Amateur Radio

WIRELESS INSTITUTE OF AUSTRALIA

3.4 GHz portable

IC-7300 review

▶ Build a versatile test instrument
▶ Steampunk antenna for 70 cm
▶ Hints for YouTube videos

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60th Anniversary

YAESU
60th Anniversary

Editorial

Editor
Peter Freeman   VK3PF
editor@wia.org.au

Technical Editor
Peter Gibson   VK3AZL

Publications Committee
Peter Hartfield   VK3PH (Callbook Editor)
Ewen Templeton   VK3OW
Kaye Wright   VK3FKDW (Secretary)
WIA Office   Bruce Deefholts VK3FBLD

All circulation matters
nationaloffice@wia.org.au

How to submit material
Secretary
AR Publications Committee
PO Box 2042
BAYSWATER VIC 3153
or *armag@wia.org.au*

Letters to Editor
Editor AR Magazine
PO Box 273
Churchill Vic 3842
or *editor@wia.org.au*

Hamads
'Hamads'
PO Box 2042
BAYSWATER VIC 3153
hamads@wia.org.au

Advertising
All enquiries to
Advertising Manager
AR Publications Committee
PO Box 2042
BAYSWATER VIC 3153
or *admanager@wia.org.au*

Registered Office
Unit 20 11-13 Havelock Road
BAYSWATER VIC 3153
Australia
Phone: 03 9729 0400
Fax: 03 9729 7325

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This month's cover
*Interest in 3.4 GHz is increasing, especially
with many 3.5 GHz subscriber units made
available surplus. See the VHF/UHF column and
the Rules for the Winter Field Day. Inset photo:
The IC-7300 review starts on page 25. Main
photo David Scott VK2JDS. Inset courtesy Icom
Australia.*

Contributions to Amateur Radio

Amateur Radio is a forum for
WIA members' amateur radio
experiments, experiences,
opinions and news. Manuscripts
with drawings and/or photos are
welcome and will be considered
for publication. Articles attached to
email are especially welcome. The
WIA cannot be responsible for loss or damage to any material.
Information on house style is available from the Editor.

Editorial

Peter Freeman VK3PF

CW Today column

Readers will have noted my comments at the end of the *CW Today* column in the May issue. The WIA Board and I have concerns around the methods used by the author of the column. However, there are always at least two sides to a story. From Louis' description of events, it appears that many others may have exaggerated the time period and frequency of transmissions made by VK5EEE. I am making no judgement, other than having allowed Louis to publish his explanation.

Identity

Having made that clear, I do need to point out that the images in the column are screen shots from the web. In particular, Photo 1 clearly shows a number of callsigns other than VK5EEE. I must point out that any individual can post to the DX Cluster without confirming the identity used to make that post and any comment. I have had correspondence with Jeff VK3JEF and Paul VK2HV, both of whom note that they did not post any such comment as portrayed in Photo 1 on page 37 of May *AR*. Jeff notes that anybody could have posted a comment using any callsign.

It was not the intention of this journal to cast a shadow on anyone mentioned or whose callsign was displayed in the images of the *CW Today* column in the May issue. I apologise to anyone who may have taken offense, and in particular apologise to Paul VK2HV and Jeff VK3JEF who believe that publishing the image places them in a bad light.

Further, I have had a number of authors write to me berating me for continuing to publish the *CW Today* column. They claim that Mr Szondy has caused significant damage to the DX community.

All that I have seen to date can only be considered to be hearsay. In his May column, Mr Szondy stated that he had transmitted for a short period on the posted transmit frequency of a DXpedition station. I noted that this journal and the WIA did not condone any such actions. We published the column as it was not defamatory to any individual, in our view, and was a valid expression of the author's views, regardless of whether we agreed or not with such views.

Just as we all can recognise that any individual may post to the DX Cluster any comments using any callsign without any form of validation, I am sure that most will also recognise that almost anyone can transmit a CW signal on any frequency at any time using any callsign they wish. To conclusively prove the identity of the actual station transmitting is difficult. It might be a little simpler to prove the identity of a person transmitting a voice signal, where voice signature technology may be able to be used to identify the person speaking. I appreciate that RF signature recognition might be possible; I have not yet seen any such evidence produced.

It is my view that anyone who claims to have evidence of anyone transmitting in contravention of their Licence Conditions should present such evidence to the appropriate authorities. It is then up to the authorities to consider the evidence

WIA comment

Phil Wait VK2ASD

Preparing for the AGM in Norfolk Island

Things have been pretty busy at the WIA in the lead-up to the AGM weekend on Norfolk Island. As you read this comment it may already be underway with about 100 people attending, about the same number as AGM weekends in previous years.

The meeting takes place in two parts. Firstly, a closely-managed formal AGM where the Directors' report and the Treasurer's report are presented and discussed. Any questions on those reports are taken. No special business or special motions have been received for the formal AGM. The second part of the meeting is the Open Forum, which is a more wide-ranging question-and-answer discussion on any topic relevant to Amateur Radio or the WIA. The meeting then goes into an afternoon session of interesting presentations. This year, we have arranged to have **live audio and video streaming**; so, if you're near a computer or smartphone, you should be able to log-on and view the proceedings.

The WIA has arranged for a commercial "LiveStream" server and is using Norfolk Telecom for the internet feed. Access to the Livestream feed is provided via a page on the WIA website.

One of the issues we constantly face is trying to allocate the various WIA Merit Awards to a large number of very worthwhile nominees. This year is no different, but we have decided to introduce two new WIA Merit Awards: the Michael J. Owen Distinction Award for distinguished service to the WIA and the Foundation Award for outstanding work with the Foundation licence.

The inaugural recipients of those awards will be announced at the AGM.

One other thing we have initiated is a **review of the WIA Constitution**. We have formed a Constitution Review Committee comprising Peter Young VK3MV, Peter Wolfenden VK3RV and Jenny Owen (Michael Owen's daughter), with a view to identifying areas in the constitution that need updating. Naturally, any proposed changes to the WIA Constitution will need to go before next year's AGM in 2017, so there will be plenty of time for discussion and feedback from members in the meantime.

It's been a busy year of change and it's fair to say there have been some issues which have sparked some vigorous debate. I'm sure some of those will feature this year.

The WIA has been a strong advocate for Amateur Radio during the federal government's Spectrum Review process, lodging numerous submissions and attending meetings with both the Department and the ACMA. Recently, the Minister announced the formation of an entirely new Radiocommunications Act, fundamentally changing the way spectrum is administered in Australia. The WIA has recently updated and resubmitted it's suggestions to the ACMA for changes to the Amateur Service, including the possibility of greater self-determination by adopting a Band Manager or Service Manager approach.

One possibility is that the Commonwealth, through the ACMA, could set the "paddock fence" conditions that regulate Amateur Radio, the interference potential and the international compatibility issues, such as permitted frequency bands and power, licence grades and knowledge requirements, third party traffic conditions etc., together with operational things like permitted modes and bandwidth, usage issues inside each band, etc., could be administered by an "Industry Code" developed by radio amateurs themselves, in much the same way that band plans are now. An Industry Code is much easier to change than subordinate regulation, so this would give Amateur Radio a great deal more flexibility and self-determination.

The WIA has always struggled with a shortage of funds, too much to do and too much reliance on a few key personnel. Along with amateur licence numbers, WIA membership numbers have been slowly declining for some years. However, member expectations seem to be steadily increasing. The WIA is now often benchmarked against large societies like the ARRL or the RSGB, but many people forget that the WIA has only two full-time staff members (the ARRL has almost 100!). How are we going to meet those increasing member expectations while working on a shoe-string budget? The solution may be to make more effective use of technology, or use our volunteer and committee network to a greater extent, or maybe simply better explain what the WIA can and can't do – the solution probably lies in all those things. I believe this is going to be one of the major challenges for the WIA in the years ahead.

WIA news

Thank you to our volunteers

An annual celebration to acknowledge the generous contribution of volunteers is National Volunteer Week. It has a theme of *'Give Happy, Live Happy'*, reflecting research that shows volunteers live happier and healthier lives.

Established in 1989, National Volunteer Week celebrates volunteerism in Australia. Think about the many volunteers in the WIA and radio clubs, who contribute so much to the running of Amateur Radio. The countless hours spent delivering numerous WIA member services, including this VK1WIA broadcast, the WIA website and *Amateur Radio* magazine just to mention a few.

The WIA Directors who give their time to the very important deliberations of the WIA Board – that heads-up a not-for-profit company. Recently we have seen after many months of planning a submission to the ACMA, delivered at a meeting with our regulator, setting out a reasoned argument for reform to the Licence Condition Determinations – our regulations.

The WIA Board is now finalising material for the Annual General Meeting of this not-for-profit company on Norfolk Island – as well as other important matters for the betterment of Amateur Radio. When you next look at the list of WIA committees, think about the volunteerism that makes it all possible.

The WIA Accredited Assessors around Australia provide a free service, some of them have been doing so for more than a decade, including a few who were involved in education for decades.

The motivation of our volunteers shown time and time again as wanting to put something back into the hobby that they enjoy. We are lucky to have them – and on behalf of all of us – thank you.

They are part of the more than six million Australian's who volunteer. We pay honour to through National Volunteer Week held on May 9 to 15.

WIA delivers major submission on future amateur licence conditions

In early April, the Board finalised the WIA's submission to the ACMA on future amateur licence conditions, addressing a wide range of issues currently affecting licensees, establishing some key principles and policies for amateur radio licensing in the future.

The 22-page submission includes an extensive two-page preamble, setting out the context in which amateur radio operates in Australia, developments in the radiocommunications industry and the WIA's desire to reduce the regulatory burden for both licensees and the ACMA, and for future amateur licensing to accommodate emerging innovation in wireless technologies and applications, to enable the hobby to develop in whatever direction current and future licenced radio amateurs might lead it.

The submission came ahead of a scheduled meeting between the WIA and ACMA, held on Tuesday 12th April.

A key purpose of the submission is to enable greater self-determination for the amateur service, along with proposing updates to the licence conditions for all licence grades in order to ensure amateur radio remains relevant in the digitally connected age. Key proposals include:

* enabling use of digital modes for Foundation licensees
* access to more bands for Foundation and Standard licensees
* relaxing permitted bandwidths for all license grades
* removing mode restrictions

* enabling DIY construction for Foundation licensees
* review of Foundation callsigns
* increased maximum power for all licensees
* early access to the 5.3 MHz (60 m) band.

The WIA proposed the licence conditions be addressed in two stages: priority changes first (as above), with proposed changes to frequency bands later, in line with the consultation process for the upcoming review of the Australian Radiofrequency Spectrum Plan.

WIA responds to the government's proposals for a new Act

Back in March, the Minister for Communications, Senator the Hon Mitch Fifield, released a consultation paper on legislative proposals for a new Radiocommunications Act, during his speech at the ACMA's RadComms 2016 Conference in Sydney.

The Minister said, "Australia's current framework has been in place since 1992. At the time, it led the world . . . but the communications landscape has now changed dramatically . . . the Government's Spectrum Review – released in May last year – found that the existing framework is slow, rigid and administratively cumbersome."

Senator Fifield went on to explain that "A new Radiocommunications Bill will modernise our regime, and allow industry greater scope to respond quickly in the market to emerging technologies and services."

The government sought comment from stakeholders by 29 April 2016.

See the WIA news release of 11 March 2014.

The consultation paper set out 19 topics for specific comment, ranging across the objects and span of a new act, the roles of the Minister and the ACMA,

radiofrequency planning, licensing of spectrum, the purpose of licences and rights, interference, equipment regulation, compliance and enforcement, user involvement (band or service managers), broadcasting, and transitional arrangements for moving between the current and new legislation. Pricing of spectrum or cost of licences were not part of the consultation paper.

The WIA's response was developed over March and April and lodged with the Department of Communications on 29 April, as required.

The Department of Communications will consider the submissions from all stakeholders and develop an "exposure draft" of the new Radiocommunications Bill. No timetable has been advised of when the exposure draft will be released.

A copy of the WIA's submission can found on the WIA web site: *http://www.wia.org.au/newsevents/news/2016/20160430-1/index.php*

WIA/RES Foundation Licence App

Training for the popular Foundation Licence in Australia is now available as an App for iOS and Android smart phones and tablets downloadable from iTunes or Google Play. The software was developed by Ron Bertrand VK2DQ who heads up the Radio & Electronics School (R&ES) with support from the WIA, fills an unmet need in this niche market of mobile device users.

The App goes through the Foundation licence syllabus step-by-step, with 17 tutorials, and for the Practical Assessment covers each competency in 20 tutorials. While formal theory, regulation and practical classes suit most people, it leaves those unable to attend for a number of reasons not able to easily access the necessary training. Established in 1997 the R&ES provides structured mentoring for aspiring radio amateurs. The volunteer not-for-profit organisation believes the course, via the new App, can be completed in a few days.

When ready, direct contact is needed with a WIA Assessor and these are on the WIA website *www.wia.org.au* If you live remotely and/or have a disability a special assessment can be requested via a Nominated Assessor appointed by the WIA.

The IOS (Apple) version is 'Amateur Radio (Foundation) Course' with the one for Android called 'Ham Radio (Foundation)' to comply with naming conventions.

Ron VK2DQ believes it to be a first of its kind in the world, although a few practice question drills are available. He explained that a number of a logistical problems had to be overcome in the development and testing phase to make them more user friendly, including being available to use off-line. The App is designed so that if there are changes to the syllabus new videos can be uploaded using the existing menu structure. The on-line course recommends purchasing a copy of the WIA publication 'Your Entry into Amateur Radio, The Foundation Licence Manual', to be used and studied in conjunction with the App.

The WIA/RES App should give more people the opportunity to enter and enjoy an exciting hobby, and maybe this will lead to career opportunities.

Editorial

and to take any appropriate formal or informal action against the person involved. Note that neither myself as Editor nor the WIA are appropriate authorities.

Until such actions have been taken by the authorities, and notification of such actions passed on to the WIA, as Editor, I cannot take any action myself or on behalf of the WIA. To undertake any such action would be denying the author of such a column of his/her right of natural justice. Any such action is of itself illegal.

I cannot act on hearsay, regardless of how many individuals make claims against another individual. Unless backed by conclusive evidence, the claims are simply that: claims, hearsay.

Comments made via electronic media

It is all too easy for anyone to voice their thoughts via keyboard in an email, or on one of the social media platforms. I urge everyone to think about what they are saying. Resist the temptation to respond immediately to something that you have read. Go away and undertake an unrelated task. Come back to the keyboard, take the time to read all of the available information on all sites, undertake some research. Consider your thoughts carefully before typing them and once again before hitting the Send button. Be a little temperate. It is all too easy in this modern age to be negative. Studies have shown that behaving in a negative manner and using negative language is associated with higher levels of cardiovascular disease, so negativity impacts your own state of health!

Perhaps I am mistaken: I thought that a fundamental principle of Australian society was to give everyone a fair go? It seems that many amateurs hold contrary views. Such is life!

Until next month,
Cheers,
Peter VK3PF

ARRL VE Session at Campbelltown, NSW

David Uzzell VK2HDM/AB3ZB

Photo 1: L-R Julian Sortland - VE, Brad Granger – VE, John Kirk - now AC8WN, Jamie Ware - now AF7YB, David Uzzell - now AB3ZB and Tom Valosin – VE. Photo by Craig Valosin – VE.

9 April 2016 was the day that we came together in Sydney, coming from Queensland and New South Wales to sit our USA Amateur Radio Exam. We all travelled a fair distance to attend with John Kirk VK4TJ/VE6XT travelling from Toowoomba, Queensland (943 km), and Jamie Ware VK4JY travelling from Warwick, Queensland (830 km), with myself travelling from Bigga, New South Wales (241 km).

You may ask what good is a USA Amateur Radio Licence in Australia. Well, if you travel to the USA you are all set to operate with full privileges the moment you land.

You can also operate an amateur radio station in the USA from your desktop computer, iPad or iPhone using Remote Ham Radio.

http://www.remotehamradio.com/

This allows you to enjoy a high powered, professionally installed amateur station with all the privileges of your US licence level. For me, this alone was enough of a reason to attempt my USA Extra Class Licence. The three participants chose to study for and take all three licence exams in the same day: Technician, General and Extra exams.

The day started out early at 8 am at the location for the exam in Campbelltown, NSW. We were all early, ready to go and get it underway. The Technician at 35 questions was first up and we all passed. As all of us already hold amateur radio licences, even if they were Australian, it made things a bit easier. The US General was next up and we all decided we would take it straight up without a break. Again with great success – we all passed without any problems. Being around and having an understanding of amateur radio definitely gave us a head start on the first two exams.

The Extra exam was next. This was to be a challenge in that we had all spent plenty of time taking, checking and double checking two exams already. The end result as a complete pass for all. The excitement and jubilation in the room from the success was all around.

And now we have John Kirk AC8WN, Jamie Ware AF7YB and David Uzzell AB3ZB as initial calls.

The Volunteer Examiners (VEs) in attendance were Tom Valosin WB2KLD/VK2RSG from Middleburgh, New York. He travelled 16033 km to Australia while on holidays as Team Liaison for the whole event and brought his experience on previous VE Sessions in America. Craig Valosin KB2KDP/VK2KDP, Tom's son, travelling the shortest distance of all (4 km), as he is working in Campbelltown. Julian Sortland AG6LE/ VK2YJS from Oberon, NSW 180 km and Brad Granger AK2QQ/VK2QQ from Thirlmere, NSW 33km.

As you can see distance is a great obstacle for many things in Australia. All those that passed are looking to apply to ARRL VEC for VE status. With more VEs we may be able to provide future exam sessions in Australia for interested parties wishing to travel to the USA or even expat Yanks that want to have a go Down Under for a new licence or upgrade.

It was a great event, with a great outcome for all who took the exams. The reason it was such a great success was due to the VEs that conducted the session with great professionalism and support. From all the participants we would like to thank the VEs for the session.

Photo 2: Participants taking General Class Licence Exam.

WIA **2016** Callbook

Available now

Producing YouTube videos for amateur radio

Peter Parker VK3YE

Video sites like YouTube are taking over from static webpages as the preferred place to describe your latest project. Broadband and cheap digital cameras have made video easier. And many concepts and projects are better demonstrated than described.

Like written language, there are rules of video. I'll give tips on what's worked for me. Consider them if planning to produce and upload videos about amateur radio.

One topic per video

There exist several regular lengthy amateur magazine type video shows where several guys sit around talking. They start with banter then leapfrog between various topics, only some of which are of interest. Watching and sifting takes both time and hard work, which is why I rarely do.

One topic per video is better. It's easier to tell your audience what they're getting first-up. You can use more specific keywords to aid viewers searching for a topic. Having more, shorter videos also aids advertising revenue if you're into that.

Viewers' time is valuable

Respect it. Picture your viewer as someone with their hand on the mouse, ready to click on someone else's video. YouTube has stats showing when people stop watching. It's often startlingly short, so try to retain their interest.

Some pet hates:
- Long and cheesy introductions. A 30 second intro works for a half hour TV show but not for a 5 minute video. Keep it to 5 seconds followed by a summary of what you're going to say.
- Time setting up. Viewers aren't interested in you reaching for cables or sorting through drawers of parts. Get your stuff

ready before making the video. Or present the setting up in fast motion as a series of stills if it's critical.
- Radio hash with marginal signals. No more than a few seconds please, though admittedly it's better than bad music. Edit if longer. The only place for noise is if it's part of the video, for instance demonstrating the effect of filters, noise blankers or receiving antennas.
- Long winded radio contacts. Some don't like long strings of Morse. Overcome this by careful editing. Or add subtitles for those who don't know it.

If demonstrating mobile operating, I'd rather have five quick signal reports and locations than a monologue from one station. There's no point including your own transmissions; them saying your callsign is enough proof of contact.

Even editing out 5 seconds here and there makes the video faster moving and more engaging. The growing number of viewers on the go will appreciate your conciseness.

Think about the content

Unless you're a talented raconteur, you need some idea of what you're going to say and the topics you'll cover before making the video.

Some people can speak off the cuff without much editing. I'm not one of those. Parts of my videos are recorded ten times or more. I take the least worst and delete the rest.

Some people need a script. IPad and Kindles can be less conspicuous than A4 paper and rarely blow away. Writing a script is good for your thought process but is poor if slavishly read from. Having said that, you can get away with more if the camera is pointed at the subject and not at you.

If you can fake natural delivery you've got it made. For the rest of us though, editing covers a multitude of sins.

Think about the picture

Computer screens used to be like TVs – always getting bigger with higher definition. Mobile data reversed that trend. More videos are being watched on small screens. So, high resolution may not be quite as important as five years ago. HD also means big file sizes, difficulty in editing and slower uploading.

I like a good backdrop. Natural scenery is a nice touch if operating portable. A bench, bookshelves and equipment are authentic but don't zoom out so far that they distract from what you're demonstrating. For a similar reason avoid clothes with big bold logos unless they're relevant to the video. Take extra care if your place is untidy; no one need see unwashed crockery or stuff on the floor.

Change the view. Some videos have the same shot all the time. That's OK if it is a quick recording of a test contact. Otherwise it's boring. Instead mix things around, maybe alternating between a talking head, the equipment you're demonstrating and some natural scenery. But if you do the talking head thing, don't have it filling the screen as your first shot. That looks scary, especially if it's a while before your first syllable.

Light can be a problem. Lights at home may be too dim for good resolution. Temporarily removing lampshades can help. Or try spotlights for small stuff like circuit boards. Even a lamp on a

gooseneck, arrays of LEDs or a torch may help.

Natural light, such as produced on a bright cloudy day, is good. But direct sunlight may not be. It's hard to look relaxed squinting into sunlight. And the shade may be too dark especially if using a camera with automatic settings.

Another bad habit is hand-holding the camera. Camera shake makes viewers seasick.

Use fences or ledges you can sit your camera on if you have no room for a bulky tripod. Or carry a collapsible mini-tripod. Where there's no alternative edit savagely to keep the shaky scenes short. Although this probably matters less where audio is your main content.

As for the zoom setting, there's nothing more frustrating than recording a perfect explanation but with half your head missing. If there's no one to optimise it, err slightly in favour of zooming out.

Think about the sound

Music on videos is often overdone and too loud. If you're demonstrating a receiver or DX contacts then I'd rather hear them than music. Use music sparingly unless you consider it sets the mood for a scene or it's your receiver playing the music.

There are many receiver demonstrations on YouTube where audio is mistuned, thin or muffled. The audio is the first impression of any equipment demonstration and can make or break the viewer's enthusiasm to buy or build it. Unless

it's to prove that a rusty safety pin and two transistors can receive a signal, fix the audio before filming. Or use it as an example in an educational video about bad audio.

I often film outside and find wind noise a problem. The pros use an external microphone. Clarity is essential for long commentaries or explanations so check if your camera has an external microphone input. Or find a calmer spot even if it means sitting or lying on the ground beside a fence. If all else fails turn down the sound and use screen text instead of narration for key messages.

Viewer engagement

Sometimes you can break the rules and still get many viewers. You'd think that video of someone erecting a portable wire antenna would be boring, but some like it, especially if done quickly. Don't stretch audience friendship and edit well for brevity.

Viewers like the unpredictable. Interfering animals boost ratings, especially if they knock something over. So do funny questions from the public. A trip or fall would have to be worth at least 20% more viewers but good editing can lessen the pain.

A friend of a friend uploaded a spontaneously shot video of a sheep narrowly missing a train. It went viral, getting over 300 000 views. That's one way to hit the viewer jackpot but you don't see that every day. A surer way is to produce consistent output of reasonable quality videos.

In a specialist area like electronics people are mostly going

after content. So I suspect that a channel with a few studio-quality HD videos will rate less than one with more hastily produced efforts with good content.

A good title and description

I've left these last as you can fix them even after uploading.

Use a meaningful title: Something vague, like receiver or DX contact, isn't helpful when there are thousands of such videos. Instead be specific. Five to eight words is fine.

Keywords are good. Don't leave that part blank. Transceiver, antenna, SSB, homebrew or Arduino might be good choices. This will help viewers of other related videos find yours.

So many producers neglect the written description. Have a couple of sentences here at least. Also list any URLs here. They become hyperlinks which is useful.

Already have videos uploaded? Edit their details, put in better titles or keywords and watch the viewership soar.

Conclusion

We've covered the basic rules of video production. Follow them to effectively use video to explain your project and encourage others.

Remember: think about the content, one topic per video and viewers' time is valuable. Five thousand readers here and many more viewers worldwide will look forward to videos from you soon.

IARU Liaison Report

Jim Linton VK3PC
e *iaru@wia.org.au*

This is an update of what the International Amateur Radio Union (IARU) does for you, the radio amateur, through membership of the IARU member society, the Wireless Institute of Australia (WIA).

The IARU is a federation of national associations of radio amateurs, representing over 150 countries around the world. The IARU is organised in three regions, to broadly mirror the structure of the

International Telecommunications Union (ITU) and its related regional telecommunications organisations.

The WIA belongs to IARU Region 3 which covers the Asia-Pacific, with R2 for the Americas,

and R1 Europe, Africa, the Middle East and Northern Asia.

Each region has a triennial conference. R3 was in Bali last year, R2 is in Chile in October 2016 and R1 will hold its conference in Germany in 2017. Each region examines the agenda and resolutions made by the other two regions and have a representative at those regional meetings.

What has IARU done for radio amateurs?

The IARU represents the interests of the Amateur Radio Service worldwide to relevant international organisations, promoting the interests of Amateur Radio and seeking to protect and enhance its spectrum privileges.

Over the years, the IARU has worked hard on achieving new bands as well as access to new regional allocations on: 136 kHz; 475 kHz; 5 MHz; 10 MHz; 18 MHz; 24 MHz; 50 MHz and 70 MHz.

Individual administrations, like the Australian Communications and Media Authority, are very mindful of the IARU advocacy and work at the ITU World Radio Conferences, the last being WRC2015 in November 2015.

The IARU wants harmonised allocations at 50 MHz, 1.8 MHz, and 3.4 GHz for all three regions. Australia through the WIA is yet to obtain access at 5 MHz and 70 MHz, full unfettered access at 50 MHz and an expansion at 1.8 MHz now allocated for another use. The ACMA is fully aware of the IARU stand.

The WIA did achieve access to 136 kHz and 475 kHz, has long had the full 300 kHz of 40 metres (7.000 – 7300 MHz), a band not yet allocated in some areas and long access to the so-called WARC bands of 10 MHz, 18 MHz, and 24 MHz.

IARU works for us

There have been extensive improvements to our international roaming and licence recognition by radio amateurs but this is an area that takes time to overcome outdated thinking of a few local administrations. The IARU is seeking further harmonisation of licence qualifications and a mutual understanding on the issue.

At the same time the IARU seeks sensible emission standards for PLT or BPL systems, which involves a lot of work at regional and international standards forums.

The IARU seeks to protect against unwanted interference that may be experienced by licensed users of the spectrum. Many member societies continue taking local advocacy action on the topic, like the WIA advocacy to the ACMA and through its membership the Standards Australia Committee and the Radiocommunications Consultative Council.

With membership at 31% share of the total Australian amateur population, we are doing significantly better than both the RSGB and the ARRL (both running about 23%), but the very best way to ensure the WIA is an effective representative organisation is to increase the number of members. I believe we do need to put more effort into attracting new members and retaining existing ones, but that's a job for everyone – not just the WIA, and some recent discussions on social media have not helped the cause. I believe we need to find some creative ways to attract new members.

A highlight of the 2015 year was certainly the ANZAC Centenary celebrations, commemorating the Centenary of ANZAC troops landing at Gallipoli. The WIA initiated the use of the VK100ANZAC and VI#ANZAC callsigns for use by individuals and groups, and over 30,000 on-air contacts were made from an estimated 250 participating stations, with coordinated events in Turkey and New Zealand. Apart from that, it was also good to see so much Parks, SOTA and experimental high altitude balloon activities adding yet another facet to Amateur Radio.

I would like to sincerely thank all those who contributed in a positive way to the WIA during 2015. Particularly all the Directors, WIA Secretary David Williams, our Treasurers, our dedicated staff, the Publications Committee and all other committee members and the very many volunteers who spend countless hours working to provide WIA benefits and services.

Without all of you, there would be no WIA and the Amateur Service in Australia would be a very different thing.

Phil Wait VK2ASD
President

PS. The WIA's Executive positions are appointed at the first Board meeting after the AGM, usually on the same weekend. It's been a pleasure acting as President for the past four years. I'm prepared to serve again, but I'm firmly of the view that being President should not be a life-long job.

GenSweep

A Swept Frequency Measurement System using a PC and a generic PIC based Interface

Part 1: Overview and Hardware

Paul McMahon VK3DIP

Introduction

In early 2010 I built a Microchip PIC based interface system to act as the go-between for a PC and the typical sorts of one chip wonders that are produced by companies like Analog Devices, such as the AD8307 Logarithmic Amplifier, and the AD9850 Direct Digital Synthesis chips. This generic interface was published in *Amateur Radio* magazine in September and October 2010 (1, 2).

Since then I have used the interface for many amateur radio related tasks. One that I have found the most useful is for measuring swept frequency magnitudes. While some amateurs have built very powerful and general purpose Vector Network Analyser systems such as the N2PK VNA, what I describe here is somewhat simpler. It is basically a Scalar Network Analyser as exemplified by such things as the old HP 8755 Swept Amplitude Analyser used in conjunction with a HP 8620 Sweep Oscillator. The difference from a VNA is that while a VNA can provide complex values, for things such as impedance, real or imaginary, or magnitude and phase values, the SNA can only provide the magnitudes of values. Another way of saying this is that a 2-port VNA can measure the full complex scattering parameters S11, S12, S21, and S22, while the SNA here can measure only the magnitude of both the return loss and through loss which equates to |S11| (Return loss) and |S21| (Through loss or gain). Nevertheless I have found the SNA to have many uses in the amateur shack. The result, which I call GenSweep, is similar in concept to what is known as PHSNA (3) [3] (the Poor Hams Scalar Network Analyser) using similar AD985x and AD8307 ICs however using a PIC rather than an Arduino and with the PC doing more of the heavy lifting, leading to a less stand-alone but more real-time result. In fact you could just

use GenSweep with the PHSNA by omitting the Atmel IC and feeding the generic interface control lines to the PHSNA main board.

The basic capabilities of the SNA here are:

- Base band frequency sweep from 0 to 35 MHz (or 65 MHz if you use an AD9851 module).
- Through amplitude detection range greater than 80 dB.
- Return Loss measurement better than 30-50 dB.
- Software Levelling.
- PC based display and control system.

The additional hardware needed, in addition to that already in the generic interface, consists of at least one, but preferably two AD8307 ICs (available very cheaply on eBay at the moment), an AD9850 (or AD9851) module that can be purchased prebuilt from a number of eBay sellers for as little as $AUS9 post-paid, and a handful of resistors and capacitors. In fact in terms of cost in my case the single most expensive items were the diecast boxes used to house the various bits. The following is not so much a detailed or prescriptive construction article as it is a description of how I did it, for both my own future reference, and to give others ideas of how they could do something similar.

GenSweep in action

Before launching into more of the technical nitty gritty, a trial run of this material at a meeting of the Melbourne North East Radio Group (i.e. the NERGS), showed that unless amateurs had at least an idea of what a Scalar Network Analyser is and or can do, eyes glaze over very quickly.

So to try and address this knowledge gap, the following couple of examples of the GenSweep setup and what it can do are presented.

Example 1. Finding the inductance of a small inductor

Figure 1 shows a screen capture of the GenSweep software in use measuring a series tuned LC circuit. The LC circuit is setup in a simple test fixture (a bit of PC board with built in input and output 10 dB attenuators to lessen loading and mismatch effects) usually known as a parallel test fixture, because the device under test (in this case the series LC circuit) is in parallel with the transmission path.

Only the transmission channel is needed here to determine the resonant frequency.

Across the horizontal axis we have the frequency range being swept, in this case 1 MHz to 60 MHz, and the vertical axis has the transmission level in dB, which is typically a loss and thus negative.

Figure 1: Series Tuned Circuit sweep.
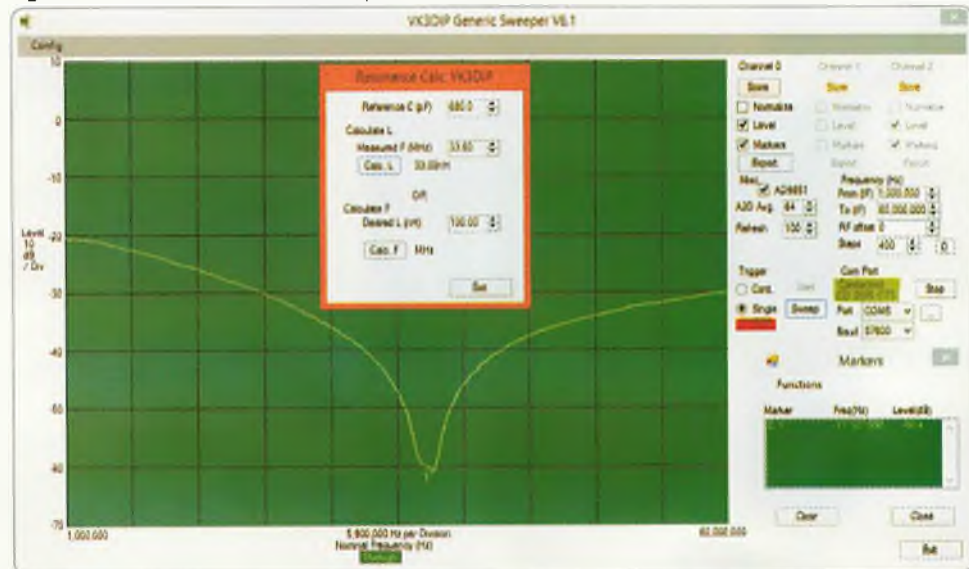
The green trace line represents the response of the circuit under test. In this case, with the two inbuilt 10 dB attenuators, the baseline (i.e. no additional shunting) is -20 dB. The typical sharp dip of the series tuned LC circuit can be clearly seen with a marker placed on the lowest point which is at 33.5975 MHz. Knowing the value of the C in the LC (in this case a 680 pF @ 1%) it is possible to simply calculate from the resonant frequency the value of

inductance (33 nH). I use a simple app to do this calculation as shown. When wanting to measure small values like this with best accuracy you need to take into account things like the residual inductance of the test fixture and the capacitors' leads. In my case this is measured at about 7 nH, so the actual inductance of the inductor under test in this case would be more like 28 nH. The residual inductance was estimated by just using the test capacitor by itself and doing another sweep. Of course I had previously calibrated the sweep frequency so that I could rely on that number also. More about frequency calibration when I go into more detail on the GenSweep Software.

Figure 2: Through Amplitude and Return Loss for a LC Filter.

Example 2. Checking a Filter
In the case of an RF filter we want to check both the frequency response of the transmission path, and how good a match it presents to the driving circuits. Figure 2 shows a screen capture of the sweep of a nominal 40 MHz LC filter being tested. Note the two traces showing simultaneously both the through measurement (green) and return loss (orange). The return loss is a measure of the degree of match to the filter under test's input impedance.

It is very handy when testing/adjusting a filter to see both of these items at once, and GenSweep can acquire and show both traces at the same time. As can be seen in this case (this is typical for a LC filter) the 3 dB down point on the transmission path corresponds to a 3 dB return loss, i.e. the point where the curves cross, in this case at 39.645 MHz. Also we can see that the input match is only

good (a nominal 20 dB Return Loss which corresponds to about 1.2:1 VSWR) up to about 25.19 MHz.

Example 3. Testing and tuning up a HF trap dipole
This example only uses the return loss channel and is the equivalent of using an antenna analyser on an antenna. Figure 3 shows the return loss of a HF trap dipole indicating clearly where the two resonances are. The two centres shown are at 3.88 MHz (a bit

high for the Australian 80 m band, so I must fix that) with a Return Loss of 23.5 dB (not -23.5 which you would say if you were talking about return gain) that corresponds to a VSWR of about 1.14:1 , and at 7.08 MHz a Return loss of 16.6 dB (1.35:1). We could of course zoom in on say just the 80 m portion and see how the matching was across the band.

Hopefully these examples give an idea of how useful this setup can be in the shack.

Figure 3: HF antenna sweep showing 80 m and 40 m tuning points.
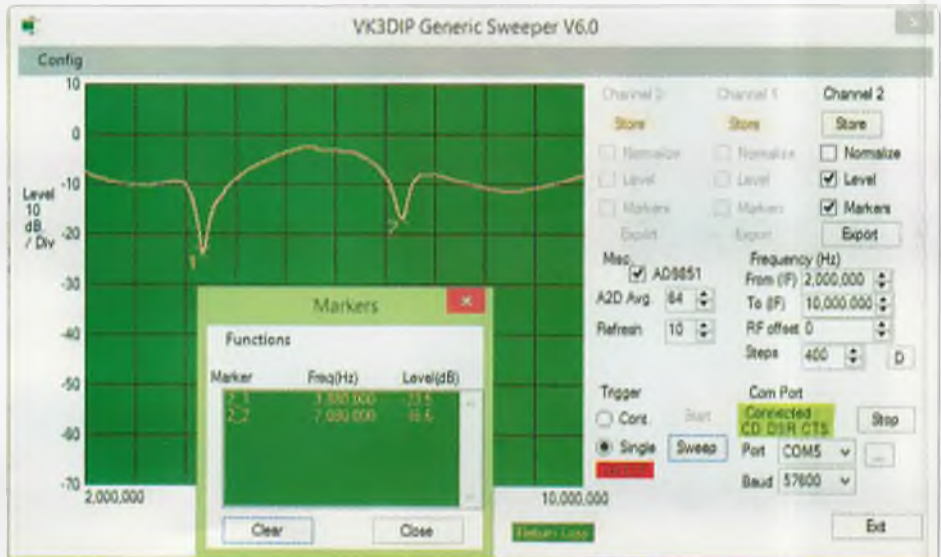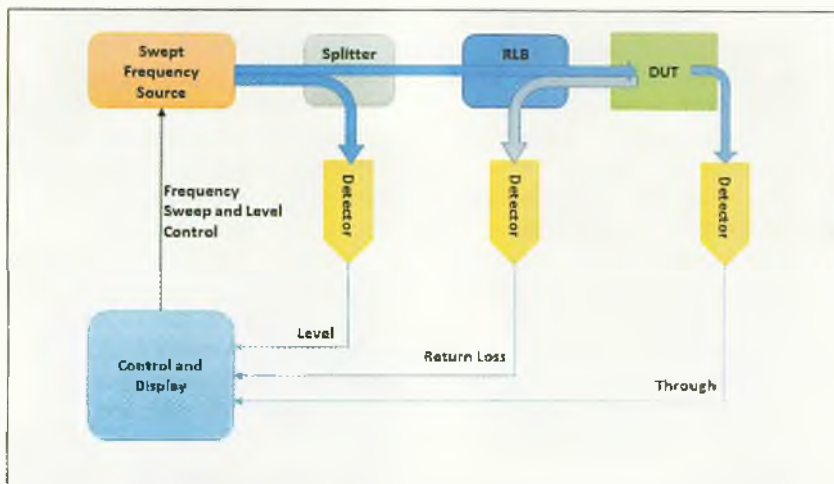
Figure 4: SNA Block Diagram.

Scalar Network Analyser (SNA) Components

Having seen some of the things that can be done with an SNA, we can now have a look at the components of an SNA.

The functional components of a classic SNA are shown in Figure 4.

The Swept Frequency source produces a signal at a frequency as determined by the control unit. Because it is difficult to make the output amplitude level inherently constant over frequency particularly when over a wide sweep range, some form of Automatic Level Control (ALC) is usually required, which is where the splitter and control unit come in.

The output signal from the Frequency Source is fed to a splitter where it is typically split into two equal halves, one half is measured by a detector which produces a value proportional to the (power) level of the output which is then fed back via the control unit, so as to maintain the output magnitude of the frequency source at a constant. Typically in commercial test equipment this done by controlling the gain of some amplifier in the Sweep source. In the GenSweep case this levelling is done in the PC software not the hardware for simplicity. Because the splitter is symmetrical even though only one output of the splitter is measured both outputs track at the same

level. This level is also an indicator of the forward power.

The other half of the swept frequency output from the splitter is applied through a Return Loss Bridge (RLB) to the Device Under Test (DUT), any reflections back from the DUT are detected and passed back to the control unit as a value representing the Return Loss.

Some of the swept frequency also passes through the DUT and is again detected and this value is sent back to the control and forms the through reading.

Figure 5: GenSweep hardware.
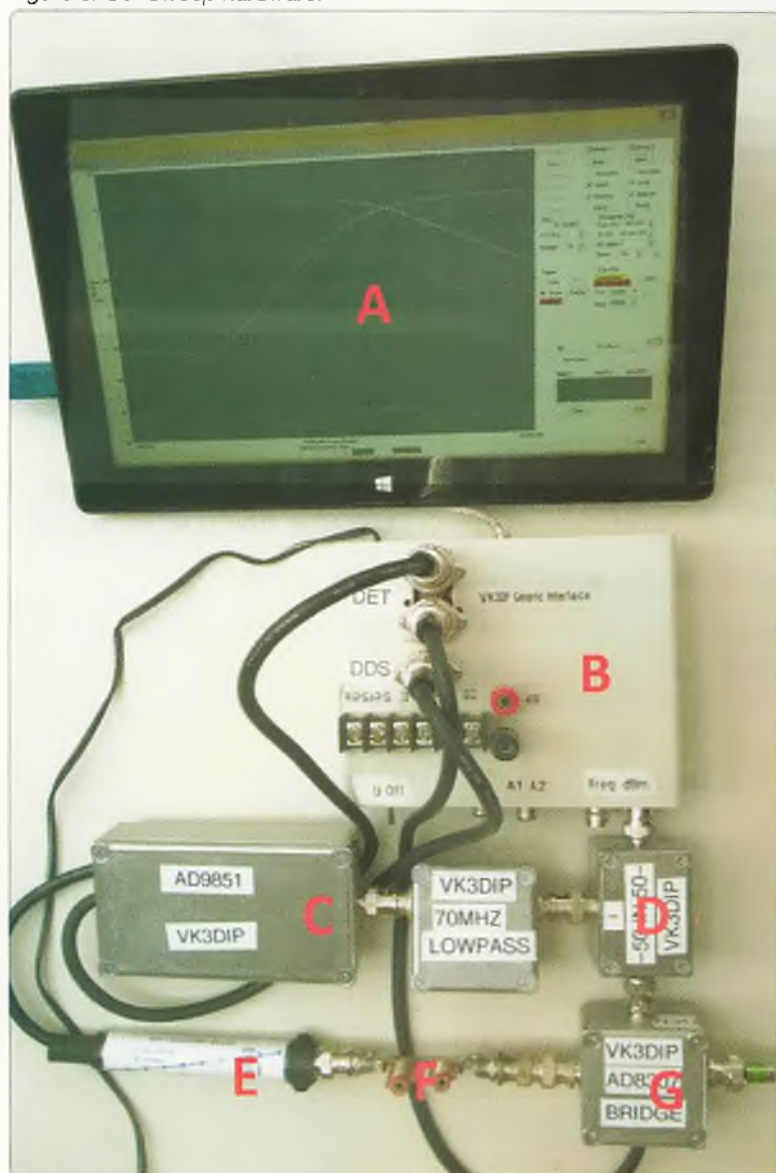
The Detectors are basically devices to convert the RF signal into typically a DC voltage proportional to the power in the RF signal.

The Display part of the system takes these values from the detectors and forms a series of traces on a screen to indicate effectively a graph of response verses frequency.

GenSweep SNA Components

In the GenSweep case basically any AD9850 or AD9851 DDS unit can be the frequency generator, and the various detectors could be any AD8307 or equivalent based units. It is not necessary to duplicate the hardware I used, or even the packaging. I present it here mainly to give an idea of the sorts of things that could be used, and the level of complexity, or at least lack of complexity required.

As can be seen from Figure 5 on page 15 in my case the GenSweep hardware setup is not huge. It consists of:

A. A Laptop or PC running the GenSweep Software with a USB socket, in this case a Surface Pro Tablet.

B. The slightly modified generic interface (full details of the mods are elsewhere in this article).

This in conjunction with the PC and software forms all of the display and control components of the SNA, as well as the built in AD8307 detector being used for either the "Through", or as shown here the "Level" detector.

C. An AD9850 (or AD9851 as shown here) module in a box with, in my case, an external filter (in another box) as the Swept Frequency Source.

D. A Splitter, which is just two 50 Ω resistors in a box. Typically two pairs of paralleled 100 Ω resistors.

E. An AD8307 detector built into a whiteboard marker shell as the "Level", or as shown here the "Through" Detector.

F. The Device Under Test, in this case an LC Filter.

G. A resistive RLB with built in AD8307 used as a balanced detector, note the 50 Ω terminator on reference port.

The Sweeper

The first and most important item needed is the swept frequency generator. As stated earlier the GenSweep software is setup for basically any sort of AD9850 or AD9851 based unit.

What GenSweep expects is an AD9850 or AD9851 set up for serial programing with the connections to the interface as shown in Figure 6. The Unreg Volts is just the supply from the interface plug pack, after the power switch, but before the interface 5 V regulator, and is nominally some 10-12 V DC . In my case it is 12 V from a 12 V 1 amp plug pack.

The output level from the sweeper module should be somewhere in the range of 0 dBm to about +22 dBm. These levels are determined by the detectors, which are more or less linear between -70 dBm and + 10 dBm (an 80 dB range), along with the 6 dB losses in the splitter and similar 6 dB in the RLB. So in the best case to optimise the dynamic range of the Through detector, the peak level out from the RLB should be +10 dBm, and then working backwards add 6 dB for the RLB (+16 dBm), and another 6 dB for the splitter (+22 dBm) gives us the optimal sweeper level. Of course at this level we would need to have another 6 dB pad in front of the Level detector to protect it, but this represents more or less the upper usable limit. The lower limit is basically determined by how much dynamic range your particular test case needs. The optimum case gives the full 80 dB range, but having a 0 dBm output from the sweeper only sacrifices 22 dB, so you still have about 58 dB range, which compares quite well with some of the older diode detector based commercial SNAs which maxed out at a 60 dB dynamic range (-50 to +10 dBm). Note, all of the modules will have some drop off in level as the signal varies from minimum to maximum frequency, this is caused by filters and the sinx/x response of the DDS itself, the worst case I have seen with one of the eBay modules was some 12 dB drop, with most cases much better than that. Even the 12 dB is easily handled by either the (software) Levelling and/ or Normalization process used in the GenSweep software. This does however effectively cost you dynamic range, so it's best if you can have the least droop possible starting from the closest to the optimal level possible.

Figure 6: GenSweep Interface connections to DDS module.
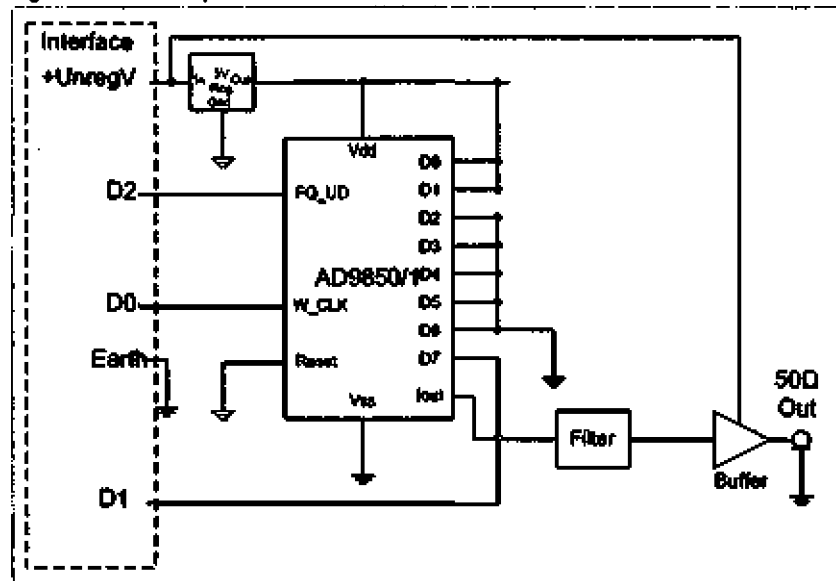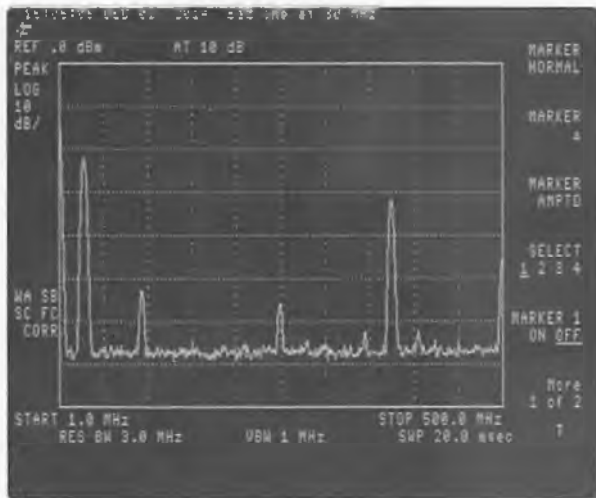
Figure 7: 3rd Harmonic of reference (i.e. 375 MHz) only 10 dB down from 10 MHz fundamental with only on-board filter.

In commercial SNAs as mentioned earlier there would have been some form of automatic mechanical or electronic mechanism to flatten the output at least to some extent. GenSweep however, with the good dynamic range available and going for simplicity does it in software.

There are any number of ways of getting a DDS module which will meet the above requirements. There is the eBay route mentioned earlier which is the way I went, but there are also several other kits and prebuilt modules that would be eminently suitable and a lot less bother. Two in particular worth a good look at would be the EME167 kit from Minikits.com. au (AD9851, 0-70 MHz +10 dBm out), and secondly the DDS-60 kit from *MidnightDesignSolutions.com* (AD9851, 1-60 MHz +16 dBm out). The sole advantage of the eBay modules is price, however if my experience is anything to go on, you will need to do a bit of work on them to get them working as well as the other two.

The most important internet adage that applies to these modules from eBay is that if something looks to be a real bargain and you can't see anything wrong with it, then it's most likely you just haven't found the problem yet. A dead giveaway in the AD9850 module case is the price. Typical buy now postage free prices on eBay are at around $8 AUS for the whole module whereas the 1000+ pieces list price from the chip manufacturer Analog Devices for the AD9850 chip alone is over $12 US each. Even at its highest, the $AUS-$US just can't explain that. Having said that the eBay modules do arrive, and the build quality is reasonable, and every one of them I have got I have eventually made work, and clearly there are a lot of them out there for some reason, so it is a viable option, it just may not be as simple or straightforward as it looks on the surface to get them going.

Just so you can have some idea of what I had to go through to get the modules that I purchased going, the following describes some of the less than obvious things I found "not-quite-right" with the AD985x modules I obtained via eBay.

Ineffective on board anti-aliasing filter

All the AD9850 boards I obtained were pretty much identical designs independent of seller, and in all cases the on-board filter was ineffective at suppressing the second and in particular the third harmonic of the reference oscillator. I assume this is because of the positioning of the filter on the board and the fact that there is no shielding between the clock lines and the output. See Figure 7. Unless this is fixed, the wideband detectors being used in GenSweep will lead to some strange results, such as notches and peaks being non-existent or having flat sections. I fixed this by adding additional off board filters. I used simple Butterworth low pass filters and they seemed to work well.

Wrong components in the on board filter

In one case with a AD9851 board I finally found the reason it wouldn't produce much output above a couple of MHz to be what turned out to be a 0.1 uF chip capacitor being placed where a 22 pF was supposed to be, basically shunting the output to earth. See Figure 8. Swapping the 0.1 uF for a 22 pF cap fixed it.

Oscillator Module is a 3.3V (or less) unit

On almost all of the AD9850 units I got from various eBay sources, the 125 MHz reference oscillator module was intended for a 3.3 V (and in one case 1.8 V) supply. Unfortunately the AD9850 chip specs say that it is only rated to handle a 125 MHz clock when run at 5 V. While the oscillator units will most likely run for a little while on 5 V, they will get hot and not be reliable! I tried one trick I found with a web search, of placing a couple of series diodes in the main

Figure 8: Note cap marked as 22 pF looks unlike other 22 pF yet same as a nearby 0.1 uF.
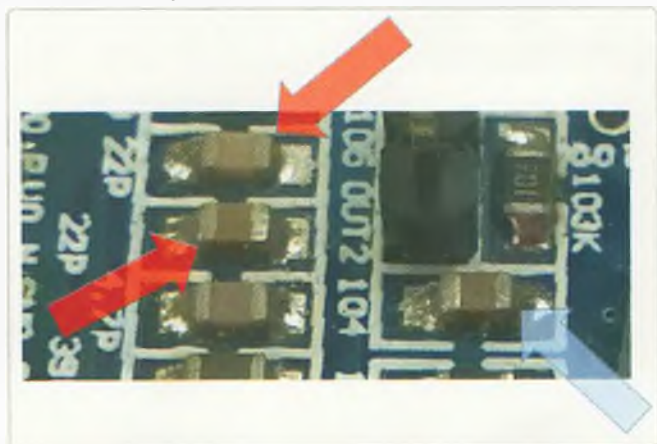
module supply line to drop it down to about 3.6 V, and using some series (1 kΩ) resistors in the data lines, and it worked for me. This is however running the AD9850 outside of its specs. and your mileage may vary. A way I found, and ended up using on my final AD9850 version, that I think is more reliable, but does require more effort, is to remove the oscillator module and mount it on another board and run that board at 3.3 V. The clock output is then run (via coax and a 100 nF capacitor) to the original board (running at 5 V) with the AD9850 chip clock input biased (via 2 x 4.7 kΩ resistors) to mid-5 V supply so as to allow the chip to handle the lower level clock inputs. See Figure 9 and Figure 10.

I got this technique from one of the AD application notes AN-557 and it seems to work well.

On Board filter is 200 Ω impedance with an on-board 200 Ω terminating resistor

The implemented filters on all of the "eBay" modules both AD9850 and AD9851 seem to be straight copies of the filters on the evaluation board circuits given in the AD data sheets. These filters were designed for 200 Ω impedances for the main reason that this higher value leads to more reasonable component values for elliptic filters. This is not bad in itself because they (if they have the correct components) have a nice sharp cut-off etc. The problems

are matching to the 200 Ω, and the fact that the inclusion of the on board 200 Ω resistor on the output assumes that they will only ever be used into high impedance loads such as oscilloscopes, or CMOS gates etc. Clearly just connecting a 50 Ω load will render the filter ineffective especially with the 200 Ω on-board shunt. So step one is to identify and remove the 200 Ω resistor on the filter output, however be careful not to remove the one on the filter input, because that is still needed. We still need to match the filter 200 Ω to our typically desired 50 Ω though. Several approaches are possible and I tried most of them. AN-557 uses a minimum loss resistive pad (180 Ω and 56 Ω) this is really simple and broadband but it has about an 11.5 dB loss so you really need a good (50 Ω) broadband amplifier or MMIC after it to get the level back up to something worthwhile. Another approach is to use a 4:1 (i.e. 200 Ω:50 Ω) transformer such as a Minicircuits T4-1, this works well and will get you perhaps 0 dBm out, except if you wanted to sweep very low frequencies (e.g. audio) where the transformer doesn't work very well. One other approach I tried and which I ultimately used in a number of the modules I played with is a single transistor emitter follower designed to have a 200 Ω input impedance and a 50 Ω output impedance. See Figure 11. I used a 2N5109 because I happened to have them on hand but this is a bit of overkill. More or less any higher FT (> say 600 MHz) NPN transistor would work after some fashion in this circuit. This both matches the impedances and produces a bit of (current) gain and its low end is determined purely by the values of the coupling capacitors. It also runs fine off the 5 V supply.

Photos of a number of the variations I have tried for the DDS component are shown in Figure 12, Figure 13, Figure 14, Figure 15, and Figure 16. You will note that the Sweepers are mounted in solid aluminium diecast boxes to
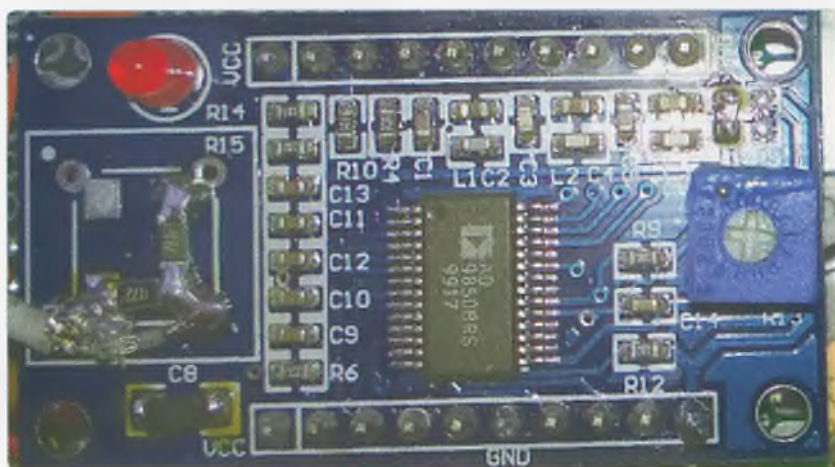
Figure 9: 2 by 4.7 kOhms bias on the Clock input.
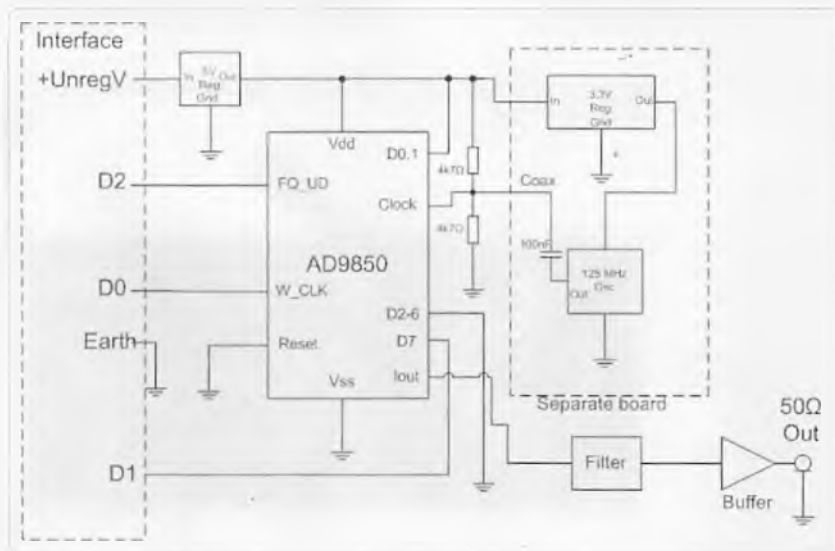
Figure 10: Fix for 3.3 V Osc. Module on AD9850 board.
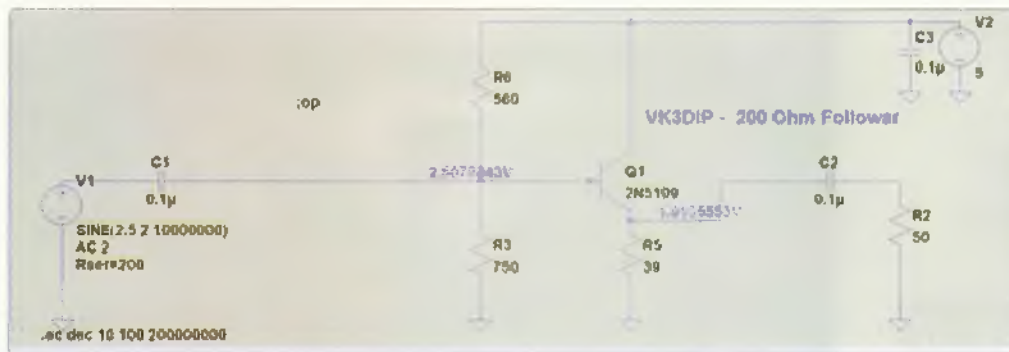
Figure 11: LTSpice Schematic of 200 Ohm Follower.

be as RF tight as possible, with a BNC connector as the output, and a short length (60-80 cm) of good quality shielded multi-core cable, terminated with suitable connectors to attach to the Generic Interface. The cable I used was 6 mm outer diameter, 4-core screened inner, and was intended for use as microphone cable, Jaycar Catalogue number WB1540. The connectors I used were locking 5-pin din type with the pin connections as per Figure 27.

Return Loss Bridge with inbuilt detector

A Return Loss Bridge (RLB) is the next major item required to make GenSweep work. Unlike the sweeper component the RLB is quite a bit simpler, if we forget about the detector for the moment it can be as simple as three resistors. I have previously gone on at length about Wideband Resistive RLBs (4, 5). Any of these versions or similar that work over the frequency range of interest would be fine, used in conjunction with an external AD8307 detector. The approach that I took in this case however is slightly different, as I didn't need the RLB to work at higher than a couple of hundred MHz, I could do away with the need for a balun by using both of the AD8307 inputs as a balanced detector. This does mean that the detector is dedicated to just the RLB, as it is built in, but as I had obtained a number of AD8307s quite cheaply on eBay this

Figure 12: Various DDS module enclosures.

was not a problem. The circuit I used is shown in Figure 17, and my prototype implementation is shown in Figure 18.

You will note that for the prototype I used all discrete leaded components, other than the AD8307 itself, which was mounted on a small generic SOIC8 to DIP convertor PCB. Even using these components (albeit with minimum lead lengths) the RLB performance was easily good enough to handle up to my requirement of 200 MHz, with the low end determined solely by the, in this case, 0.1 uF capacitors used. (0.1 uF has approximately 1.6 Ω of reactance at 1 MHz which is still relatively small compared to the nominal 50 Ω). One point of interest with the circuit is that instead of the parallel pair of 100 Ω resistors used on the other ports to provide 50 Ω , the pair on the AD8307 input is actually a 100 Ω and an 110 Ω. This combination gives 52.38 Ω which may sound a strange value, but which when placed in parallel with the AD8307's nominal input impedance of 1.1 kΩ gives an effective input Impedance of the 50 Ω required. I have seen some AD8307 implementations on the web (and the AD data sheet for that matter) that use a very hard to obtain 52.3 Ω 1% resistor for this item, however

Figure 13: AD9850 module with series diodes in supply.

the 110 Ω 1% is much more easily obtained and

$$\cfrac{1}{\cfrac{1}{100}+\cfrac{1}{110}+\cfrac{1}{1100}}$$

(i.e. the three resistances in parallel) is exactly equal to 50. If you can't get the 110 Ω then two 220 Ω or three 330 Ω will do the same trick. For the 50 Ω reference terminator I tried several that I happened to have until I found one that gave good results.

The RLB is mounted in a solid aluminium diecast box to be as RF tight as possible, with BNC connectors as the inputs, and a short length (60-80 cm) of good quality shielded multi-core cable, terminated with a suitable connector to attach to the Generic Interface. The cable I used was 6 mm outer diameter, 2-core screened inner, and was intended for use as microphone cable Jaycar Catalogue no. WB1530. The connectors I used were locking 5pin din type with the pin connections as per Figure 27.

If you don't want to use the SOIC/DIP adapter board approach, you could use the PCB I developed for this and the stand alone AD8307 detectors, the input side of which leaves the two inputs isolated from ground so it could be used for the RLB. The component overlay for this board (full size mirrored pattern in Figure 23) as a RLB is shown in Figure 19. Note as a primarily surface mount board the components are mounted on the copper track side, with the back being un-etched copper save for two small circles of copper carefully removed from around the back of the +5 V and Output connection holes using a large drill bit. The two outer ground tracks need to be connected together nominally via wire soldered on both sides through both earth holes, and/or, small pieces of copper shim folded and soldered over the board edges.

Figure 14: AD9850 Module in box, note Oscillator on board under module.

Figure 15: AD9851 Module with Transformer & classic 2N5109 Broadband Amplifier.
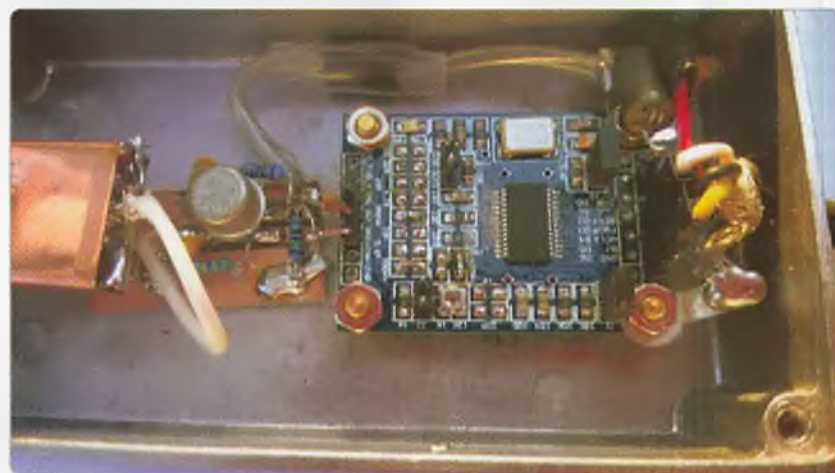
Figure 16: AD9851 module with Follower.

The Standalone "Marker" Detector

If you use a pre-existing RLB without a detector or just for the "Level" or "Through" detector you will need at least one standalone AD8307 detector. For my work with GenSweep I built my detectors using all surface mount according to the circuit shown in Figure 20.

To have the detectors work reliably down to as low a level as possible good shielding is necessary. You could put the
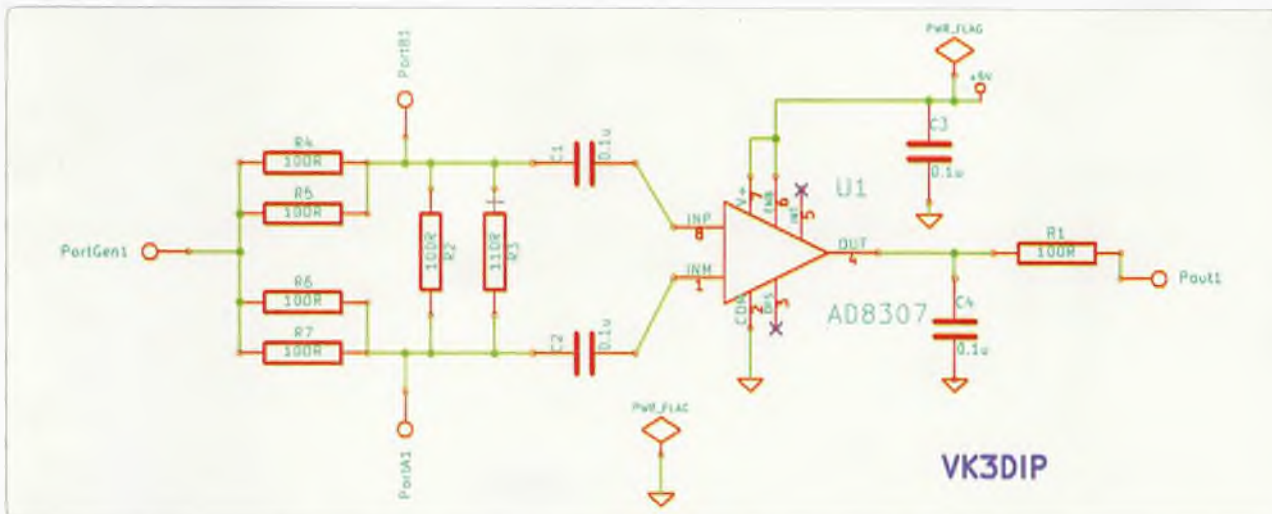
Figure 17: Active RLB Schematic (KICAD format).
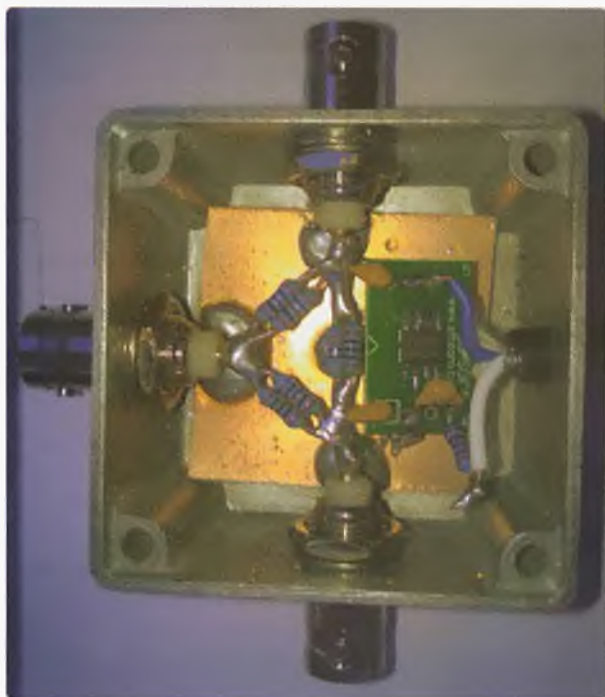
Figure 18: The Active Return Loss Bridge.

in Figure 23), the component overlay for which is shown in Figure 24, with a made version in Figure 22. Note the FB (Ferrite Bead) value is not particularly important just about any chip ferrite bead or even inductor would do the job to some extent. Even just a low value resistor such as another 100 Ω would work after a fashion. Also note in this case I show a 0 Ω resistor shorting one of the chip inputs to deck to provide an unbalanced 50 Ω input, this could be actually a 0 Ω surface mount resistor, or alternately just overlap the copper shim over the sides joining top to bottom a bit further as I did in Figure 22. Again don't forget to clear the copper away around the back of the +5 V and output pads if you drill these to insert the connecting wires into.

The same comments about the parallel input resistors apply as in the case of the RLB. I did manage to eventually find a few 110 Ω SM resistors however as you might just be able to see in the prototype at that stage I hadn't so I used three 330 Ω 1% instead. Again the cable I used for connecting to the (slightly modified, see later) analogue inputs of the interface was 6 mm outer diameter, 2-core screened inner, and

detectors in their own diecast boxes but I chose to make the detectors small and thin enough to fit inside the body of a discarded metal whiteboard marker. My initial prototype made with the AD8307 mounted "dead bug" i.e. upside down with its legs in the air, is shown in Figure 21. If you wanted to follow this approach you could do likewise, it doesn't look pretty but it works fine, or alternately use the small PCB (full size mirrored pattern

Figure 19: RLB PCB version component overlay.
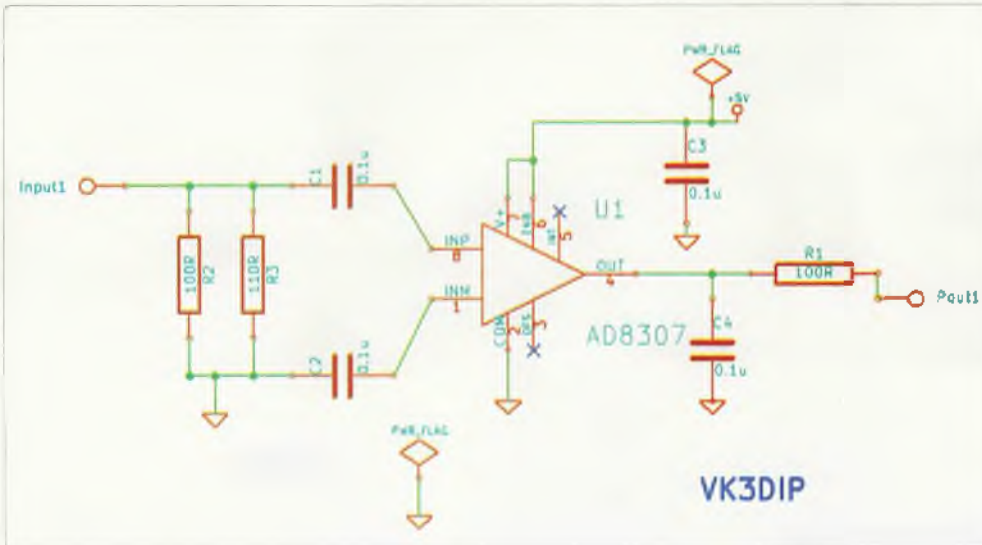
Figure 20: Schematic for the AD8307 Detector (KICAD Format).

was intended for use as microphone cable, Jaycar Catalogue number WB1530. The connectors I used were locking 5-pin din type with the pin connections as per Figure 27. The green tape (Figure 21) and cable tie (Figure 22) on the cable are strain relief. Initially insert the board etc. in the barrel, mark the cable just where it emerges through the 6mm hole drilled in the end of the barrel,

then remove the assembly and put the strain relief just past the mark.

The width of the PCB is designed specifically to (allowing for the copper shim PCB edge caps shorting the upper to lower copper) provide a push fit into the barrel of the particular metal whiteboard markers I had, and to thus make good electrical contact with the inside of the barrel, I think this size

is reasonably standard, but if you happen to have different brand markers then you may have to adjust the dimensions accordingly. I cut the threaded section of the barrel off to provide easy access, but you could try just cutting a longitudinal slit and retaining the thread if that better fitted the RF connector you were using. I finished the body off with some heat shrink and used clear contact to attach a plot of the detectors response vs level, and the individual correction factors used to convert between the value measured by the interfaces analogue input and dBm (50 Ω) (Figure 25).

Splitter Module

The splitter module is the simplest item needed, it is just two 50 Ω resistors (each made from two 100 Ω resistors in parallel) in a "Y" configuration as seen in Figure 26. You may wonder why only a two resistor splitter is used rather than the three resistor version (three by 16.66 Ω in a star or three by 50 Ω in a delta) as it is well known that the three resistor version is superior to the two in terms of matching and impedances, however what is perhaps not quite so well known is that the two resistor version is better at equally dividing the input signal.

Figure 21: Prototype Standalone AD8307 Detector.
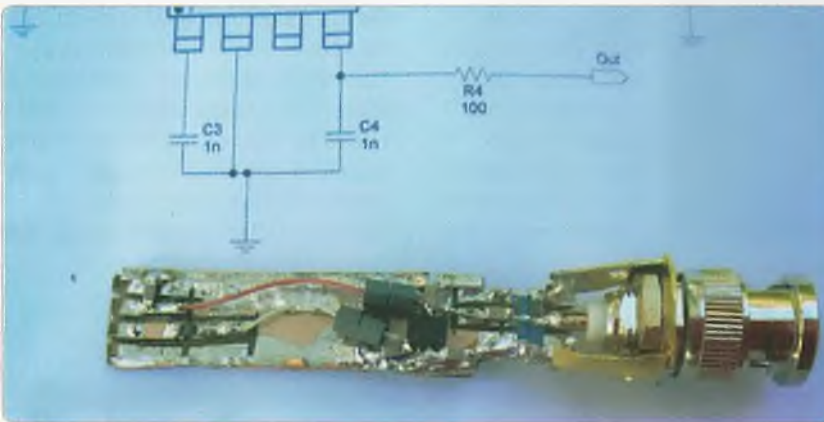
Figure 22: Version of the AD8307 Detector using a PCB.

In fact the only case where the three resistor version actually delivers exactly equal power from each output port is when each port is terminated in the (same) correct impedance, whereas the (ideal) two resistor version always delivers equal powers. In this case, because we are using the split signal to effectively level the power delivered to the load, it is more important that the two outputs are equal than that it is well matched. If you are interested there is quite a bit of information on the 2R verses 3R question out there on the web, and when it is best to use which type, usually involving some pretty fancy maths to prove it, in the SNA case, even with the splitter being not quite "ideal" the 2R gives better levelling results.

Interface Mods

Of course the interface itself has had a few modifications since it was first made. Many of these have eased the use for things like GenSweep. GenSweep will actually
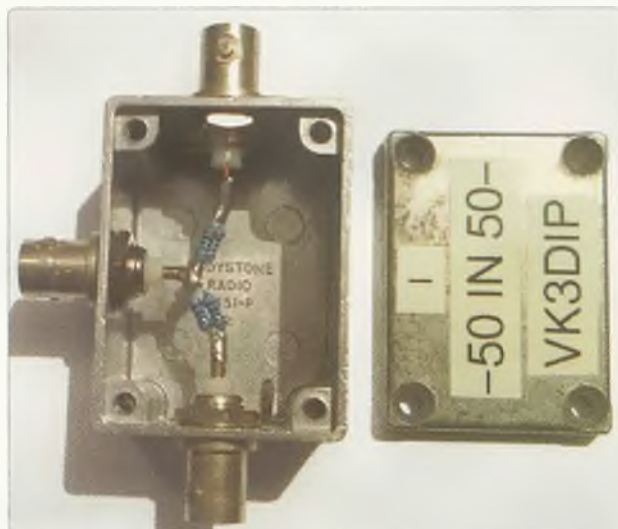
Figure 26: Prototype 50Ω Splitter.

Figure 23: Full Size Detector PCB Pattern (Mirrored).
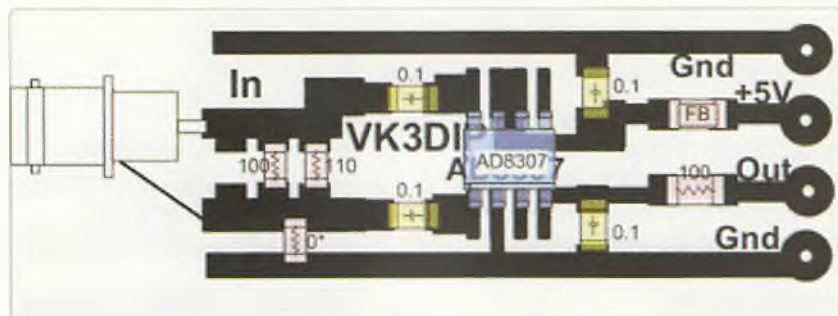
Figure 24: Component overlay for the AD8307 PCB version.
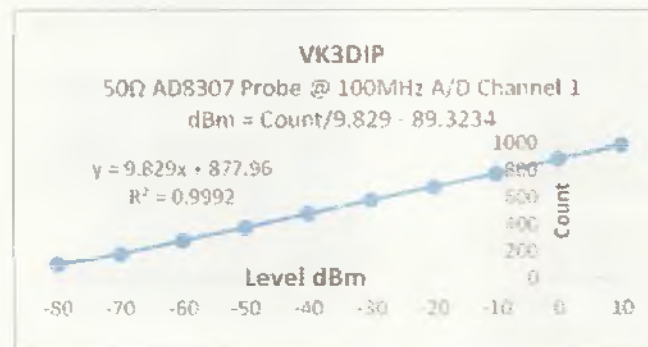
Figure 25: Calibration curve for the prototype Detector Probe.

work with the unmodified interface however some of the changes while simple are well worth it. There are basically two sorts of mods being the firmware (i.e. the PIC code) and the hardware of the interface itself.

In terms of the firmware there will be more discussion in the second GenSweep article that details the PC software, but in short there are changes to increase the speed with which the interface can capture analogue values (approx. twice as fast), to add a new command "A" for Analogue Average which allows capturing multiple samples producing a pseudo-increase in analogue resolution, and to explicitly initialize any AD985x chips attached at power up.

In terms of interface hardware there are three changes:

Firstly there is the addition of dedicated connectors for the control signals, analogue in, and power, to the various add-ons. The connection details for the three connectors (two identical detector connectors, and one DDS one) are shown in Figure 27. Many of the connections to the pins of these connectors are from the existing strip connector I had for general connections previously (1), however there are a couple that deserve a bit more comment. The Unreg+ volts is basically taken directly from the output of the power switch, or alternately the input of the Interface 5 V regulator. This is effectively whatever voltage etc. you have from the plugpack or other power supply. In my case this is a nominally 12 VDC at 1 Amp plugpack. The channel 1 and 2 analogue inputs come from the relevant input channels however they are at the same 2.56 V level as channel 0 not at the 10 V scaled
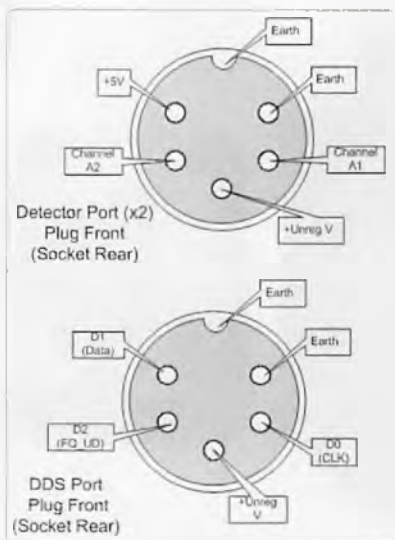
Figure 27: Dedicated DIN Connections for Detectors and DDS.

Figure 28: Modification to the Generic Interface Analog inputs.
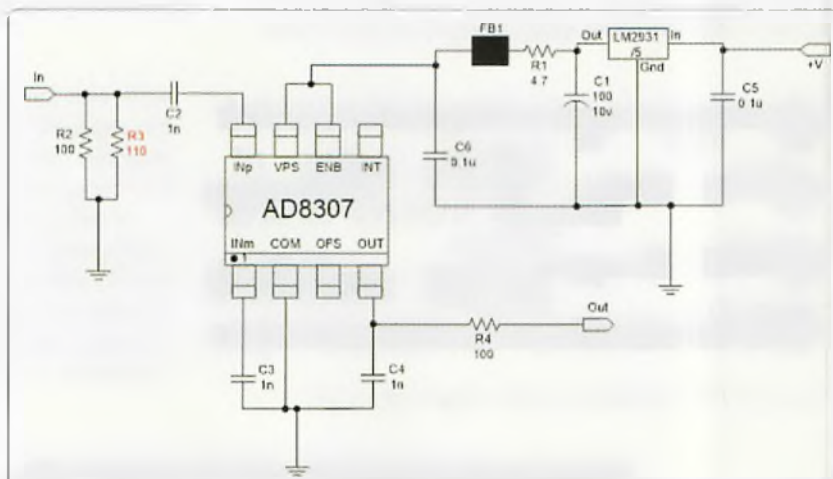
Figure 29: Modification to the Generic Interface AD8307 input.

level as used on the Interface front panel. See second change.

Secondly two analogue inputs are tapped into the existing channel 1 & 2 inputs as per the red line in Figure 28. Effectively this bypasses the front end 10 V scaling resistors and just uses the LM324 as a 1:1 follower/buffer. The 10 V inputs are not disconnected so obviously care should be taken not to use both the 10 V front panel inputs and the detector inputs at the same time. In my case this was very easily done as it happened that the loop formed by the upright mounted leg of for example R8a in Figure 28 was the side connected to the op amp input, i.e. I could just solder the wire to the protruding resistor leg without having to get to the PCB underside.

Finally there is the same item as discussed above about the input matching of the AD8307 detectors. In the original version of the interface (1), I used two 100 Ω resistors in parallel as the 50 Ω match for the interface internal AD8307 detector. For completeness I changed one of the resistors for a 110 Ω version as shown in red in Figure 29.

Next Time

That is basically it for the hardware side of GenSweep, in part two of this article I will go through the PC

side of the software and show how to configure, calibrate, and use it. In the meantime board patterns for the new detector board, along with modified interface firmware etc. can be found on my website in the projects area (6).

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Product Review | IC-7300 HF/6 m transceiver: a user perspective

Peter Freeman VK3PF

Announced by Icom at the Tokyo Ham Fair in August 2015, the IC-7300 transceiver has generated much anticipation and discussion on various internet forums, with many operators eagerly awaiting further details and finally the arrival of the radio in your local amateur radio outlet.

Whilst many amateurs await news on the latest and greatest radio, it was the change in radio architecture which was a significant contributor to the anticipation. The IC-7300 is a third-generation software defined radio (SDR), with direct digital conversion on receive and direct digital synthesis on transmit, all in a self-contained package: no external computer required!

Another difference about this model is its target audience: it is promoted as an entry level transceiver.
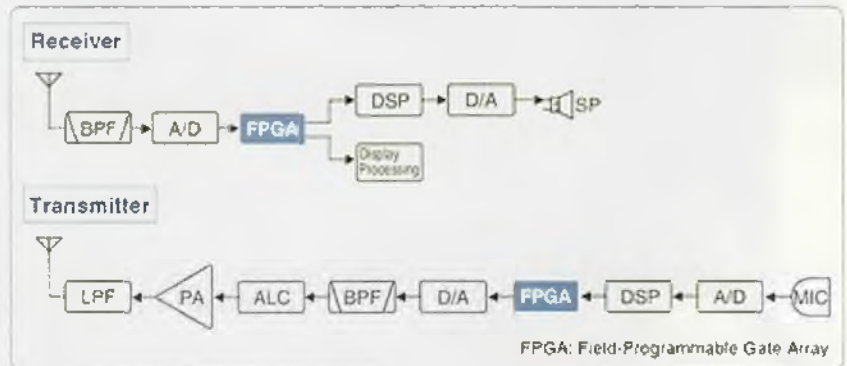
Figure 1: Transceiver block diagram.

The transceiver architecture is broadly similar to that used in other third-generation SDRs, such as the Anan, Flex and other transceivers. Most of those radios need to be connected to a computer loaded with appropriate control software. Connections to the computer are usually via USB or Ethernet cable. Therefore, most such transceivers also require the computer, adding to the cost of setting up a station. Not so with the IC-7300. Instead, the radio has a colour touch screen and menu options to adjust some of the less commonly used settings. The radio can be connected to a computer via a USB cable.

Key features of the IC-7300 include:

Figure 2: Block diagram comparing the IC-7300 architecture compared to the IC-7600. Note that most of the initial RF processing occurs with software inside the FPGA chip, with the resulting I/Q 36 kHz IF signals passed on to the DSP processor. The equivalent functions in the IC-7600 require a much larger parts count.
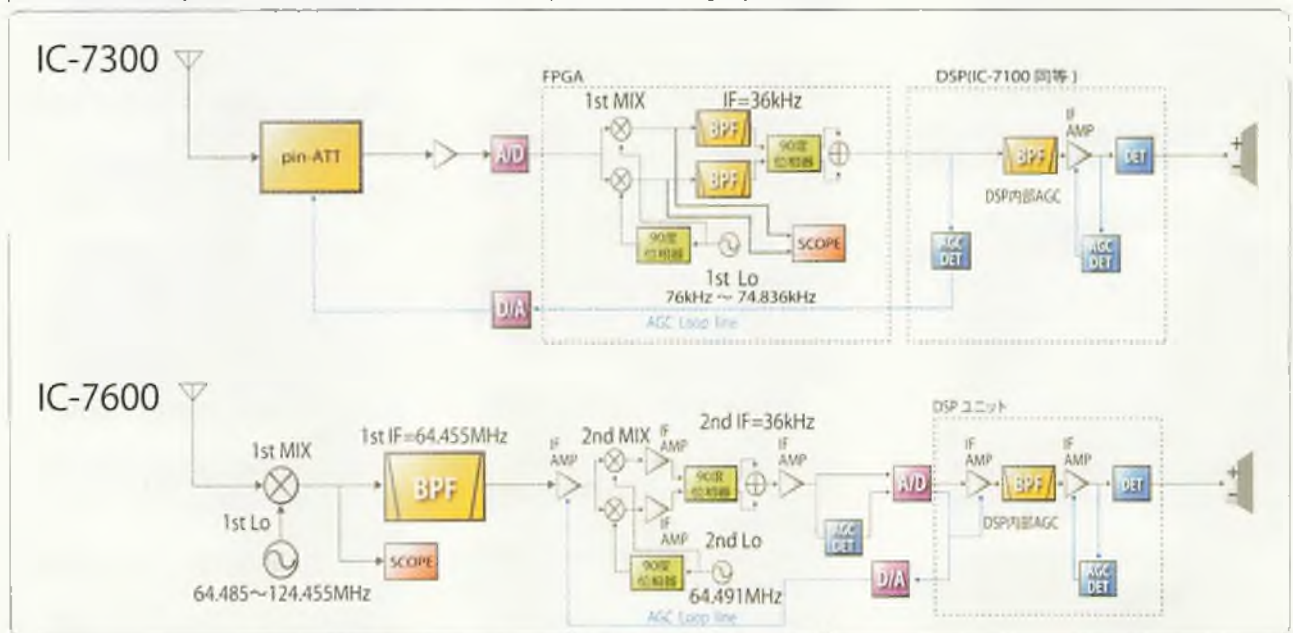
Photo 1: The transceiver front panel.

Opening the box

Unpacking the radio was simple. There is a Basic Manual with 72 pages of the essential details on using the radio, a CD, the transceiver and a smaller box containing a HM-219 electret microphone, a DC cable, three spare fuses and three interface connectors: a 13-pin DIN plug terminated with a short cable, and 6.35 mm and 3.5 mm stereo audio plugs.

The DC cable is the 4-pin model used on recent transceivers, so I used a spare cable at hand, thus saving the time required to terminate the power supply end the cable with the connectors used in the shack. It was then simply a matter of plugging in the microphone, the DC cable and a coaxial cable to connect to an antenna.

I must admit to not initially consulting the instruction manual – I simply switched on the radio and starting using it. I have previously used an IC-7100, which also has a touch screen display, and also had a quick look at the IC-7300 at the EMDRC hamfest in late February. I was quickly up and running on 40 m SSB.

The initial impressions were very good: excellent received audio using the inbuilt speaker. I had comments of good transmit audio quality, with one amateur noting that the signal sounded as if it had a little more bass than my usual transceiver (at home, an IC-9100). I have subsequently explored some of the menu options and found the menu to alter the transmit audio frequency response.

The transceiver is very simple to control, with the commonly used controls easy to find. The key controls are accessed by the touch screen, either alone or in combination with the Menu system, or via the multifunction control near the top-right corner of the display.

Transceiver layout

The transceiver dimensions are 240 (W) x 238 (D) x 95 (H) mm, with a mass of 4.1 kg.

The first impression of the front panel is the relatively small number of visible controls. This fits with the touch screen colour display: touching part of the display will bring up an associated set of touch-screen control buttons.

The front of the transceiver is dominated by the 109 mm colour TFT touch LCD screen.

To the left, there are several buttons: a twin passband tuning control and the audio/RF squelch control, plus an SD card slot, and the microphone and headphone jjacks, the latter a 3.5 mm stereo connector.

Beneath the display screen are five buttons relating to the menu and submenus.

On the lower right is the tuning dial. Above it are nine buttons relating to RIT, memory channels,

Photo 2: Rear panel layout.

A/B VFOs, split control and memory up/down controls. Just to the right of the screen is the multifunction control knob/switch, a transmit frequency check key (XFC), a Tx/Rx LED indicator, the Auto tune key and a Speech/Lock key. Below the main dial is a friction adjust control for the main dial.

The dominant feature on the rear panel is the cooling fan. Near the left hand edge we can see the 4-pin DC power socket, a ground terminal and the single SO-239 antenna socket.

To the right of the fan, there are two groups of connectors. The upper group includes the 4-pin tuner control socket for the optional external "antenna tuner", paired ALC and Send control jacks to interface to a non-Icom external linear amplifier and a 6.35 mm external electronic keyer/paddle/straight key jack. Below are a 13-pin DIN Accessory socket, a USB port (Type B), a CI-V remote control jack and an external speaker jack.

Photo 3: Underneath the top cover. Highlighted on the left is the RF unit, with the PA unit on the right. Bottom left is the speaker, located in its own compartment.
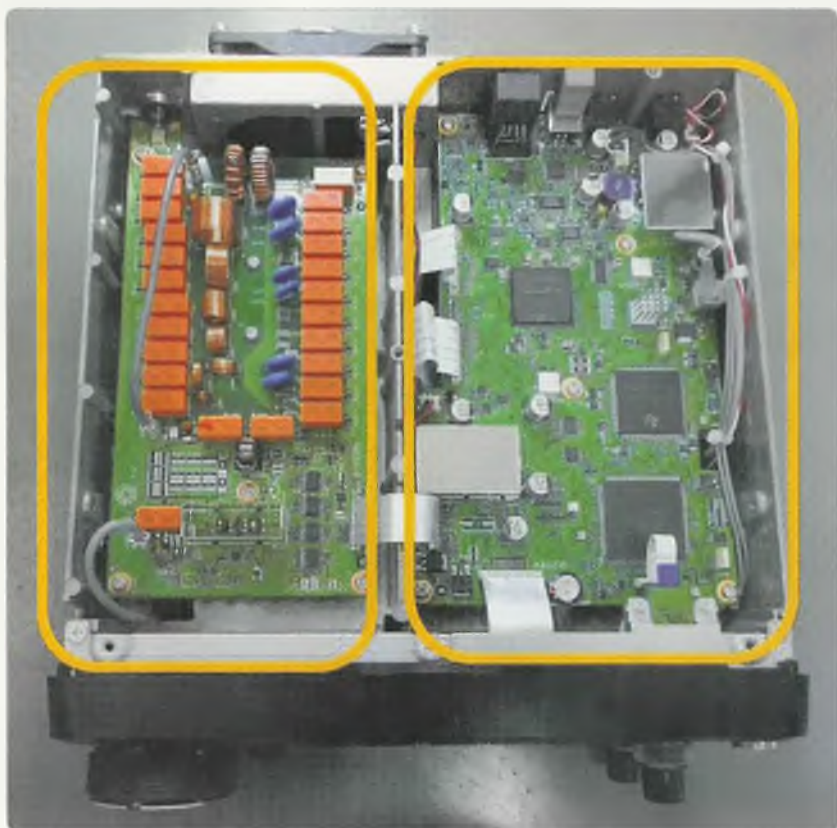
Photo 4: The view of the bottom of the chassis with the covers removed, showing the ATU on the left and the Main Unit on the right.

Operating

As indicated earlier, I found the transceiver very easy to use. Those who have not operated a recent Icom transceiver should find it relatively simple to get on-air by reading the Basic Manual. If you need to delve into some of the detailed control descriptions, open the detailed "Full Manual" from the CD (or download it from the web). The Full Manual is 173 pages as a pdf file. An advantage of using the electronic manuals is that many of the pages include colour screen shots of the display to explain the various indicators and control settings.

I quickly found the screen protector sheet fitted to the radio actual made some of the on-screen control buttons difficult to access, so this protector was quickly removed. Those wish to add an anti-glare screen protector will find suitable options available on line, such as those sold for 4.3 inch (109 mm) GPS units.

One obvious feature of the front panel is the absence of any band select buttons. Changing bands is extremely simple: just touch the screen in the area displaying the MHz digit and up pops a selection panel. Then you simply touch the "button" to move to the band of your choice. Touching the MHz digit and then the button for the band you are already operating on will take you to the next of three band stack registers. Touch and hold will take to the third register, bypassing the second register.

Tuning step size changes with operating mode. If you are using SSB, touching in the kHz portion of the display allows you to change to 1 kHz tuning steps. Touching and holding for one second in this area will bring up the TS menu, displaying a set of buttons to select the required tuning step. If you had enabled 1 kHz step tuning, touching in the Hz region will re-enable the previously used tuning step. Similarly, touching in the Hz display region and holding for one second will enable 1 Hz tuning steps, with 10 Hz steps being the default.

Another option for changing frequency is to touch the MHz region and then select the F-INP button on the pop-up panel to bring up a numerical keypad to directly input your required frequency, followed by the ENT button to move to that frequency.

Changing operating mode simply requires touching the mode displayed on screen, and a new set of buttons appear to allow you

Photo 5: In-built RTTY decoding in action, showing the decoded text and waterfall display.

to select your mode. Having learnt these methods, the logical options are available for other controls, such as changing the receiver bandpass filter settings.

One important and useful control is the multifunction (MULTI) button to the top right of the screen. Pressing this control will bring up a set of options on the right hand side of the screen that are relevant to the current operating mode. If in SSB, you will see RF Power, and microphone gain settings, which can be changed by touching the required screen segment and then rotating the multifunction knob.

In CW mode, the MULTI button allows you to set CW speed in 1 WPM increments, alter the RF Power level and set the CW pitch to suit your own preferences.

The transceiver can be set up with 8 memory channels for the inbuilt iambic keyer, with the iambic paddles connected to the rear keyer socket. Access to these keyer memories is simple: MENU, KEYER brings up the controls in the lower half of the display. Touching the EDIT/Set button allows access to the Edit/set screen. Here you can set up each keyer memory, plus set the controls for the "Up Counter" for contest operating. Several other controls can also be accessed to set your preferences for CW mode. Once you are finished, simply press the Exit button several times to return to the initial display.

The radio has semi break in and full break in operation available

in CW. Personally, I found semi break in operation easy to use. In full break in mode, the changeover relay noise level is quite high, but other users report that the noise is not objectionable if you are using headphones.

RTTY and Data modes

The transceiver has built-in RTTY decode and RTTY TX memory, so no external computer and software are needed. Of course, you can also use external software. The basic operations of RTTY are described over two pages of the Basic Manual.

Using a computer generated Data mode can be achieved through multiple methods. Perhaps the simplest method, if you have an existing interface device, is to connect the interface to the Accessory socket via an appropriately wired adapter. All that is required is to then touch the Mode button on the display, then select say USB, but to hold the USB touch button for a couple of seconds to activate the USB-D (for Data) option. Provided that the SET menu option for Connectors – Microphone is set for Microphone, ACC, you can simply toggle between microphone and Accessory socket input using the MODE control.

Another option to operate digital modes is to use the USB cable to transfer the audio between your computer and the radio. This is slightly more complicated to set up on the first occasion. You need

to install the latest Icom USB Driver on the PC, then connect the transceiver. Once set up, this should have enabled two bidirectional connections between the radio and the computer: a CI-V channel for full CAT control of the transceiver or simply reading settings to interface to your logging software plus two channels for audio transfer. The appropriate settings need to be adjusted in the SET menu system.

Menu options

There are many menu options.
Once again, the options available with the main menu are context sensitive. More detailed settings require stepping through the MENU options. Some options require stepping through multiple menu levels. Most of the commonly changed settings are easily accessed, with the controls only a couple of levels down. Those controls that are usually "set and forget" may be several levels down in the SET menu system. The more commonly used settings are explained in the Basic operating Manual. More detailed controls are described in the full Manual.

Other operational controls

The Basic Manual gives a good set of instructions for the various functions. In addition to those already discussed, there are sections on FM Repeater operation, the functions of the Spectrum Scope display, and antenna tuner operation.

Photo 6: RTTY Tx message memory buttons and message set up.

Also described is using an SD card. Uses include data settings, audio recording (both receive and transmit audio can be saved), a communication log, voice audio recorded for the Voice TX function, a RTTY decode log, RTTY transmitted or received decode history log, and screen image capture.

The LCD display

The display is bright and crisp, with excellent clarity. Uisng the menu system, it can be set to various options, including panadapter, waterfall, panafall (a combination of panadapter and waterfall) and the audio scope display. The display will change depending on operational mode: in CW the panafall display will be replaced by the keyer function buttons if the electronic keyer has been selected.

If one wants to listen to a signal displayed on the waterfall display, simply touch and hold on the display at the desired signal – the transceiver moves to the new frequency.

There was only one feature associated with the display which I thought looked odd, especially noticeable when operation on SSB. My thoughts here are based on my experience with other SDR transceiver/software combinations plus the basic facts of SSB signal generation/reception. Let us use operating on 40 m LSB as an example to explain my dilemma. If I am to operate on say 7.090 MHz, we all know that the frequency represents the frequency of the suppressed carrier frequency. The actually transmitted information is contained in the "sideband" from say 300 to 2700 Hz below the nominal carrier frequency. So we would expect to see the nominal frequency to be displayed as 7.090 MHz and the actual transmitted (received) RF envelope in the range 7.0873 to 7.0897 MHz. The IC-7300 displays the correct carrier frequency, but the waterfall display shows the passband centred on the centre line of the display, when
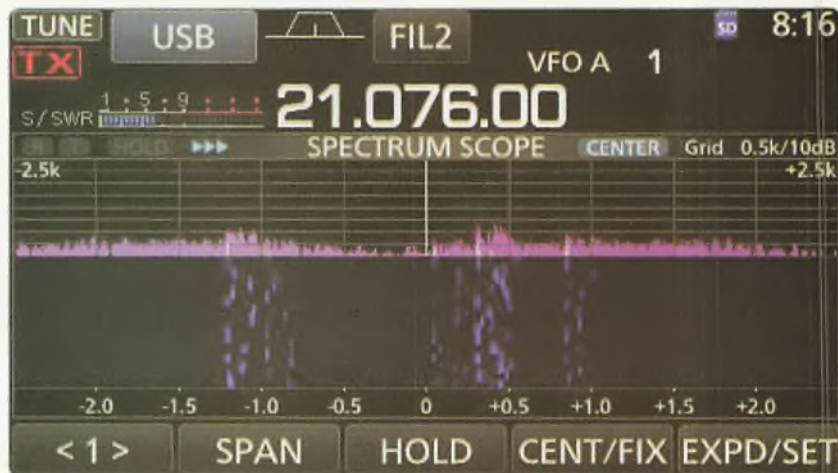
Photo 7: Transmitting JT65, with the signals from the PC coming direct to the USB port.

I would expect the passband to be displayed to the left of centre line. If operating on say 20 m USB, the opposite is true – the displayed passband should logically be located above the nominal carrier frequency.

This is not a fault in any way, but simply a manner of displaying the signal on the waterfall display is different to what I was expecting.

I could go on to describe further features, there are so many! But perhaps this is enough for now, and will assist you in deciding whether to seek further information.

Internal antenna "tuner"

The IC-7300 has an internal tuner supporting operation across the 1.8 to 50 MHz bands. It is capable of providing a match between the transceiver and antenna/feedline provided that the VSWR is 1:3 or less, and will provided a match of less than 1:1.5 in an average of 2-3 seconds. It also has a memory tune mode, which will reset the tuning for a given frequency in less than 100 milliseconds. The tuner also has an "Emergency Mode" (EMR) which provides a match up to around 1:10 VSWR, with the transceiver output power automatically reduced to 50 W maximum when in the EMR mode.

Conclusions

For an "entry level" transceiver, the

IC-7300 provides many features that were only found in higher level (more expensive) transceivers in earlier transceiver generations. A user familiar with Icom equipment will be able to set up the transceiver and be on air very quickly, perhaps not even requiring reference to the Manuals. A newcomer to Icom will find the key answers to their set up questions in the Basic Manual and be able to get on air quickly.

On air reports received were very good. I have now heard several stations using the IC-7300, and their SSB signals sound very good.

Once the user has set their preferences for the more detailed settings, operation was simple and intuitive for the author. Receive audio quality is excellent and it is easy to listen to the radio for extended periods.

One can speculate: if this is the new "entry level", with many features that were previously only available on much higher priced models, we must expect to see even better features in the next round of middle under upper level transceivers to be released.

It is also interesting to read some of the comments in user groups and other on-line forums. The vast majority of comments are very positive. Some are making comparisons between the IC-7300 and other model transceivers, both Icom and other

Specifications

GENERAL

Frequency coverage		(Unit: MHz)
	Receiver*1	0.030–74.800*2
	Transmitter*1	1.800–1.999, 3.500–3.800, 7.000–7.200, 10.100–10.150, 14.000–14.350, 18.068–18.168, 21.000–21.450, 24.890–24.990, 28.000–29.700, 50.000–52.000, 70.000–70.500

*1 70 MHz band is for EUR version. Each frequency range is differ according to versions.
*2 Guaranteed range: 0.500–29.999, 50.000–54.000, 70.000–70.500 MHz

Mode		SSB, CW, RTTY, AM, FM
Number of channels		101 (99 regular, 2 scan edges)
Antenna connector		SO-239 (50Ω)
Power supply requirement		13.8V DC ±15%
Power consumption	Tx	21A (at 100 W output power)
	Rx	0.9A typical (Standby), 1.25A (Maximum audio)
Operating temperature range		−10°C to +60°C; 14°F to 140°F
Frequency stability		Less than ±0.5ppm (−10°C to +60°C; 14°F to 140°F)
Frequency resolution		1Hz
Dimensions (W×H×D)		240×94×238mm; 9.45×3.7×9.37in (projections not included)
Weight (approximately)		4.2kg; 9.26lb

TRANSMITTER

Output power	SSB, CW, FM, RTTY	2–100 W (HF/50 MHz), 2–50 W (70 MHz)
	AM	1–25 W (HF/50 MHz), 1–12.5 W (70 MHz)
Modulation system	SSB	Digital P.S.N. modulation
	AM	Digital Low power modulation
	FM	Digital Reactance modulation
Spurious emissions	HF bands	Less than −50dB
	50 MHz band	Less than −83dB
	70 MHz band	Less than −60dB
Carrier suppression		More than 50dB
Unwanted sideband		More than 50dB
Microphone impedance		600Ω

RECEIVER

Receiver system		Direct Sampling Superheterodyne			
Intermediate frequency		36 kHz			
Sensitivity*3		0.5 – 1.8 MHz	1.8 – 29.995 MHz	50 MHz band	70 MHz bands
	SSB/CW (BW: 2.4 kHz at 10dB S/N)	–	0.16µV	0.13µV	0.16µV
	AM (BW: 6 kHz at 10dB S/N)	12.6µV	2.0µV	1.0µV	1.0µV
	FM (BW: 15 kHz at 12dB SINAD)	–	0.5µV (28.0 – 29.7 MHz)	0.25µV	0.25µV

*3 HF: Preamp 1 ON, 50/70 MHz: Preamp 2 ON

Squelch sensitivity*3 (Threshold)	SSB: Less than 5.6µV, FM: Less than 0.3µV

*3 HF: Preamp 1 ON, 50/70 MHz: Preamp 2 ON

Selectivity (sharp filter shape)		More than	Less than
	SSB (BW: 2.4 kHz)	2.4 kHz/−6dB	3.4 kHz/−40dB
	CW (BW: 500 Hz)	500 Hz/−6dB	700 Hz/−40dB
	RTTY (BW: 500 Hz)	500 Hz/−6dB	800 Hz/−40dB
	AM (BW: 6 kHz)	6.0 kHz/−6dB	10 kHz/−40dB
	FM (BW: 15 kHz)	12.0 kHz/−6dB	22 kHz/−40dB
Spurious and image rejection ratio	HF:	More than 70dB	
	50/70 MHz:	More than 70dB (Except for ADC Aliasing)	
Audio output power		More than 2.5 W (at 10% distortion with an 8Ω load, 1 kHz)	

TUNER

Frequency range	1.9–70 MHz bands
Matching impedance range	16.7Ω–150Ω unbalanced (VSWR better than 1 : 3)
Tuning accuracy	VSWR 1 : 1.5 or less
Tuning time	2–3 seconds (Maximum 15 seconds)

All stated specifications are subject to change without notice or obligation.

brands. It is interesting to see that most are reporting performance characteristics that are equal to or exceeding those of transceivers that sell for at least twice the price of the IC-7300.

The IC-7300 would be a worthy addition to any radio shack. It provides most of the benefits and features of a software defined radio without the complications of setting up software and needing a computer to drive the transceiver. Demand for this new transceiver appears to be high around the world – it seems that Icom has a hit on their hands.

Further information

The transceiver manuals and brochure are available for download from the web. Try one of the following sites:
Icom Australia: *http://www.icom.net. au/amateur_ic-7300.html*
Icom America: (*http://www. icomamerica.com/en/products/ amateur/hf/7300/default.aspx*) or Icom global: (*http://www.icom. co.jp/world/products/amateur/hf/ ic-7300eu/*)

The Service Manual and Schematic diagrams can also be found online.

Readers wish a more detailed technical assessment of the IC-7300 can find a comprehensive review by Adam AB4OJ/VA7OJ on line at: *http://www.ab4oj.com/icom/ ic7300/main.html*

The transceiver was supplied by Icom Australia, whom we thank. The transceiver has a list price of $2300.00, but at the time of writing (late April 2016), local outlets were selling the IC-7300 at $1745.00 to $1795.00.

Thanks to Hirotaka Horiuchi VK3EHG for several of the images used, including the internal views and screen capture images. The block diagrams are courtesy of Icom Inc.

VK3 news Geelong Amateur Radio Club

Tony Collis VK3JGC

TOP BAND - The Other End of the Spectrum

Whilst the GARC's credentials in the microwave community are well established, there are club members who also have a keen operating interest on the 160 metre band; amongst those are Ken VK3DQW, Donald VK3IT and Peter VK3WK. At home Ken uses an IC-729 and an H.B. tuner with a 50 ft (15.24 m) top-loaded vertical antenna whilst Donald runs a Ten Tec Omni V11 with an inverted L antenna fed against his veranda roof as a counterpoise.

The main operating mode on Top Band is still very much AM. In Melbourne the 1825 kHz net starts, on most days, around 11 am going on to 12 am AEST, extending around the bays and inland around the greater Melbourne area. Adelaide has an 1825 net in the evening. Andy VK5AAQ has been running an 1825 kHz A.M. net at 19:30 local time on Thursdays in Adelaide now, for over 30 years.

There is also VK3ASE doing cross band on Saturday nights from 22:30 local time.

A few operators get on to SSB, generally between 1840 kHz and 1860 kHz, an hour or two before dawn. Interstate stations have also been heard in the evening on SSB by the GARC members. GARC member Peter VK3WK recently had an SSB DX contact on Top Band with an DXpedition on Heard Island which is around 4000 km south west of mainland Australia.

Members report that very little FM activity has been heard on Top Band. Donald has successfully worked both the UK and Europe on CW but spends most of his air time with South Australian contacts such as VK5BUG. Ken has also worked North America and Europe from portable locations using large antennas. The perception of both Ken and Donald is that of all the states Victoria and South Australia appear to be the most active on Top Band.

For Ken, Donald and Peter working European DX from Australia requires a pre-dawn AEST start whereas our evenings are best suited to North American contacts. Interference can be a problem when operating on Top Band in and around urban areas at all times due to neighbouring appliances. Also, stations near multiple MF broadcast stations have reported interference by intermodulation products; often these spurs can be generated by poor connections on other large metallic structures.

Photo 1: Ken VK3DQW's shack.

Photo 2: Ken VK3DQW's 160 m top loaded vertical.

The "steampunk" 70 cm band satellite antenna

Dale Hughes VK1DSH

Photo 1: Photograph of the completed antenna looking down the boom towards the LNA box at the far end.

Steampunk (1): "...one of steampunk's most significant contributions is the way in which it mixes the digital with the handmade ...the tinkering and tinker-able technologies within steampunk invite us to roll up our sleeves and get to work re-shaping our contemporary world... the goal of such redesigns is to employ appropriate materials (such as polished brass, iron, wood, and leather)... in this respect, steampunk bears more in common with DIY craft and making..."

This article describes an antenna made from oak and brass, hence the name. Why oak and brass instead of more conventional materials? The idea came from a document by Kent Britain WA5VJB (2) which describes a series of cheap Yagi antennas made from wood and wire. I have built a number of these antennas for field day use and they have worked very well, so it seemed like a good approach for a more permanent 70 cm band antenna as part of my home satellite ground station. The general arrangement of the antenna system

is based upon the description given in the ARRL Antenna book (3) which is more-or-less the same as that shown in Figure 2.The dimensions provided in the article by Britain are given in inches and are mostly converted to metric in this article, but to maintain clarity both systems of units are sometimes quoted.

The antenna

The antenna consists of two 11 element Yagi antennas configured for circular polarisation by offsetting each set of antenna elements by ninety degrees, both physically and electrically.

Photo 1 shows the completed antenna along with the Low Noise Amplifier and polarisation control box. The use of circular polarisation significantly reduces fading of the satellite signal as it spins.

The boom of the antenna is 19 mm square Tasmanian Oak (also known as Mountain Ash) with a length of 2100 mm and the antenna elements are a mixture of brass and copper welding rods which have a diameter of ~3 mm.

The predicted gain for a single Yagi of the given design is 13.8 dBi with a 40 dB front-to-back ratio.

Table 1 shows the length and spacing of the elements for a single Yagi. The two Yagi's are mounted orthogonally on the boom and one is offset by a quarter of a wavelength which is specified as 6.5 inches (165.1 mm). The positions of the elements were marked on the boom and 3 mm holes were drilled through each face at the required positions, however there is one minor issue that needs to be addressed: If each set of elements are offset by the 6.5 inches, directors 3, 4 & 5 will intersect so they need to be moved slightly. I shifted the affected elements by about 2 mm so that there was no collision and this does not appear to have affected antenna performance in any way. Prior to installing the elements, the boom was given five coats of marine grade polyurethane varnish to weatherproof and protect the wood. After the elements were placed in their final position a small amount of neutral cure silicone rubber was applied to secure them.

The driven elements are made from 3 mm copper as it is easier to bend, though brass can be used if required and Figure1 shows the construction details.

Connecting the antennas

For correct operation of the antenna array, the signal from each antenna has to be combined in such a way to maintain the required 90 degree
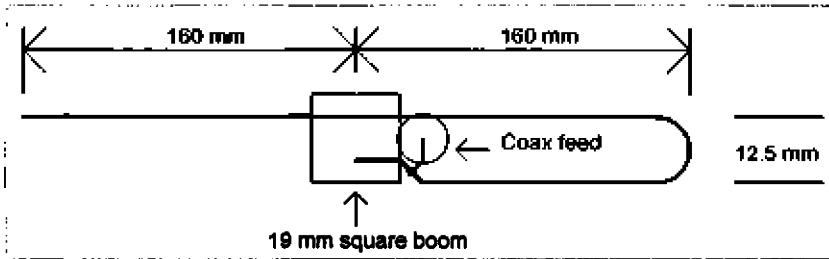
Figure 1: Construction of the driven element. It was found that best impedance match was obtained when the driven element was slightly shorter than specified by Britain and the dimensions shown above reflect that change from the original design. The element material is 3 mm copper wire.

$$Z_t = \sqrt{25 \times 50} = 35.36\Omega$$

phase difference and impedance match; Figure 2 shows the general arrangement. As the direction of the circular polarisation i.e. left hand or right hand is determined by the relative phase of the combined signals (both for transmit and receive) an additional half-wave length of cable can be switched into the antenna connections to reverse the polarisation direction. Relay RL1 selects which antenna is fed by the additional half-wave length of 50 Ohm cable, so the direction of polarisation can be remotely controlled from the operating position. To maintain the correct phase and impedance relationships

the cables from each antenna to the phasing section and relays should be of the same length and ideally an integral number of half-wavelengths long, corrected for the cable velocity factor.

As the impedance of the individual antennas is nominally 50 Ohms, the impedance of the combined antennas is nominally 25 Ohms and this needs to be transformed back to 50 Ohms for correct operation of the transmitter and receiver low noise amplifier. The impedance transformation can be performed by a quarter-wave transmission line of the appropriate impedance which can be calculated from:

A transmission line with an impedance of approximately the correct value can be made from two quarter-wave lengths of 75 Ohm connected in parallel. In this case I used two lengths of Belden 8263 (4) 75 Ohm coaxial cable (RG-59 style) which has a nominal velocity factor of 66 %, so the length of each quarter-wave section was 113.5 mm when cut for 435.8 MHz. Any other good quality 75 Ohm coaxial cable could also be used, provided the velocity factor is known.

The antenna array, now transformed to 50 Ohms can be connected to either the transmitter or LNA via the Transmit-Receive relay (RL2) which is controlled by the transmit-receive control line from the station. The LNA is an EME-173 (5) 70 cm preamplifier kit supplied by Minikits. The T/R relay is configured to be un-energised in transmit mode to minimise the possibility of damage to the LNA which might be caused by transmitting into its output.
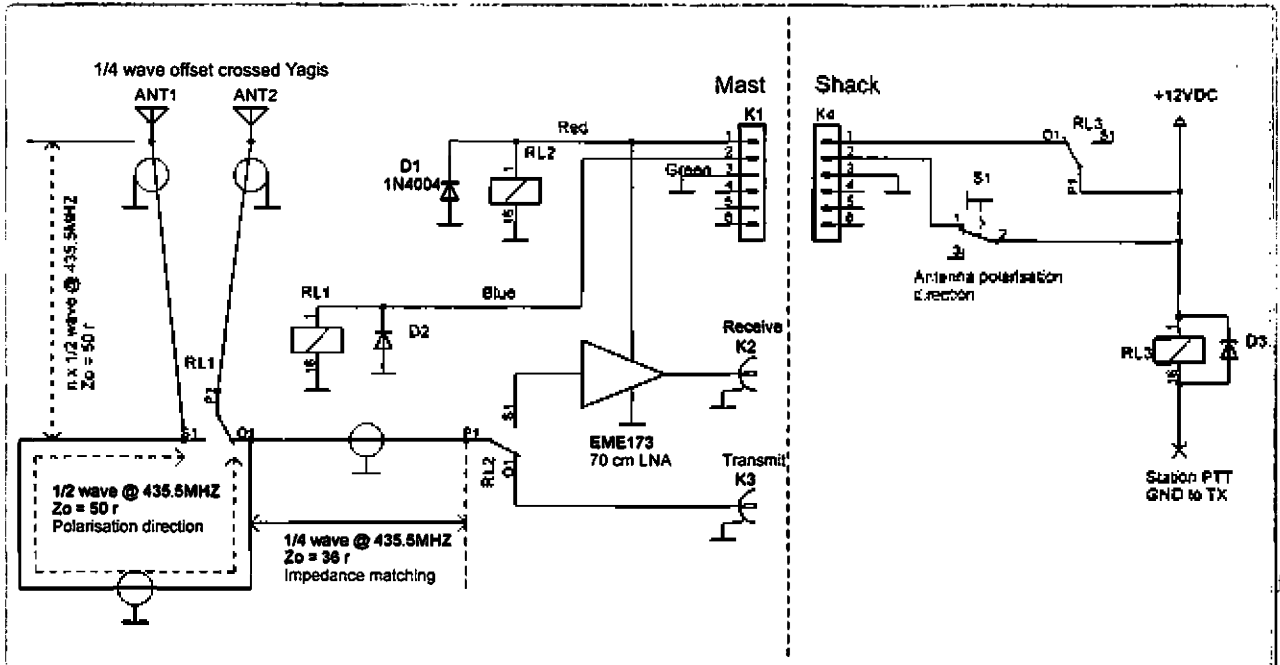
Figure 2: Phasing cables and amplifier connections for the 70 cm circularly polarised antenna system. The non-antenna parts on the mast are mounted in a diecast box for protection. Note: The 36 Ohm quarter wave impedance matching line is two 75 Ohm quarter wave lines in parallel.

Element	Length (in)	Spacing (in)	Length (mm)	Spacing (mm)
Ref	13.4	0	340.4	0.0
DE	13 (12.6)	2.5	330.2 (320)	63.5
D1	12.4	5.5	315.0	139.7
D2	12	11.25	304.8	285.8
D3	12	17.5	304.8	444.5
D4	12	24	304.8	609.6
D5	12	30.5	304.8	774.7
D6	11.75	37.75	298.5	958.9
D7	11.75	45	298.5	1143.0
D8	11.75	52	298.5	1320.8
D9	11.1	59.5	281.9	1511.3

Table 1: Antenna element dimensions. The source document quotes a dimensional tolerance of +/- 0.1 inch (2.54 mm) Element length and positions should deviate no more than +/- 2 mm from the above and this is easily achieved with a bit of care. The values in brackets are the adjusted length for best impedance match of the driven element.

In receive mode, power is supplied to both the T/R relay and LNA which switches the antenna output to the LNA input, thence to the receiver. Both relays are coaxial relays recovered from old equipment. The phasing and impedance matching lines, T/R relay and LNA are housed in a die-cast box mounted on the end of the antenna boom. A die-cast box with flanges (Jaycar HB-5041) was used as the flanges make it easy to mount the box onto the antenna boom using U-clamps. The mounting point of the antenna onto the rotator boom is selected to be approximately at the centre of gravity of the combined assembly.

Conclusion

A relatively robust and low cost antenna system with good performance providing switchable circular polarisation has been described. The antenna has been in use for approximately 12 months and has performed flawlessly. The circular polarisation and ability to switch polarisation direction has largely eliminated fading of the satellite signals and has made satellite operation more convenient and pleasurable.

SOTA & Parks News

Allen Harvie VK3ARH

VHF/UHF and higher activations

Al VK1RX and Andrew VK1AD worked VK3s on 144 MHz from Mt Mundoonen VK2/ST-053. DX contacts included Col VK2BCC @ 190 km, Russ VK2BJP @ 233 km, Gordon VK3EJ @ 307 km, Bernard VK3AV @ 438 km, David VK3AUU @ 460 km, Ron VK3AFW @ 483 km, and Michael VK3KH @ 507 km. Locals were also worked on 2 m and some on 70 cm included Ian VK1BG, Chris VK2DO (south coast), Andrew VK2UH, Dimitris VK2COW, Greg VK1AI, Matt VK1MA, Steve VK2NSS and John VK2YW.
https://vk1nam.wordpress. com/2016/04/11/sota-vk1ad-portable-70cm-update-11-mt-mundoonen/

Peter AX3PF activated Mt Tassie VK3/VT-046 with 3.4 GHz. After initial requests fell on deaf ears, Peter worked the usual 40 m SOTA chasers before attention returned to the 3.4 GHz system. David VK3QM was able to hear his beeper but still required tweaking of antennas at both ends of the path. After several minutes' delay, Chas VK3PY also heard Peter's beeper. They soon had the antennas aligned and exchanged 53/52 reports, for a contact over about 208 km (From Google Earth. The SOTA database calculated it at 211 km based on the six-digit Maidenhead locators). Peter AX3PF was using a 15 W transverter to a 75 cm offset dish fed with one of the WA5VJB PCB log periodic antennas.

As he was operating from a SOTA site and using portable equipment, Peter AX3PF claimed a SOTA/UK Microwave Group Microwave Award (Red) as an Activator for 200 km on 3.4 GHz.

Congratulations to Tony VK3VTH on recording 10000 QSOs from parks for the WWFF program, great effort. A lot of Tony's 10,000 contacts were with our WWFF friends in Europe via LP EU in the late afternoons. There are of still many opportunities to work DX and suggest all program participants give it a go. VK WWFF stations are much sought after.

Nick VK3ANL submitted an eligible Log for working 45 VK3 National Parks, thus obtaining the KRMNPA Merit Award as a Hunter.

Nick commenced "chasing" VK3 National Parks in June 2013 and completed Park 45 in April 2016 with a contact from the Snowy River NP. Peter VK3PF made a "special" detour to activate for Nick.

VK3 Show and Tell - Sunday 17 April 2016 - Brisbane Ranges National Park

17 enthusiastic amateurs, many accompanied by family members, gathered in the Brisbane Ranges National Park VKFF-0055 (just west of Melbourne) for the second VK3 "Show and Tell" event. (The first

VK3YSP and friends working FO-29 from VKFF-0055.

being held in the Churchill National Park several years ago.)

Among the 17 attendees were two most welcome interstate guests John VK2AWJ and John VK5BJE/VK5PF, accompanied by XYL Jenny. Jenny is a keen Bird Watcher and made use of the visit to undertake some bushwalking and bird spotting activities. John VK2AWJ was quick to set up gear and make a few contacts which will add to his growing number of VK3 Parks activated and KRMNPA contacts. John VK5BJE has previously activated the Park, but was seen grabbing a few contacts for the Log later in the day. A special "thanks" is extended to the two Johns and Jenny for making the journey to the Brisbane Ranges National Park.

Another highlight, among many, was provided by Joe VK3YSP. Joe set up his Portable Satellite gear, complete with mini computer controlled rotator for a demonstration earlier in the day and was ready and waiting for an early afternoon pass of amateur satellite designated FO-29. Right on cue, FO-29 came over the horizon and Joe completed what is believed to be the first WWFF contact from an Australian VKFF Park via Satellite. Joe exchanged greetings from the Park, the Park designator and name, and a valid signal report with Geoff VK2ZAZ. This was an effort by Joe and enjoyed by all present.

The concept of the Portable "Show & Tell" day was to provide a platform, in a friendly environment, for like-minded amateurs to exchange ideas, demonstrate suitable and innovative gear, discuss activations in all fields of Portable activity including ILLW, SOTA, IOTA, and Parks, to meet the face behind the call and to actively encourage licensed amateurs who may be considering getting "out and about" to have a go. All participants agreed these goals were achieved.

Many requests were made during the day to make the Brisbane Ranges "Show and Tell" an annual event. So in March 2017 it will all happen again. As they say "watch this space" for further details.

I would also like to acknowledge Peter VK3ZPF, Allen VK3ARH, Joe VK3YSP, Julie VK3FOWL, Peter VK3PF, Jim VK3PC and the ARV Council for their much valued assistance.

See you in the Brisbane Ranges National Park VKFF-0055 in March 2017.

Alerts and Spots

Most Activators and Chasers/Hunters are aware of the value of both Alerts and Spots. Please remember to use the primary tools for both Alerts and Spots. SOTA Alerts and Spots should be posted to SOTAwatch.org, but ensure that you post to the correct page: Spots have been seen posted on the Alerts page and Alerts posted to the Spots page. Thus users may miss the correct information. If placing either an Alert or a Spot for a Park activation, the main site used in VK is parksnpeaks.org, which has Spot and Alert pages. There are also global sites for WWFF which may be useful if you are hoping to make international contacts (*http://forum.wwff.co/* for Alerts and *http://hamspots.net/wwff/* for Spots).

Some operators are posting information to Facebook. Many potential Chasers/Hunters are unable to use Facebook due to constraints placed upon them by their employer. Therefore, any Alert or Spot posted only to Facebook will not be seen by many potential Chasers.

As an Activator, maximise your chances of being chased by posting an Alert prior to the activation, to either SOTAwatch (SOTA) or ParksnPeaks (for Parks). All Chasers should realise that posting an Alert is NOT a promise to be there, rather a plan to try to be there. Any Chasers who is the first to work an Activator should seriously consider posting at least one Spot: if it is a SOTA activation, post to SOTAwatch first. That Spot will then be picked up by ParksnPeaks and by the various SOTA spotting tools. For any Park activation, post the Spot to ParksnPeaks. Then you can consider posting to Facebook or to other sites. Note that a new WWFF Spot on ParksnPeaks will be posted to the DX Cluster automatically.

Parks'n'Peaks

Parks'n'Peaks continues to evolve and has recently added the ability for chasers to list requests for activations. Chasers are able to list the parks they are seeking and this will help activators prioritise activations or at least give indication as to demand for sites.

Use "Edit Requests"; Select the scheme then site of interest. The list of sites and number of chasers seeking will be displayed in the page for each scheme. The chaser will receive an email notification when activity is detected.

The individual scheme summaries

can be seen by clicking on the scheme link in the top menu: e.g. clicking on KRMNPA will bring up a summary of recent activity, a list of requests for activations and a list of posted Alerts for upcoming KRMNPA activations.

For more information, go to *http://parksnpeaks.org/*

Finally, at the end of the month we added a new park to WWFF program. Bob VK5FO noticed the new Park and sent the details to Paul VK5PAS for inclusion into the WWFF award system. Whilst adding existing parks to the award is common, having a new park is not. Wiljani Conservation Park was gazetted earlier this year. Its position is within easy reach for several activators, with Paul VK5PAS completing the first activation.

Thanks to all Activators, Hunters or chasers, be it VK or DX. Keep up the good work and don't forget to keep have fun doing it.

73 & 44

Allen VK3ARH

Silent Key   Wally Gelok VK6YS

Sadly, Wally VK6YS passed away on the 23 March 2016 after a long battle with motor neuron disease. It was a battle that he fought bravely with great humour and dignity up until the end. Wally was well known in Western Australia having contributed to many projects and activities over his nearly 40 years in amateur radio.

Wally was born in Millicent, South Australia, in 1950 and spent his formative years there. He would tell stories of teenage adventures, old cars and motorbikes that would be recounted with great detail and humour. His curiosity in radio, like many of us, started with crystal sets and valves, making his first set with help from his father whilst still a teenager. He left South Australia as a young adult working for drilling outfits across Australia, spending a lot of time in remote areas developing skills and a "can do" attitude to any task no matter the issues involved. All this wandering ended up with him based on Cockatoo Island in the North West of Western Australia working for a mining company. It was the late seventies and the CB boom was well underway. Wally would come home for lunch and call up his father in South Australia on the CB to catch up. This led him to sit the exams for his amateur licence applying for the call sign VK6CI for Cockatoo Island only to find it was already taken and instead took YS for the nearby Yampi Sound.

In the early 80s Wally moved to Mt Newman in Western Australia where he helped establish the Mt Newman Amateur Radio Club with the call sign VK6MN or "Monkey Nuts" as it was known. He was an enthusiastic member of the Northwest Amateur Radio club attending many of its rallies and contributing greatly to its success. He moved on to Perth in the mid-eighties but kept in contact with the NW and on one memorable occasion did a flying round trip of over 2000 km from Perth to Karijini National Park to attend a radio weekend complete with children in tow,

Wally VK6YS operating on Woody Island IOTA OC170, call sign VK6WDI in 2012.

such was his enthusiasm for the hobby.

Soon after his arrival in Perth he undertook the collation and broadcasting of the regular Sunday morning Western Australian news broadcast for three years. He later shared the relaying of the news to the northwest on 20 metres for 12 years. He volunteered for jamboree on the air and for car rally SOS activities with WICEN. Wally also helped with the initial set up of the Perth amateur radio repeater VK6RTH affectionately known as Tick Hill due to the local inhabitants. His wicked sense of humour and his insistence on turning up on site with the correct equipment including full safety wet weather overalls earned him the nick name VK6 "Yellow Submarine".

In the early 1990s Wally settled down on a five acre antenna farm south of Perth in a house he built with his wife Gaye. Antennas grew to great heights and he proved the old adage that his antennas were big enough when one blew down in a storm. For him the highlight of these activities was working Israel on six metres after a wait of 38 years. However, he had also not lost his wanderlust and started visiting islands off the Western Australian coast to activate them for IOTA. Over the following years he would visit nearly every Western Australian IOTA. There were many tales told including being marooned (twice), rescued by the Navy, organising a helicopter evacuation from another island for an injured fellow amateur and the boat nearly sinking in rough seas on return from yet another island. Throughout it all it was clear he really enjoyed the challenge and the experience. He was a consummate raconteur often sharing these adventures with others along with his love of all things in remote and scenic areas. He was a keen photographer and the QSL cards from these expeditions often featured the local scenes and wildlife.

One of Wally's great loves was CW. He spent a lot of time teaching the code to others and used it regularly in his on air contacts. He collected Morse keys and recently donated his collection to the state collection of keys held by the Northern Corridors Radio Club.

Apart from amateur radio Wally was a leader in the Health and Safety profession for the oil and gas industry in Western Australia working for a number of big companies and contributing to the success of many major offshore installations. All those that worked with him admired his coaching and leadership skills and his ability to negotiate at all levels using his humour and sense of the ridiculous to bring people together. This respect was demonstrated by the support and practical assistance given by his colleagues to Wally and Gaye throughout his illness.

The hobby is the poorer for his passing; he was always generous with his time and eager to help someone get started in amateur radio that included his step son Karl now VK6FAAD and his step daughter Annette who became his QSL manager during his long illness. He had unbounded enthusiasm for an idea once it took hold and he always drove it with humour to its conclusion. The last word should be Wally's, as he would say on the regular Newswest broadcast of which he was a team member "and I'm the Wally, this is VK6YS".

Wally is survived by children Jason, Nathan, Rebecca and Rachel, and five grandchildren.

Vale Wally VK6YS.

VK5news Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY

It has been a busy year so far, with a number of members competing in the early VHF and UHF contests and a successful John Moyle Memorial Field Day weekend in March.

International Lighthouse Weekend

The International Lighthouse & Lightship Weekend is coming up in August 2016. AHARS is again going to Cape Willoughby on Kangaroo Island to be our venue. This was a very successful activity last year and should be equally enjoyable and active one this year. If you want more information please go to the website *http://illw.net/* If you have not yet put your name down please contact Paul VK5PAS on *vk5pas@ wia.org.au*

The April Meeting

This was a members' Buy and Sell when, as usual one person's junk became another person's treasure. Yes, sometimes we see the same items coming back for a re-cycle next year but mostly we choose wisely enough, knowing what we plan to build. These meetings are an excellent opportunity to actually talk to other members, something we don't always have enough time for at a normal meeting.

The Shack Activity

The shack is open on Saturday mornings for social chats even when there is no formal talk planned.

On April 23rd 2016 it was a talk by Phil VK5SRP about 'valves', 'bottle' or 'tubes' etc., what they are and how to use them, how to care for them and how to feed them. He has a good display to demonstrate the items and to make it a very entertaining and interesting morning.

There will be a training weekend on 4 and 5 of May 2016. The Saturday will be devoted to a resume of the Foundation course while the assessment for the Foundation and for the upgrade exams will be held on the Sunday. For more information about this and future training weekends please contact Sasi VK5SN on *vk5en@ wia.org.au* The last course was very successful, with nine new Foundation members and three upgrades. Well done people.

The Mid-Year Dinner

This will be held on Sunday 19 July 2016 as a luncheon with the venue to be announced. Please come along with your spouse and family. These are very pleasant friendly occasions.

Book ahead for the Buy and Sell

This will be on Sunday 6 November 2016 at the Goodwood Community Centre and as always it will be a great day, an opportunity to meet the friends you don't see too often and the opportunity to see and maybe purchase the latest gear. Make sure you put it in your calendar. If you have equipment to sell, please contact David VK5KS to book a table.

Big contests coming up

The Remembrance Day Contest will be on 13 and 14 August 2016 and two weeks later, on 27 and 28 August 2016 it will be the ALARA Contest. We hope many of the AHARS members will be heard over both weekends.

Over to you

VK5EEE and Deliberate QRM

Dear Editor,

Lou VK5EEE has exceeded himself in his selfish arrogance contained within the diatribe pretending to be a CW column.

He simply doesn't understand the basics of amateur radio; he seems to think that his views are the only legitimate way to approach the hobby. He thinks that a free frequency should be made available to him and his mates whenever they want it. To him; his way is the only legitimate use of amateur radio.

He is simply wrong! I hope that new amateurs do not think that his views are a legitimate representation of amateur radio operation.

There are thousands of amateurs in the world and when lots get on at the same time the bands get very crowded. That is a fact of life. Get used to it!

It is a modern tendency to make out that people you disagree with are arguing an illegitimate case. Lou does this to extremes; such that he insults the majority of his fellow radio amateurs. This from someone who, in his own column, confesses to the most heinous crime in amateur radio: to cause deliberate interference to another amateur's operation.

That is what Lou did to the VK0EK DXpedition. His justification is just so much rubbish, he could not, and did not, "just" transmit when VK0EK was not transmitting. In the fast paced world of a DXpedition even the slightest noise on the DX frequency can cause trouble and Lou's reactions are not as fast as he believes. So we get "E7gn 599": now did VK0EK get the VK bit or was that buried under Lou's noise. So a repeat and annoyance all round.

Lou wants to force us all to do it his way and leave clear space for him and his mates. I will not be attending Lou's re-education camp any time soon!

73
Martin VK7GN.

DX Talk

Luke Steele VK3HJ

After a feast of very rare DX in the first three months of this year, April and May brought us back to a steadier offering. FT4JA and VK0EK concluded in the first week of April, and the absence of their activity left the bands rather quiet. There was still some DXpedition activity, including East Timor, American Samoa, Iran, and a new IOTA near Bahrain (A91HI Hawar Island AS-202).

Currently on air is the Indian Bharati Antarctic station 8T2BH. Bhagwati VU3BPZ has been operating SSB on the higher bands most days. He will be there until December.

For several years, there have been a number of groups working on conducting a DXpedition to Number 1 Most Wanted entity North Korea. The Intrepid-DX Group was set to activate there in the first half of May but due to a number of circumstances and some controversy, P5DX was cancelled a few days before travel. Take a look at online discussions on blogs and DX forums and draw your own conclusions. The situation is far too complex to cover in a few paragraphs here. Dom 3Z9DX, who conducted a successful demonstration of Amateur Radio in December is planning a DXpedition there later this year, so we wish him success!

1U4UN King Dmitry I of Bir Tawil

In December 2014, Dmitry RA9USU and his friend Michael, after much planning and negotiation, reached Bir Tawil. This unclaimed territory is 2060 square kilometres of desert, between Egypt and Sudan. As an experienced world traveller and DXpeditioner, Dmitry thought it would be an interesting project to "claim" this territory, and later conduct an Amateur Radio activation. Read his most interesting account of the epic journey in 2014 on QRZ.com. Dmitry did visit again and activate Bir Tawil for around 16 hours in April 2016, making 1,524 contacts. Whilst it doesn't count for DXCC, it certainly makes an interesting story.

Recently, band conditions have been variable, but 20 m seems to be good most afternoons on the long path to Europe. 15 m still shows some activity, but 12 m and 10 m have been very quiet. 30 m and 40 m have been just okay and 160 m and 80 m have been generally poor.

There is not much of note coming up in June, but there are often IOTA activations at this time of year, so look out for those. The next significant DXpedition is CY9C St Paul Island in August and there are plans to activate San Felix Island off the coast of Chile later this year.

Cycle 24 – So Far

This sunspot peak has been the weakest in living memory, with the official peak smoothed monthly value of 80 in April 2014. This is considerably later than the predicted peak of 90 in May 2013, but was within the predicted range. The Solar Cycle Prediction Panel consists of the National Oceanic and Atmospheric Administration (NOAA), the International Space Environmental Services (ISES) and NASA.

Figure 1 shows that the solar minimum occurred in early 2009. After that, it seemed to take a long time for the cycle to build, and it didn't really start heading up until 2011. The smoothed monthly sunspot number rose to around 65

Figure 1: ISES Solar Cycle Sunspot Number Progression.
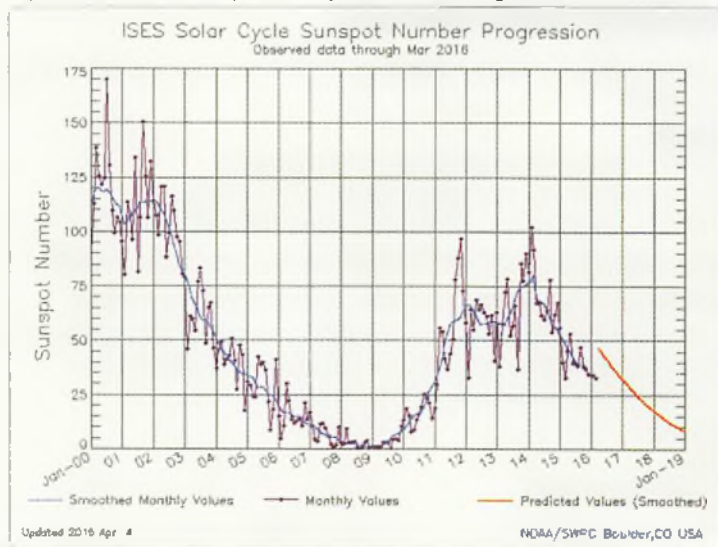
before falling back until mid-2013, when it started to rise again, to peak in 2014. Now, well into 2016, it is clear we are heading down to a minimum sometime in 2019.

What this pattern has meant to the HF DXer is mixed. Some complained that there was very little DX to be worked, after all, this was the "worst solar cycle ever". Others found plenty of DX but that it took some work. A few very committed DXers are known to have achieved Honour Roll status in the space of only 11 years; that's 331 entities confirmed since the down side of Cycle 23! Your author started seriously chasing DX in 2009, and has managed to confirm 323 entities with a real possibility of making Honour Roll by the end of this cycle.

One measure of the DX workable year by year has been the CQ DX Marathon. Since it's inauguration in 2006, the top score has consistently included around 280 entities worked each year, with only a slight drop to 274 in the solar minimum year of 2009. The high scorers in this yearly competition clearly have very capable stations and the time and dedication to chase absolutely every entity on air but these numbers indicate that a lot of DX is being worked year in, year out, regardless of whether sunspots are few or plentiful.

Some observations from your author's station through the cycle so far:

2008 and 2009 saw good 160 m and 80 m signals, and high participation in the Trans-Tasman Low Bands contests. 40 m was quite good, but 20 m was very quiet. Very little was heard on the higher bands.

2010 and 2011 saw the higher bands pick up and 20 m was showing some activity again. Low Bands were still good. The higher bands were still quiet, but 15 m showed some life.

2012 – 2014, with the increased solar activity saw some life on the higher bands at last. Summer time had even 10 m working well into the evening, and 15 m was lively. Low Bands had some good DX, but this tended to be overshadowed by the increased activity on the higher bands. Long-haul F2 layer DX on the 6 m band was rare but some contacts were made across the Pacific and some in the Northwest worked into Europe. Trans-equatorial propagation linked from time to time into the southern states and there were a number of openings to Japan and East Asia.

2015 and 2016 so far has seen the higher bands really dropping away. 10 m has been very quiet but 15 m has still been quite good. 20

m continues to work quite well. 30 m and 40 m have been variable. Low Bands have been patchy, with just the regular diehards appearing consistently. One part of the world that was quite good to work from here over the cycle peak has been Africa, at least on 40 m and up but over the past several months it has been quite difficult. Some recent DXpeditions to Africa have come and gone without a single QSO in my log and a few others just one or a couple of QSOs. Europe and Asia/Pacific continue to be the most consistent DX here, in central VK3.

These observations are quite consistent with the rise and fall of the sunspot cycle. One would expect activity on the higher bands to drop further over the next several years and for increased DX on the lower bands. However, there will likely still be opportunities for DX on higher bands but some will be missed as the focus will have moved to the lower bands.

Whatever happens, keep tuning the bands and catch the DX while you can. Who knows what will happen next month or next year! Do please drop me a line with any interesting DX news.

73, es good DX!
Luke VK3HJ

PerthTech Raffle Results

A capacity crowd of 45 attended **PerthTech** on 30th April, and a full report will be submitted for the next edition of *Amateur Radio*.

Raffle results:

1st Prize, Yaesu FTM-400XDR, won by Neil VK6BDO;
2nd Prize Heil Pro Set 6 Headset, won by Geoff VK5KIK;
3rd Prize, Daiwa CN-102L SWR Meter, won by Michael VK6MMB.

Book buyer's Prize, Comet GP15 6/2/70 antenna, won by Kevin VK6FKAP.

Congratulations to the winners and thanks to everyone for your support.

First prize was donated by an anonymous donor. The Comet antenna was donated by Steve VK6SJ of Future Systems. Door prizes were donated by Tet Emtron and Andrew VK6AS.
Thanks to the donors and Strictly Ham for the special prices.

Bob VK6POP
President,
WA Amateur Radio News

ALARA

Christine Taylor VK5CTY – Publicity Officer

The ALARA & Remembrance Day Contests

Do put in your diary that the RD (Remembrance Day) Contest on over 13 and 14 August 2016 weekend and two weeks later is the ALARA Contest on 27 and 28 August 2016.

The RD Contest is a 24 hour Contest, where you try to get as many contacts as you can over the 24 hour period with no duplicate contacts on any band. VHF simplex is allowed but EchoLink is not.

The ALARA Contest is much more 'laid back'. It is run over 36 hour so there are two evening sessions when 80 metres can be used and you can repeat contacts after an hour. EchoLink was allowed for the first time last year and was also very successful. This contest is much more a 'chat fest' because we have time to chat instead of just having a short QSO. We still try to make as many contacts as possible but at a more leisurely pace.

Please join us for both Contests. They are two important parts of the amateur year.

YL International Meet

It is still not too late to decide to go to the YL International Meet in the UK in October 2016. It is good to know that there will be a couple of VK YLs there but more would be good too. These International Meets are really something special. The friends you make there are friends for life even if you only see each other every couple of years.

The Meet is centred on Milton Keynes this year and is focussed on the AGM of the RSGB but there will be a lot more going on. In particular, this year you will have the chance to visit Bletchley Park where the German and Japanese codes were deciphered during WW2. Most of you will have seen the film "The Imitation Game", so this will be a chance to see where it all happened and to see some of the machines that were built to help with the decoding, in particular the 'bombes' designed by Alan Turing. Much of the filming was done at Bletchley Park.

There will also be an opportunity to visit the world famous Woburn Abbey and its lovely gardens. There will also be a couple of days to explore Milton Keynes itself.

But, for VK YLs it is a long way to go for just a week so my suggestion is that you book yourself on a European or UK tour on a coach, either before or after the MEET.

For more information the contact is *carolhodges1@btinternet.com* or look for the YLs of the World on Facebook.

CLARA

If any of you are planning a wonderful holiday in Canada in 2017, CLARA would love to see you at their 50th Birthday Bash. This convention will be held in Winnipeg, Manitoba, Canada. It is truly the Center of Canada. July 17-22 2017.

We have booked a block of rooms at the Best Western Plus Airport Hotel for a great price of $109.00 CND. We are looking at double occupancy.

Please go to the CLARA website: www.clarayl.ca and go to the CLARA's 50th Birthday Bash for a short survey, and to see what we have started to get planned for you.

This is not just for CLARA members; this is for ALL YLs who wish to attend. We would love to see you in Winnipeg.

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Val Lemko VE5ACJ
President CLARA

Monday Night Nets

These are going well with the new format. On the first Monday of the month the Net is held on EchoLink, on the 2nd and 4th or 5th Mondays the Net is held on 80 metres on or near 3.5700 MHz and on the third Monday both EchoLink and 80 m are active.

By using EchoLink the new VHF only members can participate. EchoLink is a free download but to use it you have to supply a copy of your callsign. It doesn't take long to be acknowledged and regardless of what type of device you use you will be accepted. We use the ALARA Conference station and while we are happy for OMs to join us we like to have the first couple of rounds just for YLs, please.

All the Monday Nets start at 1030 UTC in Winter and 1000 UTC in Summer.

Other Skeds

From Shirley VK5YL

ALARA Conference Station - IRLP node is 9509

YL IRLP net - 1st and 3rd Saturdays of the month at 2100 UTC and net control is Ann ZL3TNT (early Sunday morning for Australia).

YL Downunder Net – 4th Thursday of the month at 0500 UTC. Shirley VK5YL is net control.

YLRL Weekly net – 0100 UTC every Friday. Net control is usually Catherine AC4YL.

Minows net - 0230 UTC every Friday. Net control is Margaret AE7MB.

VE3TTT-R: Minnie's Net
This station is set up to receive EchoLink stations as well as 2 metre check-ins. Minnie VE3DBQ is net control for this sked which happens at 2130 UTC on every second

Wednesday, the next one starting on 13th April 2016 then every other week after that. (Early Thursday morning for Australia).

Please make sure you check your UTC/24 hour clock to get the timing correct. We'd love to have some new YLs check in. These nets are lots of fun.

If you, or other YLs you know, would like to run a net on the ALARA Conference Station, from anywhere in the world, please drop me a line via e-mail so I can make sure the station is free at your requested time. We did have a Gold Coast station running a Trivia Night when we were about to start our committee net last month.

33 Shirley VK5YL
endsodds@internode.on.net

Other Nets

YL Downunder Net

There is a regular YL Downunder Net on the last Thursday of each month at 0530 UTC. Shirley VK5YL and Ann ZL3TNT run this. You never know who will be there. Quite a number of DX stations know about it and join in. For us in OZ this net is in the middle of the afternoon but if you put it in your diary, hopefully you will remember it more often than I do! Sorry!

The 222 Net

If you have HF equipment there is a Net on a Monday afternoon 0500 UTC, again on 14.222 MHz. This Net has been running for many years and often attracts interesting DX stations. It is primarily for YLs but is not at all exclusive.

Now that there are few more sunspots around this should become more active. Unfortunately the sun did not know that the theory

Photo 1: ALARA Members and friends: Margaret VK3FMAB, Michi VK4FMGE, Susan VK3FZZY, Robyn VK3WX, Kaye VK3FKDW, Elsie, Carla VK3-A, Cristina VK3FCRS and Jean VK3VIP.

says the number of sunspots will vary over an 11 year period (we all have read this in out amateur notes) and in fact it is about 20 year since there were many sunspots, but we do believe we will be getting more activity in the coming years. Listen on 14.222 MHz on a Monday and hope for good contacts.

Extra ALARA Lunch

On Friday 22nd April 2016 we caught up with Michi VK4FMGE and her OM Peter VK4VQ for dinner at the Mountain View Hotel in Glen Waverly, Victoria. There were seven ALARA members and their OMs attending. Some of Michi's other friends, with whom she used to walk their dogs, also attended. There were about 23 for a very enjoyable lunch.

Michi and Peter were down here from Queensland for Peter's Mum's 96th Birthday. It was also Michi, Cristina, Margaret and Jean's ninth anniversary since obtaining their Foundation licence together on the exact date.

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Christine Taylor VK5CTY

Photo 2: Margaret VK3FMAB, Michi VK4FMGE, Cristina VK3FCRS and Jean VK3VIP.

Participate

VHF-UHF Field Day | 18 - 19 June 2016

Read page 55 for more details.

VHF/UHF - An Expanding World

David K Minchin VK5KK

Introduction

Winter has struck the southern side of Australia! That said, the weather was kind for the second 3.4 GHz QSO party. First up we have reports from VK2 and VK3 on activities from various portable sites. In this month's technical corner we have the continuation of "SDR on VHF and above" series as well as "for something completely different" another use for Mudguard washers!

3.4 GHz QSO Party 25 April meets SOTA!

The second of the 3.4 GHz QSO parties occurred on 25/4/2016. Activity was again reported in VK2, VK3 and VK5 as well as ZL! Here is some of the action:

Dave VK2JDS reports... "Stations active were VK2DAG, VK2CU, VK2KFJ, VK2ASY, VK2JNA, VK2AVR, VK2KYP and myself VK2JDS all using Geelong panels. The VK2 activity kicked off at 11 am with an unsuccessful very optimistic attempt to cross the ranges to Mangrove Mountain to Gary VK2KYP. We

Photo 1: Geoff VK2AVR and Dom VK2JNA Portable 3.4 GHz, QF56cm.

previously found 23 cm worked but not today.

Kim VK2ASY walked up to the pinnacle at Mt. Canobolas carrying his battery, Geelong panel, radio gear and two grand-kids! He had a great outing, easily working Matt VK2DAG and myself with separate stations 25 km away at Mt. Aberfoil. He could hear Justin VK2CU at Mt. Lambie between Lithgow and Bathurst but wasn't able to complete the contact. Then Justin worked us over a 74 km path on FM and SSB on 3400.1 MHz then swung his panel east and worked the Manly club fellows with full scale signals.

Steve VK2KFJ, Dom VK2JNA and Geoff VK2AVR had set up with a panel in the mountains to the east of Lithgow and are really getting into the swing of finding excellent radio sites for microwaves. There was an attempt at 47 GHz but this proved difficult due to conditions, so that's for next time.

It was a great day out in the field for all of us, no disaster and mostly great signals. The most difficult QSO of the day was the long path from us at Mt. Aberfoil to Clarence, QSB on SSB with 5/1 some of the time on an obstructed 100 km path."

Peter VK3PF reports... "I was out as well, on Mount Tassie. My initial attempts at 3.4 GHz contacts bought no joy, partly due to my distance from most of the activity around Melbourne and the lack of effective liaison. I gave up after about 40 minutes and set up my

HF station to chase a Summit to Summit SOTA contact on 40 m, plus to activate Mt Tassie VK3/VT-046. The SOTA callers were becoming less frequent when I received a phone call from David VK3QM. I worked the last of the SOTA chasers and returned my attention to the 3.4 GHz system. David was able to hear my beeper after a bit of tweaking of antennas at both ends but David's signal was very weak to me. After several minutes delay, Chas VK3PY started looking for my beeper. We soon had the antennas aligned and exchanged 53/52 reports, for a contact over about 208 km (From Google Earth. The SOTA database calculated it at 211 km based on the six-digit Maidenhead locators). I was operating under SOTA conditions, so I have claimed a SOTA/UK Microwave Group Microwave Award as an Activator for 200 km on 3.4 GHz. I was using a 15 W transverter to a 75 cm offset dish fed with one of the WA5VJB PCB log periodic antennas."

Lou VK3ALB reports... "In the latest AR magazine you were looking for details of the longest panel to panel contacts on 3.4GHz. I'm pleased to report the following: 21/02/2016 Lou VK3ALB in QF22FB01XS worked Bernard VK3AV in QF22PL84FU a distance of 92 km, Lou VK3ALB in QF22FB01XS worked Matt VK3PP in QF11NS80XT a distance of 115 km and Matt VK3PP in QF11NS80XT worked Peter VK3WK in QF22DC27GI a distance of 105 km.

25/04/2016 Lou VK3ALB in QF22FB01XS worked Bernard VK3AV in QF22PL84FU a distance of 92 km.

All operators were using surplus 3.4 GHz panels without preamps."

Matt VK3MAT reports also... "The contact between VK3WK and VK3PP on 21/2/2106 was a good line of sight path and genuine 59 both ways, the strongest contact of the day for me."

A number of VK3s & VK5s plan to take their 3.4 GHz transverters to Mt Gambier SERG weekend (11/12 June 2016). Nothing formal is planned however a few will demonstrate the panel transverters around the local area so if you are going to SERG bring your panel along!

Now as many of you know we have impending restrictions on 3.4 GHz with the NBN rollout. This will mean in some areas operation will need to QSY to the alternate band plan at 3398 MHz; just retune the IF from 444 MHz to 442 MHz. There would seem to be no end to what you can do with these "Geelong" transverters. I have now seen one with a "Chinese" 70 cm Handheld glued to the back of it with a remote speaker mike and battery as a "handheld". And already one attempt at mobile operation!

Mudguard washers save the day!

Even if you have only had a fleeting experience with microwave construction you will probably know that as you double in frequency the degree of difficulty and the cost of parts seems to be raised by the power of two i.e. 4 times! And availability of some basic parts can go from common to "unobtainium".

The case in point, we need to connect together a waveguide transfer switch with a 47 GHz mixer, filter and amplifier. To complicate things, there are two different types of WR-19 flanges in use and no less than three different thread screws (M2, M3 & UNC 4-40!).

WR-19 is used almost exclusively by amateurs on 47 GHz. Unfortunately it is an oddball size between the more commonly used WR-22 and WR-15. The EIA WR-19 flange is standard for most commercial use. It is 28.6 mm OD and mates up with a WR-22 flange so can be connected to WR-22 waveguide switches. The other flange is the "Procom" WR-19 style commonly used on all European designed 47 GHz equipment (DB6NT, I3OPW, Procom, etc.). It

Photo 2: Bernard VK3AV Portable 3.4 GHz near Kinglake, 600 m ASL

is actually a smaller WR-15 flange (19mm OD) flange that will mate with WR-12 /15 flanges however milled to accept larger WR-19 waveguide. The Procom flange is popular in amateur circles because of its physically smaller size such that two flanges can be more closely spaced on an amplifier base (25 mm is standard).

Now Procom flanges and WR19 waveguide are not hard to get from various sources in EU however EIA WR-19 flanges are a different story. For a while now (nine months!) we have been attempting to secure a supply of blank WR-19 waveguide flanges. They are commercially available but usually you need to stack up an order for $500 - $1000 in the USA, then the company that sells the flanges usually doesn't sell the waveguide and vice versa. So this project has been lying around for months held up for the sake of a few round brass bits. One attempt was made to pull some WR-22 flanges that had been cut off waveguide but it was found basically impossible to get enough heat (and grip) to pull the waveguide stub out.

Then playing with the one spare EIA WR-19 flange I got an idea that perhaps we could use a plate with the smaller Procom flange to bolt onto the waveguide switch. The centre boss of the flange is exactly 10 mm in diameter so a 10 mm

washer should work. However the washer would need to be around 30 mm in diameter and thin as the waveguide 4-40 UNC flange fixing screws are only just long enough to go through a flange with a few mm to spare. Simon VK5TE had also been chasing WR-19 flanges, a quick chat and he said "Mudguard washers, I'll be around tomorrow night".

Mudguard washers come in various sizes and materials. Typically the OD is 3 - 4 times the ID. We settled for Zenith Pt # EBP100 M10; these are 30 mm OD and 1.2 mm thick, $3.00 for a packet of ten. The hole is a perfect fit over the boss to centre the Procom flange. It was just a matter of drilling 4 x 2.5 mm holes to the EIA pattern in each washer and slipping it onto the waveguide before fixing the second flange onto the waveguide. Before tightening up the flange, rotate the waveguide so it lines up OK using a set square.

The photo shows the end result with 3 of the 4 flanges bolted on. The 20 mW amplifier bolts onto the top flange with another crook shaped piece of waveguide that connects to the port on the bottom. The cam on the waveguide switch connects to an R/C aircraft servo to do the transmit/receive switching. You might notice I have used Araldite to fix some of the flanges instead of silver soldering. Commercially it is a fairly common practise on mm wave fittings as heat can easily distort fittings. If you ever want to recover the flanges the araldite can be removed far easier than solder!

SDR on VHF and above: Part 3

Last month we covered briefly some of the advantages SDR can give over conventional analogue techniques. This month we will look at the various options around for VHF/UHF SDR and some design considerations.

Ultimately even our Gen 3 SDR base radio will not directly digitally sample signals above 70 MHz, so any VHF/UHF operation will require at least one heterodyne conversion. Gen 1 SDRs (Flex 1500, Elecraft KX3, mcHF, etc) cover much the

same frequency range up to 50 – 70 MHz (albeit with one more conversion stage), so will need an up conversion stage in the same manner.

A standard 144 or 432 MHz transverter will do the job or even a transverter up to a few GHz if you have sufficient bandpass filtering at the RF frequency to reject the image. If you are driving a microwave transverter you don't need much more than 10 – 20 mW, so the transverter can be a simple Hi level mixer with minimal gain on RX/TX. There are a number of designs around that can be used, suffice to say you do want something that has a stable low noise local oscillator and good signal handling characteristics. No point putting cross ply tyres on a modern car!

If you don't mind doing a bit of construction then there is one Gen 1 VHF/UHF SDR solution that will get you a 144 or 432 MHz transceiver with not much effort. The UHFSDR is a single PCB SDR Transceiver that can be built to cover the 1.75 MHz to 700 MHz. Charlie VK3NX has previously described a transceiver in *AR* using this module and a number of others have them in use about VK. It uses a pair of Mini Circuits 1-1000 MHz Double Balanced Mixers to convert VHF/UHF to an audio/low IF baseband. The receiver pre-amp is a 2 dB noise figure MMIC. On transmit it provides 50 mW max output, perfect for driving transverters. Options are provided for antenna switching or separate receive and transmit connections. I've had a few

Photo 3: Mudguard washer flange adapters on a 47 GHz transfer switch.

contacts "bare foot" out to 60 km on 144 MHz!

The UHFSDR uses a Silicon Labs Si570 PLL as its local oscillator. Two LVPECL 4 GHz Flip-flops produce the I/Q LO to drive the mixers at half of the Si570 PLL output. This is a departure from the usual divide by four I/Q LO generators, effectively doubling the upper limit the transceiver for the same LO. There are various versions of the Si570 available with different frequency ranges and stability. With the most basic CMOS Si570 the UHFSDR will work up to 180 MHz; the mid-level ECL version will enable the UHFSDR to work to 450 MHz. For serious work the only drawback is the stability of the Si570. It has an internal crystal oscillator with no provision for an external reference hence stability is not "digital grade". I have experimented with active temperature compensation with some success; its curve approximates that of a typical AT cut crystal. However as steps are 30 Hz at 432 MHz, it can jump every now and then! The UHFSDR does have provision for an external local oscillator input, so for serious work you can connect something better. More information on the UHFSDR can be found on this link *http://wb6dhw.com/For_Sale. html#UHFSDR*

The UHFSDR can be connected directly by a laptop/PC (with an I2C driver) or an ARM STM32 SDR Controller like the mcHF, STM32SDR or Russian Tulip. Charlie VK3NX used a SDR2GO as a controller for his 144 MHz transceiver, unfortunately no longer available as a kit. I have successfully re-worked the current source code for the mcHF UI to operate on 144/432 MHz with different waterfall spans driving the UHFSDR. We will have more on this next month

when it is finally in a box. In the meantime if you Google "YouTube" & "mcUHFSDR" you will find two videos of the project by the time you read this report.

Now if you just want to dabble with SDR software for receiving on VHF/UHF then there is another way you can down convert. That is to plug an SDR radio (perhaps a dongle) into an existing transceiver at the first IF frequency. Firstly (have to say this) you will void your warranty doing such modifications; if you have no issue with that then press on! Most transceivers fall into two groups, those with an IF around 9 – 10.8 MHz and those with a first IF around 68 – 70 MHz. Here are a couple of links to examples. The first is Matt VK2DAG's modification for the Icom IC-910H using an SDR-IQ connected to the 10.8 MHz IF *http:// www.vk2dag.com/Docs/IC-910%20 SDR%20Mod.pdf* The second is an example of tapping into a "VHF IF" radio, IW0FFK's modification for the YAESU FT-817ND can be found at *https://iw0ffk.wordpress. com/2012/07/26/ft817-sdr-dongle-panadapter/* The FT817/857/897 series use very similar 68 MHz IF arrangements, so no doubt could be modified in much the same manner. An SDR dongle is not to be sneezed at considering the software currently available. Just be aware that ultimately the dynamic range may not be as good as explained previously.

The recently released IC-7300 would no doubt make a good Gen 3 IF rig except it unfortunately doesn't have a low power transverter output. I don't know too many people who would be that trusting to try a 100W HF transceiver set to 2 watts without fear of an ALC overshoot exploding the transverter input! The caveat about warranty clicks in when considering modifying a brand new technology transceiver to have a low power transverter output. I am guessing Google will have an answer soon.

Next month we will look at the various PC and STM32 software platforms available for SDR. The

month following I hope to have a report on the SDRA 2016 conference in Friedrichshafen (DL land) on 25 June, 2016.

In closing

That's it for this month. Feel free to drop me a line if you have something to report. Contributions regarding club projects or proposed activities are always welcome. Just email me at *david@vk5kk.com* and I'll include in the column.

73 David VK5KK

Meteor Scatter

Dr Kevin Johnston VK4UH

Although the mainstay of MS operating in VK and ZL remains the FSK441 mode, as I have reported in previous articles, there are alternative digital modes available. Likewise the majority of stations still appear to run FSK441 from one version or another of Joe Taylor's K1JT WSJT platform. Last year I wrote about an alternate platform, MSHV, written by Christo LZ2HV. I reviewed a Beta version of the original programme at the time which was based around the original K1JT open source software rewritten into C++. The MSHV freeware package has recently been updated and a new version 1.15 has been released.

This new version now supports just about all the available modes for Meteor Scatter operation including FSK441, FSK315, JTMSK, JTMS, ISCAT and JT6M in a single package. Versions are available for both 32-bit and 64-bit machines. The JT6M decoder has been improved and an optional low-pass/high-pass filter has been added to attenuate interfering signals outside of the required receive pass-band. My initial impression is good, having only just started to try the package on-air. It has a very attractive and well thought out graphical user interface and installed and ran with a minimum of user input to get it working. There are a few differences to be aware of, for those used to running WSJT.
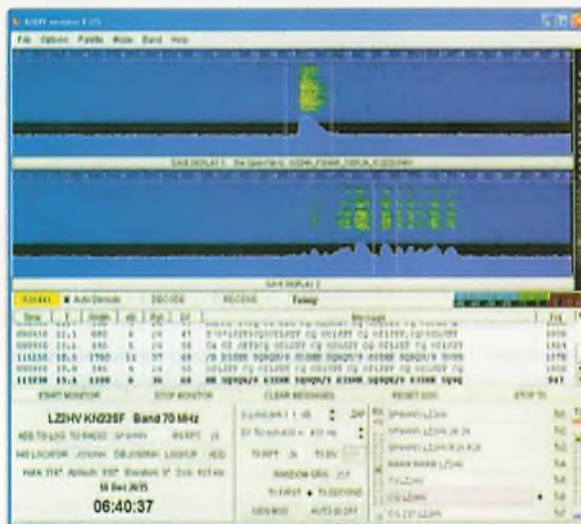

Photo 4: Screen shot from MSHV.

The on-screen macros in MSHV can be modified to the usual VK-ZL format (as per VK7MO) by entering the pull down menus.

For those familiar with ST (Short Text/Single Tone), this mode is not available in FSK441 in MSHV. This is a shame in such an otherwise well prepared package. Individual single tones can be produced however to represent the four standard test tones by the use of letters and the "@" symbol in the text window. @ A=882Hz, @B=1323Hz, @C=1764Hz and @D=2205Hz but the package is very "lumpy" to use in this way.

Another omission appears to be the option to automatically save all received audio as .wav files. This is also a shame if your normal practice is to run a "second look" decoder program, such as MSRX in the background. There is an option to save individual receive periods as

Photo 5: Visual image from NASA meteor Camera network 21.4.16.
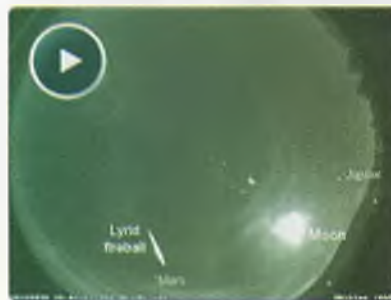
.wav files but this would have to be selected manually at the end of each receive period in this new version of MSHV.

To download the freeware and user manuals try: *http://lz2hv.org/mshv*

The annual Lyrids Meteor shower was just commencing as this article was being prepared.

The Lyrid Shower occurs annually as the orbit of the earth crosses a trail of debris remaining from Comet Thatcher. The ZHR during the peak of the Lyrids is typically 10-20/hr but has been recorded up to 90/hr in previous years. The shower was expected to peak on 22 April 2016. On Friday 21 April I was able to operate from pre-dawn for a few hours trying both 144 MHz and 50 MHz using FSK441. Only Gavin VK3HY was operational to my south. On 144 MHz conditions were very poor and although pings were decoded in both directions, the QSO could not be completed. On 50 MHz the same contact was attempted and completed with some difficulty. Two very long burns exceeding 20 seconds were seen but only a few dB above the noise floor; the only evidence of shower activity. On Saturday 22 April, when the peak of the shower was predicted, there were at least 16 stations operating on 144.230 FSK441 during the normal Saturday morning activity session. These included VK2BLS, VK2XN, VK3HY, VK3AMZ, VK3DUT, VK3II, VK4MIL, VK4KJJ, VK4UH, VK4CRO, VK4CDI, VK4JMC, VK4CZ, VK4NE VK5APN and VK5PJ. Conditions however appeared to be little different from any random day.

Plenty of meteor scatter contacts were reported on the VK-Logger but this more reflected the large number of stations active rather than any significant enhancement

Photo 6: 144 MHz MS contacts at peak of Lyrid Meteor Shower 22.4.16.

of conditions. At around 2200 UTC however, two hours after dawn here in VK4 and after most stations had gone QRT, I observed the longest meteor return I have ever seen on 2 m!

This "super-burn" came from Jim VK3II in QF21RN. The lower panel of course came first and ran the entire duration of a 30 second sweep; the signal showing the characteristic pulsating pattern of a hyper-dense meteor reflection. Amazingly the same burn was still continuing 30 seconds later during my next receive period (i.e. the upper panel) and ran right through that as well. Jim VK3II reported that he received my signal at a constant S9 throughout my transmit period (between the upper and lower panels above), but was unable to decode the signal as is common with FSK441 on constant loud signals. We both initially thought someone local was transmitting in the wrong period! Clearly the burn was not finished even at the end of the third consecutive period.

Photo 7: Single burn from VK3II at VK4UH extending across three periods (Lyrid Meteor Shower April 2016).
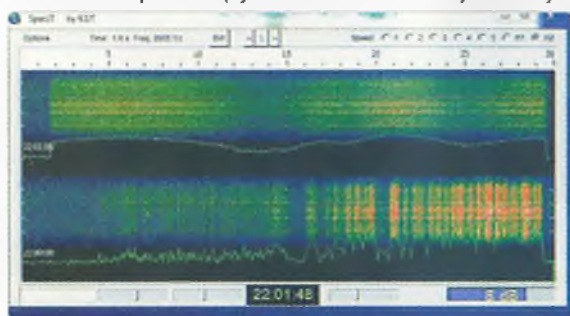
On Sunday 23 April there were again at least 16 stations on-air on 2 m during the normal MS activity session. These included VK2DO and VK4LHD. Again conditions appeared little different, for the most part, from background levels at the VK4UH location at least.

There was some suggestion of shower enhancement continuing on ANZAC Day (Monday), as demonstrated on the MSHV screenshot from VK4MIL.

Arie VK3AMZ reported on the Lyrids Shower:

"Conditions from here for the past three days (Saturday, Sunday & Monday) have been above average and certainly better than the drought of meteors since Christmas. There were some multi-second pings from many stations but there were also a lot of blank frames received. QSO count as follows: Saturday 6, Sunday 7 & Monday 5. If there were more stations active there certainly would have been a reflected increase in QSO count. Stations worked over the three days were: VK4JMC, VK4KSY, VK4UH, VK2XN, VK4NE, VK4MIL, VK4CRO & VK4NWH. My experience with the Lyrids meteor shower suggests that this shower was on par with previous ones; a general increase ping rate, coupled with some multi-second pings but a fairly low ZHR."

Gavin VK3HY provided this extract from his log:

21st April - not much activity; only two completed contacts - only one other station heard.

50 MHz FSK441: VK4UH 144 MHz FSK441: VK4CRO; (VK4UH Rx only).

22nd April - seemed to be the peak as predicted; eight completed contacts - total eleven stations heard. 50 MHz FSK441: VK4CZ VK2FAD VK5RM 144 MHz FSK441: VK4NE VK4JMC VK4UH VK4KSY VK2XN (VK4CDI VK4MIL VK4CRO Rx only).

23rd April – 144 MHz activity
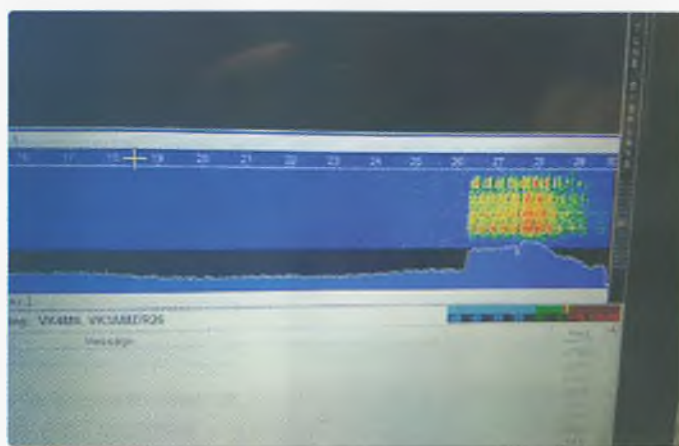
Photo 8: 144 MHz Lyrids Burn 24.4.16 (AX2DO to AX4UH) - received by VK4MIL.

restricted by QRM from a noisy SMPS; three completed contacts - total seven stations heard. 50 MHz SSB: VK4AFL 50 MHz FSK441: VK4CZ. 144 MHz FSK441: VK4KSY (VK4MIL VK4UH VK4JMC VK2XN Rx only). Overall, I would say Lyrids provided a noticeable lift in conditions for a day or so but nothing spectacular. Looking forward to ETA Aquarids 6th - 7th May.

The next Meteor Shower on the calendar will be:

Perseids – peaking around 12 August 2016

Dr Kevin Johnston VK4UH
Brisbane
vk4uh@wia.org.au

What Happened at the 2016 URC Easter weekend

Ken Gold VK2DGT

The weather was kind to us, a full two days of Foxhunting (ARDF). Some Amateur's came from as far away as Melbourne, Sydney and Newcastle. The 80 m Hunt proved challenging, with two high power foxes; Rodney's new high power fox worked well, although the loading coil was getting hot. Ken and Carl set the foxes on Mailman's Track Road and Overhead Bridge Rd. *(We were surprised to find someone car camping in the middle of nowhere.)* **1st Geoff VK2BYY, 2nd Rodney VK2TI.**

Photo 1: Ken, June, Winner Brian Slarke Award: Geoff Pages VK2BYY, team Bryan VK3YNG, Kevin VK2KD, 2016.

Squid Pole used on one fox: a bit hard to erect in the bush.

Pedestrian Hunts with four foxes tested their fitness. Each one has different tones. Mobile Hunts similar but longer distances; you get to see a lot of Urunga and surrounding areas. Foxes and Sniffers are supplied by URC for use of amateur's and interested persons.

Brian Ackerly gave a well-received presentation on ARDF: he has been to China, Mongolia, USA, and other ARDF Championships. His presentation included photos of

Photo 2: Bryan Ackerly VK3YNG, 80 m hunt.

the events, and how they were run.

The Victorian Clubs are very strong with regular Hunts run every month. He has been coming up to Urunga Convention for years.

Kitchen Staff, Terry and Patrick, did a marvellous job. The ice cream pancakes and maple syrup were going faster than they could make them. Free tea and coffee were on all week-end and all were well fed.

Merv and Pat were a bit too cunning: the Night Hunt particularly: six low power foxes OR had several hunters going round in circles looking for a fox that was up in a tree above their heads. The one hidden under the sand had quite a few going; Chris VK2YMW nearly dug a rock out looking for it (but the Tx wasn't there).

Photo 3: Rodney Somerville VK2TI, Tabatha, Carl Winkler, Bryan Ackerly VK3YNG, Geoff Pages VK2BYY and Kevin Dawson VK2KD.

First Bryan Ackerly VK3YNG, second Kevin Dawson VK2KD (Safety Vests supplied).

The New Fox coordinator was kept busy with Gloria and Ian on the desk registering. (And do you want a raffle ticket?). June and Robyn were keeping an eye on things and keeping the convention going smoothly. Radio Supply was in attendance, as usual. with keen prices. Home brew gear was on display and Pre-loved Gear. Old Trophies from old days were also on display, dating from first Convention in 1949 at the Do Me Boat Sheds.

Saturday night Dinner was very well attended at the Bowling Club; a good meal as always for a bunch of Happy Foxhunters, then back to the Hall for the Night Fox hunt.

Photo 4: Chris Williams VK2YMW and Ken Golden VK2DGT presenting Rodney Somerville VK2TI with his award.

Sunday events went off without a hitch, although in the 40 m fun event, Ken out-foxed most of them.

First Rodney VK2TI and second Geoff VK2BYY.

Tabatha our youngest fox hunter did very well for herself and ran a few of the older ones ragged.

Photo 5: Saturday night Dinner at Bowling Club, several tables 2016, URC.

Thanks to all who attended and Thanks also to our Sponsors.

Results
Urunga Radio Convention 2016

Saturday multi foxes 80 m: 1st Geoff VK2BYY, 2nd Rodney VK2TI, Tabatha, Chris VK2YMW.
2 m ped.: 1st Bryan VK3YNG, 2nd Alan VK2EFM
2 m mobile: 1st Geoff VK2BYY, 2nd Chris VK2YMW
Talk In mob. 2 m: 1st Chris VK2YMW, 2nd Graham VK2FA

Night 2 m Fox O.R.: 1st Bryan VK3YNG, 2nd Kevin VK2KD
Sunday multi foxes **Urunga Scramble:** 1st Graham VK2FA
40 m Fun event: 1st Rodney VK2TI, 2nd Geoff VK2BYY
2 m mobile: 1st Geoff VK2BYY, 2nd Chris VK2YMW
2 m ped.: 1st Bryan VK3YNG, 2nd Rodney VK2TI, Tabatha
2 m Talkin ped.: 1st Rodney VK2TI, 2nd Caitlin.
Arnold Austin Memorial: Geoff Pages VK2BYY.
Brian Slarke Memorial: Geoff Pages VK2BYY (Overall 2 days).

VK4news BARG

Les Neilson VK4FAEB

BARC AGM

BARC has just put our AGM successfully behind us and the committee is ready to tackle another year of projects and presentations.

We were pleased to be able to induct Kevin VK4AR into a Life Membership of the club with a lively presentation. We are still gaining members, at least one per month, which is very encouraging for the club.

Project Saturdays

These days are proving to be a great help for members to bring and discuss their personal projects with other members as we have more time (around four hours) to socialise and work on any other club activities as well. Note: Gary VK4FGZA likes to put on an impromptu BBQ and feed for attending members.

Licence Training

Our licence training is gaining momentum with members and we have purchased some new resources to assist members in furthering their amateur ambitions.

BARC 2 m repeater

Our repeater frequency of 147.925 negative offset has gained approval from WIA and submitted to the ACMA for final approval and licence. We now have a regular low power (5 watts) Test Net to gauge the access capabilities with our members.

The repeater will move to Club headquarters soon, once the modified cavities are completed. This should improve its coverage and increase the number of members who can access it successfully. Its temporary home with Kevin VK4WA was a good foundation to test it at low power and resolve any tuning up and/or operational issues. Its final home will be housed inside the new BARC Hut together with the 70 cm repeater.

BARC Hut progress

BARC members recently acquired a telescopic antenna mast through a generous donation that will now serve for our 2 m and 70 cm repeaters. This will help us to safely erect into position by just winding it up and of course down if ever we need to. It will make it so much safer and easier for our repeater crew. The hut has been levelled and ready to be outfitted with all the facilities we have planned for it.

Tower base construction is under way and is our next prominent project for 2016 to finish and to be ready in plenty of time to use for JOTA 2016.

2016 BARC Fest on 4 June

We have booked 4 June 2016 in the Upper Community Hall at the Mt Gravatt Showgrounds and we also have the run of the outside area as well with plenty of parking available for customers.

A BARC flyer has been sent to retailers and clubs advertising the date and time, so that plenty of bargains will be on offer for all of our visitors.

We plan to do all the catering ourselves, to maximize the profits available for the club. We are planning to serve Hot Tea and Coffee, sandwiches and cakes indoors. Outside will be a barbecue selling cans of cold drink, bacon and egg burgers, fried onions and hot dogs cooked fresh while you wait. Are you getting hungry yet, because we are looking forward to hosting a great event?

Thanks
Have a great Day
Les Neilson VK4FAEB
Rochedale Sth Qld
BARC President.

CW **Today**

Louis Szondy VK5EEE
e vk5eee@wia.org.au

As promised this month we will give space to proven successful techniques for those chasing rare DX in huge pile ups to not only maximise their chances of success in getting though with modest power and antennas but even to succeed often on the very first call.

First however, I'd like to revisit one of the reasons why CW is still popular for chasing DX, SOTA activations and does not require amplifiers and high gain beam antennas for successful DX contacts. To do this, we will compare CW to SSB and examine the claim *"Does CW Really Get Through When Nothing Else Can?"* which was addressed in the ARRL's *"The Doctor is In"* by Joel, W1ZR.

The claim is indeed true and has a good solid basis for it with a number of aspects. Firstly, when things can't get through, it's usually due to not having enough signal compared to the noise, i.e. a poor Signal-to-Noise Ratio (SNR). All things being equal, the noise is proportional to the bandwidth in your receiver. With CW you can cut the bandwidth to 250 Hz, or even down to less than 50 Hz. On SSB assuming a bandwidth of 2 kHz, that is a gain over SSB in SNR of over 10 dB.

Secondly, in SSB you require a stronger signal to be able to understand what someone is saying. You may hear the voice but not be able to understand it, contrary to CW where you can hear a much weaker signal and have full readability. This is due to CW being "on or off" whereas with voice there is much more that needs to be heard to decode it. That advantage

is at least another 3 to 6 dB.

Thirdly, on CW when transmitting say 100 W, you are transmitting 100 W when the key is down. On SSB you may be transmitting on average 25 W depending on compression and how loud you talk into the microphone. That is thus another 6 dB gain. Therefore these three factors combined give an advantage of 20 dB, or a power factor of 100. This means that 10 W of CW would equate to 1 kW of SSB in order to get through in the same conditions.

If it takes 1 kW of CW to get through that would take 100 kW of SSB to get through in the same conditions. So clearly the power factor is a huge advantage in favour of CW. Then, if we consider that a really good HF antenna would have 6 dB or maybe 12 dB gain, but very rarely more than that within the normal limitations of amateur radio set ups, CW on a dipole would still have an advantage of around 10 dB over SSB on a 10 dB gain antenna, therefore a 100 W CW signal on a dipole would be equivalent to a 1 kW SSB signal on a 10 dB high gain antenna.

The above comparison is between CW and SSB. Naturally, there are digital modes, which can do as well or even better than CW in terms of throughput in marginal conditions. Not including those which partly use the Internet and/or very limited information at slow speed, there is for example PACTOR, developed by German QRQ CW Operators, which achieves astounding results, but is a more expensive mode requiring not only software but special hardware. CW

equipment is cheap, robust and simple and is included by default on even the most expensive of SSB/DATA rigs.

These are all reasons why CW is making a come-back as urban RF noise levels continue to rise, unchecked by governments which are more interested in easing regulations and increasing profits than in the interests of a limited number of radio amateurs, no longer seen as an asset to the nation. If anyone believes CW is dying out, they may like to ask the manufacturers of amateur radio equipment when they plan to stop including CW as a default mode on modern transceivers or what other mode is available to man that allows for sending and receiving information by hand and ear with a greater efficiency than the ancient Morse code.

How to break through the pile-up?

So with the scientific facts before us, showing clear advantages of CW over SSB, how can we compete with those who are chasing that same rare DX but have the advantage of geographic location, higher power and higher gain antennas? How can we get into the DX log with 100 W to a dipole up half a wave length or less above ground?

The mantra often repeated by DX stations giving advice on what to do is "listen, listen, listen." But surely this is not something that many would like to do, as the first instinct may be, how can I contact the DX if I only listen? But it is very important and without regurgitating

DX codes, I will give some practical advice born of experience and I find this works almost every time.

Firstly, work out the available time for the DX. How long are they going to be around, if known, just a few days, or a few weeks? Are they available 24 hours a day? Are they working on all bands in CW? Then decide how much time you have available on various days to make contact with them. You may not be able to do so when you are at work or you may be prepared to take a little time off work. But after calculating the maximum time available to you and having worked out a schedule of possible times that you can sacrifice a little sleep, or are otherwise available, be mindful that you are not going to spend this time calling for hours and hours, hoping for a reponse. We are going to look at how to increase your chances of just calling once, or at most a few times, and be successful.

Propagation
Your next mission is to check propagation between your location and the DX. Although shortwave fadeouts as well as enhanced conditions do occur, you can get a good theoretical average prediction that will be close to reality, from *www.voacap.com* and use this to plan which bands and times match the best with your earlier worked out schedule. Now write down those periods you are prepared to be available to chase the DX, and fill in the bands that are offering the best propagation chances for each hour within that schedule.

Now you know when you will have the best chance of having propagation on your side, you will want to know how to find the DX and if they are on the air at those times on those bands. Nothing is easier than tuning the relevant band at those times, and you will probably find a pile up of other stations calling the DX, without even needing recourse to the Internet. But if you don't consider use of the Internet as spoiling your achievement, you can set up alerts on DX spotting sites.

Listen to the DX
Now you have located the DX, listen to the DX station for a few minutes on his frequency. How strong is the DX signal? If it is S6 or more you are in with a chance. If it is less than this, your chances are going to be significantly less. Resist temptation to call the DX when you cannot hear it with a full readability of 5, because you will risk transmitting at the wrong time, and if the DX responds to you, you will have problems and maybe not hearing those responses. Don't be one of those that the entire pile up has to listen to your call sign being called 2, 3 or even 4 times!

Now, you are still listening, right? Don't transmit yet! You were listening to see if the signal strength was consistently allowing for full readability and was at a reasonably strong level, generally needing to be stronger for lower frequencies such as 80 m than on say 10 metres, if the DX is far away, because you are competing with others who will have strong signals at the DX location who will likely be nearer than we are down here in Australia. But while listening for those few minutes, you will also be noting the style of the operator: using split? Any instructions? Simple "5NN TU"?

Listen to the callers
Now, switch to your other VFO and look for the pile up and note how wide it is. Tune through the pile up and you will notice that most stations call on a round kHz frequency of i.e. .000 Hz. This may be e.g. 1, 2, 3 or more kHz up, but most of those calling are calling on those exact frequencies and thus, zero beating each other, making it harder for the DX station to pick out anything but the strongest of signals, or, tuning and taking calls from those who are perhaps 0.7 or 1.7 kHz up, rather than 1.0 or 2.0 kHz up.

While tuning through the pile up, look for those stations that are giving the DX a report, e.g. "5NN" and note down their exact frequency. Here, it is absolutely essential that you understand how to tune in a CW signal and measure its exact frequency. Typically you turn off the transmitter, put your key down, and zero beat the station with your side tone audio frequency, if the offset of your TX to RX on CW is equal (as it should be, ideally) to your side tone AF.

Note how many other stations are also on that same frequency where the last successful station was transmitting. You won't be the only one who knows how to do this properly and you may find suddenly other stations appear on that same frequency and may thus make things again hard by being all zero beat. Still resist the temptation to call, you don't have enough information yet to make your pounce!

Prepare your TX frequency
Listen to a few stations getting through with success, and see if there is any pattern to their frequencies, so that you can see if the DX station is taking calls currently one after the other on the same or very close by frequencies, or is tuning up, down, or randomly through the pile up. Once you see the pattern, or if the DX is taking calls around a particular frequency, and you are ready to make that call, decide if there is stiff competition on that frequency in which case, change the VFO by 0.2 kHz above or below the last successful station, but otherwise just 0.1 kHz if competition isn't too fierce, then switch back to your other VFO and push the SPLIT button and make sure you have full break-in. Do NOT try to call the DX using anything less than full break-in (QSK).

Now as soon as the DX is listening again, typically right after "TU" or "UP" send your callsign, and stop sending as soon as you hear the DX between the letters of your call sign, otherwise complete sending your call once, pause a little, and start sending it a second

time, again, stop as soon as you hear the DX transmitting. If still nothing heard, even a third time, but never more than that. Chances are high the DX will come back to you, but if they don't listen to who they call and then push that VFO button to see if you can hear the other station, and if they are near the frequency you are on.

Results

Using all the above methods in combination will usually get a quick result and often on the first call. If you find that you don't have any success after calling with full use of the above methods for even 10 minutes, don't bother trying any longer. Go back to sleep, or spend time with the family, because you are likely wasting your time: give it a shot when the conditions are better – this is why you have many periods on your earlier calculated schedule. When you are calling in the right period using these methods, you truly will get through very quickly.

I've used these methods over the years with consistent success. Naturally, if the operation is a short one and/or you don't have much available time to check and see if signals are good, then you will have to invest more calling time during your more limited listening time, but still resist the temptation to just call and call and call, if you cannot hear that DX station clearly.

Those who thus invest more time in listening and resisting the temptation to pounce and start calling before having enough information to hand, almost always achieve success far sooner and with far less calling, with often just one single call sufficing to catch that rare DX. The result is much greater satisfaction at your skills and bragging rights ("I got that DX after just one call!") and far less QRM to others.

I realise that for some, awards and rare DX are not of interest, or the lack of satisfaction many feel over getting a "5NN" the same as everyone else, and particularly Old

Timers who remember the days when working DX was a real pride and joy and the physical QSL card with honest reports and even a few words in the hand-writing of the DX, meant quality over quality. But for many others this is a great interest, and if you engage in it you may as well do it successfully!

CW Contests in June 2016

There are as always many CW mini contests or activities taking place this month, which are regular events and can be found on the web sites of CWOPS, FISTS, SKCC and others, as well as the QTT Hour activities each month details of which are on VKCW.Net – the points are the actual minutes spent in QSO during QTT Hour each day from 1st to 24th of each month, where CW Club and membership numbers are exchanged, or formerly operated commercial CW callsigns. These events are fun for those who are less into the fully fledged contest style activities.

Larger CW contests which offer great fun during this month include the All Asia DX Contest, the VK Shires Contest, and the SEANET Contest as follows:

Saturday 4th June 2016 1200Z through Sunday 5th June 2016 1200Z the 24 hour SEANET Contest (South East Asia Net) aims to promote two-way amateur radio communications within the SEANET region and between the SEANET region and the rest of the world. All bands 80-10 m except WARC with CW activity centred around 25 kHz from band edge. Single or multi operator categories with modes SSB and CW only being allowed, and without separate categories for each mode. Australia is classed as one of the SEANET region members: 4S, 4W, 8Q, 9M/DX0 (Spratly), 9M2, 9M6/8, 9N, 9V, A5, BS7, BV, BV9P,BY, DU, H4, HL/DS, HS/E2, JA, JD1/M, JD1/O, KH0, KH2, P2, P5, S2, T8, V6, V8, VK, VK9C, VK9X, VR2, VU, VU4, VU7, XU, XV/3W, XW, XX9, XY, YB.

Only one contact is allowed on

each band, irrespective of mode, one point per QSO, serial number starting 001, multiplier for SEANET stations is one multiplier for each DXCC entity worked on each band, including those in the SEANET region and in their own country, i.e. Australia. Full details at *www. seanet2016.com*

Saturday 11th June 2016 0600 UTC through Sunday 12th June 2016 0600 UTC the 24 hour VK Shires Contest is for amateurs around the world to contact as many VK shires as possible in the contest period. VK amateurs are to work the world including VK, whilst the rest of the world can only work VK.

Bands allowed are 80 metres 3.500 - 3.700 MHz, 40 metres 7.000 - 7.250 MHz, 20 metres 14.000 - 14.300 MHz, 15 metres 21.000 - 21.350 MHz, 10 metres 28.000 - 28.600 MHz. Please note there is no 75 m DX window permitted for VK stations which means the rest of the world can operate above 3.700 MHz i.e. split operation. For details of this contest please see the WIA website.

Saturday 18 June 2106 0000Z through Sunday 19 June 2016 is the 48 hours CW period of the All Asia DX Contest 2016 on all non-WARC bands 160 m – 10 m, organised by the JARL. VK is not an Asian country, and so should QSO only Asian countries. We can operate single operator single band or all band, and multi operator single transmitter or multi TX giving four operating categories.

Call CQ, and for OM give RST and your age in years, YL can either give their age or 00.

Points: each contact completed with an Asian station on 160 m is 3 points, 80 m and 10 m 2 points, other bands 1 point. Multipliers are Asian prefixes following WPX contest rules as to prefixes. It's a fun contest to see the age of operators, for full rules and details please see *JARL.org*

As always, have fun with CW and your feedback is always welcome!

VK7news

Justin Giles-Clark VK7TW
e *vk7tw@wia.org.au*
w *https://groups.yahoo.com/neo/groups/vk7regionalnews/info*

Save the Date

We are pleased to inform you that the date for the Miena Hamfest is Saturday 26th November 2016. This biennial event will again be held at the very well-appointed Miena Community Hall and we look forward to seeing many traders supporting the event along with the usual pre-loved stalls. If you are looking for a table then please contact Dave O'Brien (03) 6273 0642. We will also have the NBN Sky Muster truck at the event. This truck is an emergency communications facility complete with steerable satellite dish and equipment to provide broadband anywhere in Tasmania and Australia. We might even have free WIFI on the day! NBN will also be giving a presentation at the day. Please mark this date in your diary to reserve the day.

ANZAC Day Event

Thanks to Vince VK7VH, who broadcast a wonderful commemoration and tribute to Australia's last surviving ANZAC Alec Campbell. Alec was born, raised and enlisted in Tasmania. The story of his life, his enlistment and memories from family members was played on 40 m on the ANZAC Day afternoon. The story included Alec Campbell's memories, family comments and the story of his life, read by a number of people who interpreted his family's recollections, including Alec's own words. Great tribute Vince.

VK7 SOTA News

At the time of writing we had two Shack Sloths in VK7: Steve VK7CW

Photo 1: Burnie Challenge – mud run participants. (Photo courtesy of Roger VK7ARN).

was three times a Shack Sloth with a score of 3362 and Tony VK7LTD had become a Shack Sloth with a score of 1202. Congratulations to Steve and Tony.

NorthWest Tasmania Radio and TeleVision Group (NWTR&TVG)

NWTR&TVG joined the SES to provide safety assistance and communications for the Burnie Challenge. This is a community mud run event held every year near Burnie. Many people took part on the 4 km course over 17 obstacles and all obstacles had to be manned in case of any difficulties. Thanks to VK7LSB, VK7DC, VK7NGA, VK7ARN and VK7MGW.

Following the NWTR&TVG general April meeting it was decided to hold some Fox Hunts around the VK7 Central Coast area. The first attracted about ten participants

and David VK7DC was the fox and a good one from all reports! It took one hour and 30 minutes for the first hound to find him! This was followed by a BBQ and more are being planned!

Northern Tasmanian Amateur Radio Club (NTARC)

Congratulations to Andrew VK7ADW, Greg VK7GX and Peter VK7PLR who have all upgraded over the last month. Look out for these new callsigns on the air.

Kevin VK7HKN held an antenna building workshop and eight builders successfully completed their Flowerpot 6 m antennas. After some turns adjustment for the PVC diameter, the antennas were quickly completed and tuned. There was even some experimentation and adjustment made in the workshop to further improve the design and in Kevin's words "experimentation is

what amateur radio is all about, isn't it?" Hear, hear, Kevin!

In early April, NTARC and the Flinders Island Amateur Radio Club met at the beautiful Lilydale Falls Picnic Ground for a walk to the falls and finishing with a social BBQ. The NTARC social "Farewell to Daylight Savings" night on April 13th was well attended and celebrated the success of the movement of VK7RAA from Mt Barrow to Mt Arthur. This was also show and tell night with Peter VK7PD showing his 3.5 GHz subscriber transceiver being converted with details from the Geelong Amateur Radio Club to the 3.4 GHz amateur band. Peter then showed his very nice Kuhne transverter as well. Idris VK7ZIR finished the show and tell with his Comet Antenna Analyser, covering 1.8 MHz to 500 MHz and in usual NTARC tradition a sumptuous supper completed the night.

Radio and Electronics Association of Southern Tasmania

At REAST's April presentation night we welcomed back Lalla Mackenzie, who is Senior National Stakeholder Relations Manager NBN Co., and Dylan Parrant, who is National Technical Specialist - Network Enablement NBN Co., and is also VK7NZ. This was an excellent presentation of about 20 minutes and then about another 40 minutes of questions and answers. Lalla went in to the Multi-Technology Mix in all its different forms including NBN Satellite through the Sky Muster satellites. Progress of the Tasmanian rollout was a hot topic with over 129k premises passed and over 64k activated. The Tassie rollout will be complete by 2018 and this is way ahead of the rest of Australia. A huge thank you goes to Lalla and Dylan.

A call out to our Ladies, are you interested in amateur radio but don't know how to get started? ALARA or the Australian Ladies Amateur Radio Association is an organization encouraging women's interest in radio. ALARA, in conjunction with REAST is planning to hold a free lunch on June 18th to enable women and girls to become familiar with amateur radio. We are also inviting licensed women to come along so they can meet you. If interested then please contact Linda VK7QP at email: *vk7@alara.org.au* if you are interested.

Hackers before Hackers was the theme of a presentation given to the Tasmanian Linux Users Group at their monthly meeting by Scott VK7LXX. Scott explained how modern electronics and wireless technologies are bringing together amateur radio and modern day hackers and went onto demonstrate various aspects on the hobby and linked it with Linux as the perfect amateur radio operating system. Well done Scott!

Now for a reminder of the VK7RCR Repeater that Clayton VK7ZCR looks after. The 70 cm repeater (438.535 MHz – 91.5 Hz CTCSS) now has an IRLP (6720) and EchoLink (176335) node and don't forget the D-STAR repeater is also operational on 146.9625 MHz with an input of 145.3625 MHz.

Our DATV Experimenter's nights have been covering many topics including - LiIon and LiPo battery packs, Chinese component testers thanks Larry VK7WLH, Bass Link HVDC cable discussions thanks Joe VK7JG, SOTA and VKFF activations thanks Ben VK7BEN.

Rex VK7MO gave presentations on QRP EME and Ross Hull, Pico-balloon activations and tracking telemetry thanks Andy VK3YT, historic TV text books thanks Steve VK7OO, CablePi discussions and experiments, Werner Wulf HF verticals, low dams!, Red Pitaya demonstrations, thanks Scott VK7LXX and a 1960s homebrewed phase shift network valve HF transmitter using push-pull 807 valve finals.

Our videos included some great archival footage of the 1920-70s Hydroelectric Commission films thanks to Tony VK7LTD and Bob VK7ZL and many other interesting videos.

Photo 2: LtoR – NBN Co's Dylan Parrant VK7NZ and Lalla MacKenzie with the launch of the Sky Muster Satellite on 1 October 2015. (Photo courtesy of Justin VK7TW).

Plan ahead

GippsTech 2016 | 9 & 10 July 2016

VHF-UHF Field Day 2016: one more time

Roger Harrison VK2ZRH

AIR ON A FIELD DAY

WHO COULD BE SAD THO' THE SKIES ARE A-GREYING
THE HILLTOPS AND RIDGES ARE EMPTY AND BARE
THOUGHTS OF FIELD DAYS IN A MIND THAT IS STRAYING
RECALL SOUNDS OF CQs THAT RING OUT ON-AIR

– after Winter Song, by Paul Laurence Dunbar

The foreshadowed consultation process to canvass views about the rules for, and conduct of, future VHF-UHF Field Days has had to be postponed to concentrate on higher priority work on the future of amateur radio in Australia – research for and preparation of WIA submissions on licence conditions and responding to the government's proposals for a new Radiocommunications Act.

This event carries-on the rules set for the 2016 Summer VHF-UHF Field Day. The two Divisions are retained for this event – grid-square scoring and distance-based scoring. The Sections and Sub-sections, the two-hour re-work period and the exchange of 6-character locators for all contacts remain the same as for the summer contest.

I wonder if we can expect a bit of a fillip for this event, now that so many of the 3.4 GHz GARC transverter panels are out there in keen hands and have passed a 'trial by fire' in two 3.4 GHz QSO Parties. It remains to be seen.

Strategies

The introduction of the **Single-band only** Sub-section is designed to encourage newly-licensed operators, those new to the bands above 30 MHz, those returning to the hobby after a period of absence, or any operator who takes it in mind to join in casually.

If you're in this group, but have your stuff a bit more together, consider entering the **Four-bands Sub-section**. At a minimum, you can operate on any two of the bands 6 m/2 m/70 cm/23 cm, or three, or the whole four.

A founding principle of the Field Days is to go out and have fun, so the Single-band and Four-bands Sub-sections meets that philosophy and provides a taste of that for newbies. Look out, you might get hooked!

For those who are 'old hands' at VHF-UHF Field Day shenanigans, why not invite an F-call or Standard to join you in the field. Or, invite an F-call or Standard to your home QTH for a few hours of the contest; likewise, if you know someone returning to the hobby. Get them involved and mentor them through the process of making contest contacts. Light blue touch paper and retire!

Acquaint yourself with the **Contest Radar website** (*www.contestradar.com*). Enter your planned portable location (4- or 6-character locator), or your home QTH, along with other salient station details. The website will display your details on a map – along with the fleet of other stations doing the same. You can see at a glance who is where. Notably, the website is integrated with the VKCL logging software.

Sections

A: Portable station, single operator, 24 hours (A1) OR 8 hours (A2).

B: Portable station, multiple operators, 24 hours (B1) OR 8 hours (B2).

C: Home station, 24 hours (C1) OR 8 hours (C2).

D: Rover station, 24 hours (D1) OR 8 hours (D2).

Note that 8 hours means **any period up to 8 hours** (*but the period must be contiguous*); i.e. you can submit a log for a few contacts (even just one!). Likewise, 24 hours means any period from 8 hours up to 24 hours.

Sub-sections

(a) **Single-band only:** any single band permitted on the operator's licence.
(b) **Four-bands:** 6 m/2 m/70 cm/23 cm – any two, up to the four – only.
(c) **All-bands:** all bands 50 MHz-up permitted on the operator's licence.
(d) **Digital:** contacts using non-voice digital modes (e.g. FSK441, JT4, JT65, MAP65, PSK31, RTTY, etc.) are encouraged for any Section–Sub-section, but entries *must* be submitted in a separate log, scored separately. Operators may submit a log for any other section in addition to their digital log entry. 'Digital' means those modes where the received signal is decoded by a computer.

Stations entering the all-bands sub-section cannot enter additional logs for the four-bands or single-band sub-sections.

A station operating on any number of bands cannot enter the single-band section for each band they use. *That's not in the spirit of this section!*

General Rules

There are two Divisions:
Division 1 scores contacts on the basis of Squares (4-character locator) worked; Division 2 employs distance-based scoring. Operators may enter either Division 1 or Division 2, or

both. See the scoring rules below. A Square refers to the Maidenhead Locator system definition – as denoted by the 4-character locator. To facilitate scoring for Division 2, all stations are required to exchange Sub-Square locations (i.e. the 6-character locator).

Operating periods:
Stations may elect to enter either a 24-hour section or an 8-hour section, but not both. Those stations entering the 8-hour sections may operate for more than eight hours, and nominate which 8-hour period they wish to claim for scoring purposes, but *the 8-hour (or lesser) period submitted has to be contiguous.*

Rover stations:
The Rover section is for all portable or mobile stations that operate from more than two Squares or that change Squares more than twice; i.e. Square A to Square B to Square C, etc., or A-B-A-B etc. However, a station may move from Square A to Square B and return to Square A, without having to enter as a Rover.

Entering more than one section:
If a Portable or Rover station spends part of the contest period operating from their home station, they may also enter the Home station section.

Two operators:
If two operators set up a joint station with shared equipment, they may choose to enter Section A or C as separate stations under their own callsigns, or Section B under a single callsign. If they enter as separate stations, they may not claim contacts with each other.

Multi-operator stations:
Portable stations with more than two operators must enter Section B under one callsign. Operators of stations in Section B may not make contest exchanges using callsigns other than the club or group callsign. Home stations may enter as a multi-operator station, but only one callsign can be used.

Operating Rules
One callsign per station. Operation may be from any location. A station is portable only if all of its equipment is transported to a place that is not the normal location of any amateur station.

You may work stations within your own locator Square.

Portable stations may change location during the Field Day, provided that the station is dismantled and reassembled at each move.

Repeater, satellite, EME or crossband contacts are not permitted.

Except for CW, no contest operation is allowed below 50.150 MHz. Recognised DX calling frequencies must not be used for contest activity. Suggested procedure for SSB stations is to call on .150 or higher on each band, and QSY up to make the contest exchange.

Stations may enter either Division 1 or Division 2, or both.

About Contest Exchanges
RS or RST reports, a serial number, and your **6-character** Maidenhead locator (the Sub-Square). The Maidenhead locator is optional if it has already been exchanged in a previous contact during the Field Day and neither station has moved since then.

Note that Squares must be used for Division 1 scoring calculations.

For digital contacts, as RS or RST reports plus serial number make for a cumbersome exchange, it is sufficient to exchange callsigns and 6-character locators, plus two further digits that cannot be predicted by the other station. This is similar to the practice used in the annual Ross Hull contest. However, when compiling your log to enter the contest, include a unique serial number for each successful contact.

Repeat Contacts – Re-work Period
Stations may be worked again on each band after two hours have elapsed.

If either station moves to a new location in a different Square, repeat contacts may be made immediately. If the station moves back into the previous locator Square, the re-work period limit of two hours still applies

to stations worked from that Square previously.

Your Log
Your log should cover the entire operating period and include the following information for each contact: UTC time, Frequency, Station worked, Serial numbers and locators exchanged.
- All-band stations cannot submit a separate log for a single-band or four-band entry.
- Logs for a single-band operation must not include any contacts on other bands.
- Logs for a digital operation must not include any contacts using non-digital modes.
- Logs for a four-band operation must not include any contacts on other bands.

Division 1 Scoring
For each band, score 10 points for each **Square** (4-char. locator; i.e. the first 4 characters of your 6-char. locator) in which your station operates, plus 10 points for each Square worked, plus 1 point per contact. Multiply the total by the band multiplier, as follows:

6 m	2 m	70 cm	23 cm	Higher
x 1	x 3	x 5	x 8	x 10

then total the scores for the bands used. Thus, the score is based on totalling the number of locator Squares worked and the number of contacts made.

Division 2 Scoring
All contacts are scored on the basis of one point per kilometre, multiplied by the scoring Multiplier for each band in Table 1, with points/100 km applied after 700 km for 6 m, 2 m and 70 cm, to 'flatten' scores for DX experienced under enhanced propagation conditions on these bands. A 200 km contact on 432 MHz would be 200 x 2.7 = 540 points. A 1000 km contact on 50 MHz would be 703 x 1.7 = 1195.1 points (1).

The distance error of using Sub-Square (6-character) locators is small and accuracy is sufficient for the

purposes of this event. Distance is calculated from the Sub-Square centre.

Submitting Your Logs

Only electronic logs in ASCII text (.txt) format are being accepted now. **Note:** If any operator participating in the contest has a genuine disability or other impediment preventing submission of a digital log, a paper log will be accepted, provided it reaches the WIA National Office by post or fax by the deadline time and date.

The free VK Contest Log (VKCL) software, from Mike VK3AVV, caters for the VHF-UHF Field Days (including Division 1 and Division 2 scoring) as well as a host of other contests. You can download it from: *www.mnds.com.au/vkcl/*

A **Cover Sheet** must be included with your log, which clearly states: –

- the Contest event (i.e. Winter 2015 VHF-UHF Field Day) and its date;
- Division 1 / Division 2 (as appropriate);
- the relevant Section–Sub-section and the Period (24 hr or 8 hr);
- Name and Callsign of operator submitting the entry; Names and Callsigns of other operators for Multi-operator stations;
- contact email address; mailing address, and
- a declaration that the operator/s have abided by the rules.

3.4 GHz QSO Party ANZAC Day 2016. Will we see more of these 3.4 GHz GARC transverter panels out and about this Winter Field Day? Picture by David Scott VK2JDS, taken near his home QTH, Gowan, on the 2016 ANZAC Day 3.4 GHz QSO Party.

Upload your logs via the WIA website Field Day Log File Uploader, at: www.wia.org.au/members/contests/upload/

Logs must be received by midnight, Monday 4 July 2016. Early logs would be appreciated.

Certificates

Each top-scoring station in every Section–Sub-section will receive a colour certificate in .pdf format, sent to the contact email address on their log cover sheet.

In addition, colour certificates will also be sent to all second and third place-getters and top-scoring Foundation stations.

Check for Updates

Check for any updates or advisories on the VHF-UHF Field Days website at: *www.wia.org.au/members/contests/vhfuhf/*

The Next Event

The Spring 2016 event is scheduled for Saturday 19 and Sunday 20 November.

The options paper on future VHF-UHF Field Day rules is expected to be published following this event and the new rules settled ahead of the Spring Field Day, if all goes well.

References

§ Roger Harrison VK2ZRH, *The basis of distance-based scoring for the VHF-UHF Field Days, Amateur Radio*, June 2014, pp 11-13. Also posted on the VHF-UHF Field Days web page.

Total the scores for the band or bands used.

Band	Multiplier	Distance Scoring
50 MHz	1.7	1 point / km to 700 km; thereafter 1 point / 100 km or part thereof
144 MHz	1	1 point / km to 700 km; thereafter 1 point / 100 km or part thereof
432 MHz	2.7	1 point / km to 700 km; thereafter 1 point / 100 km or part thereof
1296 MHz	3.7	1 point / km.
2.3/2.4 GHz	4.4	1 point / km.
3.4 GHz	5.4	1 point / km.
5.7 GHz	6.4	1 point / km.
10 GHz	7.4	1 point / km.
24 GHz & up	10	1 point / km.

VK2 news

Tim Mills VK2ZTM
e *vk2ztm@wia.org.au*

The 2016 AGM for ARNSW was conducted on 30 April 2016 with 33 members attending. Thanks to all who made it on a morning when the weather was not inviting but the promised rain did stay away.

The meeting got underway at 1015 with Vice President Al VK2KAM taking the chair. There were five apologies and three proxies tabled – unlike some past meetings where there were hundreds of proxies, just for one member. The 2015 minutes were accepted and confirmed and the President's report was read out. Next were the other reports, these being taken as read and adopted. The annual accounts were accepted after a clarification of invested monies.

The Returning Officer Peter VK2EMU, who had manned the site gate at 6 am for any late proxies – there were none – advised that at the close of nominations that eight had been received and therefore an election was not required. All those nominating were from the retiring committee. There was one vacancy due to the late arrival of the nomination from a committee member who was away at the time. He has since been co-opted to committee. [The various positions will be advised in future notes.]

Then came the election of Returning Officers and the existing pair quickly raised their hands for re-election, being Peter VK2EMU and Eric VK2VE who feel the safe way of not being nominated to a committee position is to be a Returning Officer.

There was a presentation of award certificates to Patricia VK2JPA, who after a quarter century of submitting IPS and DX news to VK2WI News has retired from the position. The other award was to Ross Wilson VK2ER who has recently retired from being the presenter of the VK2BWI Morse session on 3550 kHz, a position held for many years.

Then Geoff VK2AVR from the Manly Warringah Radio Society, a club that received a 2015 Development Fund grant, demonstrated their project of a Web SDR node. Geoff had brought the project and gave a video presentation of the construction as well as having the equipment for inspection.

In general business, Librarians John VK2LJ and Ray VK2ASE reported on the current status of library development. Paul VK2APA, our Education officer gave a report on this year's progress.

The meeting ended an hour after it started and those who stayed on enjoyed a BBQ lunch. It will all occur again in a year's time.

As mentioned above, Ross VK2ER ended the 3550 Morse session late last year when users dropped off. Now it is reported that Michael VK2CCW from Westlakes intends to re-establish the service on 3550 kHz at 8 pm on Mondays and Friday evenings.

While on Morse code practice, it was advised in the May notes, that more text had been added to the VK2WI automatic transmission on 3699 kHz. Well, the gremlins struck and rejected the new text – a History of ARNSW – this has now been corrected, resulting in double the amount of text – round 8000 words.

Its only days to go until the 41st Oxley Region field day over the June long weekend in Port Macquarie – see page 27 in May *AR* 2016 for details.

Last month the Hornsby & District ARC and Westlakes ARC had their AGMs. On Sunday 26 June 2016, ARNSW have planned the next in the Talk Fest series. The topics were not known when these notes were prepared. WICEN NSW has a training day planned at VK2WI Dural on Sunday 5 June 2016. Over the weekend of 2 and 3 July 2016 is the annual Nav Shield operation for WICEN.

73 – Tim VK2ZTM.

Contributions to *Amateur Radio*

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences, opinions and news.

Manuscripts with drawings and/or photos are welcome and will be considered for publication.

Articles attached to email are especially welcome. The WIA cannot be responsible for loss or damage to any material. Information on house style is available from the Editor.

VK3 news   Amateur Radio Victoria

Jim Linton VK3PC
e *arv@amateurradio.com.au*
w *www.amateurradio.com.au*

In the park for Show and Tell

Some 17 enthusiastic radio amateurs, many accompanied by their family, gathered in the Brisbane Ranges National Park VKFF-0055 just west of Melbourne for the VK3 'Show and Tell' event. This was on Sunday April 17 and included those from interstate John VK2AWJ and John VK5BJE/VK5PF who was accompanied by XYL Jenny who is an avid bird watcher and took the opportunity to spot a few while bushwalking.

John VK5BJE has previously activated the Brisbane Ranges National Park, but was seen grabbing a few contacts for the log later in the day.

Among the many highlights was Joe VK3YSP assisted by Julie VK3FOWL to set up a portable satellite station, complete with a mini computer-controlled rotator for a demonstration.

This was featured in the May edition of *Amateur Radio* magazine. Joe VK3YSP worked through the satellite FO-29 with an eager crowd watching on.

During the satellite QSO with Geoff VK2ZAZ he gave the park designator and signal report in what is believed to be the first Australian VKFF Park via satellite.

The concept of the Portable Show & Tell began a few years ago at the Churchill National Park to provide a platform for like-minded radio amateurs to exchange ideas, demonstrate suitable and innovative gear, and discuss activations in all fields of portable activity.

This year it had information and displays of gear for use in a variety of activities including KRMNPA, SOTA and ILLW. Among those presenting were Peter VK3ZPF, Allen VK3ARH, Joe VK3YSP, Julie VK3FOWL and Tony VK3VTH/VK3XV.

The aim is to further encourage portable activity and included operating station VK3WI on site to give an opportunity to gain points in the Keith Roget Memorial National Parks Award. The station also was used to demonstrate first hand operational and logging methods.

John VK2AWJ also made a few contacts, which will add to his growing number of VK3 Parks activated and Keith Roget Memorial National Parks Award contacts.

The event was organised by Tony VK3VTH/VK3XV who acknowledged the support and enthusiasm of the other presenters and the assistance of Amateur Radio Victoria to make it another success.

The Show and Tell event has proven so successful that plans have started for the next one in March 2017.

Training for beginners and upgraders

Enrolments close soon for the quality Foundation licence training and assessments on the weekend of June 11-12 2016.

Candidates are expected to prepare by reading the study and operational practice guide book which is available as a mail order from Amateur Radio Victoria online shop.

Also a Bridging Course for the Standard licence will be held over five Wednesday evenings at 6.30 pm. It starts on September 21 2016 and ends with revision and assessments on October 22 and 23 2016.

To enrol in the Foundation licence at the Amateur Radio Victoria office, 40G Victory Boulevard, Ashburton, or inquire about the Bridging Course, contact Barry Robinson VK3PV *foundation@amateurradio.com.au* or 0428 516 001.

VK6news

Keith Bainbridge
✉ vk6rk@wia.org.au

Yet another month has flown past, I can't keep up with them these days! We will start off this month in reverse to the normal routine.

NCRG

The NCRG were approached some 18 months ago by the team organising the VK0EK DXpedition. The original plan was for us to supply tower sections, assist with acquiring generators and other locally sourced equipment. Unfortunately the Russian ship they had planned to use became unavailable and travel was switched to MV Braveheart, a well-used DXpedition ship! This also meant that they would embark in South Africa and finish the journey here in Fremantle.

We decided to throw a big welcome home party for them at the Club rooms. So on 23rd April 2016 all 14 members of the team plus several invited local DXers and most club members put on a roast dinner, with starters and sweets and a really good time was had by one and all. The drink flowed :) especially the selected wine for the event. The wine was somewhat special you

Photo 1: Robert KK6EK receiving the wine from Zeljko VK6VY.

see. Zeljko VK6VY approached a friend in the industry and acquired 24 bottles of Margaret River limited edition Cabernet Merlot. He was also given permission to print our own NCRG labels, with the approved DXpedition logo and 14 bottles were autographed by every member of the VK0EK team on a special label on the back of the bottles.
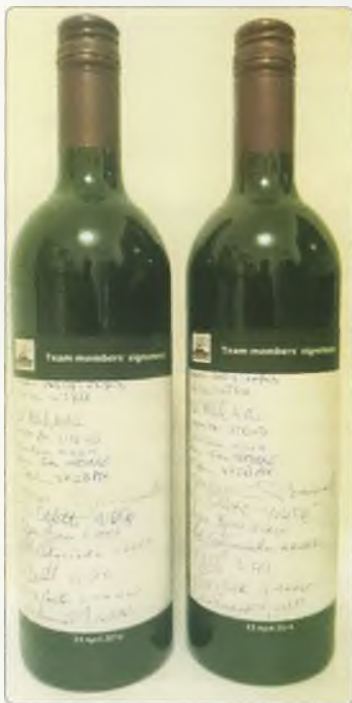
Photo 2: The wine bottle rear label.

On the night we held an auction and 12 bottles were sold to various bidders, with the 12th bottle being bought by Bob KK6EK the Team Leader. He promptly donated it back to the club to put on display. A true gentleman!

The remaining two bottles will be auctioned soon, one around VK and the other around the world and 50% of the funds raised will go back into the DXpedition's funding.

In all it was a great experience, building on from our involvement with the FT5ZM team two years

ago, and has put the club in the international spotlight again, and that can only be good!

WARG

Now over to WARG for this month's contribution.

On behalf of the West Australian Repeater Group, WARG Secretary Anthony VK6AXB advises that on Monday April 18th 2016 a successful working bee took place at the VK6RKN repeater site, located at Kellerberrin, about 200 km east of Perth.

This site had previously suffered a lightning strike, which did significant damage and put the 2 m repeater off air. Whilst partial work had been done to restore the service, thanks to Colin VK6ACT and Pete VK6FUN, it hadn't been previously possible to climb the mast and replace damaged antennas and feedlines.

Due to the efforts of Trevor VK6MS, the mast was ascended, the antenna and feeder replaced and some other work done to improve the site's lightning immunity. As a service to the site owners, we were also able to fix the UHF CB repeater antenna.

Thanks are due to VK6MS for the climbing, to Bruce VK6LAW, who used his local contacts to solve a number of problems on the day and to VK6FUN, VK6PK and VK6AXB who made up the ground crew. Reports on the coverage and performance of the repeater and APRS service would be appreciated.

Also in April, work was done on the VK6RCT site at Cataby, around 150 km north of Perth. The voice repeater Tx was repaired; however a subsequent problem with the controller was identified, which will require another visit to correct. In the meantime, the APRS service is operating from the main antenna and being heard far and wide! Thanks are due to Craig VK6FLAM and Martin VK6ZMS for their efforts in keeping Cataby going.

Mac VK6MM also is planning to improve the solar and battery capacity at the VK6RMW Mt William

repeater site, as the mains power feed to our cabinet is still offline following the devastating bushfire in January.

As these notes go to print, WARG's AGM is scheduled to take place, and a report on this will feature next month.

WARG meetings occur monthly at 7:30 pm on the first Monday (or the second, if the first is a public holiday), at the Peter Hughes Scout Communications Centre, corner of Gibbs St and Welshpool Rd, East Cannington. Upcoming meetings are scheduled for 13 June, 4 July and 1 August 2016.

WARG's regular on-air technical and general net continues every Sunday, at 10:30 local time, on VK6RLM, 146.750. More information is on our website – recently updated – www.warg.org.au, or contact secretary@warg.org.au

Thanks Anthony, busy times at WARG.

Bunbury Radio Club

Our monthly notes would not be complete without a contribution from Bunbury Radio Club, and here it is!

At our April meeting, Bob VK6TJ gave a very interesting talk on power supplies. This was a continuation of a previous presentation on this subject and covered the uses and dangers of working with high voltages and very large capacitors. Bob is an engineer with one of our commercial radio stations and has extensive knowledge of high power electronics. Old timers will recall the days of vacuum tubes and the high voltages that floated around such equipment and may also recall the effect of accidently touching such voltages. With today's equipment much of which is at very low voltages we tend to be a bit blasé about handling these devices. Consequently Bob's talk was a salutary reminder about the need for care when working with higher voltages.

The proposal to acquire a HF radio for the clubrooms has

proceeded to the next step. The Club has authorised Richard VK6VRO to purchase a suitable radio and antenna tuner.

Under the leadership of President Richard VK6VRO, a team will visit the club's repeater site on Saturday 30 April 2016, to conduct an inspection, general maintenance and clean-up of the installation at Harvey. A couple of years ago the repeater crashed due to mice chewing up a couple of key components and we don't want that to happen again. So apart from the inspection, the team will be conducting mice preventive actions.

Anyone interested in sitting for Foundation or other licence upgrades should contact Norman VK6GOM on 0438 878 582. The next lot of assessments is tentatively planned for July 2016. And so far we have six intrepid members who will be attempting upgrades.

The next monthly meeting of the Bunbury Radio Club will be held on Saturday, March 14 2016 from 2:00 pm at 21 Halsey Street, Bunbury. This will be informal meeting, without a business session, giving members a greater chance to socialise and discuss future activities. Steve VK6HSB will give a talk on "Digital Electronics for Dummies". This will be followed at our June meeting, by Brian VK6TGQ talking on "Packet Radio for the Petrified". Any South West based amateur (or anyone interested in radio or electronics) is more than welcome to join and participate in our activities. Because so many of our members come from near and far we are evolving into a semi "virtual" club. Consequently, regular attendance at meetings is not a requisite for membership. The annual fee is only $25.00. Those wishing to join can contact the Club via our Secretary, Nick Evans on 0429 201 343, or vk6brc@wia.org.au Further details can be found on our website at http://bunburyradioclub.wordpress.com

Thanks Norm.

The Avon Districts Radio Group

A new group has formed in WA, known as The Avon Districts Radio Group and Peter VK6PK has sent me their details, welcome to the Notes!

We have established a new radio group, being the Avon Districts Radio Group which encompasses the shires of Northam, Beverley, York, Toodyay, Merredin, Kellerberrin, Goomalling and Dowerin. Apologies to those I've missed!

The drive of this group is to establish a maintenance and advancement of existing and new repeaters in the included shires. We welcome any new participants.

Our interests include VK6RAV Hoddywell, VK6REC El Cabello, VK6RFI Beverley, VK6RKN Kellerberrin and VK6RTU Kalgoorlie.

VK6RTU has recently been relicensed for 6 m, 2 m and 70 cm and we are keenly looking for a keyer and suitable hardware. This beacon has been off air for 20+ years. It is to be located at the Kalgoorlie School of Mines and will be horizontally polarised.

More up to date, last year we re-guyed RAV and removed some of the commercial antennas, and more recently it has become an ISP hub delivering high speed internet to York. The intention is to create internet access and to provide IRLP. We also want to link RAV to RKN some 110 km away; undecided which way to go at this time.

A working party was put together with Anthony VK6AXB to replace the 2 m feeders and antenna at Kellerberrin.

A big thank you goes to Trevor VK6MS, who undertook both the 2 m service and UHF CB antenna replacement at VK6RKN. A site is being sought for another repeater between Merredin and Southern Cross. John VK6XJ has ideas on this one.

VK6RFI is in a bit of a hole with no convenient way to get a service to it; could be via internet at York; early days for this one. John VK6RN

is the property owner here.

It has been suggested that we have an informal 80 m sked on 3610 kHz at around 20.00 local each Sunday to encourage activity.

Well, that's it for now, more soon.

Any correspondence for ADRG can be forwarded to PO Box 1 Wooroloo 6558 or VK6CA, VK6YSF, VK6AMD, VK6LAW, VK6FUN or VK6XJ all QTHR

73 Peter VK6PK

Thanks Peter, you are helping to fill in the holes in the network of repeaters nicely.

HARG The Hills Amateur Radio Group

HARG had a busy month as well, with the HARGfest taking place and it was a great day out I can assure you all.

Well another happy HARGfest was held on Sunday 17 April 2016. The Club received many emails of thanks with comments that it was wonderful to catch up with old friends not seen face to face for a long time. Hams bought and sold treasured items and a lucky eleven won prizes. Bill VK6WJ from HARG reports that HARGfest was once again a success with over 150 bargain hunters through the doors and nearly thirty tables of new and pre–owned goodies on sale. The food was delicious with Ray, Alan, Steve and Marty dispensing the popular HARGburgers and sausages. In the kitchen, Ron, Dot, Lyn and Sue tempted diners with beautiful cakes and scones to go with their tea and coffee. The major prize winners in the raffle were John VK6JAH taking home the Yaesu FT-8800R even though his XYL said that he should have taken the coffee cups! Simon VK6FBMW won the Yaesu FT-1802 and Lance VK6LR the Ultrasonic Cleaner.

The club was very pleased to see their regular supporters taking tables - WARG, SOTA, VHF Group, Fritz VK6UZ with Glen VK6IQ, Gary VK2BLC and TET-Emtron. This year HARGfest also welcomed

Photo 3: Expectant faces during the HARGfest Raffle.

WA Amateur Radio News and Altronics who exhibited products for the first time. HARG particularly want to thank their sponsors who donated all the prizes. Ian Garnett VK6LCT, Kylea Garnett VK6XYL, Altronics, TET-Emtron and VK4-ICE Communications. Please support these suppliers. We all need them to help us again next year, not only with HARGfest but also with the NCRG Hamfest which will be held on Sunday 7 August at 9.00 am at The Cyril Jackson Hall in Ashfield. See you there and at HARGfest again next year in April 2017!

HARG Meetings are held twice a month at their club rooms at the Paxhill Guide Hall near the corner of Brady and Sanderson Roads in Lesmurdie. The Social and Practical meeting is held on the second Saturday of the month and the General Meeting, often with a technical talk, on the last Saturday of the month. Doors open at 1.00 pm for a barbecue lunch and the meeting starts at 2.00 pm. More information at www.harg.org.au

Cheers from Bill VK6WJ Publicity Manager for HARG.

Thanks Bill, it was a good day out as I said.

Finally this month a reminder that the NCRG Hamfest will be happening on the first Sunday in August 2016 (the 7th), at the usual venue, Cyril Jackson Rec Centre in Fisher St, Ashfield 6054, doors open for traders at 7.30 am and the

public at 9 am.

Please let us know if you require tables as soon as possible as there are only 40 at the centre and we will need to hire more again if numbers exceed that. Last year there were 60 tables taken.

Admission is still $5 and tables are still free. Contact me VK6RK, more details are on the website: ncrg.org.au

Till next month, stay safe and good DX.

73 de Keith VK6RK.

Photo 4: HB9BXE, KK6EK and yours truly.

Contributions to *Amateur Radio*

AR is a forum for WIA members' amateur radio experiments, experiences, opinions and news.

Your contribution and feedback is welcomed.

Guidelines for contributors can be found in the AR section of the WIA website, at *http://www.wia.org. au/members/armag/ contributing/*

Email the Editor: *editor@wia.org.au*

WIA Functional Committees

The WIA is a membership organisation with a very wide range of complex functions and member services. Core functions and services are administrative in nature (general administrative functions, membership services, examination and callsign management, financial etc...) and are performed by salaried staff.

Volunteers perform a diverse range of highly specialist functions (ACMA liaison, Frequency Co-ordination, Standards liaison, Interference issues, technical support and training and assessment etc.). These volunteers provide the majority of member services, however they have been loosely organised and often overstretched.

The new committee system attempts to structure the WIA's non-core activities into 10 broad functional areas, each comprising a team of volunteers under the direction of the WIA Board. This structure is intended to spread the workload on our volunteers, improve communications between members and the WIA Board, improve services to members, and encourage more people to become involved in the WIA.

WIA Committee Charters

Spectrum Committee
(Regulatory, ACMA, ITU, IARU, Repeaters & Beacons, Standards, Interference & EME, Monitoring Service)
Andrew VK4QF, Brian VK3MI, Dale VK1DSH, Gilbert VK1GH, Jim VK3PC, Noel VK3NH, Peter VK3APO, Peter VK3MV, Phil VK2ASD, Richard VK2AAH, Rob VK1KRM, Roger VK2ZRH, Ron VK3AFW.
- Perform all ITU and IARU liaison activities.
- Liaise with, and act as the 1st point of contact for, the ACMA.
- Advise the Board, and enact Board policy in relation to all radio communications regulatory issues and the LCD.
- Represent the WIA to State and Local Government
- Represent the WIA to Standards Australia
- Provide specialist technical advice and coordinate repeater and beacon licence applications and frequency allocation.
- Develop responses to significant and prolonged harmful interference issues affecting amateur radio operations.
- Provide an information resource for EMC/EMR issues.
- Administer the IARU Monitoring Service in Australia
- Provide a technical resource to other committees and the WIA Office.

Technical Advisory sub-Committee
(Tech support, Band plans etc.)
Amanda VK1WX, Barry VK2AAB, Bill VK4XZ, Eddie VK6ZSE, John VK3KM (Co-ordinator), Paul VK2TXT, Paul VK5BX, Peter VK3APO, Peter VK3BFG, Peter VK3JFK, Peter VK3PF, Rex VK7MO, Tim VK2ZTM, Walter VK6KZ

General Committee
Executive Administrator (Bruce VK3FBLD), President (Phil VK2ASD), Vice President (Fred VK3DAC), Treasurer (Murray Leadbetter), WIA Secretary (David VK3RU).

- Responsible for the efficient and correct operation of the WIA office.
- Responsible for staffing and workplace safety.
- Provide a specialist administrative resource to the WIA office as required.
- Manage contractual agreements.
- Manage business relationships.
- Ensure compliance with the ACMA Business Rules
- Prepare yearly budgets
- Prepare quarterly financial reports for the Board
- Prepare independently reviewed YE financial reports and balance sheets for circulation to the membership prior to each Annual General Meeting.
- Manage insurances and to be responsible for currency of insurance policies.
- Maintain a complaints register.
- Ensure complaints are handled in accordance with WIA policy and any contractual agreements.

Communications, Media and Events Committee
Jim VK3PC, Phil VK2ASD, Robert VK3DN, Roger VK2ZRH
- Communication with members and the public:
- Communicate with the membership.
- Publicise WIA activities and initiatives.
- Develop strategies and resources for the promotion of Amateur radio to the public.
- Develop strategies and resources for the promotion of WIA membership to the Amateur community.
- Supervise and/or perform promotional activities.
- Co-ordinate the yearly AGM activities

Education Committee
Fred VK3DAC, Ron VK2DQ, WIA Executive Administrator Bruce Deefholts VK3FBLD
- In association with the WIA's RTO and affiliated clubs offering training services, develop and administer the WIA's training and assessment systems.
- In association with the Spectrum Strategy Committee, develop and maintain the various licence syllabi and associated question banks.
- In association with the Community Support Committee and the RTO, develop and maintain the Emergency Communications Operator scheme.
- Ensure the confidentiality and security of all personal information, question banks and examination papers.

Grants Committee
Drew VK3XU, Gary VK2KYP, Peter VK3PF (Coordinator), Peter VK3PH, Scott VK3CZ

Radio Activities Committee
WIA Director TBA

Contests sub-Committee
Alan VK4SN, Colin VK5DK, Denis VK4AE / VK3ZUX, James Fleming VK4TJF, John VK3KM, Kevin VK4UH, Tony VK3TZ

Operating Awards sub-Committee
Bob VK3SX (Coordinator), Alan VK2CA, Alek

VK6APK, David VK3EW, Laurie VK7ZE, Marc VK3OHM, Paul VK5PAS

ARDF
Jack VK3WWW (Co-ordinator)

ARISS
Tony VK5ZAI (Co-ordinator)
- All activities associated with actual radio operation, such as: contests, awards, distance records, QSL services, ARISS, AMSAT, ARDF etc.

QSL Card sub-Committee
Alek VK6APK, Alex VK2ZM (Outwards Manager), John VK1CJ, John VK7RT, June VK4SJ, Max VK3WT, Stephan VK5RZ, WIA Office (Inwards Manager)

Historical and Archive Committee
David VK3ADW, Drew VK3XU, Ian VK3IFM, Jenny VK3WQ, Linda VK7QP, Martin VK7GN, Peter VK3RV (Coordinator), Will VK6UU
- Develop, maintain and preserve the WIA's historical and archive collection
- Encourage access to the collection by WIA members and those seeking historical material for publication.

IT Services
Robert VK3DN, Marc Hillman VK3OHM, Tim VK3KTB
- Provide an IT resource to other committees and the WIA Board.
- Be responsible for the off-site data back-up of all IT systems information.
- To update and maintain the WIA website as required.
- Advise the Administrative / Financial committee in relation to the MEMNET Cloud Service contract.

Community Service Committee
Fred VK3DAC (Director), Greg VK2SM (Assistant Treasurer), Ewan VK4ERM (Director), Paul VK5PH
- Develop, promote and co-ordinate all WIA community support activities

New Initiatives
Phil VK2ASD (Director), Robert VK3DN (Director), Roger VK2ZRH (Director), David VK3RU (Company Secretary)
- Think-tank ideas and initiatives to advance amateur radio and WIA membership.
- On approval by the Board, run proof of concept trials.

Affiliated Clubs Committee
Ted Thrift VK2ARA, President (Phil Wait VK2ASD), Vice President (Fred VK3DAC)
- Manage all arrangements between the WIA and WIA Affiliated Clubs
- In cooperation with the Administrative / Financial committee, manage the Club Insurance Scheme
- Encourage stronger relationships and communications flow between the WIA and WIA Affiliated Clubs
- Encourage increasing WIA membership ratios in Affiliated Clubs
- Manage the Club Grants Scheme
- Identify and bring regional Affiliated Club issues to the attention of the WIA Board.

New Foundation Manual is available now

Your **Entry into Amateur Radio**, The Foundation Licence Manual 3rd Edition is **now available** for purchase.

As stocks of the 2nd edition were nearly depleted, the WIA formed a sub-committee to review, revise and publish the third edition of this very successful study aid.

The team, consisting of Robert Broomhead VK3DN, Jim Linton VK3PC, Peter Hartfield VK3PH and Ivan Smith (Communique Graphics), worked hard to revise the manual that has seen the amateur population grow since the introduction of the Foundation licence over ten years ago. Many thanks to those that have provided feedback on the second edition.

It has been the standard, must have, reference manual for entry into amateur radio in Australia.

The 3rd edition contains revised text, more images, the latest first aid resuscitation chart and a copy of the band plans that were released by the WIA at the end of 2015.

The Manual is attractively presented and contains all the information needed to qualify for the Foundation licence in Australia.

It includes the Foundation licence syllabus and other extracts reproduced with permission of the Australian Communications and Media Authority.

To purchase the Manual, order on-line at the WIA bookshop or obtain a copy through the learning facilitator at your local radio club.