/0.035)/SqRt 2.6 = 45.1Ω. (Quite close).

Strangely enough, the same formula applies to a wire over an infinite ground-plane, provided the diameter of the wire 'd' is very small compared to the height above the ground plane 'D'.

Consider now a length of hard drawn copper wire with a diameter of 2.03mm suspended 7 metres (7000mm) above a perfect ground.

Zo = 138 log (7000/2.03) = 481Ω.

This result is in keeping with table 13.12 on page 13.71 of the RSGB *Radio Communications Handbook*, 4th edition.

Quarter-wave Line

Moving on, we'll now consider one half of a dipole as

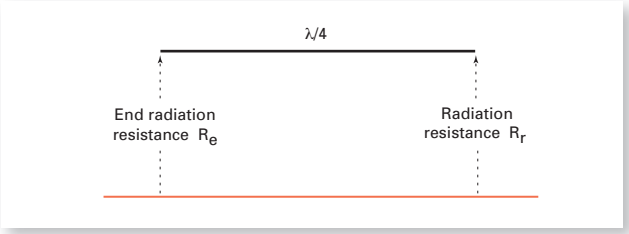


Fig. 4: A quarter-wave (λ/4)wire antenna above an infinite ground-plane.

Ratio L/d	Z_o	R_e	Band (MHz)	Length & diameter	Calculated L/d
15000	500	4200	7	20.13m(66ft) of 14swg	20101/2.03 = 9902
10000	480	3800	14	10.07m(33ft) of 14swg	10050/2.03 = 4951
5000	450	3400	28	5.03m(16.5ft) of 14swg	5025/2.03 = 2475
1000	350	2000	7	21.13m(66ft) / 31.75mm	20101/31.75 = 633
500	300	1500	14	10.07m (33ft) / 31.75mm	10050/31.75 = 316

Table 1.

Ratio L/d	Z_o	R_e	Band (MHz)	Length & dia./gauge	Calculated L/d
16600	1130	8750	7	20.13m (66ft) of 18swg	20101/1.22 = 16475
2500	920	5750	28	5.03m (16ft) of 14swg	4873/2.03 = 2500
320	655	2925	14	10.07m (33ft) / 31.75mm	10050/31.75 = 316

Table 2.

Ratio L/d	Z_o	Band (MHz)	Wire	Calculated L/d
5000	980	7	10.07m (33ft) of 12swg	10050/2.64 = 3814
500	705	28	10.07m (33ft) / 20mm	10050/20 = 502.5

Table 3.

a quarter-wave transmission line. This is where that formula Re = Zo^2/Rr comes into play.

It's well known that the radiation resistance at the centre of a dipole is about 72Ω. **This is affected by ground resistance as well as the effective height** but 72Ω is an average.

One side of the dipole will then have a driving impedance Rr of 36Ω. So taking the 481Ω characteristic impedance Zo determined above it's now possible to find the end resistance Re.

Re = Zo^2/Rr = $481^2/36$ = 6427Ω.

Contrary to popular belief, the end impedance of a dipole is not infinite! It perhaps would be - if the driving impedance were zero Ω – but it's not!

In a transformer the impedance ratio is the square of the turns ratio and the voltage ratio is directly related to the turns ratio. Applying this basic rule to the transmission line acting as a transformer, the voltage step-up should be the square root of the impedance step-up.

The end voltage Ve, divided by the feed voltage Vf will be the square root of Re/Rr. Then Ve/Vf = SqRt (Re/Rr). Likewise. Ve = Vf * SqRt (Re/Rr).

If the driving power is 200W to each half of the dipole and

P = V^2/Rr, then V^2 = P * Rr and V = SqRt (P * Rr).

V = SqRt (200 * 36) = 86.85V rms. Vpeak = 1.414 * 84.85 = 120V.

The end voltage Ve = 120 * SqRt (6427/36) = 1603V peak. Knowing Ohm's Law it's simple to determine the peak current Ip = Vp/Re, Ip = 1603/6427 = 0.25A.

Warning Note: When the Amateur Radio Licence full legal power limit is being run into a dipole at 7 metres above ground the end voltage and current are lethal!

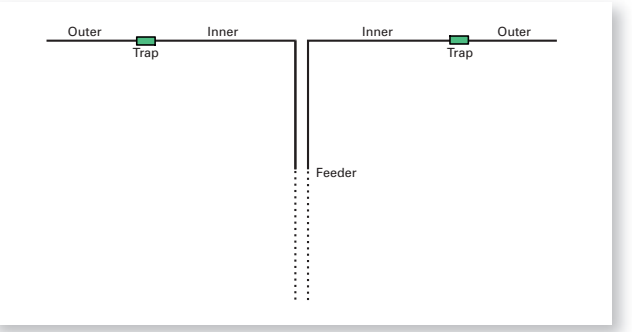


Fig. 5: A trap dipole, showing the inner and outer sections, either side of the traps.

Trap Dipole

Traps are parallel tuned circuits fitted to the end of an inner dipole, for example resonant on 7MHz (40m). Beyond the traps are outer sections of wire, which together with the traps, produce resonance on 3.5MHz (80m), see **Fig. 5**.

The traps add lumped inductance to the antenna and the total length need be only 32.9m (108ft) instead of 40.2m (132ft). This was the classic antenna developed by **W3DZZ** in the 1960s and resonates on the 80, 40, 20, 15 and 10 metre bands.

Similarly, the half size W3DZZ is a derivative of this antenna at just 16.45m (54ft) in length and this version is usable on the 40, 20, 15, and 10 metre bands.

The traps are resonant at the frequency of the inner dipole and as a result present high impedance isolation between the inner and out antenna sections on that frequency. With the traps having a *Q* between 75 and 200 the peak voltage across them would be enormous if the outer end was low impedance.

Fortunately, the outer section (being non resonant at that frequency) adds a very high impedance in series with the trap. Nevertheless, it's usual practice to use trap capacitors rated in excess of 5kV to avoid flashover.

Trap Not Resonant

At frequencies where the trap is not resonant, it acts as either an inductor to lengthen the effective length of the dipole, as on 80 metres, or as a capacitor which shortens the effective length. The now common construction of traps, using about 1.45 metres of coaxial cable wound on a plastic former, has an inductive reactance of about 150Ω and a *Q* about 85. This gives the series loss resistance as 150/85 = 1.76Ω.

The losses in one arm of the antenna will then be, the radiation resistance Rr, the resistance of the inner Ri, the trap resistance Rt, and the resistance of the outer section Ro. The radiation resistance is 36Ω. The 10m (33ft) inner section of hard drawn copper will have a resistance of about 8Ω, the outer section about 4Ω.

The current peaks in the middle of the antenna and it falls to a very low value at the end. The effect of losses in the end resistance can therefore be ignored.

Total antenna resistance RT = Rr + Ri + Rt + Ro = 36 + 8 + 1.7 + 4 = 49.7Ω.

The percentage loss introduced by the trap will be N% = (1.7 * 100)/49.7 = 3.42%.

If the trap can dissipate (let's say 10W) as heat, this is 3.42% of the power and as a result of this one side can handle 282W and the whole antenna 564W continuously. This means the trap dipole can handle well over a kilowatt of unprocessed speech.

Vitally Important

It's vitally important - to minimise pick up of noise and the generation of TVI - that dipoles and trap dipoles are fed with the two sides equally balanced. And although it's common for Amateurs to use coaxial cable up to a balance-to-unbalanced transformer (balun) at the feed point, this is a lossy, heavy, and relatively expensive technique. By far the best method is to use a 1:1 balun in the shack and then twin 75Ω feeder to the antenna feed point.

Little Published

There's very little in the way of published practical equations for the operation of dipole and trap dipoles and much of what has been published is conflicting or suspect. I'm sure there are Amateurs (and professionals) who do understand this stuff but so far have been unwilling or unable to translate it into print in a usable and understandable manner!

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rallies

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

2007

January 28
The Horncastle Radio Rally
Contact: Tony G3ZPU
Tel: (01507) 527835
E-mail: rallly@enlandrepeater.org.uk
This is a small informal event, with stalls selling items of interest for the Radio Amateur and computer enthusiast. Horncastle Youth Centre, Cagthorpe, Horncastle, Linconshire LN9 6HW Admission only £1. Doors open at 1030.

February 4
South Essex ARS Mobile Radio Rally
Contact: Ken
Tel: (01842) 861089
E-mail: www.southessex.ars.btinternet.co.uk
The South Essex ARS Mobile Radio Rally will be held at the Paddocks Community Centre, Long Road, Canvey Island, Essex SS8 0JA (southern end of A130). Doors open at 1030 and there is free car parking. Clubs may book tables to sell unused equipment and Amateurs are also welcome to book tables to sell any of their unused equipment.

February 11
Wakefield & District Radio Soceity
Contact: John Carter
Tel: (01924) 251822
Wakefield & District Radio Society are holding their Northern Cross Mobile Rally at Thornes Park Athletics Stadium on the A642 Horbury Road, Wakefield WF2 8TY. The dealers are on the ground floor and there is good disabled access. The Bring & Buy has booking in from 1015am. Doors open 1030 with disabled access also at 1015. There is ample parking on site and admission is £2.50.

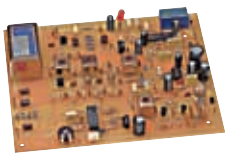
February 18
Swansea ARS Amateur Radio Show
Contact: Roger
Tel: (01792) 404422
The Swansea ARS Amateur Radio Show will be held at the Afan Lido, Aberavon seafront, Port Talbot SA12 6QN (1mile from M4 J41). Doors open at 1030. There will be a Bring & Buy and free car parking.

March 3/4
M0VOG Radio Club Rally
Website: www.firepowerradiorally.zoomshare.com
The M0VOG Radio Club Rally will be a Vintage Radio Display, Demonstration & Radio Junk Sale (no computers) at Firepower, The Royal Artillery Museum, Royal Arsenal, Woolwich South East London SE18 6ST. Doors open at 1030 on both days.

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off. Look out for representatives from *Practical Wireless* and *RadioUser* at rallies printed in bold.

SPECTRUM COMMUNICATIONS

STATION PREAMPS for 2 or 4 or 6metres. RF & DC switched. Adjustable 0-26dB gain. 100W power handling. **RP2S, RP4S, RP6S, PCB & Hardware kit £29. Ready Built £47.**



POUNDBURY SSB IF UNIT
9 or 10.7MHz SSB generator & receive IF unit with receive front end mixer. Incorporates a speech processor, double balanced mixer and crystal filter. Crystal carrier Oscillator. Receive IF amplifier, balanced demodulator and AGC generator, and S meter circuitry. Also a 1W audio amp. Supplied with a 9MHz 6 pole crystal filter and matching carrier crystal for USB generation. **PCB and component kit £82 50 including P&P**. Optional extras mic gain pot, volume control pot, £1.75 each, signal meter £9.00, 8ohm loudspeaker £2.00, P&P £1.50.

PORTLAND VFO as featured in March 2006 *PW*. 7-7.2MHz as local oscillator for a 40m direct conversion receiver or transceiver. Otherwise as 7.9-8.4MHz to use in conjunction with a mixer-vfo system as local oscillator for a 4 meter receiver/transmitter with a 9MHz or 10.7MHz IF. Available with Buffer 2 to drive a diode ring mixer directly or with Buffer 1 suitable for IC and mosfet mixers, including the MIXER-VFO unit. **VFO PCB with Buffer 1 or Buffer 2 PCB and parts kit with potentiometer £14.50.**
PCB and parts kit with drilled box £23 50.

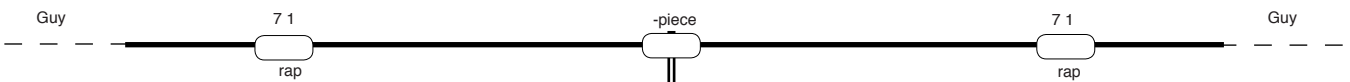
TRANSVERTERS for 2 or 4 or 6 metres from a 10 metre rig, or 4 or 6 metre from a 2 metre rig. Includes new overtone local oscillator, and integral interface unit. 20dB receive gain, 25W transmit power. Low level drive dual IF versions **TRC2-10dL, TRC4-10dL & TRC6-10dL**, high level drive single IF versions **TRC2-10sL**, **TRC4-10sL**, **TRC6-10sL, TRC4-2sL, TRC6-2sL.** Complete kit **£163.00**. **Built £244.00**

TRANSMIT AMPLIFIERS, for 2 or 4 or 6metres, single stage switched class AB linear. Diecast box with SO239 connectors. 1W to 5W drive, 8W to 30W output, Types **TA2SA, TA4SA, TA6SA**. **Complete kit £59.00, Ready Built £82.00**. 5W to 20W drive, 22W to 60W output, Types **TA2SB, TA4SB, TA6SB**, **Complete kit £65.00. Ready built £88.00.**

TRANSMIT AMPLIFIER & RECEIVE PREAMP, for 2 or 4 or 6metres. Receive gain adjustable 0-26dB gain. Switching for either part or straight through. RF & DC switched on transmit. Diecast box with SO239 connectors. 1W to 5W drive, 8W to 30W output, Types **TARP2SA, TARP4SA, TARP6SA**. **Complete kit £72.00, Ready Built £109.00**. 5W to 20W drive, 22W to 60W output, Types **TARP2SB, TARP4SB, TARP6SB**, **Complete kit £75.00. Ready built £112.00**.

3N201 MOSFET equiv. 40673 £2.25 each, P&P 75p any quantity.

G2DYM Aerials



Full size Trap Dipole, 108 feet overall length, for 80-10m parallel fed, also 160m as T configuration. Comprising two inner wires, two outer wires, two 7.1MHz traps, a centre piece, two end insulators, and 70 feet of 75 ohm twin feeder. 400W rated. Prices including carriage.
Light duty, for sheltered environment, 2.5sq.mm stranded top wire, **£167.00**.
Light duty, for sheltered environment, 4.1sq.mm hard drawn top wire, **£171.00**.
Medium duty, for typical inland site, 6sq.mm top wire, **£185.00**.
Heavy duty, for exposed site or rugged use, 10sq.mm top wire, **£207.00**.

Half size Trap Dipole, 54 feet overall length, 40-10m parallel fed, also 80m as T configuration. Comprises two inner wires, two outer wires, two 14.15MHz traps, a centre piece, two end insulators, and 35 feet of 75 ohm feeder. 400W continuous rated. Prices include Special Delivery or Carrier cost.
Light duty, for sheltered environment, 2.5sq.mm stranded top wire, **£143.00**.
Light duty, for sheltered environment, 4.1sq.mm hard drawn top wire, **£145.00**.
Medium duty, for typical inland site, 6sq.mm top wire, **£152.00**.
Heavy duty, for exposed site or rugged use, 10sq.mm top wire, **£168.00**.

Balun 1:1 ratio, 160 - 10 metres, air cored, 2KW rated. Low impedance in and out.
£40.00, carriage £3.00.

3.5MHz G4CFY traps. For use in a four trap 160 - 40 metre dipole 124 feet overall length. A design by W8NX, as published in QST July 1992. **£40.00 each, post £3.00 singly, or £3.50 pair.**

7.1MHz G2DYM traps. For the classic Full Size 80 -10 metre Trap Dipole. **£30.00 each, post £3.00 singly, or £3.50 pair.**

14.15MHz G2DYM Reyco Style traps. For the Half size 40 - 10 metre Trap Dipole. £25.00 each, post £3.00 singly, or £3.50 pair.

Mail order only. Prices include postage unless stated. Cheques payable to A.J. & J.R. Nailer.
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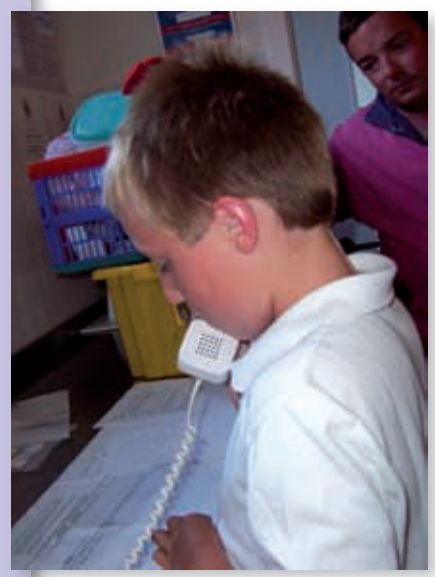
Amateur, CB, Hospital Radio Links, OB Links.

Neston Primary School

International Space Station Project



One of the Neston School's children speaking to the astronauts aboard the ISS. It all looks very easy but in his article Charles Riley G4JQX shares the adventures that led to the very successful 10 minutes and 15 second QSO!

I've no doubt that most readers will have heard about the **Neston Primary School's** highly successful contact with the International space Station. If you have watched the video on **Howard Long's** website **www.g6lvb.com** you will probably have shared in some of the excitement that took over the part of rural Wiltshire, in England's West Country.

It may also have looked all very easy but don't be misled! Behind that 'easy' ten minute contact was a vast amount of work by many people, which all had to come together for a one-off chance of a lifetime for some 20 school pupils.

The Beginnings

Following a business trip to the USA, and a chance meeting with a member of the original Apollo team, I was fortunate to get a look around Cape Canaveral (honest, it was a business trip!). While walking around we inevitably got held up, so I sat reading a staff notice board and there was a newsletter/poster, which detailed an upcoming contact between a school in Illinois and the *ISS*. I didn't know it at the time, but this was a notice about the first *ISS* contact with a school arranged by ARISS.

The Early Ideas

I'm a technical director for a large engineering company in the South West. For a number of years now, I've been increasingly concerned about the shortage of young practical engineers available to my profession who've wanted to have an engineering career **because they loved engineering**. The sort of youngster you see around with an instinct for engineering. Those that took apart their parent's TV when they were younger and didn't kill themselves in the process!

As a business we'd been involved with encouraging secondary school engineering education but it all seemed too late then. Would it be possible to excite the younger children?

I remember being seven years old and I staying up all night to watch the Moon landing (go on, work out how old I am!) and being inspired to enter engineering from that point onwards. Was it possible, I wondered, to get a Primary School involved in the Amateur Radio *ISS* (ARISS) contacts with a school? Would talking to a real life astronaut inspire children aged five to ten?

Approaching The School

Approaching a suitable school might be difficult. However, I was lucky because at the time I had a six year-old daughter at a local Primary School. The school is small, friendly and rural – the sort of school where you can walk in and talk to the Head Teacher. In December 2001, after a short meeting with the Head and subsequently a few of the senior teachers, I pitched the idea.

I asked, "What about some of the children conducting a live interview with an astronaut on board the *ISS* from the school?" A stunned silence followed! I left having committed myself to produce a proposal. (To be honest, I think that was the last time they expected to see me!).

It took a lot of gentle perusasion to get things moving. The task of communicating the seemingly impossible to the sceptical is a very gradual process! But after a lot of hard work, one day in the Spring of 2002, we found our application had been accepted.

Part of the deal of an ARISS contact with the ISS is that the school devotes part of its curriculum to space and the *ISS*. For the 2002/2003 Academic year the school committed itself and the whole curriculum was turned over to a space theme, **Fig. 1**.

The children participated in the Starshine Project **www.azinet.com.starshine** and began getting involved

Charles Riley G4JQX describes just what goes on to ensure an educational QSO with the International Space Station (ISS) is achieved. And it seems that you'll need 'space age nerves' to cope with the occasion!

in the activity on board the ISS. The other part of the deal is publicity for NASA, ARISS and the space programme in general and Project Starshine revealed to us how easy this could be polishing mirrors for the Starshine Project got the school onto the front page of the local paper. Space was, it seems, still an exciting media topic.

No Mobile Phone *ISS* Calls!

Ask any child these days, "what's the best way to get in touch with someone" and the inevitable answer is the mobile phone. The mobile phone has swept away the mystery of radio. Seemingly, there's nothing on the planet that can't be reached on the mobile phone, although it may take a satellite phone in some places. But then ask how you communicate with the *International Space Station*, mobile phone's don't work, it's then that the child's imagination begins to take over – the mystery is still there and so is the magic of radio!

Suddenly, radio becomes 'sexy' again and is the 'in' thing, rather 'cool'! The thought of talking to an astronaut over a radio system, doing something the average person in the street can't do – visualising antennas pointing skywards – suddenly meant that the project took on a life of its own. It began to inspire everyone involved!

Fig. 2: A 20m high scaffolding tower ensured the antenna system was well clear of obstructions, providing a horizon-to-horizon pathway for the QSO.

The *Columbia* Tragedy

The loss of the space shuttle *Columbia* on February 1 2003, was a major tragedy. I had come to discover that primary schools are - by their very nature - caring places. Great emphasis is put on self-awareness, attention to other's needs and the school creates a loving environment for its young pupils.

Of course, we had discussed what happens if something went wrong in space but we hadn't prepared ourselves for the loss of all seven of the *Columbia's* crew. The children knew their names, had E-mailed them and had pictures on the classroom walls.

When the *Columbia* was lost the children had a difficult lesson the disaster had proved that engineering in space is a dangerous business and that others risk their lives for our joint advancement. It was hard lesson for everyone involved. That group of children from the school in Wiltshire will never forget the *Columbia's* crew.

New Start & Prospect

Following the tragic loss of the *Columbia*, ARISS resolved to fulfil potential school contacts and finally the prospect of a contact window came close. In June 2003, we got a call from **Gaston Bertels** of ARISS Europe, advising us we had a window in July/August and could we hold the contact during the school holidays? We had already resolved to do so. Neston Primary School by this time would have got up in the middle of the night on a Bank Holiday!

Applications & Maths

At the start of the application I had done some simple maths. They were simple indeed, a simple free space path loss calculation suggested that a contact with the *ISS* on 144MHz is easily possible on a 5W hand-held and indeed is but it's not that simple!

Fig. 1: During the 2002/2003 academic year the school curriculum was turned over to an outer space theme, with the children thoroughly enjoying the various projects and the ultimate QSO!

Not many people have attempted a continuous horizon-to-horizon contact with the *ISS* and with 20 children wanting to ask a question of the astronaut and a window of 10 minutes 25 seconds maximum! The nature of the engineering changes and it's also also a one-shot affair no second chances and has to work on the day.

There's no chance to practice and virtually no room for error. Then you discover the *ISS* equipment isn't optimal on the frequencies concerned and things rapidly get marginal!

I did some work and eventually settled on an 8-element crossed Yagi with circular switchable polarisation. I estimated about 50W of f.m. to the antenna.

As luck would have it, the Neston Primary School site is terrific. It's on high rural ground with the only possible obstruction being the local village church. The early prediction suggested that the *ISS* path would drop to the horizon, neatly to one side of the church. We had full natural horizon-to-horizon visibility!

No second chances mean just that so we then thought carefully about the equipment. I opted for my ultra-reliable FT-847 that - despite masses of abuse - has never failed. I planned to use a traditional transformer/rectifier power supply capable of supplying 40A, which meant it would be 'idling' on the day because I wanted to avoid switched mode power supply complexity with all the possible noise problems. I also set about designing the circular polarisation harness, which I eventually abandoned in the interests of simplicity.

Fig. 3: This shot shows just how bright the film crew's lights were during the ISS QSO as both BBC and ITV cameramen were busy recording the occasion.

Scaffolding Tower

To make absolutely sure of getting the full horizon-to-horizon coverage, we arranged for the loan of a 20m builder's scaffolding tower this lifted the 8-element crossed Yagi clear of all obstructions, **Fig. 2**. We than carefully matched a pre-amplifier to overcome the losses of the cabling (and no more) we had over 100m of feeder and ensured we didn't degrade the FT-847's front-end (which is surprisingly good for a wide-band rig).

As I've mentioned before there are no second chances with this type of QSO so I abandoned the circular polarisation harness and all its switching. I did this because there were failure modes in the switching that could result in no path to the antenna should it fail.

We then decided to go for linear polarisation. switching, even if the coaxial relay fails and won't throw; at least one polarisation would still be available! We then decided in a bit more power to compensate for the 3dB polarisation loss if this happened and ended up planning to use 100W to the antenna.

The final problem was with the rotator. We needed an azimuth/elevation type and after approaching Yaesu, they graciously loaned us a G-5500. Our home-brewed attempts using a conventional rotator and a screw jack for elevation control probably would have worked, but the G-5500 is an acclaimed piece of equipment and operated faultlessly.

On the computer side we ran F0Dtrack, a DOS based tracking programme with an interface to the G-5500, which is used by thousands of Amateurs working satellites. Why DOS? Well, there were some nasty viruses running around at the time and we were operating from a school environment.

For visual tracking we used STS Plus simple enough for the kids to play with, DOS based and accurate enough for the day. In the end, we ran a big projection using the STS Plus and ran it on 10 school PCs for the visitors to play with and we managed to find time for a rehearsal, **Fig. 3**, with the chosen children practising their messages.

The Day Arrives!

The day arrived! We had expected a lot of interest but nothing could have prepared us for the day. We had an audience of 200, camera crews from the BBC and HTV. We also had sound reporters from radio stations and several newspaper journalists.

The BBC were making a *Newsround* film article and getting footage for the news. We supplied no less than seven individual audio feeds to the visiting crews. However, the careful planning of the EMC environment we were going to operate in went out the window because suddenly camera crews brought in their equipment.

High power lights were switched on, **Fig. 4**, and cables were everywhere. With 15 minutes to go to the contact we were getting crews to change their cabling and lighting arrangements the QRN was S8 across the band, and then suddenly we cured the problems, there was silence, no QRN whatsoever

The last few minutes as we watched the tracking software redraw the ISS visibility circle on the screen in front of us, were the longest of my life. I turned the squelch off to give me the reassurance that the rig was still alive. The noise from the rig was being amplified in the hall, and unnoticed to most, there was a subtle change in the noise level. The *ISS* had given us a call from below the horizon. The *ISS* circle of visibility on the screen then touched the UK and I put out the call.

The signal from astronaut **Ed Lu** on the *ISS* was 'end stopping'. I was initially expecting to have to hunt in the noise and I was so surprised I couldn't speak for a moment. Then we got to work, getting the children in front of the microphone, doing what we had practised. Astronaut Ed Lu was a true professional on the microphone.

Fig. 4: The rehearsal before the big day - with one of the pupils practising the QSO wording ready for the 'real thing'.

Fig. 5: Charles G4JQX (operator) and was especial grateful to Howard Long G6LVB, the AMSAT UK ARISS co-ordinator (on G4JQX's right) with TV producer David Rixon looking on.

The QSO was perfect! Doppler corrections were as predicted and there was one polarisation change from vertical to horizontal and back again as the *ISS* passed overhead. With 30 seconds to spare, I had the opportunity for a brief personal thank you to Ed Lu, before signing off, closing the station down as the ISS disappeared over the horizon.

The contact lasted 10 minutes and 15 seconds and it was a job well done! The media interviews lasted over two hours, and then it was time to pack up, go home and get some sleep. Even then, the task was not finished; we were up at 0600 hours the next morning getting the tower down!

Dozens Involved!

As you can well imagine, it's impossible to do this sort of exercise alone and cover all the various aspects as well as you need to. Dozens of people were involved and thanking them all would take up another article! Personally, however, **Fig. 5**, I'm indebted to Howard Long G6LVB, the AMSAT UK ARISS co-ordinator, who casually enquired if I needed some help about three weeks before the contact! Howard ended up providing extremely valuable technical support and took a heavy weight off my shoulders.

Without Howard, the visiting media would not have had their press packs, their audio feeds or their video feed in one case. Towards the end, Howard was existing on three hours a night sleep and still found time to be the rehearsal astronaut, give the children a presentation on the *ISS* using his inflatable globe (he even carries a spare!) and feature in some of the TV coverage. Thanks Howard!

You cans see the video and listen to the audio on Howard's website. Give it a look and maybe you too will be inspired to encourage your local school children into our fabulous hobby and maybe into an engineering career.

The RSGB sponsored a video of the event and it captures the tension and excitement perfectly. Contact Grindelwald productions for a copy (website **www.grindelwald.co.uk**) But be warned, if you do get involved in a school contact, the roller coaster ride is not for the faint hearted! ●

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revised *Shortwave Frequency Guide (11th Edition)* is a valuable reference document. It's about as up-to-date as you can get and was compiled with deadline of November 2006! There is a huge amount of information in the guide with some 8,985 broadcast frequencies along with full schedules for those stations. This is supplemented with an alphabetical list of all broadcast stations.

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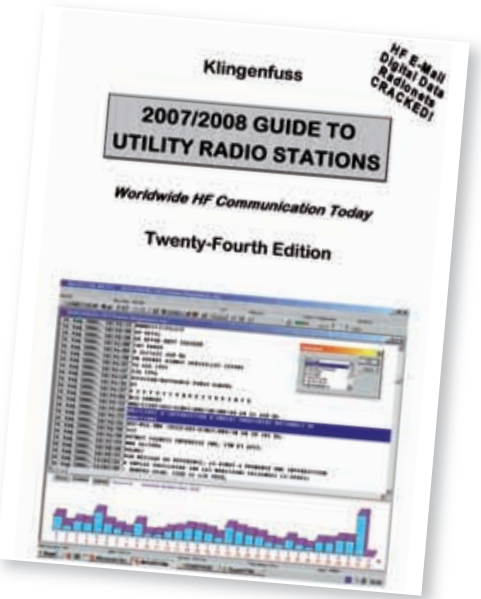

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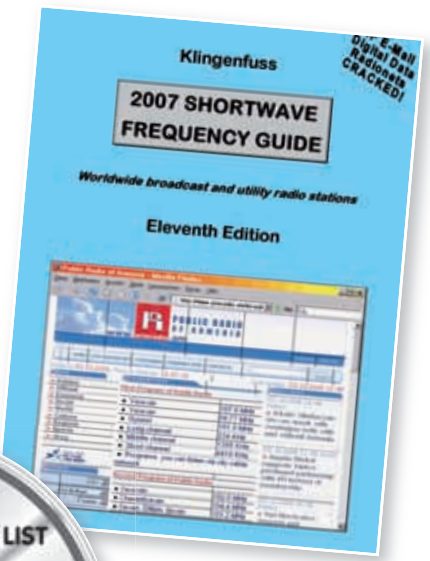

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Antenna Workshop

Coaxial Cable - Choosing and Using

Clive Smith GM4FZH takes the mystery out of trying to decide which coaxial cable is the most suitable for your purpose. It's easier than you think!

I have often been asked - how do you choose a coaxial cable? It's a common problem encountered by many Radio Amateurs, especially considering the number of cable types there are to choose from. You may want the cable for a main antenna feed, a connecting lead for test equipment, making a connection inside equipment or for the neighbour's satellite system.

I will concentrate here on the types of cable used by a typical Radio Amateur or short wave listener. I'm also not going to delve into considering the screened cables used in audio systems and set-ups.

When choosing a coaxial cable, the first choice is usually - is it to be a 50Ω or 75Ω system? Most Amateur Radio activity will involve cable suitable for a 50Ω system. But when we come to TV camera connecting leads, 75Ω cable is more usual, this then changing to 50Ω types when the transmit/receive side is reached. The following points certainly need to considered but in no particular order:

- The frequencies involved
- Acceptable cable losses
- Power to be used
- The length of cable involved
- Does it have to be outside
- Will it be buried or in the air
- Will it have to turn sharp corners
- How much shielding is necessary
- Cable size (diameter)
- The cost involved

I've included a table, **Table 1**, showing some of the more common types of coaxial cable available. The table is arranged in ascending order of cable outside diameter. Please note that there are some variations on some of the cable types, mainly of the RG varieties. The figures in the table are nominal and when making calculations, try to find out the manufacturers exact specification. In **Fig. 1**, I've shown the screen arrangement for two types of coaxial cable (braid and corrugated copper).

There often seem to be two qualities quoted for any cable, these are Standard and Military specifications. Always try to get the military specification cable if it's available, as the cable often has a greater amount of screening braid, along with often being slightly stronger.

Making the choice

The next consideration when choosing a cable type is; will it be used as a connecting lead or as a main antenna cable? For most short connecting leads (say 2m or less) the thinner more flexible cables, such as URM43/RG58 and URM70/RG59 types, are the best.

The very thin RG174 is most suitable for short lengths within equipment but because of the smaller diameter it's very easy to melt the dielectric and cause a short circuit. Solder with care - you have been warned! For sensitive test equipment leads a double-screened type such as RG223 is the best, as it minimises stray radiation.

For antenna main cable runs you must consider both the overall length and the maximum frequency that will be used. Again, in the Table, you'll find the relative loss per 10m at various frequencies for each cable type. You have to used this figure multiplied by the line length (in 10m sections) to work out the total loss to be expected.

Remember a 3dB cable attenuation is a loss of 50% of the transmitter's output power getting to the antenna feed-point. There's also a similar loss of signal from the antenna that arrives at the receiver. If you want to check the loss of a cable at particular frequencies I suggest you go to the Westlake website to at: **www.whwestlake.co.uk/interact/feederloss.htm**

At h.f. it's possible to use a cable such as URM43 or RG58 and I would suggest maximum runs of 30 to 35m with these cables. The length should include any runs of cable up to antenna itself. For overall lengths greater than this, you need to consider thicker cables. For 50MHz and 70MHz consider URM67 or RG213 as the initial options.

At 144MHz and above, you need to consider the actual line length more in depth. For shorter runs up to about 20m then the URM67/RG213 option is satisfactory but for longer lengths and if you are trying to dig out the weaker signals, then consider H100 or Westflex 103. They are more costly but then there's a big price hike to LDF4-50, which is not so easy to obtain anyway.

For short runs at u.h.f. (say less than about 10m) URM67/RG213 is suitable, but for medium runs (typically up to 25m) use H100 or Westflex 103. For longer runs it really should be LDF4-50 or one of its bigger and better siblings. Always use the best cable possible – especially if it comes at the right price!

Connectors

Now, let's turn to the type of connector to be used, as this may well be determined by the equipment involved. If at all possible use the correct connector at the ends, avoiding the use of adapters if possible. This is especially so as you move above the h.f. bands.

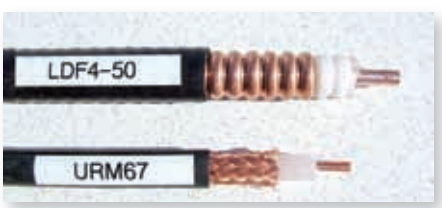

Fig. 1: Two types of better quality coaxial cable, the LDF4-50 is suitable up to u.h.f., while the URM67 type is more suitable for h.f. and lower v.h.f. purposes.

Fig. 2; The result of water entering the outer insulation of a section of coaxial cable and corroding the screen. Severe mismatch and its attendant losses can occur when this happens.

Cable Type	Impedance (Ohms)	Velocity factor	Nominal Diameter (mm)	Nominal Matched Losses per 10m (dB) 10MHz	100MHz	1GHz	Bend Radius (mm)	Screen type and material	Typical uses
RG174	50	0.66	2.8	1.08	2.76	11.15	14	Copper Braid	More suitable for use within equipment as the cable is very thin.
URM43									
RG58	50	0.66	5.0	0.4	1.3	4.5	25	Copper Braid	More suitable for h.f. and short antenna cable runs at v.h.f. Also useful for connecting leads.
RG223	50	0.66	5.3	0.39	1.35	4.75	25	Double silvered Cu. Braid	Very good as a connecting lead due to double screening.
URM70									
RG59	75	0.63	6.0	0.33	0.98	3.58	30	Copper Braid	Typical for video and/or connecting leads.
H100	50	0.84	9.8	-	0.44	1.33	60	Copper Tape and Braid	Suitable for antenna cable runs at v.h.f. and u.h.f.
URM67									
RG213	50	0.66	10.3	0.2	0.68	2.5	60	Copper Braid	Suitable for antenna cable runs at v.h.f. and shorter ones at u.h.f. Stiff as a connecting lead.
Westflex 103	50	0.85	10.3	0.09	0.32	1.3	55	Cu. Tape and Braid	Suitable for antenna cable runs at v.h.f. and u.h.f.
LDF4-50	50	0.88	16	0.066	0.22	0.79	125	Corrugated Copper	Suitable for long antenna cable runs at v.h.f. and u.h.f.

Table 1: A selection of the more commonly available coaxial cables, their parameters and uses. Although the LDF4-50 isn't so easy to find it's one of the best available.

For bands up to 144MHz the ubiquitous PL259/SO239 seems to be the choice favoured by manufacturers. I feel their use at 144MHz is questionable, as the plug/socket combination is of a non-constant impedance and reflections can occur on the cable usually becoming worse as you rise in frequency.

Certainly at u.h.f. the N-type connector is preferable, especially the higher quality types. Typical connectors to be found on test equipment are the BNC and N-type. **Be aware though, that there are both 50Ω and 75Ω versions – use the correct one**!

Use a connector that offers the correct cable entry arrangement. Both the BNC and N-type connectors have a much better cable clamping arrangement, with the N-type being preferred for outside use. With Westflex 103 it is possible to use off-the-shelf connectors but you may have to file down the centre conductor slightly.

It's possible to buy the correct connectors for Westflex, though they attract a premium price. But when it comes to Heliax cable, it is necessary to buy the correct connectors.

Power Handling

Be careful if you want to run full legal power using URM43/RG58, as it's only suitable for that power level up to about 30MHz. And even then I would recommend using URM67/RG213 or better. At the higher frequencies always use the better cables; it is going to hurt the pocket but you get what you pay for!

Bend Radius

If coaxial cables are bent too sharply deformation of the inner dielectric and screen can occur. Where such deformations occur, the impedance will not be the same as the rest of the cable and hence there's a mismatch. It can also reduce the voltage handling capacity of the cable so producing a 'weak point' in the power handling ability.

The minimum bend radius on most coaxial cables is usually five to six times the cable's outer diameter. As a good rule of thumb, keep the bend radius to at least 10 times the cable's outer diameter.

Outside Use

When considering outside use, whilst the pvc outer of a cable remains intact, then water should not enter. Despite this even a small nick can spell disaster. The photograph of **Fig. 2** shows what can happen if the outer pvc is broken or a connector is not fully waterproofed. The typical copper braid is very good at acting as a wick!

If cable is likely to be damaged or buried then protection is required. A common item such as a hosepipe will afford a fair amount of protection and it is relatively cheap. Heliax (LDF4-50 and its siblings) is by far the toughest of the cables and is usually the preferred choice for commercial sites.

The shield is formed by continuous corrugated copper so even a nick in the pvc outer will not allow water to penetrate the screen/inner conductor space. This cable can be directly buried due to its robustness. If several cables have to be buried then it might be worth using underground waste-pipe for protection.

Where cables are used outside all connectors should be protected from the elements and if they're exposed should first be covered with self-amalgamating tape and then covered with Denso tape. If possible, house the connectors in a box with the cables coming in at the bottom. Where cables enter a building they should have a 'drip loop'.

Getting the Cable

As with most engineering problems, there may not be a single choice and cost may come into play. It is worth spending the money in the first place and getting the best you can afford as it may mean that problems will be minimal in subsequent years. When running antenna cables you should also consider whether the cable can be used for more than one band by the use of filters, diplexers and antenna switches.

It will usually work out a lot cheaper if you can buy a 100m reel of cable (URM43, RG58, URM67, RG213, H100 and Westflex 103) but it does depend on the circumstances. Consider it if you can share a reel with a friend. Have a good look around the catalogues and magazines and go on-line as well.

Remember that there is always the carriage cost to be added if done mail order and a 100m drum of URM67 is heavy. Maybe it would be better to wait until you attend a radio rally.

Expect to pay serious money for the better cables and look out for lengths of Heliax cable such as LDF4-50 and the connectors at rallies. ●

More information

If you're looking for more information about coaxial cables, then I can recommend both the the ARRL *Antenna Handbook*, 20th Edition, Chapter 24 and the *VHF/UHF Handbook* from the RSGB, 1997, Chapter 12. If you have internet access, then try searching Google with the words 'coaxial cable' in the query slot.

Feature

See the Light!

keeping the display working on classic Yaesu rigs

Thanks to the kit provided by Teruhiko JA2SVZ, John G4ILA has a working display on his 'Classic' Yaesu rig.

Do you have an FT-101ZD, FT-107, FT-707, FT -901 or an FT-902 (later version) with a frequency counter integrated circuit (chip) that has ceased to function? If so, I might have the answer for you in the shape of a useful little kit from Japan.

The problem arises because the 40-pin MSM9520RS chip used in the Yaesu rigs I've mentioned is no longer available. Fortunately, Japanese Amateur **Teruhiko Hayashi JA2 SVZ**, has brought modern technology to the rescue. He has produced a kit, which replaces the counter chip on the display counter board PB-2086A with a pre-programmed microcontroller chip, the PIC 16F873.

I was renovating an FT-107M with a 'dud' counter chip, so I E-mailed Teruhiko at **thayashi@ta2.so-net.ne.jp** to check the cost of the kit. I sent the required £40 via PayPal and within five days I received an extremely well packed parcel from Tokyo containing the kit and an excellent 17-page A4 manual with colour photographs.

The Kit

The kit consists of eight resistors, two capacitors, a 20MHz crystal, a 2SC3605 transistor and a programmed PIC 16F873. There's also a 40-pin header, two 14-pin sockets, two diodes and a double-sided printed circuit board measuring 55 x 10mm. Incidentally, the resistors are very small, 1/6W, and it's a good idea to identify them with an ohm meter!

Modifying The Counter Board

I then had to start making the modifications to the counter board. The PB-2086A counter board has to be removed from the rig, simply by removing the four screws and the push-fit connectors. The 40-pin socket has to be removed by desoldering - I used a small solder sucker and a fine soldering bit.

The 6.5536MHz crystal on the board is replaced by the one (20MHz) supplied. Additionally, one capacitor and three resistors have to be changed.

The 2SC1674L is replaced with the higher gain 2SC3605 to increase the signal to the chip. (Although the pin outs for the two transistors are different they are clearly shown in the manual).

Two diodes have to be removed from the board to give the right offsets on the replacement chip. (The kit contains two 1S1555 diodes in case the automatic gain control (a.g.c.) diodes D01 and D02 have white markings on the cathode. On my board the cathode markings were black, so I didn't need to use the two diodes supplied).

Assembling The PCB

The next job was to assemble the p.c.b. I found that the board needs to be held in a small vice, or clamped with bulldog clips or similar, to keep it firm when soldering. Again, a very fine bit and fine core solder is necessary. I also found it most helpful to mark the top side of the p.c.b. with a fine marker, to show the hole corresponding to pin 1 of the old 40-pin chip, and pin 1 of the new 28-pin chip.

The p.c.b. has to be fitted with three resistors for the mode select logic, two biasing resistors, and one bypass capacitor. Note that the resistors are mounted vertically - originally I put mine in horizontally and then decided to change them!

Two 14 turned pin holders are then soldered onto the board to make a 28-pin socket for the programmed integrated circuit (PIC). If you build one yourself, make sure that you've got everything right on this board before going any further! Check it thoroughly with an ohm meter and make sure there are no shorts on it.

Completing Board & Header Assembly

The next stage was to fit the p.c.b. over the 40-pin socket in the

The Rev. John McKae G4ILA describes how he built the frequency counter replacement kit for his FT-107M. John found that an E-mail to an Amateur in Japan, brought a well packed kit to him in five days and it solved his problems!

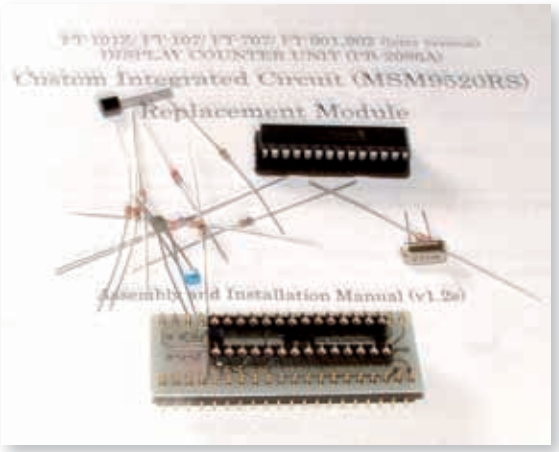

Fig. 1: Contents of the JA2SVZ kit.

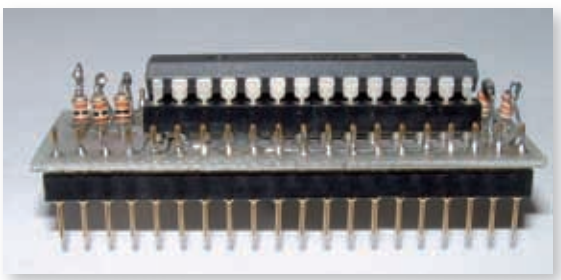

Fig. 2: 'Sandwich' of the PIC, holder, p.c.b. and 40-pin header.

kit, which has pins above the socket as well as below it. Once this has been done the top pins have to be carefully soldered. This completes the conversion board.

The manual then says that the conversion board should be fitted in place of the original 40-pin socket on the counter board. However, I decided to solder a 40-pin socket (turned pin) to the board and insert the conversion board into it.

The final stage was to insert the PIC into the 28-pin socket. Then I replaced the board in the rig and restored the connections.

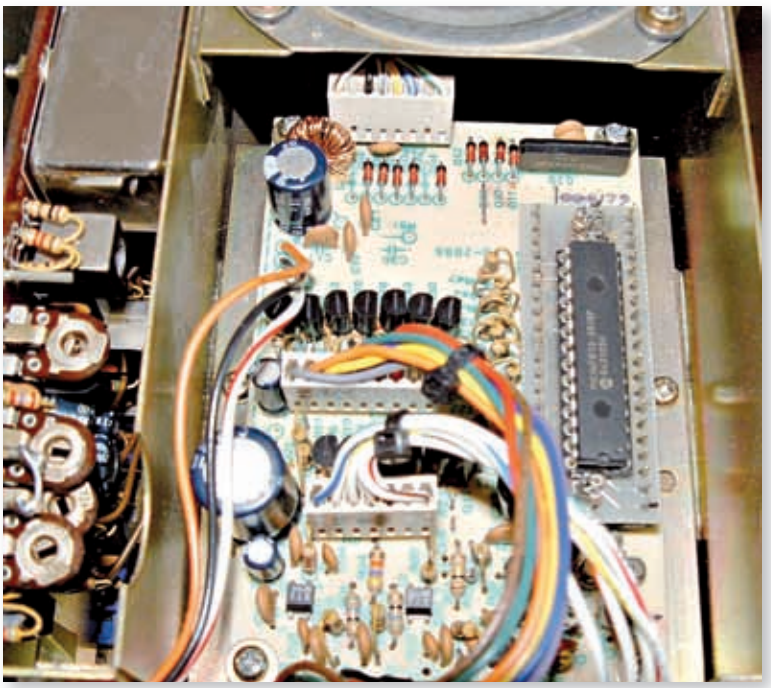

Fig. 3: The counter board on the FT-107M after John G4ILA's modificaitons.

Final adjustment

The manual describes how to adjust the crystal trimmer to get the most accurate read-out. It also describes the slight differences on the PB-2086A board for the various Yaesu models (the FT 901, FT 902), which can benefit from this modification is the later model with 'DIM' on the left side of the frequency display.

Altogether I was very pleased to get my display working and I found JA2SVZ a delight to deal with. I was very impressed with the speed with which the kit was dispatched, the careful packing, excellent manual and instructions, and high quality of the components. Thank you Teruhiko!

•

Carrying on the Practical Way

This month, the Rev. George Dobbs G3RJV describes some more receiver building blocks to add to your circuit collection but not until after you've read the quotation!

Rev. George Dobbs G3RJV
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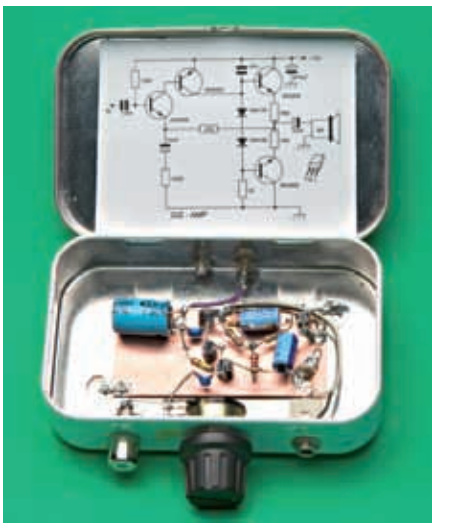


George G3RJV describes some more – extremely useful-circuit 'building blocks' this month. He starts off with an audio amplifier designed by an American friend.

"Don't throw away the old bucket until you know whether the new one holds water."
Swedish Proverb

Welcome to COTPW where, in my last column I discussed a small 'receive box' that could be used to build a direct conversion (DC) receiver in a number of combinations. As I developed this idea, I wondered about the possibility of using a simpler mixer unit with a number of other units to provide building blocks for a beginner to experiment with simple receivers.

Ideally, the simpler mixer would use cheap and easy to obtain parts, avoiding the use of integrated circuits (i.c.s). It would also be an advantage if each building block unit was useful enough to be kept with a view to using it in further projects. The aim was to build a few self-contained units that would be simple and utilitarian.

The first unit is an audio amplifier using four transistors rather than an integrated circuit. About the time I was playing with this idea, I was in touch with **Diz Gentzow, W8DIZ**, of 'kitsandparts' a small company in the USA known for its competitive prices on toroid cores (website **http://partsandkits.com/**). Diz had already sent me a circuit of a simple discrete audio amplifier for *Sprat*, the G QRP Club journal, and was happy for me to use it elsewhere. The circuit, **Fig. 1**, uses the cheap and easy to obtain 2N3904 (*npn*) and 2N3906 (*pnp*) transistors.

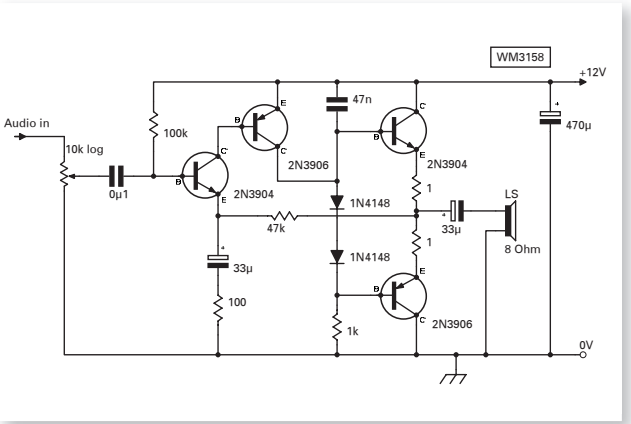


Fig. 1: The audio amplifier circuit, designed by Diz Gentzow W8DIZ, provides good results without using integrated circuits.

Studying Internal Arrangement

The circuit design comes from studying the internal arrangement of several common audio amplifier chips and transferring the circuitry to discrete components. It works well with a supply in the 9 to 14V range and drives a small loudspeaker or portable cassette player type headphones.

Note: Some extra gain could be achieved by shorting out the 100Ω resistor.

I built the circuit up, very quickly, 'ugly' style on a piece of printed circuit board (p.c.b.) material measuring about 60 by 25mm. The finished item fitted nicely into an *Altoids* mint tin complete with the volume control, a phono input socket and a 3.5mm jack output socket!

I could have shifted things around and found room for a PP3 9V battery but I thought a better approach would be to have an external supply, which could power more than one unit. A 1nF feed-through capacitor takes the supply to the amplifier but an insulated wire through a small hole in the tin would be fine.

The amplifier worked well the first time and provides a useful amount of gain. I christened it the 'Dizamp' and decided that this little unit is a 'keeper' for my stand-by shelf as it's a handy utility amplifier.

The Mixer

The next task was to build a mixer. My mixer circuit (used in the last edition of this column) was based on a commercial double balanced passive mixer. These are expensive so, a cheaper alternative is shown in **Fig. 2**. It's a single balanced circuit using a trifilliar transformer and a couple of diodes. The input signal is applied to one of the windings and the oscillator signal drives the common, centre-point of the two secondary windings. The mixed signal appears across the 1kΩ resistor and charges up the 22nF capacitor.

Ideally, Germanium diodes (1N34A or OA81) or Schottky diodes (BAT82 or BAT83) should be used for D1 and 2 but I used ordinary silicon diodes (1N914 or 1N4148). The Germanium and Schottky diodes have a lower forward voltage drop. Matching a pair of diodes for forward resistance with an ohm-meter is worthwhile, although I just picked two at random from my drawer of diodes.

Probably the most difficult part of the circuit is winding the transformer. The transformer is 12 turns of trifilliar wound wire on a ferrite toroid former. The former I used was an FT37-43 but any similar core would also serve and might be easier to wind.

In practice almost any ferrite core pulled out of the junk box would be suitable. The winding space demands a fine gauge of wire, I found that 0.3mm (32s.w.g.) enamelled copper wire worked well.

Trifilliar Winding Problems

Trifilliar windings can cause problems so perhaps a brief description is not out of place? L1, 2 and 3 are three lengths of wire twisted lightly together and wound on the core as one wire. Take three lengths of wire, each about 600mm (2ft) long. My method is to hold them side-by-side, tie a knot in one end and then secure the joined ends in a small vice or 'third-hand' soldering tool.

The wires are stretched side-by-side and another knot is made to join them at the free end. Experience has taught me that twisting the wires by hand is the

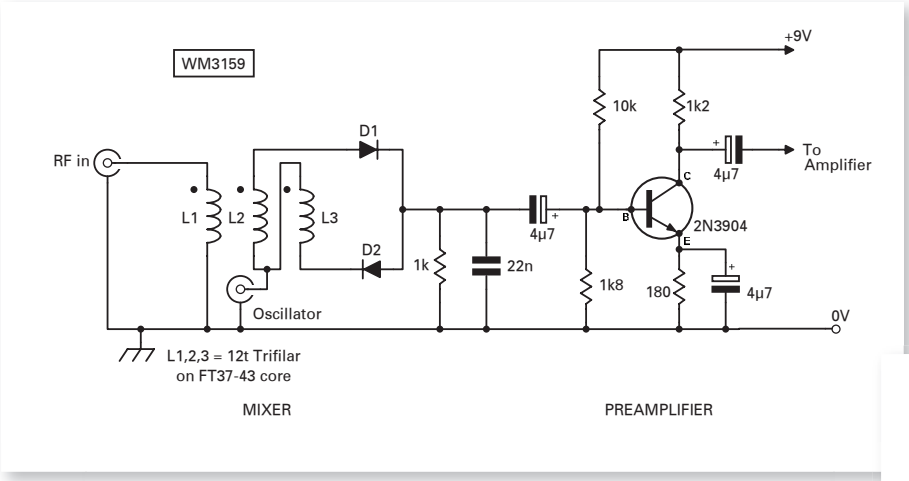
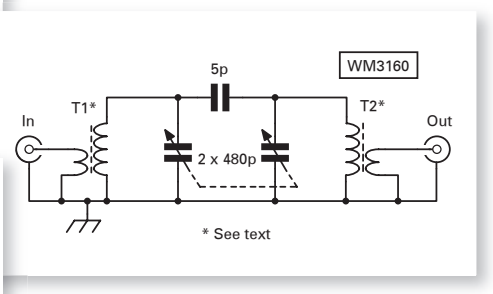


Fig. 2: The mixer circuit G3RJV chose is on the single balanced type, using a trifilliar transformer and two diodes.

Fig. 3: Band-pass filtering is essential for simple receiver circuitry. This circuit is of a tunable pre-selector to cover the Amateur bands from 7 to 28MHz. It originally appeared in Sprat, the G QRP Club journal in a design by W3TS.



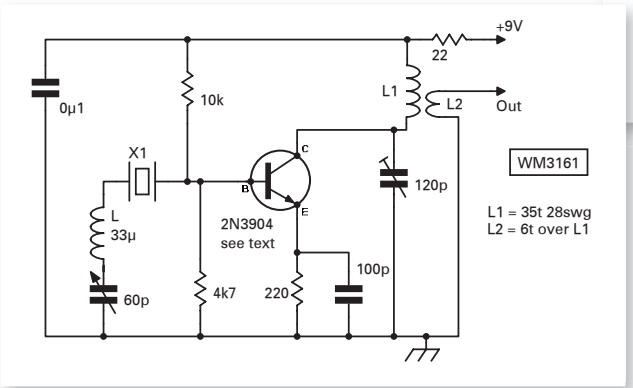


Fig. 4: George G3RJV found that the Utility Transmitter circuit's oscillator (published in April 1998) provides enough drive for the 'building block' mixer and it's shown again for reference.

easiest method. I usually slide a pencil through the inside of the free end of the three wires and 'twirl' it. As the twists are formed, I stroke them along the wires to keep the twists even over the whole length. (One twist per 3mm or about eight twists per inch are about right)).

The twisted wires are treated as one wire as the turns are added to the core. Remember that in toroidal core winding, each time the wires passes through the hole counts as one turn. The idea is to space the winding evenly over about three-quarters of the available core space. Once the winding is completed the wires at each end are separated and tinned with solder.

The top ends of L1, 2 and 3 have a small dot. This is to identify the same end of each of the windings. The vital thing is to get the phasing right, the right ends of the windings going to the right places. Using the ohms range on a multi-meter will easily identify the ends of each wire. It is essential that the correct wire goes to the right place in the circuit. The polarity of the diodes must also be correct.

The mixer requires quite a lot of oscillator drive. If using a simple diode probe to measure the oscillator output, attempt to get about one volt peak-to-peak going into the mixer. Unlike the commercial double balanced diode mixers, which use very thin wire, there's little risk of damaging these home-brewed mixer transformers.

I used my workbench signal generator to drive the mixer feeding directly to the 'Dizamp'. The arrangement lacked overall gain so I added the audio pre-amplifier shown in Fig. 2. It would be possible to add the pre-amplifier to the 'Dizamp' box but the pre-amp fitted easily into another Altoids tin that I used to house the mixer.

With the added audio amplification, I heard plenty of Amateur band signals when feeding a 7MHz oscillator signal to the mixer. I also heard broadcast breakthrough so the next requirement was input tuning!

Band-pass Filter

The obvious answer is a dedicated band-pass filter for the required band. But I decided to build a more universally useful input circuit that could serve for several Amateur bands. The circuit, **Fig. 3**, shows a tunable pre-selector to cover the Amateur bands from 7 to 28MHz. It originally appeared in the G QRP Club journal *Sprat* in a design presented by **W3TS**. In effect, it is two tuned circuits loosely top coupled by a 4.7pF (5pF)capacitor.

I made up a temporary version of the tuner on a scrap of printed circuit board (p.c.b.) attached to the two-gang capacitor. Two phono sockets, for input and output, were then mounted on the board with T1 and T2 directly wired to the relevant socket. However, the pre-selector should really be housed in a screened box, with the ground connections around T1 going to the ground on the input socket and the ground connections around T2 going to the ground of the output socket.

My temporary arrangement worked well and gave a sharp peak on 7MHz when the capacitor vanes were nearly fully meshed. In fact, at resonance the pre-selector becomes 'microphonic' and tapping the control knob on the variable capacitor produces a distinct 'ping' at the output of the audio amplifier. Again, I had made another little unit worth keeping as it can provide 'instant' input tuning for receiver experiments.

Initial Experiments

My initial experiments to test the mixer and amplifier was done with my workbench signal generator but, of course, any signal source at the required frequency and with enough output could be used with the units.

I had very good results using the Universal VXO, which I described in the last edition of this column. This can be adapted for several bands using the data given with the circuit last month. **Note:** The 'Slug VXO' described in the November COTPW does not give enough output to the mixer.

Looking around for other existing oscillators to use, I found the Utility Transmitter board I described in this column several years ago (*PW* April 1998). I tried feeding just the variable crystal oscillator (VXO) stage from this project into the mixer. The circuit of utility transmitter oscillator is shown in **Fig. 4**, and as it did give sufficient driven for the mixer, it could be quickly built if required.

The obvious answer is to use a v.f.o. (variable frequency oscillator) for the required band. But that would take the project up a whole stage in complexity! Perhaps readers will have a v.f.o. or two, around the shack that they can use? Anyone following through his article and building the circuits will end up with some handy little modules, worth keeping for future use!

●

In the Shop with Harry Leeming G3LLL

Harry G3LLL looks at the automatic level control system, discusses thermal run-away and advises on how to protect your signal generator.

Previously, in this column I have shown how we can tap into our brain's ability to sort out words under difficult reception conditions, by concentrating the audio response to the frequencies between about 1 and 3kHz. But how about the level of modulation?

Any s.s.b. transmission will be heard best when the audio modulation is as loud as possible. There is, however, a limit as to how much audio can be applied before the transmission will become distorted and will spread-out causing interference to stations on adjacent frequencies. (The same, of course, applies to a.m. and f.m. transmissions). As it's pretty much impossible to speak at a constant level, (especially if you are excited and chasing some rare DX!) it's necessary to provide some form of automatic level control (a.l.c.).

The a.l.c. system, which is used on most s.s.b. h.f. valve operated equipment, is pretty basic and is similar to that of the FT-101E shown in **Fig. 1**. The p.a. valves in almost all Amateur Radio rigs are operated in class AB1. In this mode the valves do not pass any grid current, unless they are over driven. If too much drive is applied on a speech peak grid, current will flow though R8.

The a.c. component of this is passed via C17 to the rectifier diodes, which form a voltage doubling circuit and generate a negative output voltage, this is stored by C18. This negative d.c. voltage is then fed-back to an earlier low-level driver stage, where it turns down the transmit gain, to stop the p.a. valves from being overdriven. The charge in C17 holds the voltage for a while and if too large a value is chosen, low level sounds that arrive immediately after a loud sound will be lost.

The a.l.c. system is rather like shutting the stable door after the horse has bolted, as it does not turn down the gain until after excessive drive has occurred. Fortunately, both r.f. and audio valve power amplifiers overload rather gradually and so as long as you do not go mad with the gain control or shout into the microphone, it works quite well. This allows a boost in average output as the valves 'flat top' slightly and acts as a speech compressor. Transistorised r.f. or audio power amplifiers are, however, quite a different story and must be operated so that they do not overload at all.

Budget Hi-Fi System

Some 30 years ago, I proudly demonstrated a budget d.i.y, hi-fi system to 800 people in the Windsor Hall, Blackburn. The system consisted of a 6W per channel stereo valved amplifier, which fed a pair of Wharfedale 200mm (8in) speakers, mounted in concrete drain pipes. To get sufficient volume for such a large hall I had to run the amplifier way beyond the point where the sound peaks were clipping somewhat but it still sounded good (it must have done, the shop I was working for got quite a few sales). If anyone were to try to entertain 800 people with a 6W transistorised amplifier, (or even to attempt it with some modern so called 100W amplified computer speakers) the distortion at a reasonable listening level would be intolerable.

While running audio transistorised amplifiers into distortion may produce unpleasant results, solid-state r.f. power amplifiers simply must not be allowed to operate so that they get anywhere near to their maximum possible output in radio transmitters. If they do become non-linear and cause interference to adjacent channels, it's known as 'splatter'.

Apart from the problems mentioned, r.f. p.a. transistors are expensive, difficult to replace and easily destroyed if overloaded. For these reasons the majority of solid state h.f. Amateur rigs are designed to produce a maximum of around 150W of r.f. output but are held down to their rated output of 100W by the a.l.c., to ensure linearity and reliability. The a.l.c. system on a transistorised r.f. power amplifier measures the power output and if this tries to exceed its rated output, instantly turns down the power.

Over the years, I've had many complaints from customers who have swapped a nominally 100W output valve rig, for a similarly rated transistorised unit and have noted that the output shown on their antenna tuning unit's meter, when speaking is much less than was registered with their valve operated rig.

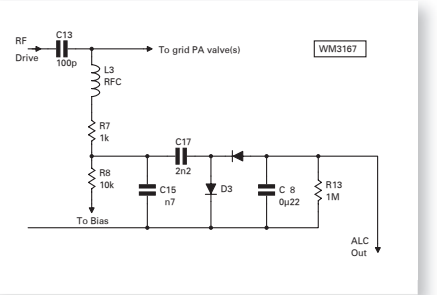


Fig.1: A typical automatic level control, this one is from an FT-101E.

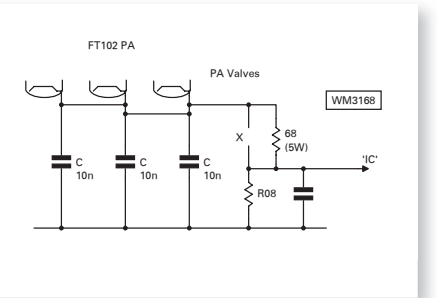


Fig.2: An additional 68Ω resistor in the cathode line of the 3 p.a. valves can help reduce the chances of thermal run-away.

This is just a fact of life, you can't 'talk-up' a transistorised rig, the a.l.c. system used prevents it.

Of course, they may chop the circuit around, though you will always find the screwdriver wizard who thinks that they are being clever when they adjust the a.l.c. system on a solid state rig to give more output; in reality they being anti social and are risking damaging their rig; all for a gain, at the receiving end, of about a quarter of an 'S' point. Having looked at automatic level control systems, next time I will look at speech clipping.

Thermal Run-away

It's well known that as a transistor warms up, the current it takes will increase. As it is then taking more current, it will get hotter still and so take even more current and get hotter again! Before you know where you are the whole thing can snowball, the current goes sky high and the transistor is burn out.

The 'runaway' scenario is inherent with transistors and the problem is dealt with by adding extra circuitry, and in the case of transistor power amplifiers, the use of heat sensing diodes. What is not always appreciated is that, this effect can also occur with valves!

The FT-102 is very susceptible to the

problem. It's designed to produce about 170W maximum and so give a very clean output when operating at around the 100W level to drive a linear amplifier. To achieve this, three 6146B valves are operated in parallel but unfortunately, they are rather near to each other and can tend to warm each other up. This can cause the p.a. stage to go into thermal run-away, which if not spotted, can cause a lot of damage, especially if the correct value of quick blow fuse is not fitted

To protect yourself from unnecessary expense when operating the FT-102 or any other valve rig, always leave the meter switch set in the 'IC' position and keep a watchful eye on the p.a. current. If the standing current starts to creep up appreciably during a long over, the current in the p.a. stage is starting to 'run-away'. Make your apologies quickly, go back to receive and let things cool down. This is not terribly convenient, so how about a cure?

An obvious first move is to ensure that the ventilation holes around the power amplifier stage are not blocked with dust and that the fan is clean and well lubricated. If after doing this the p.a. current still tends to creep upwards, you can try a new set of p.a. valves (expensive) or investigate the possibility of fitting a more powerful fan, (noisy?).

I have tended to favour modifying the bias arrangements by adding some cathode bias, in addition to the fixed bias as shown in **Figs 2** and **3**. If the cathode current tends to increase, so will the voltage across the 68 resistor; this will increase the effective bias voltage and limit the rise of current.

When carrying out the modification check the connections with an ohmmeter, be absolutely certain that the original shunt resistor, R08,is connected between the chassis and the end of the new resistor and that the meter feed runs from this point. This modification will reduce the rigs output by about 20%, which no one will notice but it will make thermal run-away much less likely.

Problems with an FT-225RD

I received an E-mail from John advising me that his 25W 144MHz base station would only give out about 1W and did I have any suggestions?

Of course, with most rigs the chief suspect for a fault like this would be the p.a. transistor but the FT-225RD often has problems with output power, when this is perfectly okay. This common fault can be traced by careful visual inspection of the low-pass filter coils in the 'Booster Unit'.

Fig.3: The new resistor is added to the right-hand terminal, marked 5.

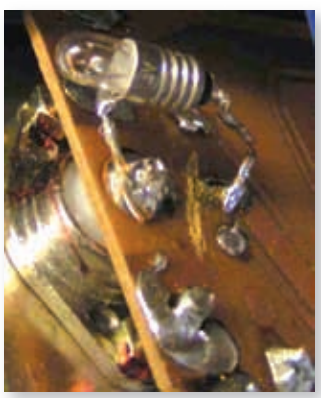


Fig.5: Adding a 6V/100mAbulb to the output socket of your signal generator, should protect it if you inadvertently transmit into it.

Fig.4: A replacement coil for an FT-225RD, wound on a 2.5mm mandrell.

Two of these coils are wound on ferrite cores and these cores have a tendency to disintegrate into white dust, if they become overheated.

Once the faulty coil has been spotted, a replacement is required but as the rig is over 20 years old it might not be easy to find. Fortunately, making a replacement low-pass filter coil is quite a simple d.i.y. task.

Take a small electrical screwdriver that's about one tenth of an inch thick and a short length of 20 s.w.g. tinned copper wire. Wind five turns on the screwdriver with a little to spare at each end, as shown in **Fig. 4** and you'll have your replacement coil. Once this has been fitted and the booster unit reassembled, peak the two trimmers TC03 and TC04 for maximum output and the job is finished. The cost of the parts is nil. This tip was passed onto me many years ago and has enabled me to fix quite a few of these rigs.

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Harry's waiting to hear from You!
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Remember the mains supply is potentially lethal. Unless you really know what you are doing, always pull the mains plug out, do not just switch off at the wall socket, when working on equipment.

Protecting your signal generator

Probably, like myself, many readers have a professional grade signal generator that they purchased 'for a song' at a rally many years ago. Such an item may not be used very often but it's indispensable on the occasions when it s needed. They are not that easy to replace and are very easily damaged in the Amateur's shack.

It only takes a seconds inattention when checking a transceiver to accidentally key the microphone (or worse still the Morse key) and before you realise enough power to burn out the attenuator can then be 'squirted' into the generator.

Having had one or two near misses in the past, I now protect my equipment with a very simple fuse unit, which I keep in-line all the time and which I made from a scrap CB s.w.r. meter. Simply unsolder (or cut the track) going to the centre connection from one of the SO239 sockets and then reconnect the circuit from the meter to the socket via a 6V 100mA lamp. The output of the generator then has to flow through the lamp and this acts as a fuse, protecting the generator from any accidents. A small loss of about 3 or 4dB will result but this can be allowed for if any exact measurements need to be made.

See you in a couple of months!

Feature

The QRM Dilemma & POSFOPs

Inspite of the advances made in filter techniques in the last 60 years, the problem of another station appearing more or less 'bang on' your frequency - and with the same signal strength is largely unresolved. For example, as I type this on my battered old mechanical tripewriter (not a misspelling) I've just come from trying to work a G station on 3.5MHz c.w. and after we had just exchanged reports, another station came on the same frequency calling "CQ".

Immediately, I can imagine 99% of my readers saying, "Typical loutish behaviour, never listens before transmitting - knows there's other stations on frequency, ignores them anyway and blasts away on the key, etc. " Well, all that might be true, but for the purposes of this article it's necessary to leave the rights and wrongs to concentrate on what to do next.

Shifting Frequency

In my case I always try to shift my frequency slightly so that I shall be slightly clear of the QRMN and then also ask my station "(the station I'm working) to do the same. However, if the other station is lacking in experience, they may not be expecting me to have moved and will think the QSO has ended. Because of this it's important to suggest QSYing (changing frequency) slowly, with plenty of repeats to alert the other station of my frequency change.

My approach may be considered reasonable, except that (unfortunately), there are many active stations that have never concentrated in sharpening what I regard as their poor operating skill factor and my attempts to get them to QSY often results in failure.

A typical - completely flummoxed - POSFOP who has just lost G3COI on 7MHz!

Time and time again, I have met with these POSFOP (poor operating skills factor operator) Amateurs, with the result that I now simply sign off as I have little patience with someone who 'refuses' to hone their operating skill. Actually, to be honest with you dear reader, I think the POSFOP type is a branch of the Amateur Radio hobby that's been gradually neglected in inverse proportion to the improvement in equipment we see today. This is, perhaps, rather strange as I think that the ability to purchase a nice rig, instead of having to build it, would allow more time to learn how to operate efficiently under whatever conditions come our way!

Parting Of The Ways

If two stations are transmitting on the same - or very nearly so - frequency using similar power levels, then quite obviously, no filter yet devised with work - even if they are speaking different languages via the Morse mode! So the only real remedy is the parting of the ways. Under these conditions, I feel that the only way to communicate my intentions to go QRT is to shift frequency slightly, while still being heard in the pass band of their receiver.

If you try my technique, don't go too far in frequency or you'll be sunk but if you just adjust it a small fraction, the other station will hear your request to go elsewhere.

In today's crowded bands, of course, you can't change frequency willy-nilly 5kHz up or down without at first making sure the alternative frequencies are clear (they're very likely to be in use!). This means you may have to roam far and wide to find a clear spot, but this is surely the sign of slick and efficient operating - especially if you don't lose the other station!

Unfortunately, many of the POSFOP types I work are truly flummoxed by my attempts to continue the QSO. If I try to get them to move - I'll often lose them for the rest of the day. Filters for removing the noisy row from a nearby station are very fine, but remember that if left in circuit they can attenuate a call for you that's slightly off your working frequency. To remedy this I politely suggest dear reader that you practice a bit and avoid joining the POSFOP brigade!

Of course, there's the (now seldom used) method of employing a directional receiving antenna (if used today, it's normally a magnetic-loop) to reduce the QRM. But the method can be sporadically effective because of random signal arrival due to differing propagation pathways.

At times, I think that the only effective thing is to get 'the hell out of it!' If you're operating on 7MHz s.s.b. or c.w, there's always 3.5 or 10MHz. See you on 30 metres - ±5kHz ? ●

John Worthington G3COI, now firmly ensconced at his new QTH in Shropshire, turns his years of experience and wicked sense of humour onto the subject of QRM!

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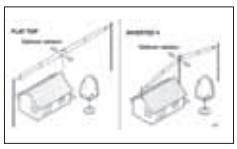

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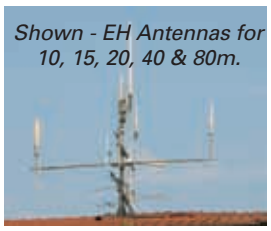

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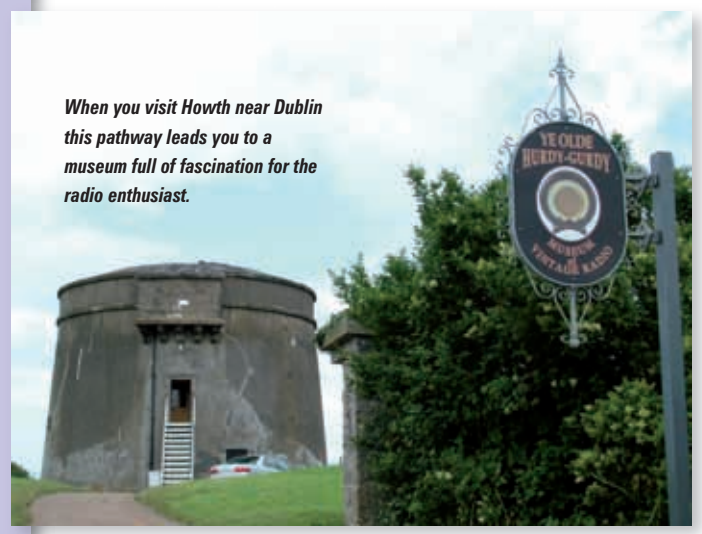
Ye Olde Hurdy Gurdy
museum of vintage radio



When you visit Howth near Dublin this pathway leads you to a museum full of fascination for the radio enthusiast.

"Aoibhinn bheith i mBinn Eadair,
Firbhinn bheith ós a bánmhuir."

Ye Old Hurdy-Gurdy Museum of Vintage Radio holds many fascinating secrets

The words above are from an Irish Gaelic poem, which I remember from my school days many years ago. It translates as; *"Marvellous to be in Howth, Wonderful to look out over its surf-covered sea."* These words come to mind every time I visit Ye Olde Hurdy Gurdy Museum of Vintage Radio, which is located in the Martello tower in Howth.

Howth was one of the earliest Viking settlements in Ireland. Its name is derived from the Norse word Hofuth, meaning a headland. The town lies on the northern side of a hilly peninsula about 15 kilometres (almost 10 miles) north-east of Dublin City.

Before the harbour silted up in the middle of the 19th century, Howth was the Irish port for the mail boat from Holyhead. The road from Dublin to Howth became known as; 'The Road to London.'

About 200 years ago, under threat of invasion by Napoleon, a network of fortified coastal Martello watchtowers was built around these islands. Fears of an invasion were well-founded. A small French force had landed successfully and unobserved on the west coast of Ireland in August 1798. However, two weeks later the French were forced to surrender. To protect against these invasions the Martello tower in Howth, was completed in 1805.

Reliable Cable

In 1854, the first reliable submarine telegraphy cable was laid between Howth and Holyhead in North Wales. The cable came ashore in Ireland on a short beach just below the tower, which became a telegraph cable station.

Around the turn of the next century, wireless telegraphy experiments were being carried out by Lee de Forest and Marconi among many others. In 1903 de Forest, the famous American inventor was invited by the British Post Office to demonstrate his wireless telegraphy system.

Holyhead and the Martello in Howth were the locations selected for the two wireless telegraphy stations. The demonstration was a great success. Lee de Forest claimed that his system was more efficient and faster than Marconi's.

However, despite its success, de Forest's system hardly stood a chance of acceptance. Many influential British politicians and investors already held shares in the Marconi Company. This only came to light when a public enquiry was held in 1912. By that time de Forest's wireless telegraphy company had become insolvent (1906), and the field was clear for Marconi.

When the Russo-Japanese war broke out in early 1904, Lee de Forest sold his wireless equipment to Lionel James, the war correspondent for the London Times. The apparatus was shipped to the Far East and was used to relay news from the front lines for

Tony Breathnach EI5EM shares the enjoyment he gets when visiting a museum near Dublin. Once located on the famous Howth tramway system, visitors can now get there quickly on the equally well known Dublin Area Rapid transit system (DART) to enjoy the museum.

onward forwarding to London by cable. In the February 2001 edition of *PW*, **Peadar Slattery EI2JA** had an article printed about the reporting of the war and he subsequently published a book *Reporting the Russo-Japanese War, 1904 -1905.*

In 1905, the British Post Office carried out quantitative wireless telegraphy tests from the Martello in Howth with HMS *Monarch* as she sailed to various locations in the Irish Sea. The eminent British physicist **William Duddell** and a **Mr. J.E. Taylor** read a paper on the test results to the Institution of Electrical Engineers in London later that year.

Tower Derelict

Let's now take a giant leap forward in time, to the year 2001. Sadly, the Martello tower, vacant for over 15 years, had become derelict. Fingal County Council commenced restoration works, and in 2003 offered use of the building to **Pat Herbert** to display his collection of vintage radio equipment.

Pat had been a collector for nearly 40 years but was in need of a suitable exhibition premises. Thus, Ye Olde Hurdy Gurdy Museum of Vintage Radio came into existence.

In the early days of Irish broadcasting, a Government Minister paid a visit to the radio studios in Dublin's GPO. During his visit, the Minister referred to radio as, "The old Hurdy Gurdy." This comment inspired the name for the museum!

As 2003 was also the centenary of Lee de Forest's experiments, some local Radio Amateurs were invited to operate a special event station in the museum. The callsign **EI4LDF** (Lee De Forest) was activated over a weekend in November to commemorate the centenary.

The operators were **Joe Dillon EI4FV** and myself EI5E. A home-brewed QRP c.w. transceiver was used on h.f., in keeping with the spirit of the event. It was magical to hear the sounds of the Morse code reverberating around the inside the tower after an absence of so many years. I felt privileged to be a part of it!

Further special event stations operated during the Howth Peninsula Festivals of 2004 and 2005. Award Station status for International Marconi Day (IMD) was accorded in 2005 with the callsign EI6IMD. Hopefully, IMD participation will become an annual event at the museum.

Leaps & Bounds

Since the museum's opening in 2003, the curator has brought the establishment on in leaps and bounds. Pat has tastefully used every square metre to maximum advantage. Every visitor is given a warm welcome and a personal guided tour of the museum. Time stands still within this magical tower and no visitor need ever feel rushed or hurried.

The exhibits are arranged in a chronological order. The first displays are of early submarine cables, followed by vintage Morse and telephony equipment. The museum also houses some fine examples of early crystal sets.

Pat's main interest is in old radios, and there is a vast selection of valved and transistorised receivers on display, dating from the 1920s up until the present time. Some classic Amateur Radio equipment is also on view.

Pat has an extensive collection of old 78rpm records and he is always happy to play a selection for his visitors on one of the gramophones. It's amazing to hear the volume and sound quality reproduced by these purely mechanical machines. The sound is hardly of MP3 or CD quality but there are no batteries to charge or replace! Just wind the handle and away you go.

Howth Martello Tower. This Napoleonic war era fortification has taken on a new life as a specialist museum, complete with its own special Amateur Radio callsign – EI0MAR, operated by the Howth Martello Radio Group.

With the harbour behind them Joe Dillon EI4FV (left) and Curator, Pat Herbert feel justly proud of what has been achieved at Howth Martello Tower museum.

Many old photographs, posters and banners adorn the walls of the museum. Among these is a framed 1903 edition of the *Dublin Penny Journal* reporting on the success of de Forest's demonstration in Howth. There is also a large photograph of the Marconi station as it was in 1905. In addition to the radio related exhibits, there are many contemporary everyday items on display to add some context.

Martello Radio Group

Following the successful International Marconi Day (IMD) event in April 2005, the **Howth Martello Radio Group** was founded by several interested radio experimenters (the official term for Radio Amateurs in the Irish Republic). Shortly thereafter, a permanent Amateur station was set up with the callsign **EI0MAR**.

The MAR suffix serves two purposes as it can represent the MAR in Marconi or in Martello, as the occasion requires.
The station is now QRV most Sundays on 144MHz f.m.(145.575 MHz), and on h.f. using c.w. (mostly).

The Amateur station cannot be left permanently in situ and must be stored when not in use. At the same time it must be easy and quick to set up. This is achieved by housing all the radio equipment in a compact, hinged wooden cabinet. All the units are permanently wired up within the cabinet.

Tony Breathnach EI5EM at the Amateur Radio station operating position in the Martello Tower.

Two very short coaxial leads, terminated with in-line SO-239 sockets, protrude from the rear of the cabinet. These connect to the two 20 metre long lengths of coaxial cable running up the spiral staircase to feed the antennas. The only other external connection required is the mains lead and this plugs into the PSU through a cut-out at the rear of the cabinet.

The equipment used is a Yaesu FT-90R for v.h.f/u.h.f., and a 20W SGC-2020 transceiver for h.f. An LDG Z100 automatic antenna tuning unit (a.a.t.u.) and a switch-mode power supply unit (p.s.u.) complete the station.

The choice of antennas was always going to be a problem. The roof of the tapering tower is only five metres in diameter. Being a protected heritage building, no permanent antennas or fittings are permitted.

To overcome these limitations, we use a home-brewed 'Ultra Slim Jim' antenna for v.h.f. This is housed within a 3 metre long plastic pipe, with sealing caps at both ends. The lower cap is removed, revealing an SO-239 socket, when the antenna is in use. The sealed and waterproofed antenna can be stored lying on the roof when not being used.

The home-brewed vertical h.f. antenna is made from a 9 metre long hollow telescopic fishing pole with an internal antenna wire running its entire extended length. The antenna is clamped to a 1.5 metre length of 50 x 50mm section of timber, to which several coats of external varnish have been applied. This short timber mast has a plastic connection box attached, which has suitable connectors for the antenna, coaxial cable and three ground planes.

The automatic a.t.u. matches the h.f. antenna on all bands from 10 to 80 metres. When not being used, the retracted h.f. antenna, still clamped to its timber mast, is stored just inside the door to the roof.

Fortunately, there are several conveniently placed iron rings embedded in the parapet wall. These were originally used to secure a rotating gun platform. Now, they are used as anchoring points for the antennas and for their nylon guy ropes.

The three-metre length of the plastic pipe housing the Ultra Slim Jim doubles as a mast. When raised, both antennas just clear the parapet. Setting up the equipment and antennas is quick and easy, taking no more than ten minutes.

The backdrop of Howth Head rises steeply from the harbour to a height of over 200 metres. This attenuates signals in some directions, particularly on v.h.f. and u.h.f. However, the stunning sea views from the roof of the Martello and from Howth Summit more than compensate for this minor inconvenience.

The town and summit are served by public transport from Dublin City centre. So, if you ever find yourself in Dublin, why not take a day trip out to Howth? You can breathe in the fresh sea air, enjoy the magnificent panoramic sea views, sample the local seafood, and visit Ye Olde Hurdy Gurdy Museum of Vintage Radio.

"Aoibhinn bheith i mBinn Eadair ..."

Check the museum website **www.free-webspace.biz/ei5em/museum.html** or E-mail **hurdygurdymuseum@eircom.net** the curator for opening hours or for further information. We hope to meet *PW* readers and everyone will be made most welcome! •

Irish Scouts, Mark Kilmartin EI4FNB and Eamonn O'Connor EI2CHB (a white stick Amateur) operating the Amateur radio station.

Editorial encouragement: Although I've been to Howth (I've been told off for the way I've said the word as local people tend to pronounce the 'w' as an 'o' - making the word sound like 'Hooth') many times and have seen the Martello Tower, I've not been there while it's been open. However, good reports on the museum (and the welcome received) are consistent. The Howth area is well worth a visit and the local fish and chip shop (just by Howth DART station) uses locally caught fish. Additionally, there are several local restaurants where locally caught fish is a speciality. Many people take weekend breaks in Dublin and I encourage everyone who visits the city to 'get out of town' for a while and make the journey to Howth – it's well worth the effort and if the museum is open it will make a great trip!

Rob G3XFD/EI5IW

More items are added to the Kidderminster Kollection

Valve & Vintage

Ben Nock G4BXD welcomes readers as he opens the 'shop' for his first time in 2007. There's a rather special Soviet made transceiver and some unusual walkie-talkies from the Vietnam war era sitting on the counter ready to be featured. Over to you Ben!

Fig. 1: The Russian P-107M man-pack set, batteries fit in the base of the unit.

A Happy New Year to you all and welcome to my first column of 2007! I hope you've had a good festive season and that Santa brought you all you desired.

Here at my home in Kidderminster, it was a good end to the second half of 2006 and few new items were added to the collection. There were also some quite interesting contacts made while experimenting with the old sets. Anyway, let's make a start.

New Arrivals

I'll chat about the new arrivals first. At the top of the list I'll mention a rather nice Soviet radio, the P-107M. I already had other versions of this set, the P-107 valved transceiver and the P-107T transistorised version. The P-107M, **Fig. 1**, is the manpack version, although I really would not like to carry it very far! The P-107M set covers 20 to 52MHz and provides 5W output of frequency modulation (f.m.) or c.w. (telegraphy).

The transceiver has a rather odd frequency readout system, using two viewing windows. A small one, **Fig. 2**, shows the frequency in MHz selected by a switch on top of the set, while a larger round window shows a series of illuminated numbers, depicting the kHz selection chosen by the round knob next to the window.

As the kHz are selected the illumination runs up and down the rows of digits, counting in three sets of 0 to 9. Thus a frequency readout of say 50.255 or 28.500MHz can be depicted. A mode selection switch enables c.w. receive and transmit, f.m. transceiver and an option for external remote control.

A knob controls the tuning of the beat frequency oscillator (b.f.o.) used on c.w. and two push buttons allow metering of battery voltage and illumination of the frequency dials. There are no other controls, not even a volume control. The set was powered from four batteries, providing an 8V supply.

The antenna employed could, depending upon the operational frequency, be either the standard Kulikow flexible short whip or a longer antenna made up of solid sections with the flexible whip on top. For the lower frequencies the complete station even came with long wire Beverage antenna and support poles. The set even has a built-in automatic antenna tuner.

Fig. 2: The P-107M controls, two tuning dials, MHz centre right, kHz in the round window.

Vietnamese Village Communications

Another new arrival for my collection was a pair of Village Radio walkie-talkies. These were apparently issued by the American Central Intelligence Agency (CIA) to the chiefs of Vietnam villages so that they could send in reports of the Viet Cong's movements. (A task I would imagine to be extremely dangerous to the villagers!).

The radios, **Fig. 3**, are quite nice and arrived in Kidderminster in very good condition. These are type HT-2 and differ from the earlier HT-1 model in that while still having the 30 to 40MHz single channel a.m. capability they had an added module bolted to the front of the set.

The modification provides the transceivers with a v.h.f. channel between 100 and 136MHz. A switch on the front selects between the two bands and the v.h.f. unit connects to the main chassis via a 15-pin D-plug and socket.

The transmitter provides a radio frequency (r.f.) output of approximately 500mW of a.m., while the receiver seems to be a double conversion superhet with 14.4MHz and a 455kHz intermediate

The built-in whip is a huge 2m (6ft) in length and I hope to get the pair crystalled up on a suitable frequency in the 28MHz band with the possibility of getting the v.h.f. section onto 144MHz as well.

More Eddystone!

Another Eddystone joined the shelves recently, this one being the Model 1002/1, **Fig. 4**. This model is a domestic use receiver, designed for receiving a.m. and f.m. broadcast stations. Tuning is 150 to 350kHz, 550kHz to 30MHz and 88 to 108MHz v.h.f. stereo. The set runs from household mains, internal battery or external 12V d.c. supply, employing 18 transistors, four integrated circuits (i.c.s) and 23 diodes.

The set has the joy of being small and fairly lightweight although the case is quite sturdy and the front handles make it easy to move around. The ever useful **Eddystone User Group**'s QRG (Quick Reference Guide) file states this set was used by HM Forces as so-called 'comfort sets' and indeed, my example does have its military plate fixed to it. The set arrived

Fig. 3: The Vietnam war era HT-2 walkie talkies with extra long whip antennas.

Fig. 4: The Eddystone 1002 receiver, nice clean lines and easy-to-use comfort set .

Ben Nock G4BXD
62 Cobden Street
Kidderminster
Worcestershire DY11 6RP
E-mail: military1944@aol.com

Fig. 5: The French SARAM receiver, the round dials are not clocks but counters!

with a faulty v.h.f. tuner but this has since been repaired and the set works very well indeed.

French War Time Receiver

A recent sort out of my stores threw up a box in which I found a nice example of a French war time set. This is the receiver section for the SARAM made 3-11 series of aircraft radios fitted to the French bombers in a role similar to the R1155/T1154 of RAF Lancaster fame.

The two units shown, **Fig. 5**, are the main high frequency (h.f.) tuning section, radio frequency (r.f.) amplifier, mixer and oscillator and the low frequency and audio amplifier stages. Each unit has four valves and the complete bomber station employed a transmitter, the two receiver units, two units connected with the transmitter s modulation, a control box and two power supply motor-generators units.

The receiver's design configuration is a little odd in that it changes intermediate frequency (i.f.) depending on the range selected. The receiver tunes 2170 metres to 19 metres (the continental way of frequency readout), approximately 138-kHz to 16MHz, in six ranges. The two lowest frequency ranges use a 754kHz i.f., while the upper four use 625kHz.

While the receiver uses the more normal 6K7 and similar type of valves, the transmitter uses type 89 as oscillator and doubler with a pair of PE 1/75 valves in the output stage. High tension supplies of 300V for the receiver and 1200V for the transmitter are required. Once space permits, I intend to pair up these sets and try them out on the air.

Recent Developments

While keeping myself busy expanding and looking after the 'Kidderminster Kollection' I have finally got around to building the power supply for the Chinese 102E set I mentioned back in the August 2006 edition! Now it's operational I'm really pleased with its performance.

Talking to other specialist collectors on the Internet about a related matter it was suggested that a balun might be worthwhile between the set and the 50 feed to the main antenna tuner. As these sets were designed to work into short antennas, in the main they match to a higher output impedance. With a 4:1 balun in place the set does indeed seem to work better.

Another recent arrival is a BC-1306, this is a war time portable set, used in the field and from the back of US Army Jeeps, etc. Luckily, I found the supplies needed are identical to those coming from the recently constructed 102E power supply so at least that's one less job! More on this set next time I'm in the shop.

Well that's about it for this stint at the V&V shop. I hope you have enjoyed the selection I have bought you and I hope it has wetted your appetite for things old and valved. As always I can be contacted direct at: **62 Cobden Street, Kidderminster, Worcestershire DY11 6RP** or via E-mail at **military1944@aol.com**

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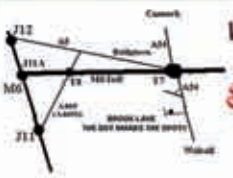

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Share your news, views and reports with fellow readers. Reports to David by the last Saturday of each month please.

VHF DXer

This month, David G4ASR takes a look at some excellent tropospheric openings on the VHF, UHF and microwave bands.

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Very little ionospheric DX activity was reported on the 50 and 70MHz bands during November. Sporadic-E (Sp-E) openings on the 50MHz band were noted on November 3, 4, 5 and 6 to stations located in Azores (CU3EQ), Portugal (CT1AOZ) and Spain (EA7FZS). On November 3, there was a brief 70MHz opening to Portugal with the station of CT1HZE contacting a handful of UK s.s.b. operators.

The CQ5FOUR beacon in Portugal (70.608MHz) was also heard by stations in England and Wales. The Leonids meteor shower created additional meteor scatter (m.s.) activity over and above the normal daily count, with contacts being reported on the 50MHz band with stations such as EA7AAJ, IK2JUG and SP3RNZ, on 70MHz with OZ3ZW, S51DI and 9A1Z and on the 144MHz band with HA8IH, TK5JJ and YL3GDF.

Tropospheric Enhancements

During the autumn period, it's normal to expect periods of enhanced tropospheric propagation on the v.h.f., u.h.f. and microwave bands. Autumnal openings are often caused by temperature inversions that occur under still, clear conditions when the land cools rapidly, thus cooling the air close to the surface but leaving the higher levels relatively unaffected. These conditions occur most often in anticyclonic weather systems, an anticyclone being an area of high pressure. Although they can appear at any time of the year, anticyclones are more common in late summer and early autumn, when one or two big tropo openings are very likely. True to form there were some excellent periods of tropospheric propagation during September, October and November with many long distance contacts being made on all bands from 144MHz through to 47GHz.

There were four lengthy periods of enhanced tropo propagation in September. The first occurred at the beginning of the month, between September 1-6, encompassing the IARU 144MHz contest. This was good news for the contester and home station DXer alike. Some of the contacts made during the contest, held on

Fig. 1: The antenna system at the QTH of Reg Woolley G8VHI.

September 2-3, included the s.s.b. stations of HB9RF (Switzerland), HB0/DG3XA (Liechtenstein) LA9Z (Norway), LX/PA1TK/P (Luxembourg), OE5MPL (Austria), OL2R (Czech Republic), OZ7Z (Denmark) and SK7MW (Sweden).

Conditions were also good to the south, with many Spanish stations being worked including EA1BFZ/P (IN81), EA1FDI/P (IN52), ED1OCV (IN63), EA2RL/P (IN83), ED2EA (IN93) and EA3EZG/P (JN12). Propagation remained good until September 6 with a stable 144MHz opening to many countries such as Austria (OE5XBL), Czech Republic (OK1RI), Denmark (OZ9KY), Spain (EE1SDC), Switzerland (HB9FAP) and numerous stations in southern France and Germany. The lift in tropo conditions faded out during the evening of September 6 but returned early in the morning of September 9 with widespread propagation to southern France, Germany, Spain, Switzerland and Austria.

Contacts on s.s.b. were made from much of the UK with stations such as EA2CHT (IN83), DF1CF (JN57), F6BHI/P (JN15), HB9AOF (JN36) and OE2SCM (JN67). A path also opened up to the Czech Republic with contacts being made with 144MHz stations that included OK1CDJ/P (JO60), OK1KVK (JO60), OK1TEH (JO70), OK2AF (JN89) and OK2ZAW/P (JO60). Later in the evening from around 1900UTC, the propagation swung around to the northeast and contacts were heard being made into Denmark and Sweden.

Stations in England and Scotland reported working OZ1BEF (JO46), OZ1BNN (JO55), OZ6ABA (JO57), SM6EAN (JO57), SK7MW (JO65), SM7FMX (JO65), SM7GVF (JO77) and SM7RYO (JO76). Sometimes, tropo paths are very stable and the lift in conditions seems fixed to a particular area of Europe. At times though, it can swirl around depending on where the high-pressure anticyclone moves to and this was the case during this event.

Following the opening to Scandinavia, the 144MHz band opened up on September 10 to Switzerland, Italy and Poland. The HB9HB beacon (144.448MHz) was pounding in over much of England and UK stations were heard making s.s.b. and c.w. contacts with stations such as HB9HLM (JN36), HB9RDE (JN37), HB9/DB7HL/P (JN37), IK2NJX (JN44), IK2YXK (JN45), I4STU (JN54), I4/HB3YIT (JN54), SP2JYR (JO92) and SP9NQN. Late in the afternoon a duct formed over the North Sea enabling contacts to be made with stations in Denmark and Sweden.

Conditions on September 11 were excellent with many long distance contacts in excess of 1000km being made into the Czech Republic, Poland, Switzerland and Italy. After the Sun had gone down the North Sea path re-emerged with numerous Scandinavian contacts being made on the 144MHz band. Other tropo events during the month included an opening to Czech Republic, Germany and Switzerland on September 20 and a really extensive opening on September 21 to Denmark, Finland, Norway, Sweden, Germany, Poland and Latvia. Among the DX worked were the stations of OH1ND (KP00), OZ0TE (JO55), OZ8QS (JO65), LA0BY (JO59), LA4YGA (JO48), SM0KAK (JO89), SM4BDQ (JP80), SP2IPK (JO93), SP2MKO (JO93) and YL2GJW (KO06). On September 26-27 the 144MHz band was open to Spain with contacts being made with stations such as EA1DDU (IN73), EA1FBF (IN73), EA1YO (IN73), EA2AGZ (IN91), EA2AVM (IN82), EA2NN (IN83) and EB2FJN (IN83).

Propagation was equally good the following month, with v.h.f. and u.h.f. openings on October 7-8 (coinciding with the IARU u.h.f. contest) to Austria, Czech Republic, Denmark, France and Spain. The period between October 13-17 was

excellent with many contacts being made on all bands from 144MHz through to 10GHz. On v.h.f. the conditions extended from Denmark, Norway, Sweden, and Finland to the north, Belgium, Netherlands, Germany and over to the Czech Republic and Poland and to France and Switzerland to the southeast. Stations in the south of the UK experienced good conditions to southern France and Switzerland on October 29-30 as a ridge of high pressure moved across the country.

Reg Woolley G8VHI (Warwickshire IO92) reports that he has recently rebuilt his v.h.f. and u.h.f. antenna system, as seen in **Fig. 1**. Mounted on a telescopic tower are a pair of 9-element 144MHz Yagis, a bay of four 23-element 430MHz Yagis with half inch hard line phasing cables and a 67-element Yagi for the 1.3GHz band. All Yagis are manufactured by Wimo, a German company making antennas to the DK7ZB design. They evidently work, as some good DX contacts have recently been made.

On the 430MHz band the station of G8VHI comprises of a Yaesu FT-847 transceiver driving a 100W SSB Electronics amplifier into the array of four Yagis. In the IARU Region 1 u.h.f. contest, held on October 7-8, contacts were made with the stations of DR5A (JO30), EA2RL/P (IN83), EA3FTT/P (JN12 his first EA3 on 430MHz), F1CBC (JN09), F4CKV/P (JN16) and F5SDD/P (JN24). On October 14, he caught a nice tropo opening to Sweden working the station of SM6MVE (JO67).

Reg mentions an excellent 430MHz opening on October 19 to Germany, Norway and Sweden with s.s.b. contacts being made with DK1PZ, DL3YEL, DF5AE (all in JO41), LA0BY, a difficult contact as Stefan is tucked behind hills and screened from the UK, and LB8SE (JP20). The beacon station of SK4BX (432.461MHz) located in JO79 was also heard but no active stations appear to be operational on 430MHz this far north.

On the 144MHz band Reg is using a Trio TS2000X transceiver and a 200W solid-state amplifier. Beaming south he contacted the Spanish station of EA1DDU on September 26 and EE1VHF and EA2RL/P on October 8. Later in the month, on October 1, he worked the stations of DF0CI (JO51), OZ1BNN, SK6HD, SK7MW and SM7MVE and on October 19 the s.s.b. stations of LA0BY, LA3BO, LB8SE and SM7NWH.

Gordon Fiander G0EWN posted an alert on November 2 to the Internet E-mail reflector **ukmicrowaves@yahoogroups.com** notifying microwave operators to carefully monitor the s.h.f. bands from Sunday November 5 for a few days. He mentioned that a stable high-pressure system was forming and that it would persist for over a week, possibly giving good conditions from most of the UK to stations in the continent.

I'm pleased to report that Gordon was spot on and that tropo conditions were really excellent between November 6-7. The following is a list of some of the c.w. and s.s.b. contacts made from England and Wales on the 10GHz (3cm) band. It includes the stations: DK1KR (JO53), DC7QH (JO62) DF9QX (JO42), F1DBE/P (JN19), F6DKW (JN18), F6CBC (IN94), HB9AMH/P (JN36), LX1DB (JN39), OE5VRL/5 (JN78), ON4IY (JO20), OK1JKT (JO60) and OK7RA (JO60). There were even more stations than this active on the 10GHz band so you can imagine what the activity was like on the more popular v.h.f. and u.h.f. bands!

The sudden arrival of colder air temperatures in November after the warmest September and October on record creates lower path losses on the 24 and 47GHz bands. This is due to the lower moisture content in the atmosphere. At these frequencies it's harder to make long distance contacts because water absorbs a significant amount of energy. So any operation in wet or humid conditions reduces the range significantly.

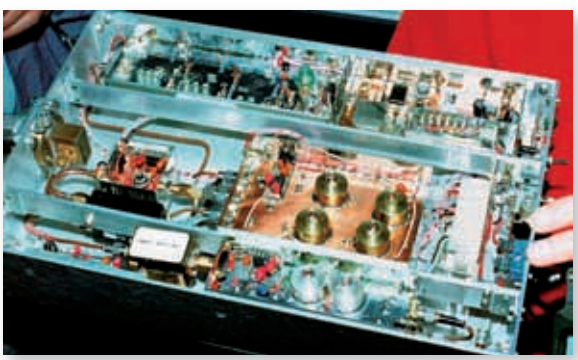

Fig.2: The G3WDG/G4DDK 10GHz transverter.

On November 7, the tropo conditions were exactly right for the station of OE5VRL/5 (JN78) to make two 47GHz c.w. and s.s.b. contacts with OK1AIY/P (JO70) over a 266km path. The station of OK1AIY/P was only running 10mW output into a 25cm dish, which makes this first OE-OK contact all the more remarkable.

Deadlines

That's it for this month. If you have any news, reports or anything of interest regarding the 75 years anniversary of Practical Wireless please send me the information to the address given below, before the last Saturday of each month.

73, David G4ASR

75 Years Celebration - The 1990s

Every month during 2007 I'm celebrating the 75 years of *Practical Wireless* by looking at notable developments and this time around I'm looking at the period between 1990-1999.

In the early 1990s, **Charlie Suckling G3WDG** and **Sam Jewell G4DDK** developed printed circuit board based modules,which could be used on the 10GHz (3cm) band. This was a major transition from the very low power (10mW), low-sensitivity, frequency unstable waveguide system to a medium power (>1W), high-sensitivity, stable crystal-locked coaxial-based transverter system. Available in kit form, as shown in **Fig. 2,** they revolutionised 10GHz operating by the use of narrowband c.w. and s.s.b. and as distances rose the old wideband frequency modulation (f.m.) techniques declined. In 1995 the station of G3WDG proved how good his equipment was by making the very **first UK to Australia** 10GHz moonbounce contact. This historic QSO was with the station of **Lyle Patison VK2ALU** who was also using G3WDG designed equipment.

For many 144MHz operators the highlight of the 1990s was the absolutely fantastic Leonids meteor shower on November 17 1998. From 2330UTC on November 16 very loud bursts of signals could be heard on the 144MHz band from numerous European DX stations. Over the next few hours the fireballs got larger and larger and bursts of signals turned into continuous transmissions, first a few minutes in length and then up to five or six minutes in duration. It really was tremendous and it continued right through the night until the shower disappeared below the horizon around 1200UTC on November 17. Everyone likened it to a Sp-E opening but this event was much much better.

The ionisation was very intense and spread all over Europe at the same time. You could work stations via forward scatter, backscatter, sidescatter, in fact, in any direction you wanted. As a consequence it made very little difference in which direction you were beaming. You could point towards Finland (OH) and work into North Africa (EA9) or beam towards Hungary (HA) and work into Portugal (CT).

On the 144MHz band the best DX contacts were between G4ASR (IO81) to RW1AW (KP50) at 2231km, EA7GTF (IM87) to SP2FAX (JO83) at 2372km and F5OWN (JN25) to LA3FL (KP19) at 2871km. Signal reports of 59 were exchanged with stations over 2000 kilometres away and many UK stations worked over 20 countries in one night of v.h.f. activity. This really was the event of the decade.

Share your news, views and reports with fellow readers. Reports to Carl by the 15th of each month please.

HF Highlights

Carl GW0VSW rounds-up the latest news from the h.f. bands with the help of your reports. Its been a busy month once again!

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Here we are at the start of a brand new year and there's plenty to fit in this month. I will begin with some news of an operator who has been worked by several of our *PW* reporters over the past few years! Straddling the Equator off West Africa in the Gulf of Guinea is Sao Tome where **Charles Lewis S9SS** will finish his work as manager of the International Broadcasting Bureau (Voice of America station) on the Island where he has been operating as S9SS (Other calls include A22AA, S92SS, SV0LM, SV5/SV0LM, A25/KY4P, KY4P).

In his deserved retirement, in February, Charles and Lesley S9YL (S92YL, SV0LN, N3TIA), will return to the USA, and live in the mountains of the north-western region of North Carolina. His S9SS LOG is uploaded to Logbook of the World (LoTW) **www.arrl.org/lotw/** and an on-line log can be found at Paper QSLs can be confirmed by his QSL manager **Gerard Rossano N4JR,798 County Rd 350, Hollywood AL 35752-6731, USA**.

By the end of February, more than 80000 QSOs will be sent to **www.logsearch.de/** while all of his logs for callsigns prior to S9SS exist only on paper Charles does plan to create files of at least some of them for submission, little by little, to the LoTW over the next few years. It will require a good deal of work typing the data for about 100,000 QSOs and he will begin with the A25/KY4P log first. Further information on the I.B.B. can be found at **www.ibb.gov/** and a fact sheet can be seen, both make for interesting reading.

DX News

On to some DX news now. Keep an ear open for **Mitch Gill K7TUT** who is serving in Iraq and has finally received his licence after a very long wait. Mitch will be signing YI9TU and will be operating out of Tallil where he will use 7, 14, 18 and 28MHz and s.s.b., c.w. and PSK31 between 1500-1800z weekdays and also Sundays between 0400-0600UTC. Operations will be sporadic due to work commitments and all QSLs should go to **Robert Schenck N2OO, PO Box 345, Tuckerton, NJ 08087, USA**. Mitch say's "Please be patient with me as I am a rookie at being a DX station but I do want to give out as many QSOs as possible."

The mobile station of Colin Topping GM6HGW used for his contacts mentioned in readers' reports.

The SG-2020 used by Colin Topping GM6HGW.

West of the Dominican Republic, between the Caribbean Sea and the North Atlantic Ocean, lies the Island of Haiti and this is where Jean F1ABQ will be operating as **HH2FJM** until 27 April. He will be using s.s.b. and PSK31 on the 14, 17 and 21MHz bands and you can QSL via **Evelyne Terrail F5RPB, Quartier St. Jean, 26340 Saillans, France**.

In Western Africa, bordering the North Atlantic Ocean, between Guinea and Senegal is Guinea Bissau where **Father Gianfranco J59OFM** operates from the Catholic mission at Caboxangue. He is active only on Sundays and Wednesdays between 1615-1645 on 14321kHz (±). Father Gianfranco does not speak English but answers to calls in Italian, Spanish and Portuguese. If you are able to work him you can QSL via **Lucio Bresciani I3LDP, Via Locchi 29, 37124 Verona - VR, Italy**.

Your Reports

The Top Band log of all c.w. man **Ted Trowell G2HKU** on the Isle of Sheppy, Kent starts our reports this month. Stations worked by Ted using a Ten-Tec Omni 5 at 70W to a G5RV included; HF16CD (Poland), 4O6EME (Macedonia) and VY2ZM (Canada) around 2100UTC.

Also on 1.8MHz was **Leighton Smart GW0LBI** in Trelewis, Mid-Glamorgan where OY6QN (Faroe Islands), ZB2FK (Gibraltar), RK6AX (European Russia), RK2FWA (Kaliningrad), HB0/HB9AON (Lichtenstein), EA8/DL5DSM (Canary Islands) AF-004, TK/HA0HW (Corsica) EU-014, EA6/DL5DSM (Balearic Islands) EU-004, HA8BE (Hungary), UT7EC (Ukraine) and Ted G2HKU all made his log between 2000 and 0030UTC using his Yaesu FT-100 with 100W c.w. to a 60m (220ft) foot long wire antenna tuned against earth.

Leighton says "The band is really picking up now with the shorter days during the winter months. This means reduced ionisation of the 'D' layer and therefore less signal absorption. Signals that were S3 in August I am now monitoring at S8-9!"

In Nuneaton, **Chris Colclough G1VDP** used a Yaesu FT-1000 Mark V Field and 400W via a UK Ranger amplifier to a Moonraker 3-band Trap dipole 33 metres long and inverted working s.s.b. station ON4WW (Belgium) at 2221UTC.

The 3.5, 7 & 10MHz Bands

Moving to 3.5MHz Chris found KC1XX (USA) in Mason, New Hampshire at 0011, 5A7A (Libya) 0013, MU5W on Alderney EU-114 at 1531, TF4M (Iceland) EU-021 at 2203, SK6DZ (Sweden) 2216, OT6A (Belgium) 2234, CN2R (Morocco) 2346 and OH0Z (Aland Island) EU-002 at 2355UTC. All were using s.s.b. once again.

On to 7MHz and **David Bambrook 2E0DAB/M3DAB** in Little Milton near Oxford who uses a Yaesu FT-747GX and a dipole installed in his loft for his h.f. activities. Voice contacts making his log include LX/PA6Z (Luxembourg) 1023, DJ7SR (Germany) 1207, D44BS (Cape Verde) AF-005 at 2114 and OM3CGN (Slovak republic) at 2335UTC.

On 10MHz, Ted G2HKU found conditions 'marginal' but still managed to work W8EGB (U.S.A.) in Mancelona, Michigan, 4X70R (Israel), YI9KT (Iraq) and 6Y3T (Jamaica) NA-097 between 2030 and 2200UTC.

The 14MHz Band

Martyn Medcalf M3VAM in Chelmsford, Essex used s.s.b. on 14MHz logging CT6A

(Portugal) 0859, 7S2E (Sweden) 1034, HA506NF (Hungary) 1007, LY8O (Lithuania) 1025, ZB2FX (Gibraltar) 1626 and SV9GPV (Crete) EU-015 at 1923UTC. Martyn was using an Icom IC-746 and long wire antenna with SGC-237 auto tuner.

In East Finchley, North London **Martin Addison 2E0MCA** used a Yaesu FT-840 and 10W s.s.b. to a folded half-size G5RV antenna and lists s.s.b. QSOs with LY1DT (Lithuania) 0808, IO8SRT (Italy) 0816, YU1JW (Yugoslavia) 0816, SG3U (Sweden) on Grimskar Island EU-176 at 0830, EM10U (Ukraine) celebrating the tenth anniversary of independence at 1035 and Z36A (Macedonia) at 1109UTC.

In Seckington, Staffordshire, **Geoffrey Powell M1EDF** used his Yaesu FT-840 and 100W into a dipole finding UU5AT (Ukraine) 0840, IZ7FUL (Italy) 0855, EA4CA (Spain) 0912, SP9IGY/9 (Poland) 0925, RN1NA (European Russia) 1004, VY2ZM (Canada) 1910, VP8CMH/MM Mike (GM0HCQ) in South Georgia at 2038, YV4A (Venezuela) 2125, PS2T (Brazil) 2130 using s.s.b. and on the key VQ9JC (Chagos) AF-006 at 1515, LU9XW (Argentina) 1857, VE2CBW (Canada) 2029 and PR2NJ (Brazil) at 2048UTC.

Gary McKelvie G7USC in Guilden, Surrey has been operating RTTY with RU3EJ (European Russia) 1037, DK2AJ (Germany) 1027, LX1DA (Luxembourg) 0950, UR3LC (Ukraine) 1640, XU7ABN (Cambodia) 1831 and HA7TM (Hungary) at 1820 all making his log using a Yaesu FT-857D at 40W to a TGM MQ26 beam.

Also on the band was Eric Masters G0KRT in Worcester Park, Surrey who worked CT3A (Madeira Island) AF-014, VE3EJ (Canada), K3LR (U.S.A.) in West Middlesex, Pennsylvania and RN3QO (European Russia) around 0720UTC using a Kenwood TS-570DG and 100W s.s.b. into SGC-230 auto tuner and W3EDP antenna. Dropping to 5W QRP Eric managed three contacts, UN7ECA/QRP (Kazakhstan) QSL via DL7EDH at 1145, YU7ECA (Serbia & Montenegro) 1509 and IT9IFI (Sicily) EU-166 at 1609UTC.

The 18 & 21MHz Bands

The 18MHz band was where **Elgin Mackinlay M0ELG** in Kidderminster decided to spend his time using a home-brew dipole cut for the band and 100W s.s.b. His large log included YO3YZ (Romania) 1029, OH6PN (Finland) 1030, OE6MWG (Austria) 1050, UN7MM (Kazakhstan) 1112, S55C/M (Slovenia) 1123, CT2JFR (Portugal) 1129, RW3AS (European Russia) 1130, DL7UR (Germany) 1150, VK6WC (Australia) OC-001 in Perth at 1159, WP4U (Puerto Rico) NA-099 at 1253, VA3GA (Canada) 1315, 5B4AHY (Cyprus) AS-004 at 1355, VE3OWV (Canada) 1442, 9H1ET (Malta) EU-023 at 1512, LZ2KV (Bulgaria) 1515 and W9ZIH (USA) in Malta, Illinois at 1655UTC.

Regular HF Bands reporter Leighton Smart GW0LBI in his shack working Top Band.

The 004WIX QSL received by Martin Addison 2E0MCA.

This band also enabled Martin 2E0MCA to call CT3FQ (Madeira Island) 0845, SM0OWX (Sweden) 1013, EA3FYZ (Spain) 1053, YO9CMC (Romania) 1131, W2QN (U.S.A.) West Cornwall, Connecticut at 1134, CU2/OH1VR (Azores) EU-033 at 1135, ES5TV (Estonia) 1155, 5B/AJ2) (Cyprus) 1159, J3A ((Grenada) NA-024 at 1220, LY2W (Lithuania) 1221, HA5UK (Hungary) 1238, 9H4DX (Malta) at 1306, NQ4I (USA) in Griffin, Georgia 1430 and 6W1RY (Senegal) at 1728UTC, once again using s.s.b.

In Scotland **Colin Topping GM6HGW/P** has been working s.s.b. QRP on 21MHz from a 'mobile' QTH near St. Andrews using an SG-2020 runing 10W to a Watson whip cut for the band and tuned by a MFJ-971 tuner. Despite some 'odd' conditions Colin found CN8K (Morocco) 1036, IR2X Italy) 1045, EU1PA (Belarus) 1047, EA3FYZ (Spain) 1053, VO1HE (Canada) 1141, OM0M (Slovak Republic 1143, ES5TV (Estonia) 1155, LZ5W (Bulgaria) 1225, 4X/AA4V (Israel) 1406, PA6Z (Netherlands) 1426, PS2T (Brazil) 1715 and 6W1RY (Senegal) 1728UTC.

The 24 & 28MHz Bands

The 24MHz band provided two contacts for Chris G1VDP, 5A7A (Libya) at 1104 and 3XM6JR (Guinea) at 1533 while a move to 28MHz found the band in good shape, listing 3DA0WW (Swaziland) 1101, FY5KE (French Guiana) 1242, V51W (Namibia) 1246, T93O (Bosnia-Herzegovina) 1248, 7W2W (Algeria), ZS9X (South Africa) 1254, TU2CI (Ivory Coast) 1326, 6W1RY (Senegal) 1336, LA2OKA (Norway) 1433, HB0/HB9AON (Lichtenstein) 1506, ZX2B (Brazil) QSL via PY2MNL at 1556 and LU8DWR (Argentina) at 1612UTC amongst his many contacts here.

Eric G0KRT also managed some time here and had voice contacts with S58D (Slovenia) 1448, IZ2FOS (Italy) 1500, TO4T (France) 1503, OM0M (Slovak Republic) 1516, OE9R (Austria) 1521 and DJ1ZU (Germany) at 1636UTC.

75 Years Celebrations

History of h.f. operating during the 1990s

In keeping with *PW*'s 75th anniversary celebrations, this month I'm looking back at few things that were happening on the h.f. bands around that time. The 1990s saw a good deal of work and development on digital modes, here are a few highlights:

1991 – **PACTOR** was developed in Germany by **Ulrich Strate DF4KV** and **Hans-Helfert DL6MAA** to improve AMTOR/SITOR and packet radio in weak conditions.

1998 - Based on an idea by *SP9VRC* SLOWBPSK and developed by **Peter Martinez G3PLX** a new Amateur Mode called **PSK31** was developed.

1998 - The UK's 500kHz Morse Telegraphy service finally closed in the early hours of 1 January with a last exchange between Lands End Radio/GLD and Portpatrick Radio/GPK. The broadcast ended with "Marconi, if you can hear us, we salute you".

Next month, I'll be looking at the h.f. scene during the 1980s.

Signing Off

Well that's about it for another month and a busy one it has been. Judging by the logs received all bands have been open at some time during the day or night and there have been plenty of stations active on them. Longer distances have been worked as conditions have improved slightly.

Is this is a sign of better things to come in 2007? If so and this trend continues, it should bring with it better propagation and we should see an improvement on all the h.f. bands especially those above 21MHz.

As usual, my thanks to all our reporters for their logs, which have all contained some nice DX, though as space is limited I have had to be very selective in the callsigns mentioned. My thanks must also go to **Tedd Mirgliotta KB8NW** editor of the *OPDX Bulletin* for all the DX information. I wish you all good DX filled month and a very Happy New Year.

73, Carl GW0VSW

Share your news, views and reports with fellow readers. Send your information to Graham.

In Vision

Graham G8EMX welcomes readers to a new year of ATV activity.

Graham Hankins G8EMX
17 Cottersbrook Road
Acocks Green
Birmingham B27 6LE
E-mail: g8emx@tiscali.co.uk

The radio and computer rally at Kempton Park was the first one attended by the British Amateur Television Club (BATC) after its General Meeting. The club's table was staffed by BATC Treasurer, Brian Summers G8GQS and myself, which not only gave each of us a break during the day but meant that Brian was able to hear a few of the comments that came from some of the visitors. We did our best to assure everyone that their views would be passed to the new names, or old names with new jobs on the BATC committee.

One of the 'old names' on the BATC committee but with a new position, is, of course, me, taking over as Secretary from **Paul Marshall**, who had held that position for many years. Paul warned me to expect telephone calls at 0300, presumably from overseas members! I've not had any yet but I've had loads of 'spam' E-mails arriving via the forwarding system from the BATC website.

Other conversations at Kempton highlighted some of the problems that digital television is generating for itself . Yes, we have far more channel choice in the limited available bandwidth, better pictures for those who did not already enjoy a strong analogue signal and a more natural wide screen viewing screen.

The digital compression cannot always faithfully respond to rapid change of picture content and the newer screen technologies bring their own characteristics, which occasionally result in vision errors to be spotted by the very discerning viewer. One of these mentioned to us was a perceived distortion in shape and poor response to a football's rapid change of position when a game was viewed on a 54 inch plasma display

I think that many of these 'artefacts', as broadcasters refer to digital errors, will resolve when the analogue system closes and the full bandwidth is available to digital transmissions; meanwhile, please remember that most digital viewers are able to enjoy an outstanding technical achievement, delivering generally excellent picture quality and programme variety. Please don't criticise too heavily at this stage, particularly if you are sitting only a few feet away from a very large screen!

Malvern Amateur Radio Club

I gave an Amateur TV ta k to the **Malvern Amateur Radio Club**, recently and it's astonishing how time passes. I remember travelling there with **Alan Kendall G6WJJ**, chairman of the Beacons Repeater Group, not many years ago. To my surprise, even members who had been in the Malvern club more than ten years could not remember our previous visit but that could mean it wasn't very memorable!

I have a standard *Powerpoint* presentation for exhibitions and club talks, that was compiled a few years ago. So regrettably, some of its content is either no longer done, or no longer available without obvious replacement. So a few of the 'slides' had been modified with a large red X! The Malvern evening became a somewhat philosophical look-back at how ATV used to be, its present position with plenty of repeaters, which supported localised analogue activity but with very limited and significantly expensive experiments with digital ATV.

I therefore posed the question "how could the amateur ATV scene possibly match the advances in professional broadcast digital?" Admittedl,y not the most positive note from the new club secretary but perhaps deliberate so to highlight the moves I think the BATC needs desperately to take.

Broadcast television will be entirely digital by 2012; it may be difficult for Amateur TV to match this, both technically and financially. But there is plenty of life left in analogue ATV if equipment is available again. Hopefully, with the co-operation and expertise within the numerous ATV repeater groups,we will manage to keep the mode gong. This is a task I intend to address as BATC Secretary.

I was going to buy the 2007 *RSGB Yearbook* from the Kempton rally but a courtesy copy had been sent to the BATC and Brian Summers was able to pass this on to me! The Yearbook is, of course, much more than a callsign listing; the first sections contain a wealth of information for the Radio Amateur. This includes a list of local Amateur Radio Clubs, contact information for Regional Managers (RM) and so on. So another job for me as new BATC Secretary is to write to RMs about Amateur Television, perhaps to encourage the clubs in their region to affiliate and thus be sent a club copy of the BATC's magazine *CQ-TV*.

75 Years Celebration

Looking Back - the 1990s

This decade saw several 'firsts' for broadcast television. British Satellite Broadcasting came on air in 1990 and the curious 'Squarial' microwave antenna appeared on many homes. But BSB was soon to merge with Sky to form BskyB, adding to the growing complexity of choice for the television viewer. BSkyB would also change the face of how we might pay for some of our viewing by transmitting, in 1996, the first 'Pay-Per-View' programme, a boxing match from Las Vegas was shown.

Terrestrial television was changing too. The names of the familiar regional ITV franchises - Central, Thames and so on gave way in 1993 to Carlton, West Country and the rest. GMTV began to put out breakfast television news; mornings were dominated by the radio audience, so there was the challenge of attracting substantial static viewers. But the greatest impact on the home audience would be the opening of Channel 5 in 1997; this was to occupy a previously unused channel number in the broadcast allocation - unused that is except for the domestic video cassette recorders that had their r.f. outputs on this previously clear channel. So a huge re-tuning operation had to be organised for millions of v.c.r.s in order to prevent interference.

All of this was still in the analogue domain. Then, in 1998, television changed for ever with the coming of digital satellite, soon followed by digital terrestrial services offering pictures free from noise and interference, many additional features and a panoramic 16:9 viewing experience.

Active ATV

Perhaps as Secretary I should actually become more active in ATV for 2007? One area could be to take part in the ATV contests, at least to support the efforts of the BATC's new Contest Manager, **Dave Crump G8GKQ**. Congratulations to Dave and fellow operator (name not stated) **G8ADM** for winning the International 2006 from Dunstable Downs. Both went out on the contest Sunday morning and operated out of the back of the G8ADM Land Rover, which was well equipped with pump-up mast and equipment for 430MHz (70cm), 1270MHz (24cm), 13cm and 10GHz (3cm) with them (taken from BATC Website.

I may soon be operating from a new QTH – perhaps that house on a hilltop I have always promised myself – then run the full legal power from a large beam and see if I can win a contest or two?

Graham G8EMX

Introduction

One of the privileges I have as Editor of *PW* during the 75th anniversary year is selecting articles to reproduce as we feature the chosen decade – the 1990s - for this issue. This month has been far more interesting than I could have imagined!

The Yeovil Club

Readers who have met me at clubs or during rallies will know how much I value the importance of their local Amateur Radio club. In 1994 we were able to spotlight the Yeovil Club and their 50th anniversary and it's still going strong.

The tangible support for local Amateur Radio clubs from *PW* will continue and I look forward to meeting you at your club!

The Poky-toky

At first glance, the short review of the ultra-QRP Poky-toky 144MHz f.m. transceiver might not seem 'special'. However, even though these little rigs weren't on sale for very long, they still appear on the second-hand market. In fact, I saw two being used at the 2006 Leicester Show.

In a way the Poky-toky foreshadowed the introduction of the ultra-QRP PMR 446 licence free u.h.f. hand-helds. I've often come across people 'hill-topping' with these remarkable little rigs. And once Amateurs realised what could be achieved with very low power, similar home-brew designs appeared in the Amateur Radio press and no doubt we'll soon have more!

The Desk-Top Microphone

The late **Fred Judd G2BCX** was a prolific technical writer and often produced lengthy articles for hi-fi magazines, alongside his radio output. Many Radio Amateurs - because of parallel interests - knew that Fred wrote under pen names. However, I couldn't understand (at the time) when G2BCX politely insisted that the Allan Lester Rands pen name be used with the Desk-Top Microphone project.

The article was so typically a G2BCX type I doubt anyone was misled! In fact, Fred told me he had letters sent to him addressed as Allan Lester Rands/Fred Judd G2BCX! Fred and I often laughed about it and I still miss him very much. Thanks for your support Fred!

Rob Mannion G3XFD

1990 - 1999

Royal Mail from 1990
January 1990
A personal message to the World of Amateur Radio Communications from **HRH King Hussein JY1**.

Poky-Toky OVER
April 1994
Keen QRP operator **Peter Barville G3XJS** tries out a single channel low power v.h.f. transceiver – the 'Poky-toky OVER'.

News 94
July 1994
Newsworthy items from 1994 – how many of these do you remember?

Desk-Top Microphone
August 1990
Desk microphones capable of providing good quality speech are fairly expensive. In this practical article **Allan Lester Rands** describes an easy-to-build design that you can build for approximately a quarter of the price of a commercial model.

Looking Back
1990-1999
Snippets from the *Practical Wireless* archives.

The Yeovil Club
April 1994
Half a Century coming up!

News 1996
November 1996
More memories from the 1990s.

Practically Yours

75 years of Heritage & History

Coming up during 2007

- January Issue: 2000 - 2006
- **February Issue: 1990 - 1999**
- March Issue: 1980 - 1989
- April Issue: 1970 - 1979
- May Issue: 1960 - 1969
- June Issue: 1950 - 1959
- July Issue: 1940 - 1949
- August Issue: 1930 - 1939
- September Issue: *PW* Launch in1932
- October Issue: Pre-*PW* Radio Days
- November Issue: Pre-*PW* Radio Days
- December Issue: Pre-*PW* Radio Days

Every month during this eventful year we take a look back at a decade of radio reading in this special 16-page supplement

Royal Mail from 1990

Amman

28 October, 1989

My involvement in Amateur Radio goes back to the early sixties. I look at Amateur Radio as a means of self-education in many fields apart, from the field of Communications. I learnt more about different parts of the world through the many fellow Radio Hams I came into contact with.

It has long been my belief that only through communication can people know each other and eventually come to understand the different peoples which is one important step towards attaining world peace.

I would like to mention that a great service is provided by Radio Hams especially during emergencies and natural disasters when they provide help to people in need throughout the world.

A Radio Ham should never hesitate to pick up the mic, listen carefully, never mind if the signal is weak, and to spend the time and the effort to lend a hand to someone who is in need of help.

God bless you all.

73s

Hussein

JY1

A personal message to The World Of Amateur Radio Communications From HRH King Hussein JY1

Jan 1990

Poky-toky OVER

The Poky-toky OVER is really a pair of transceivers and these single channel (144.550MHz) rigs are just about the ultimate in simplicity. Apart from the p.t.t., there is only a three position slide switch, which selects **Off**, **Low Volume**, or **High Volume**. No other controls are provided (or needed).

As you'll be able to see from the specifications, the transceivers are extremely small and light, yet the case appears to be quite sturdy, and fits well in the hand. The range obtainable will obviously depend on terrain, buildings etc., but I found the Poky-toky's 10mW power output to be reliable over a distance of about 250 to 300m. This should be more than adequate for conducting TVI tests, antenna erection parties and communication at rallies etc., where a limited range is called for.

The Poky-toky OVER was actually supplied as a matched pair of transceivers.

Small And Light

Two antennas are provided with each unit - a thin helical whip, and a flexible wire antenna. The transceivers are small (and light) enough to be put into a shirt pocket.

Fig. 1: Internal view of the 144MHz QRP transceiver.

The clip at the end of the wire antenna is designed to be attached to a jacket, or coat collar. Unusually, the antenna connector is a 3.5mm jack socket and I wonder whether these will prove reliable over a long period of time?

The earphone connector, mounted adjacent to the antenna socket, is also a two-pole 3.5mm jack. I don t recommend plugging an earpiece into the antenna socket and didn't experiment to discover what the result would be!

Power is supplied from a single 9V PP3 battery and care must also be taken when inserting the battery. There are no symbols marked on the casing to indicate which way round the battery should go. In fact, the positive terminal does have a red connecting lead soldered to it, but you must still correctly identify the battery terminals. (I don't know whether reverse polarity protection is incorporated in the rig).

The battery compartment cover is very tight when a battery is installed but I'd rather that than a cover, which could fall off too easily.

I measured the current drain to be about 18mA with the receiver squelch closed (no signal present), and 46mA on transmit. With the volume set at **Low**, the audio from the internal speaker seemed about right for normal applications and very healthy indeed at the **High** setting. The audio quality was surprisingly good between units and also sounded very acceptable when checked on my main station rig.

One Channel

There's one disadvantage of the Poky-toky as it has only one available channel. This means that, if you are using a pair at the local rally (or boot sale) to tip off a friend about the best bargains, anyone else using a Poky-toky will also hear your good news! However, there s another (potentially more serious) drawback. Recent changes to the 144MHz band-plan mean that packet radio operators may now use 144.550MHz for Mail Box access, etc. Local activity levels will determine whether this is likely to present a problem when using your Poky-toky. The wire ended crystals (soldered into the circuit board) but it should be possible to obtain and install, alternative frequencies if you wish. Crystal specifications are available from South Midlands Communications*.

Excellent Value

At £59.95 a pair, these transceivers represent excellent value for money and they offer a good 'no frills' performance. I suspect they may be a little susceptible to strong out-of-band transmissions or other nearby 144MHz transmitters but should otherwise provide excellent short range personal communication and a lot of fun.

My thanks go to **South Midlands Communications Limited, S.M. House, School Close Chandlers Ford Industrial Estate, Eastleigh, Hampshire S05 30Y**.

This article first appeared in 1994 and SMC are no longer in the Amateur Radio business. **Editor.*

Specifications

Receiving system	Double conversion superhet (with squelch)
Receiving & Transmitting frequency	144.550MHz
Frequency control	Crystal controlled
Operational mode	Narrow band f.m. (n.b.f.m.)
Operating temperature	-20 to +50°C
Power source	One 9V battery
Dimensions	63 x 104 x 21mm
Weight	90g (without battery)

Keen QRP operator Peter Barville G3XJS tries out a single channel low power v.h.f. transceiver - the 'Poky-toky OVER' .

April 1994

News '94

Saunders Success

Despite all sorts of obstacles, **Clarice Saunders** is now **GOTVS**. Following her success, this determined lady wants to pay tribute to her friends in Amateur Radio and also encourage others to persevere. So, it's over to you Clarice:

"I became a Radio Amateur purely by accident. It started when my husband, Stanley said 'I want to be a radio amateur'. I replied "Amateur Radio...whatever's that"? Patiently, Stanley tried to explain, but I didn't really understand. So, we explored the possibility of attending evening classes and found a class at the local College. I found it very difficult to understand, let alone take notes, and I must admit that I fell asleep several times!

Stanley plodded on but unfortunately, was unable to sit the exam owing to illness. Also at that time we decided to retire from our farm in Oxford and move to Christchurch. Stanley's interest was rekindled by meeting several Radio Amateurs in the area. They informed us that RAE classes were being held at Poole Logic's shop, in nearby Poole.

We went along one Friday evening to try and find out more about the classes, where we met Paul G1CSC, who was just starting a new class. Paul said "Come along then, you might as well have a go". As we walked through the door I realised that I was the only female in a class of about 20! Stanley passed the RAE exam at the first attempt and was issued the callsign G7AET. Unfortunately, due to the pressures of organising our new home, I failed but persevered and finally passed at my second attempt, gaining the callsign G7BKS. Together we joined the local radio club at Christchurch. Then some of the other members suggested that I should now learn Morse code.

So, using all the methods available to me, including books, tapes, Morse tutor and so on. I began to learn the code. To my surprise, I began to enjoy it and wanted to take the test.

Although I failed, I must at this point thank the test examiner Stewart Dade G3HJZ who was sympathetic and considerate. It was this and later experiences that made me all the more determined to go on.

Partners at home and in Amateur Radio. Clarice Saunders GOTVS with her husband Stanley G7AET, pay tribute to everyone who helped introduce them to the hobby.

A month later, I went to the Clayesmore Morse Festival weekend on the 27 March 1993 to take the test. I failed again but it was here that I met G3XFD and his friend **John Goodall GOSKR**.

With G3XFD's encouragement and John's stories of how he became a Radio Amateur to inspire me, we carried on. At this time, I had the privilege of speaking to **Roy Clayton G4SSH**, the Chief Morse Test Examiner, who also encouraged me to keep trying.

Vernon G2DVY told me that when he was learning the Morse code (he had just got his late father's callsign), he had been greatly helped by a friend, **Gerald GOJIC**. Gerald had heard how disheartened I was and said he would like to help me if I was willing and I immediately took up his offer.

In the middle of June I took the Morse test again and this time passed. So, here I am with my chosen callsign GOTVS. I'm really grateful to Gerald and his wife **Sheila** for all the kind help, together they make a wonderful team.

Also, I must thank **Norman GOTMZ**, who had just got his A licence and helped with extra lessons. Also, I mustn't forget **Les G4XGC** and his wife **Barbara GOTND** for their continued support. We have made many new friends who have shown us such kindness and care it has been overwhelming. Stanley and I are looking forward to meeting them on the air with both 'phone and C.w. And, Stanley is now beginning to learn the code! All this from a lady who had originally said "amateur radio... whatever's that"?

The *PW* team wish Clarice and Stanley every continued success with their pursuits in Amateur Radio.

Youngest Honorary Member

The Guildford & District Radio Society has awrded five week old Steven Croucher Honorary Membership of the club. Steven's parents, Peter G4YPC and Ruth G0NRJ met at the Guildford club. They got married in 1991 when Peter was Chairman and Ruth, Secretary and the wedding almost tuned into a club activity, with over 30 members attending.

Steven is shown in the photograph aged only three days, trying to grasp an understanding of how the p.t.t. works. Peter and Ruth hope to encourage Steven to be one of the youngest Novice Licencees as grows older.

There's not much happening on the bands so I think I'll have a nap.

Prize Winners

Mr Jan Lutterot G0LUT from Bristol was the lucky winner of the SGC Special Prize Competition, which *PW* ran in the October to December 1993 issues.

Jan and his wife, Gaby were recently invited to the *PW*

Lucky winner Jan GOLUT with his prize SG-2000, his XYL Gaby and PW's Editor, Rob Mannion G3XFD

editorial offices to collect Jan's prize of the SGC SG-2000 h.f. mobile transceiver and to meet the team. Jan has since informed PW that he is busy reading through the SG-2000 handbook and says he has noticed a subtle difference between the SG-20000 and his 24-year old Yaesu FT-101!

The second and third prize winners of the SGC competition were **David Smith G1FYX** from Lancashire who won the Jones Morse Key and **A.K. Whillock G4ZLK** who will receive *PW* free for two years with his prize subscription. The Practical Wireless editorial team would like to congratulate all three winners and express thanks to every reader who took the time and trouble to enter the competition.

International QRP Day

International QRP day is to be held on June 17 this year. To coincide with this event **GB2SM**, based at the Science Museum, Kensington, London will run at internationally accepted QRP power levels over the weekend July 17 - 19 1994.

The station will be operational at QRP power levels from 1100 to 1600 on Friday June 17 and will concentrate on the 7 and 14MHz bands. Over the Saturday and Sunday (18 & 19th) the GB2SM station will be operational at the same times as on the Friday but the emphasis will be shifted to the 3.5, 21 and 430MHz bands. Morse and 'phone operation will also be taking place if conditions allow.

Friday June 17 is an under '9s' day at the Science Museum and so it is hoped to be able to place a great deal of emphasis on the Novice Licence scheme.

Amateur Software Callbook

The first UK Amateur Radio Callbook has been produced for the PC by GOLOV & G4LUE Amateur Software. The data for the callbook was purchased in April from the Radiocommunications Agency and is therefore very up-to-date. The UK callbook is supplied on 3 x 1.44 3.5in disks and requires DOS 3.1 or above and 15Mb of hard disk space to run. The program is simple to install and use, is menu driven and can be used to carrry out searches on addresses, postcodes and towns. Also contained on the program is UK repeater data, a nodes list and Packet mailboxes.

If you would like a copy of the UK Amateur Radio Callbook for the PC it will cost you £11.50 including P&P and is available from **J. Bailey. 8 Hild Avenue. Cudworth. Barnsley. South Yorkshire S72 8RN**.

Oops – PW Leaps Forwards

The editorial pen unfortunately slipped again in the June issue of *PW*. The volume number that appears at the head of the contents page jumped forward by one making the volume number 71, when it should, in fact, read 70 (we like to work ahead but not that far!). The editorial team apologises for any inconvenience caused by this slip up.

Fun Day

The RAF Sealand Radio Club GW4RAF is holding Fun Day on 26 June 1994 to celebrate its 70th Anniversary. The club will be setting up under canvas on RAF Sealand's airfield to operate the Spec Event Callsign GB2RAF.

The RAF Club Station, GB2RAF, will be operational on h.f and v.h.f and 50MHz from early mor ing on June 26 and possibly during the evening of the 25th. All equipment for use on the day has be donated or loaned by suppliers. Special QSL cards have been produced for the event and will be available through the bureau only. During the Fun Day there will be plenty of attractions to suit the whole family including the first flying display to take place at RAF Sealand since 1983.

For more information about the **RAF Sealand Fun Day '94 contact Sqn. Ldr. Peter O'Connell on (0244) 288331 Ext. 7572.**

Club Security

With vandalism on the increase, many people are looking for extra security for their premises. This also applies to radio shacks and club premises.

The ultimate in security protection is Closed Circuit Television (CCTV). A complete CCTV system comprising of monitors, video recorders and operating staff can very expensive and impractical for premises such club houses and shacks. However, Albion Security Products (ASP) have developed the **Crimestopper.** Designed as an effective deterrent against theft Crimestopper costs a fraction of the price.

The Crimestopper range of dummy CCTV cameras has been designed for use with warning sign to advertise that your property is protected and hopefully discourage the potential thief, causing him/her to move on. Each Crimestopper CCTV camera is identical to a real camera, has a high intense flashing light, adjustable wall mounting bracket and ASP say they can be installed in minutes. For more information on the Crimestopper range contact **Albion Security Products, Unit The Townsend Centre, Blackburn Road, Houghton Regis, Bedfordshire LU5 5BG. Tel: (0525) 378649.**

Cushcraft Antenna Dealership

The *PW* Newsdesk has recently received the news that Waters & Stanton Electronics of Essex he been appointed sole distributors in the UK for' Cushcraft range of h.f. and v.h.f. antennas a beams.

The dealership appointment was made at the recent Dayton HamVention, Ohio, USA. During the HamVention several new and revised antenna models were announced by the Cushcraft Corporation and these will form part of the range that Waters & Stanton Electronics will be handling.

A copy of the latest Cushcraft catalogue is available to dealers and customers from **Waters Stanton, Spa House, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835/204965.**

Sept 1996

Easy-to-build design.

Desk-Top Microphone

Editorial comment: The late Fred Judd G2BCX was a prolific technical writer and although many readers will remember that G2BCX was very actie writing for the hi-f.i audio market, it will perhaps come as a surprise to some that Alan Lester Rands was another pen name used by Fred! I cannot remember now just why Fred insisted on using the pen name within *PW* for this particular article – perhaps he thought he was being 'over published'? Whatever the reason, I think It's important to let our readers know just how versatile Fred was. The project was very successful and I built one myself although I was fortunate enough to use a (rare) round die-cast aluminium box for the microphone section case and a moving armature insert. I've chosen the project for re-publication as it represents the very best type of project and reflects the period very well. **Rob G3XFD**

The original text:
Free-standing, or desk-type microphones complete with controls allowing adjustment of bass and treble, cut or lift, don't come cheap nowadays! But by building this project you'll end up with a very reasonable looking microphone and save money at the same time.

The primary component is the microphone itself. This may be any miniature loudspeaker of approximately 40 to 60mm diameter. Alternatively, you could use a balanced-armature type insert (of the type found in telephone handsets and freely available on the surplus market).

With a suitable housing, including some acoustic treatment within, and with a 'tailored' pre-amplifier response, I found that speech quality and an overall smooth response equal to that from a good class moving-coil microphone could be obtained. 'On air' tests carried out on h.f. and v.h.f. resulted in favourable reports for speech clarity and smooth response.

Performance

Acoustic and electrical performance may also be of interest. First, the microphone was compared with others of known make by using a professional tape recorder with replay via a high fidelity amplifier system. These tests proved that the 'home-brewed' prototype described here, had a wide overall frequency response, no 'resonances' and a near cardioid polar response which reduced reverberation effect from the rear and sides of the instrument.

In order to reduce natural resonances produced by the microphone, the frequency response of the matching and pre-amplifier circuit is 'tailored' as shown in the **Fig. 1** curve A. This is in addition to the acoustic treatment within the microphone case.
The bass and treble, lift and cut, is **produced** by the use of an active (negative feedback) Baxandall tone control network (shown in the dotted curves). The noise level from the pre-amplifier is practically nil as only the, grounded base amplifier. (Tr1) provides actual gain. Total harmonic distortion from the pre-amplifier was measured at less than 0.5% at 1kHz. (Very few people realise that the audio frequency response with a narrow band f.m. transmission is somewhat narrower than one might imagine).

The response, shown in **Fig. 2**, was obtained with an audio frequency sweep generator that covered 10Hz to 100kHz. The sweep generator's output was to within plus or minus 0.1dB level and the diagram clearly shows just how narrow the response really is. It's therefore desirable that the microphone used with narrow band f.m. transmitters has not only a smooth response, but also a facility for increasing the treble to compensate for reduction of the higher voice frequencies. This also applies to bass response to a lesser extent.

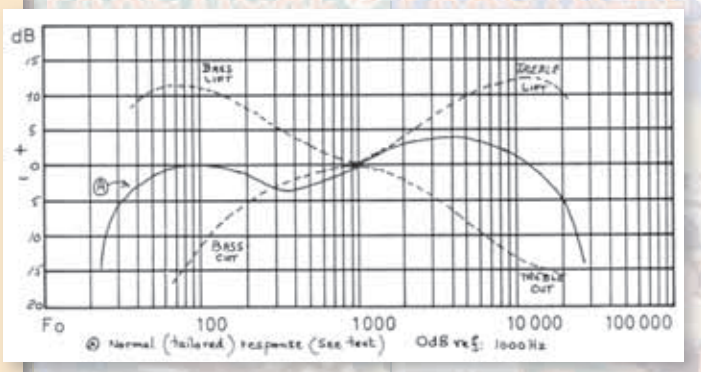


Fig.1: Frequency response of the matching and pre-amplifier.

Matching and Pre-Amplifier Circuit

The matching and pre-amplifying circuit is shown in **Fig. 3**. To obtain a very low impedance input, compatible with the

Desk microphones capable of providing good quality speech are fairly expensive. In this practical article Allan Lester Rands describes an easy-to-build design that you can build for approximately a quarter of the price of a commercial model.

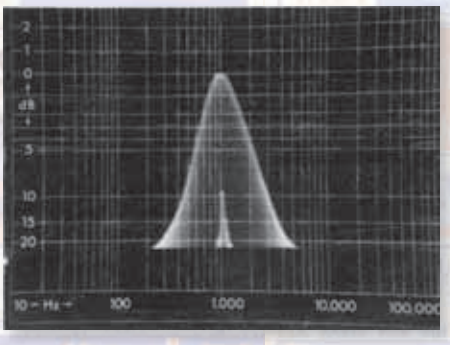


Fig. 2: The narrow response obtained from narrow band f.m. (n.b.f.m.) transmissions.

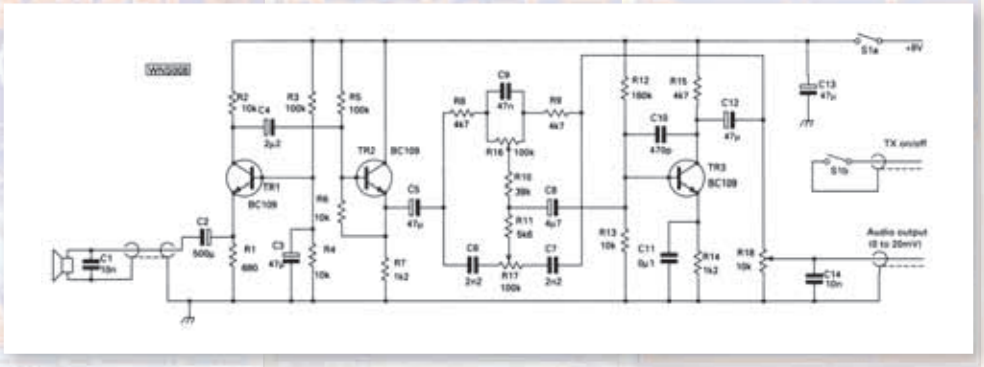


Fig. 3: The microphone matching and pre-amplifying circuit.

microphone impedance of 8Ω, a grounded-base transistor is employed (Tr1, a BCI09). This stage produces a small amount of gain which is reduced slightly by Tr2, which is operated-as an emitter follower to provide a low impedance feed to Tr3 which incorporates the active Baxandall tone control network. This stage has a gain of less than I, supplying a maximum audio voltage to RI8 of approximately 50mV RMS.

With the bass and treble controls, neutral frequency response dips to -3dB at 400Hz and increases by about 3dB at 4kHz (with reference to 1kHz), which nullifies the major resonances produced by the microphone itself. The acoustic treatment of loosely packed cotton wool within the screen around the microphone helps to further smooth the response. **Note:** The values of the circuit components are critical and must not be changed except for reasons to be dealt with later.

Additional Circuitry

The additional circuitry is simply an extra switch integral with the battery switch S I, a double-pole double-throw switch (see **Fig. 6**). This can be used as the 'transmitter on' switch by connection to the appropriate contacts on the transmitter which are often brought out to the 'auxiliary socket'. One lead is 'live' and the other is 'earthed' but this can be changed as required.

The object of the exercise, if this is possible with the transmitter, is that when the transmitter is switched 'off', the microphone battery is also switched off. This removes the possibility of the pre-amplifier being left on when transmitting is finished and running the battery down.

Total current drawn from the battery should in any case, only be approximately 3mA. If such facilities are not available, then the switch is not used. On the other hand if there s an auxiliary socket on the transmitter, a suitable d.c. voltage (9 or 12V) may be available and could be used instead of the 9V PP3 type battery to power the pre-amplifier.

Note: Any additional cables between the microphone unit and the transmitter must be double-screened to prevent radio frequency (r.f.) interference entering the pre-amplifier.

Construction Details

Details concerned with the microphone, its case, circuit connections, screening, cotton-wool packing, mounting pillar, etc., are shown in **Fig. 4**. The thin, earthed aluminium screen is important. Apart from keeping r.f. out, it also serves to form a smaller enclosure for the moving coil speaker unit which forms the microphone transducer.

The moving-coil speaker itself is actually secured in the housing with a rapid-setting epoxy resin adhesive. But whatever you use for the job - make sure none gets onto the speaker cone!

After the various connecting wires with double shielding (made from outer screening braiding from short lengths of coaxial cable) have been soldered and secured, cotton-wool is loosely packed around and over the microphone unit. The screen is then fitted into place. The cable to the pre-amplifier is then brought out from the bottom of the case and is taken through the square aluminium pillar into the metal base box.

The main pre-amplifier board is shown in **Fig. 5**. The prototype was built using perforated matrix board with the components on one side with the interconnecting wires on the other side. The finished board is supported within the base on stand-off pillars with the components mounted side facing downwards.

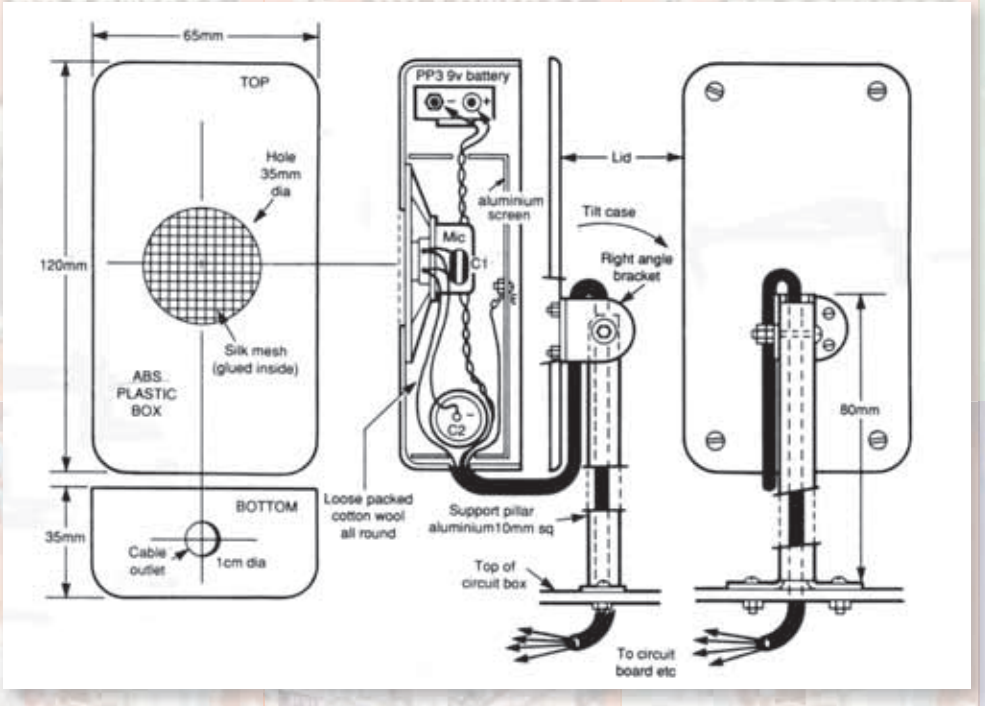


Fig.4. Diagram of recommended design and layout of microphone and battery housing. Note this version uses a moving-coil speaker as the microphone.

Tone Controls

The bass and treble controls should operate in a clockwise direction. In other words they should provide full

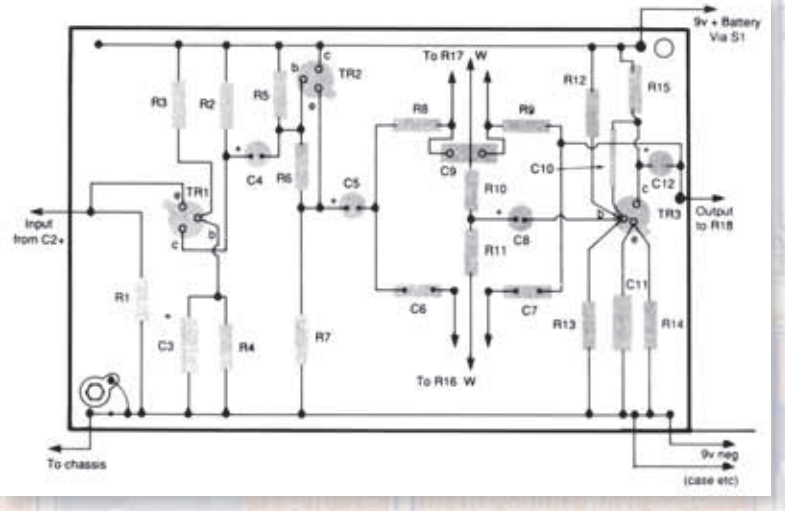


Fig. 5. The recommended wiring layout using a matrix (perforated) board. 170mm

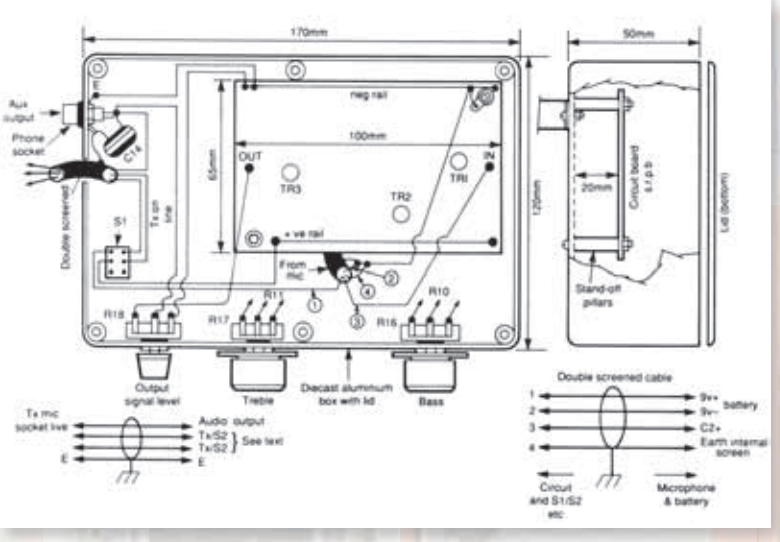


Fig. 6: Interconnection wiring diagram of the desktop microphone.

Shopping List

5% 0.4W carbon film.

680Ω	1	R1
1kΩ	2	R7, 14
4.7kΩ	3	R8, 9, 15
5.6kΩ	1	R11
10kΩ	4	R2, 4, 6, 13
39kΩ	1	R10
100kΩ	2	R3, 5
180kΩ	1	R12

Rotary Potentiometers (linear)

10kΩ	1	R18
100kΩ	2	R16, 17

Capacitors (Polyester)

2.2nF	2	C6, 7
10nF	2	C1, 14
47nF	1	C9
0.1μF	1	C11

Silver Mica 5% Tolerance

470pF	1	C10

Electrolytic

2.2μF	1	C4
4.7μF	1	C8
47μF	4	C3, 5, 12, 13
500μF	1	C2

Transistors

BC109	3	Tr1, 2, 3

Miscellaneous

Moving coil speaker or balanced-armature telephone insert (see text); PP3 type battery and connector (if required); die-cast aluminium boxes; switches; knobs; rubber feet; screened wiring; silk or other suitable fabric material for microphone 'fret'; Matrix board for assembly; various connecting wires; Double-pole double-throw switch; rapid hardening epoxy resin adhesive,

HOW MUCH? £20.00
HOW DIFFICULT? INTERMEDIATE

bass with the control fully clockwise, full bass-cut with the control fully anti-clockwise. The same applies to the treble control.

With the controls centred, the tone circuit response is flat but the overall response of the whole pre-amplifier will be as curve A in Fig. 1. If either control operates opposite to the way I've described, you only need to reverse the outer connections to the appropriate potentiometer.

Using The Microphone

Unless your transmitted signals (using a dummy load) can be monitored with another receiver, you must rely on observations other people listening as you adjust the controls. Start the adjustments with the bass and treble controls and the output level control R18 set to mid-range. Adjust R18 for optimum modulation level with a speaking distance to the microphone of approximately 300mm.

You should then set the tone controls for a response that best suits your own voice and the frequency response of the transmitter internal amplifier. Initial tests are best carried out with the help with a number of different operators who know how your voice should sound.

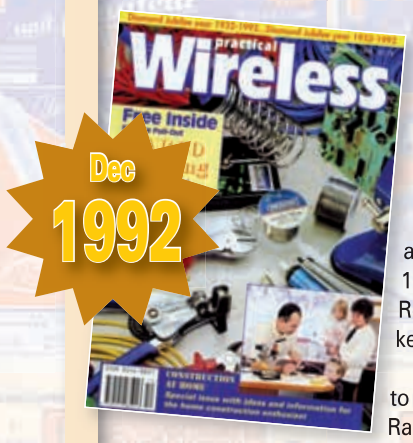
If the mid-treble needs to be be increased a little to provide a little more 'top' - don't try to force it with the treble control at maximum. Instead, you should change the value of CII, the emitter bias resistor by-pass capacitor to a 47nF or 0.1μF which will increase the response at around 4kHz but reduce the overall gain slightly. This shortfall can be overcome by adjusting R18 increasing the output of the pre-amplifier slightly. Apart from this no other changes to the pre-amplifier circuit should be necessary.

Battery Operation

If the microphone unit is to be operated from a battery supply, the following comment applies. Owing to capacitor charging up when the unit is switched on, there is a voltage rise of approximately 4V at the output of R18 in the form of a very rounded pulse, which may be conveyed to microphone input of the transmitter.

The charge decays fairly quickly and no d.c. potential is left at R18. The problem can be overcome by using a small, low voltage working 2μF capacitor in place of 47μF capacitor. The modification will produce a slight loss at very low audio frequencies, although it is barely noticeable. There is more than enough bass lift available to compensate if It's required. The modification was checked on my prototype and on another, which was built by a friend.

News, Views and Memories from 1990-1999



Young Amateur of the Year

Martin Saunders G7JCJ, who comes from Broadstone in Dorset has been chosen as the Young Amateur of the Year for 1992, Martin, a member of the Flight Refuelling Amateur Radio Society, is a keen packet radio enthusiast.

The first prize of £250 was presented to Martin, by **Stephen Spivey**, of the Radiocommunications Agency's (RA) Head of Mobile Radio, at the Radio Society of Great Britain's HF Convention in Windsor on Sunday 27 September. Martin also received an invitation to visit the RA's monitoring station at Baldock, Hertfordshire.

During the ceremony, Stephen Spivey announced that the Radiocommunications Agency 's continuing support for the Young Amateur of TheYear Award. The RA has pledged its support for another two years.

Martin Saunders received a number of prizes, including gifts from Icom UK and Siskin Electronics Ltd. Martin is mainly interested in packet radio and has assembled his own equipment and operates his own mailbox. He's also written articles explaining packet radio, has been appointed secretary of his packet group and serves on the forward planning committee of FRARS.

The closest runner-up in the 1992 Young Amateur of the Year award was **Neil Mothew G7NGM**. Neil, from Loughton. Essex is another Amateur who is keen on home-construction. Neil has also been invited to visit the RA's monitoring station at Baldock.

Martin Saunders G7JCJ, Young Amateur of the Year 1992.

Presidential Visit to Poole

There was a 'state' visit to Poole on Thursday 7 May, when Radio Society of Great Britain President **Terry Barnes GI3USS**, was a guest at the Quayside editorial offices of *Practical Wireless* and *Short Wave Magazine*.

Terry, who has been a reader and supporter of *PW* for many years, was delighted to find that the Royal Marines provided a march-past welcome for him outside Enefco House! He wasn't disappointed to find that his visit coincided with the Marines' traditional right of marching through the town with band playing and fixed bayonets!

During his visit, Terry met the staff and publishers and saw the make-up stages of the June issue of *Short Wave Magazine*. Pictured with Terry (centre) are Editor of *SWM*, **Dick Ganderton G8VFH** (on Terry's left) and **Steve Hunt** who is Art Editor on both *PW* and *SWM*. Taking a back seat for once is **Rob Mannion G3XFD**, Editor of *PW*.

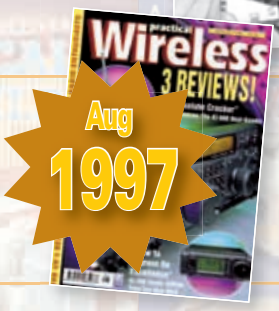
Exclusive Distributor

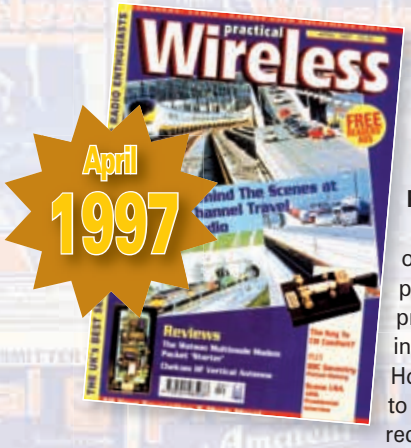
Nevada of Portsmouth have been appointed exclusive distributor for the range of **AEA** data products from the USA. This appointment follows the purchase of AEA by **Timewave Technology Inc.**

During the coming year, Timewave intend to improve and develop the AEA range as well as streamlining the production techniques. The first benefit of these changes is that customers buying from Nevada will be able to purchase the PK12 TNC for just £99.

Phil Jeffery Commercial Manager of Nevada (left) with Randy Gawtry President of Timewave Technology at this year's Dayton HamVention.

A selection of what was happening between 1990-1999 in the Amateur Radio hobby – how much do you remember?





RSGB Install A New President

Ian Kyle GI8AYZ, shortly to take up the callsign MI0AYZ, was installed as the 63rd President of the Radio Society of Great Britain (RSGB) at a dinner and ceremony held on Saturday 8 February at the Forte Posthouse, Dummurry, Belfast.

During the Saturday afternoon, a Zonal Open Meeting of the Society, open to anyone with an interest in Amateur Radio or the Society from all parts of Ireland, as held. This was the first such meeting to be held in the province since 1980 and was attended by more than 100 radio enthusiasts, including the Presidents of the national societies for Eire, Germany, Belgium, Holland and France. The meeting covered a wide range of topics pertinent to Amateur Radio and was kept in order by **Terry Barnes GI3USS** – the most recent RSGB President to come from Northern Ireland.

The Society also announced that the new Executive Vice-President is **John Greenwell G3AEZ**, **Paul Essery GW3KFE** is the new Chairman of the Membership Liaison Committee, filling the vacancy left by Ian Kyle when he became President. **David Butler G4ASR**, who compiles *PW*'s VHF Report column, resigned recently from the position of VHF Manager and has been replaced by **Ian Cornes G4OUT**, who is also continuing with his duties as VHF Awards Manager.

The 1997 RSGB President Ian Kyle GI8AYZ (left) presenting Executive Vice President John Greenwell G3AEZwith his chain of office.

(Photo by Stewart Mackay GI4OCK).

New Licence for the new Millennium

The following announcement from the RadioCommunications Agency and issued jointly via the Radio Society of Great Britain arrived at the *PW* offices in the final 'make up' stages of this issue of *PW*. Published literally in the same form as it was received from the RA via the RSGB, the *PW* team think it contains good news for the Amateur Radio hobby in the United Kingdom. Further comment will appear in the August Keylines editorial. Editor.

The press release begins with the statement: "UK Amateur Licensing is about to undergo the most exciting changes seen since the introduction of the Novice Licence in 1991".

Two major initiatives will allow greater access to the full range of facilities that Amateur Radio bas to offer and broaden the appeal of the bobby to a wider audience. More Amateurs will have the opportunity to experience world-wide communications and newcomers to the bobby will find it possible to make contacts on a wider range of frequencies.

These substantial improvements stem from discussions between the Radio Society of Great Britain and the Radiocommunications Agency, following consultation with the Am~teur Radio community carried out by both organisations.

A new class of licence, to be known as the A/B licence and which will use the callsign M5***, is to be introduced in the early autumn. This will provide access to all Amateur bands, on passing the Radio Amateurs Examination and a 5 wpm Morse test. 100W p.e.p. output will be allowed on the bands below 30MHz (the h.f. bands) and 400W p.e.p. output above.

The Novice A and Novice B licences will be enhanced in the summer to allow a bigger transmitted power than at present. The power output will go up to l0W p.e.p. New frequencies will include the 144MHz band, an s.s.b. allocation on 3.5MHz and the extension of the existing Novice h.f. allocation to include the QRP c.w. calling frequencies.

It is expected that the World Radio Conference to be held in 2002 or 2003 will agree to the removal of mandatory Morse testing for access to frequencies below 30MHz. Following that decision, the existing licence structure will be replaced with an incentive-based system. In the meantime, discussions are under way to ensure that Morse and data are safe-guarded by incorporating them into licence schedules.

In summary, the improvements are:

- Access to b.f. bands with a lower Morse test speed;
- The Class A/B Licence to provide access to all h.f. bands at the 100W p.e.p. level;
- Higher output power on all Novice bands;
- Wider allocations on existing Novice bands;
- Access to 144MHz for Novice Licensees;
- Safeguards for Morse and data sub-bands;
- In the longer term, the introduction of an incentive-based licensing system.

The RSGB and the RA are hopeful that these initiatives will provide a more attractive path into Amateur Radio, at the same time as increasing the facilities available to existing Radio Amateurs. These measures. together with the new licence structure. which will be put into place after a future WRC, will provide a bealthy future for Amateur Radio well into the 21st Century".

Engineer's Key To Success

Peter Jones is an enterprising engineer, and almost by accident he has fou himself in the Morse key business. He's the driving force behind Peter Jones Engineering in Smallfield, Surrey, not far from Gatwick airport. When he heard that an American distributor wanted 200 Morse keys and that the manufacturer was not interested - Peter decided to design and manufacture an entirely new key in his own workshops.

As he's an engineer and not a Radio Amateur, Peter took the advice of **Phil Godbold G4UDU** to find out what was required. The result was what has turned out to be a popular and solidly built paddle key that has proved to be a winner, especially in the USA.

Following the interest shown in the Jones' key at the 1992 Dayton HamVention, Peter has produced yet another, but this time it's a traditional 'pump' action. The latest key was launched in time for the 1993 HamVention and attracted a great deal of interest on the Palomar Engineering stand at the show.

The newly-introduced traditional key from Jones Engineering has a very heavy metal base, with an attractive finish. It's likely to appeal to operators prefer a traditional key that's not likely to slip around the operating desk during QSOs. Further details on this and other products are available from **Peter Jones Engineering, Chapel Road, Smallfield, Surrey RH6 9NI Tel: 034-284-3555.**

Half a Century coming up

The Yeovil Club

There are anniversaries galore in the air for Yeovil Amateur Radio Club says Mike Glasson G70WG. Mike, official historian for the club, reminds us that the 10th QRP Convention will be taking place on May 8 1994, that Club members claim they made the first transistor contact just over 40 years ago on February 21 1954, and that the club will be 50 years old in 1996.

The very start of the Yeovil Club was an advert placed in the local press by **Bill Kirkland G8FP** (now a Silent Key) in September, 1946. Three weeks later, on Thursday 17 October, the first meeting was held at the Wellington Inn. Yeovil. Ten members attended; they formed the committee and established the name. Since then, the club has had nine headquarters, being guests of such worthy organisations as the British Legion. the Ministry of Defence and currently the British Red Cross Society.

Callsign Issued

In April 1947, a callsign was issued - **G3CMH** (first held by **G3BEC** on behalf of the club) - and the acquisition of a class B licence – G8YEO celebrated the first 30 years of the club's life. The appropriate callsign of G8YEO was coming up for issue and the opportunity was seized to help put the club on the map!


Fig. 1: Peter G3CQR operating the special event station GB3LOW during the Yeovil QRP Competition.

Thousands of stations have been contacted since 1947, among the most notable being contact with **K2ZXM/MM**, Captain Kurt Carlsen, Master of the ill-fated ship the *Flying Enterprise* (it eventually sank on tow towards Falmouth, Cornwall). In 1989 Yeovil was delighted to welcome **Joy VK2EBX** and her husband **Dan** from Yeoval in New South Wales. At the time Joy was the only Amateur in the town of about 500 inhabitants, presumably named by emigrants from Somerset.

The Club likes to show the flag at local events such as Air Days at Royal Naval Air Station Yeovilton, the Yeovil Festival of Transport and the Royal Bath & West Agricultural Show; each with a special event callsign.

The QRP Convention

The Club also organises the annual QRP Convention (callsign GB2LOW) the tenth airing of which is to be mounted in May. The Club and several individual members belong to G-QRP Club; Rob G3MYM and then chairman **Tim Healey G4WMV**, (now a Silent Key) conceived the idea for a forum – the Yeovil Convention - where Amateurs could expound the science and technology of low power, long distance.

The Convention has gone from strength to strength. Those who have attended include QRP notables **George Burt GM30XX**, **Chris Page G4BUE**, **Bob Hudson G4JFN** and *PW*'s own **Rob Mannion G3XFD**.


A typical busy scene at the Yeovil QRP Convention. Since this article was first published, the event has moved to Sherborne in Dorset.

The Convention programme includes lectures, on-air stations, displays of equipment and a Constructors' Challenge. In this event a problem is set - last year (1993) it was to measure two frequencies in the 3.5MHz band. Much ingenuity and skill goes into the devices. And the spectators derive much amusement from the weird and wonderful contraptions on display! This year (1994) the emphasis is on the number 10. The task will be to construct the most sensitive receiver using ten components.

Transistor Transmitter

The transmitter used to test the QRP Challenge receivers will be equivalent to the one used on February 21 1954. This was when club members made what was, almost without doubt, the first long distance radio contact with a transistor transmitter. The original, which unfortunately has not survived the passage of time, used a point contact transistor. Experiments were being performed with an audio frequency device to see if it would oscillate at radio frequencies.

The transistor worked successfully at r.f., and the circuit was then matched to an aerial and calls were made. The power input was 30mW, representing an output of some 5mW. In due course contact was established with **J. A. Shaw G3CAZ** in Haslemere, Surrey. And, what is believed to be the first Amateur Radio transistor sky wave QSO was made on 3.5MHz. The achievement was recognized in the book *World At Their Fingertips*.

American Amateurs made their own first known similar contact 18 months later in August 1955. Incidentally, the test transmitter for the Yeovil Challenge has to be described as an 'equivalent' because a point contact transistor is not available today to replicate the original design.

Class Success

Each year since 1976, **Rob Micklewright G3MYM** has run an RAE class. It's timed for the December examination an has met with with outstanding success. This year **George G3ICO** has become a registered Novice instructor.

Morse instruction is not forgotten either and **Eric G3GC** has directed many class B licensee onto the road to an A licence with his immaculate Morse sending. Construction continues with the 'Yeovil' 3.5 and 14MHz transceiver designed by **Tim Walford G3PCJ**. This project is a stable companion to his 'Tiny Tim' published recently in *PW*.

Founders Still Active

Two founder members **Don G3NOF*** and **Dennis G3OMH** are still active in the Club. They're keenly looking forward to the 50th anniversary in 1996. Don's name and callsign will already be familiar to readers of *PW*'s HF Bands Report pages.

Those members mentioned are just a very few of the people who deserve credit. The very existence of the Club depends on the efforts of its members and we're fortunate in having an enthusiastic and knowledgeable membership. The Convention in May will be preceded a radio 'Fun-Run'. For further details of this and the Convention contact **Peter G3CQR,** QTHR.

***Since this article was first published, Don G3NOF has since become a Silent key. Editor**

News 1996

Nov 1996


NEWS 1996

Martin.Lynch Upstages MicroHenry!

Determined not to be continually up-staged by his son - nicknamed 'MicroHenry' - Martin Lynch has pulled a master stroke and arranged a birthday party young Henry can't compete with. MicroHenry can't compete because he's not got 'enough years in', as Dad Martin is celebrating his 40th birthday while poor young Henry is still in a single figures!

Striking a double blow, Martin Lynch is celebrating his birthday and almost 20 years in the Amateur Radio retail trade and inviting everyone to his 'Open Day' on Saturday 2nd November 1996.

Martin, recalling almost 20 years 'in the trade' reflects on how much has changed and the widespread nature of his business. And in fact the widespread nature of the customer base was demonstrated during August when **Andy Wyspianski**, the Customer Services Supervisor, called a customer in Belfast to tell them a radio was ready. The customer's wife answered and while Andy was explaining the reason for his call, he heard a 'thud' from the other end. Not getting an answer from the lady, Andy dialled 999. Contacted by the Metropolitan Police in London, the Northen Ireland police and an ambulance were despatched and after forcing their way into the house, found the lady slumped unconscious on the hallway floor. She'd suffered a burst ulcer, fallen down and knocked herself out! Operated on that night, she is now recovering well. Martin Lynch says "So 'howszat' for customer service to the extreme"! (Well MicroHenry, Dad did at least got the last word!).

Rob Mannion G3XFD

In 1973 the young Martin Lynch was challenging his elders, now 'MicroHenry' is challengin Dad!

Leading Scottish Station

On the night of 17 August 1996 the **Cockenzie & Port Seton Amateur Radio Club** held their 3rd Annual Junk Night, which proved to be a great success. During the evening, £477 was raised from the entrance fee, refreshments and raffle money, which was then added to other money raised by the club throughout the year amounted to a grand total of £727. This money was donated to the club's adopted charity, the British Heart Foundation.

Also during the evening, it was announced that the Cockenzie Club had been placed **Leading Scottish Station** in the *Practical Wireless* QRP Contest. For the second year running, the club was presented with the **Tennamast Trophy in Memoriam of Frank Hall GM8BZX** in honour of their success. The presentation was made by **Mrs Beth Hall**, widow of the late Frank Hall.

Beth Hall pictured presenting (l-r) Alex GMIVIU, Colin GMOCLN and Bob GM4UYI with the Tennamast Trophy In Memoriam of Frank Hall GM8BZX.

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Trader's Table

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Rob's chance to air his views!

Topical Talk

This month, Rob G3XFD discusses the Morse mode. Some people think it's archaic but it seems as though it has many uses in modern times. Rob also mentions some problems he's having with a major European consumer electronics manufacturer.

Usually, we're working under 'high pressure' just before Christmas due to the truncated seasonal publishing schedules. This year, we've been so busy I needed cheering up and Ron Taylor's letter (see Radio Waves) did just that! It was really amusing, just right for a dreary Friday afternoon. However, although it was amusing there was a distinct message (deliberate pun) in what Ron says. There really does seem to be a use for Morse code in modern electronics!

Personally, I feel that those who aren't able to use the Morse code - although they are no less valuable a Radio Amateur for that - are really 'missing out on another language' to help in our hobby! One of the best modern uses of the mode (and I cannot think of any other method immediately available to everyone without the use of special equipment) – is the International Beacon Project's h.f. beacon system that uses 22w.p.m. Morse transmissions. It's so simple and effective, providing much information within each 10-second beacon slot

Discussing The Ability

Recently, during a lunchtime meeting, I discussed the ability to use Morse with Amateur friends who doubt the dedication of those who cannot send or read the code. However, whereas I could never agree to query an Amateur's dedication or ability because they don't know the code, I really do think 'Morse-less' operators are missing out on both h.f. and above.

With the help of Morse on 18MHz I've had fully understandable QSOs with Japanese stations, using our well-known c.w. 'shorthand' abbreviations. And, working on the bands recently I've been heartened to hear - and work - an increasing number of stations using Morse for the first time. My most frequently asked friendly enquiry, "Why are you using Morse", often attracted the reply, "I find it can be difficult with s.s.b. on low power and I can often get a QSO with my low power on c.w. "

I really do think Morse has a place in modern times. I'll always encourage other Amateurs to try it. As I've said before - there's a famous book where the main character says, "There are many rooms in my father's house and all are welcome." And as I've also stated in the past - the same applies to our hobby!

Consumer Electronics

Rodney Byne G7OEL's letter, was interesting. However, I would hesitate (even with a hand-held transceiver) to transmit in a TV/consumer electronics showroom! My experience has shown me that they often use wide-band distribution amplifiers and even a very low power out-of-band signal could cause havoc and misleading results! Please bear this in mind!

I think that many of the EMC problems that led to Rodney and others to write to *PW* have been caused by the poor attitudes of the major manufacturers towards their customers and the lack of adequate 'customer service' and feedback on the performance of their equipment. As I'm having problems with a famous company (Philips) myself, I'm left wondering - do they really care about their customers? The once highly reputable Philips organisation (I've always liked their equipment) seems to have abandoned this customer! Even a replacement DVD recoder I got from them is faulty!

Philips aren't alone! The generally poor customer consumer electronics service/support situation is getting worse! Recently I complained to the **Advertising Standards Authority** (ASA) about a TV advert from Dell Computers (it has now been running for several months). This company sells direct to the customer, and by using English 'voice overs' during the advert gives the impression that its call centres and support are in the UK. Not so! When my wife had problems with a Dell computer the call centre/support turned out to be in India where the operator and I were speaking different versions of English! However, the ASA tell me that the Dell advert does not mislead and they don't think the average consumer is concerned where service support is based!

What do you think readers – is service/support poor? Am I in the minority (as the ASA seems to suggest) or would the choice of a British/or European based support system sway your choice of equipment? In closing on this topic, I'm reminded that one of the UK's major energy supply organisations closed its Indian based call centres because they were losing significant numbers of customers!

Rob Mannion G3XFD/EI5IW

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