Amateur Radio

Volume 84
Number 7
July 2016
Price: $9.70 incl GST
www.wia.org.au

WIRELESS INSTITUTE OF AUSTRALIA

Norfolk Island: radio active!

- Build an Enigma machine
- Memoirs of a signaller
- News from the AGM

ISSN 0002-6859
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60th Anniversary

Volume 84
Number 7
July 2016
ISSN 0002-6859

Amateur Radio

The Journal of the Wireless Institute of Australia

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Production Deadlines
All articles, columns, hamads and advertising booking by **first day of previous month.**

Technical

This month's cover

Heath VK3TWO/9 operating portable late in the afternoon on Mount Bates VK9/NO-001. Read several reports on activities on Norfolk Island in this issue. Photograph by Monique Faulkner VK6FMON.

General

Columns

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.

Back Issues
Back issues are available directly from the WIA National Office (until stocks are exhausted), at $8.00 each (inducing postage within Australia) to members.

Photostat copies
If back issues are unavailable, photocopies of articles are available to members at $2.50 each (plus an additional $2 for each additional issue in which the article appears).

Disclaimer
The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia
ABN 56 004 920 745

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Representing
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Member of the International Amateur Radio Union

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Editorial

Peter Freeman VK3PF

A short break

I am not long back from a short break – I visited Norfolk Island for the WIA AGM and associated activities. It was a great few days, with lots of socialising, some radio activity including activating Mt Bates VK9/NO-001 and the island for VKFF-0392. The daytimes were generally pleasant, with temperatures in the low 20s but with relatively high humidity, with an occasional shower – most of the rain fell at night.

Conditions did not allow for a trip to Phillip Island, but I had an excellent view of the island and Jacky Jacky (VK9/NO-002) during our approach to land. The summit looks as if it will require rock climbing skills and equipment to access the summit, or a helicopter!

The AGM, Open Forum and conference sessions went well, with some lively discussion at times. There are several reports in this issue regarding the various program components, plus many photographs – thanks to those who submitted images quickly. The Sunday included some more radio activity, when several groups visited Mt Bates in the morning. In the afternoon, I was able to join Keith VK5OQ and others at one end of some microwave contacts on 3.4 GHz and 10 GHz – only a short distance at around 5 km, but very loud signals were easily heard above the strong wind.

There was little time available between the event and the compilation of this issue, so I was working hard on the magazine as soon as I returned home.

Winter hits

The start of the winter season in the southeast of the continent has seen some intense weather. Gippsland was relatively unscathed in comparison to other areas, notably the NSW coast and Tasmania, with storms and floods.

The SOTA "Bonus" season is almost upon us, so Activators will be looking for reasonable weather to head for the higher hills.

Regardless of one's interests, the winter season is a time to keep an eye on the impacts of heavy weather. Be sure to be safe!

For many, winter is the time to consider hitting the workbench and making progress on some projects.

Several key Club members, including myself, are gearing up for the annual GippsTech Conference. Our final preparations are in full swing. It will be a hectic weekend for all: presenting a great chance to socialise and more importantly to share some new technical information.

Until next month,
Cheers,
Peter VK3PF

WIA comment

Phil Wait VK2ASD

Back to Business

Many people have commented that this year's AGM and Conference weekend on Norfolk Island was the best the WIA has ever held. I wouldn't go that far, because they are all different in their own way, but it was held in a unique and beautiful location, and catered to a multitude of interests. In addition to the AGM and Open Forum, there were DXpeditions, Norfolk Island Awards, sightseeing, SOTA and Parks activities, and even a new Norfolk Island distance record for 10 GHz!

I must admit to having two minds about Norfolk Island as the location for our AGM, initially. In previous years, we have relied heavily on the local clubs to organise much of the AGM weekend, but as there is no local club on Norfolk, that responsibility fell most heavily on WIA Directors Fred VK3DAC and Robert VK3DN. Fred and Robert pulled it off expertly and I'm sure everyone who attended is as impressed as I am.

Largely owing to the remote location and the fact we wanted to be as inclusive as possible, this year we trialled live video streaming of the AGM and Open Forum proceedings and took questions from members on notice via a member log-in facility on the WIA website. That worked very well, with many people commenting on the good picture quality, even with the limited facilities on the Island. The WIA Board would like to make live streaming a regular feature of our AGM and Open Forum weekends. We only received a relatively small number of questions via the website this year and, obviously, if we receive large numbers in the future we would need to select questions for 'live' reply, or group similar questions together.

The AGM is largely procedural, being concerned mainly with corporate matters, accepting the Directors' and Treasurer's reports, welcoming the newly elected Directors, and remembering the Silent Keys. The Open Forum follows the AGM and offers members the opportunity to express their individual opinions and ideas about amateur radio and the WIA. This year, the Open Forum discussed the content and delivery of *AR* magazine, options for increasing WIA membership, options for attracting young Australians to amateur radio, and a variety of other issues.

The WIA has been running small deficits for a number of years now and, although in no way a threat to the organisation at current levels, we really need to try and turn our finances around. One of the great challenges the WIA now faces is how to both meet the ever-increasing need for advocacy at a time of rapid regulatory change, and also meet ever-increasing expectations for services, all with just two full-time staff members and a shoe-string budget.

Some good suggestions came from the Open Forum discussion on how we might be able to achieve this. One suggestion is to introduce a digital-only option for the delivery of *AR* magazine. A show of hands in the room suggested that about two thirds of those present would prefer to receive their *AR* magazine digitally, not by paper in the mail. So, if say half the membership preferred to receive their *AR* magazine digitally that would halve the postage costs. It would also reduce printing costs a little, (though not by half, due to the scale economics of the printing industry). That single initiative could go a long way to reducing the WIA's expenses and could off-set further membership fee increases.

Another good suggestion was to offer a short-term free Associate Membership of the WIA to all new radio amateurs, including a digital-only copy of *AR* magazine. This would give new amateurs an introduction to the WIA, and hopefully they would choose to rejoin when the free period expired. Each person could be followed-up with a phone call towards the end of the free membership period.

The retention of existing members may be improved by introducing a system similar to that prevailing in many other community clubs these days, where rejoining each year is automatic unless the member advises they no longer wish to be a member, i.e. an opt-out rather than an opt-in membership renewal process.

The Open Forum also discussed the obvious need to attract more young Australians into the hobby, and the possibility of amateur radio having a part to play with the STE(A)M initiatives being introduced into high schools.

The first meeting of the new WIA Board took place on the Sunday morning. In addition to all the normal business conducted at the first Board meeting each year, such as introducing the new Directors, declaring and recording potential conflicts of interest, and appointing the Executive Officers, the Board identified three key areas for extra special attention. These largely reflect the discussion and feedback during the Open Forum session, and are:

(i) Young Australians;
(ii) Increasing WIA membership; and

Continued on page 4

 Continued from page 3

(iii) Strengthening the WIA's Committee system.

These three items will be at the forefront of Directors' minds this year, and we hope to have more to say about each of them shortly.

So, it was a very successful AGM weekend and we are looking forward to advancing some important issues identified in the open Forum. Am I glad it's behind us and we can get back to business? You bet!

P.S. I would like to thank my fellow Directors for their confidence in me for a further year as WIA President, by which time I think it will definitely be somebody else's turn. The WIA reminds me of Winston Churchill's comments on democracy: *"no one pretends that democracy is perfect or all-wise. Indeed, it has been said that democracy is the worst form of government except all those other forms that have been tried from time to time."*

WIA news

US Technician Class Licence - reciprocal arrangements

The ACMA is seeking comments about the reciprocal arrangements for the US Technician Class Licence. The knowledge requirements for the US Technician Class Licence have changed over the years, and is now considered to relate more closely to the Australian Foundation Licence.

You can enter your comments directly into the ACMA webpage at: *http://www.acma.gov.au/theacma/proposed-changes-to-amateur-reciprocal-qualifications*

The WIA made a submission to the ACMA on the subject previously. If you send comments to the ACMA, the WIA would also like to receive your comments, too. Use the 'Contact the WIA' website form to send us a copy: *https://www.wia.org.au/joinwia/wia/emailwia/*

ANZAC history of the Australian submarine AE2

The exploits of an Australian submarine in the Dardanelles as ANZAC troops landed at Gallipoli on April 15, 1915, have been shown through a presentation to a very interested gathering.

Kevin Mulcahy VK2CE, the Master of a Masonic Lodge on the New South Wales coast gave an informative talk that detailed the AE2 story. His presentation at a lodge meeting went for 90 minutes before an audience that included former Navy sailors resulting in few questions being asked.

Kevin VK2CE said: *"The story of AE2 one of amazing fortitude, skill and perseverance plus of course, gallantry. Its sister Australian submarine, the AE1 which disappeared in battle, was skippered by a Freemason, and that has led to further research."*

The two E-Class submarines were the first for the then fledgling Royal Australian Navy. The PowerPoint presentation drew heavily on the original article written by Michael Charteris VK4QS, "The spark gap signal that changed ANZAC history", in the April edition of Amateur Radio magazine, the WIA journal.

On the ANZAC Century that article talks of the role of Australian submarine AE2, and that crucial wireless message sent by telegrapher William Falconer in the Dardanelles as ANZAC landed at Gallipoli on April 15, 1915.

The gallant officers and sailors on AE2, located in the Sea of Marmara, are part of the ANZAC legend.

An Australian DIY satellite project

In many countries the challenge of space exploration continues, and here in West Australia is what could be the start of a new satellite project. This can have a place in the era of innovation and the emerging STEAM activities at schools.

The OzQube-1 project is a tiny PocketQube satellite that is being built in a back shed, and has been on ABC radio and television, even its own website and Facebook page.

Building OzQube-1 is a challenge for its builder, Stewart McAndrew, but preparing for a low earth orbit by piggy-backing with others on a space launch costs money.

In his childhood he had an interest in finding out how things worked, built electronics kits, studied aviation and settled into a career in Information Technology. To make the OzQube-1 dream closer to reality, crowdfunding through a GoFundMe campaign is underway.

WIA QSL Bureaux has some simple rules

The Wireless Institute of Australia operates a QSL Bureau system for its members that generally follow the guidelines decided by the International Amateur Radio Union. Among them are standards for QSL cards. The IARU has a universal standard for QSL card production to improve the handling of them by volunteers around the world.

The WIA only processes cards that meet the IARU standard. That is, they should be no larger than 140 mm by 90 mm, and are at least 0.25 mm thick. Copy paper is not suitable and glossy photographic paper with inkjet printing also causes issues for QSL Bureaux around the world.

All current users and those thinking of having QSL cards printed, need to read to IARU standards and methods used by the WIA including the pre-sorting of cards by those using the outwards bureau.

More information on this WIA membership service is on the WIA website under For Members.

MF Down Under

David (Doc) Westcombe-Down (Editor) & Rob Gurr VK5RG

"MF Down Under: An edited VK-compendium of articles and projects for the 630 m & 160 m bands" is the first ever Oceania-based one-stop-reference for embarking upon MF operating, and is all-mode inclusive. Publication date 20 June 2016, to be published by RSGB.

The book contains 345 x A4 pages. ISBN 978-0-9873638-6-2.

Wire spiral binding so it will lay flat on a desk for convenience.

44 articles and projects for 630 m and 160 m. Material contributed by 15 VK authors.

It includes Contents and Index pages to facilitate finding topics of specific interest.

This is intended to be a limited-run, cost recovery legacy to amateur radio in Oceania and the retail price will be AUD$48 plus postage satchel cost.

Foreword

The release of the former 500 kHz International Distress and commercial traffic frequencies has provided amateurs with yet another area for experimentation: the 630 m band (472-479 kHz). Many skilled radio operators will tell of the distant signals heard on these frequencies, and their disbelief when decoding the callsigns of these remote stations and the distances involved.

160 m has been the MF playground for many amateurs internationally since WW2, and to this day provides a fascinating environment with quirky propagation conditions to fascinate, absorb and occupy many enthusiastic amateurs seeking something more than commercial "black box" operating. Both bands embrace a wide range of modes and the scope for personal customising of one's amateur station is almost boundless.

"MF Down Under": An edited VK-compendium of articles & projects for the 630 m & 160 m amateur bands has been written by amateurs for amateurs, yet has managed to achieve an adventurous blend of professional input and "been there, done that" anecdotal experiences. Doc VK5BUG has woken a "sleeping giant" by bringing his working lifetime of LF/MF and wireless telegraphy experience to interface with each co-author's contribution. They contain sufficient data, real-life amateur experience and personal enthusiasm to authenticate and validate the innovative projects for tackling the vagaries and challenges of the spectrum segment below 2 MHz. A resulting MF experimentation potential by amateurs has become a new study area of both restricted suburban backyard aerial challenges and the improved earthing techniques required, thus providing excitement, learning and great satisfaction from on-air successes whether local or DX. There are no boundaries other than those which an amateur MF operator determines for herself or himself.

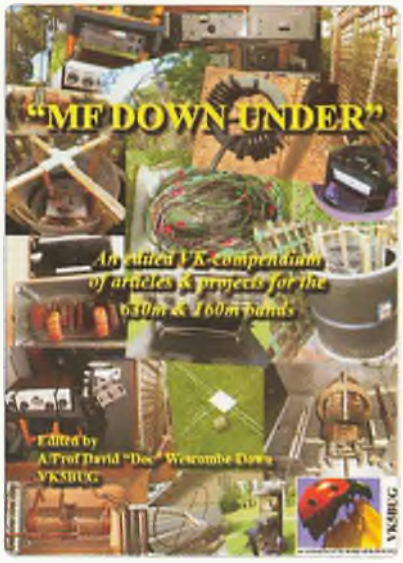


Photo 1: The cover of the new book.

Photo 2: Rob VK5RG and "Doc" VK5BUG with a copy of the cover image.

Information contained in this publication has not been freely available in any Oceania press before, with some having only been cited in professional journals and overseas material. Content is appropriate for amateur radio of today, and exploration of the various modes in the MF context is an under-utilised field with real potential. There is much scope for small residential area experimentation and operation without requiring either a tower or large aerial array. The transmission and reception results by all of the contributors are an absolute testimony to their rhetoric. This book is a comprehensive assembly of amateur-savvy advice and information that is very suitable for guiding amateurs into constructing and adapting appropriate MF station equipment, whether solid state or valve-based, and using digital, AM, CW, SSB or any other mode approved for use in the Australian MF bandplans. The articles collected by Doc and his associate authors present the current situation, and with the availability of this volume we anticipate many more readers will become aware of the benefits of the MF bands availability throughout the world.

Doc VK5BUG and his collaborative co-authors, along with the Wireless Institute of Australia, are to be congratulated for this outstanding contribution to the amateur radio press.

Rob Gurr VK5RG

Eric Clifford Jamieson OAM JP VK5LP

Lloyd Butler VK5BR

An RAAF Radio Technician who served in Bougainville in WW2 and who returned to become a collector of Vintage Radio, a builder and serviceman of radio receivers and a radio amateur who specialised in VHF/UHF communications.

Eric Clifford Jamieson, was born in Gumeracha, South Australia, on the 18th February 1924. He had a lifetime interest in radio and electronics. He built a crystal set at the age of 9 and a three-valve short-wave receiver at the age 12. The following paragraphs describe his lifetime in radio.

Eric enlisted in the RAAF in 1942. He initially spent four years in the RAAF repairing radio equipment used in aircraft and ground stations. Commencing in 1944, Eric was posted to the largest radio communications station in the South West Pacific on the island of Bougainville for 14 months where he carried out installation and maintenance of the base telephone system, the electrical wiring of buildings and the radio receiving station. In 1945, he was promoted to Sergeant and placed in charge of the large transmitting station located five miles away in the dense jungle.

Commencing in September 1945, Eric spent seven months in the RAAF at Gawler aerodrome maintaining the Transmitter Station.

After discharge from the RAAF in 1946, he joined his father on the family farm. But his love of radio technology soon diverted him, in his spare time, to the repair of the district's radio receivers.

During 1948-49, he obtained a licence to construct and sell radio receivers. He sold 64 of these.

Eric was quite busy during the 1950s. Initially, he was engaged in the construction of a house for his proposed marriage in 1956 to intending wife Merna. He still serviced radio receivers and in 1959 prepared for the television which was due to start in South Australia later that year. He sold and repaired many television sets, initially for ten years in his spare time and then full time for 15 years with Radio Rentals.

Presentation of GA Taylor Medal in 1995 to Eric Jamieson at Meninge by Garry Herden VK5ZK.

Eric become a licensed amateur in 1960, operating on 50 MHz under the callsign VK5ZEJ (and later around 1967/69, VK5LP). He was initially located at Forreston, near Gumeracha. Around 1987, he moved to Meningie.

With the introduction of transistor radios in the 1950s, Eric soon recognised that valve radios would be phased out, so he commenced collecting every valve radio receiver he could find. By the early 1960s, he had more than 100 radio receivers and by 1987 after he had moved to Meningie, he had collected 335. He could not house that number at his new location so he progressively sold 300 to other collectors and kept 35 for his own collection which was displayed at the Meningie Cheese Factory Museum. In 1983, Channel 7 featured his vast collection on the Today Tonight programme.

Eric was a true vintage radio collector. His collection included receivers and other vintage gear built as early as 1920. One rare piece was a 1925 model eight-valve superheterodyne. (The superheterodye was invented by Major Edwin Armstrong in 1918, during World War 1 but it took to the 1930's to phase out the early TRF sets).

Eric has been involved in many community activities. In 1985 he was awarded the Medal of the Order of Australia (OAM) for his service to the community.

Eric was well known for his amateur radio activity on the VHF bands. For many years, he was the presenter of the *"Amateur Radio"* column *"VHF/UHF - An Expanding World"*.

Much of the radio gear which Eric used is described in the article *"50 Years on 50 Megs"* by Steve Gregory VK3OT and Eric Jamieson VK5LP (Reference 1). Some of this gear is described in the following paragraphs:

For the 50 MHz band, Eric used a transmitter consisting of a 7C5 crystal oscillator, 7C5 buffer amplifier and a pair of 807s running 100 watts modulated by a pair of 807s.

For a 6 metre antenna, Eric built a version of WJ Orr six-element beam mounted on a 20 foot length of water pipe and rotated by the "Armstrong method". (This means it was rotated by hand).

For receiving on 6 metres, Eric initially used the KCR6/10 tuneable converter, fed into a Kingsley Radio AR7.

Eric's next receiver was a Hammarlund HQ-150 which tuned up to 32 MHz, and provided the all-important "slow-tuning IF" for Eric's VHF converters, which he constructed in September 1963

from the pages of the journal *Radio and Hobbies*. These converters used a 6ES8 twin triode valve developed for TV use and when coupled to a good receiver, they were excellent performers on the six metre band.

Eric experimented with other 6 metre receiver designs including modified TV turret tuners operated ahead of a 28 MHz IF stage.

Over his time in amateur radio, Eric has received a number of awards from the Wireless Institute of Australia (WIA). In May 1995, four WIA SA Division Councillors made a visit to Meningie to present the GA Taylor Medal Award to Eric Jamieson VK5LP. The award presentation was carried out by the Division President, Garry Herden VK5ZK. The GA Taylor Award is the highest honour which can be bestowed by the WIA on an amateur radio operator.

As part of his activities, Eric published a number of books on a wide range of subjects. Of particular interest to our radio history are the titles: *"Memories of a Past Era in Radio, or Born with a valve in my hand"* (Ref. 5) and *"The War, the RAAF and Me, 1942 to 1946"* (Ref. 4).

To summarise: Indeed Eric Jamieson was truly born with a valve in his hand. At 9 years old he started building radio receivers. He joined the RAAF and maintained radio transmitters and other radio equipment during war time on the Island of Bougainville. Returning from active service, he turned to building and selling radio receivers and later television receivers. By 1960 he had become a radio amateur and concentrated on VHF/UHF communication. He became well known as the writer, in the amateur radio fraternity, who for many years prepared the VHF/UHF column in the journal "Amateur Radio". The WIA presented him with the GA Taylor Award, their highest honour.

But he also had many other interests. He collected vintage radios and was interested in the community around him. He wrote a number of books about the community as well as on his life in radio. He was awarded an OAM for his work in the community.

References

(1) "5o Years on 50 Megs" by Steve Gregory VK3OT and Eric Jamieson VK5LP *http://www.uksmg.org/content/50years.htm*

(2) The Meningie Cheese Factory Museum - Eric Jamieson profile *http://www.meningiecheesefactorymuseum.com/memberarticlesprofiles.htm*

(3) Gawler Bunker Profile - *http://www.ohzatwar.com/bunkers/gawlerbunker.htm*

(4) Book "The War, the RAAF and me, 1942-1946" by Eric Jamieson *http://catalogue.nla.gov.au/Record/1566649*

(5) Book "Memories of a Past Era in Radio, or Born with a valve in my hand" by Eric Jamieson *http://catalogue.nla.gov.au/Record/1566649*

Look What Geoff Made (An Enigma Machine)

Geoff Linthorne VK2GL

During WWII, the German Army used Enigma coding machines to encipher most of their radio messages. At the time, the Germans were convinced that this machine was unbreakable, but recent history has proven them wrong. For most of the war, the Poles, and later the British and Americans managed to decipher the German messages.

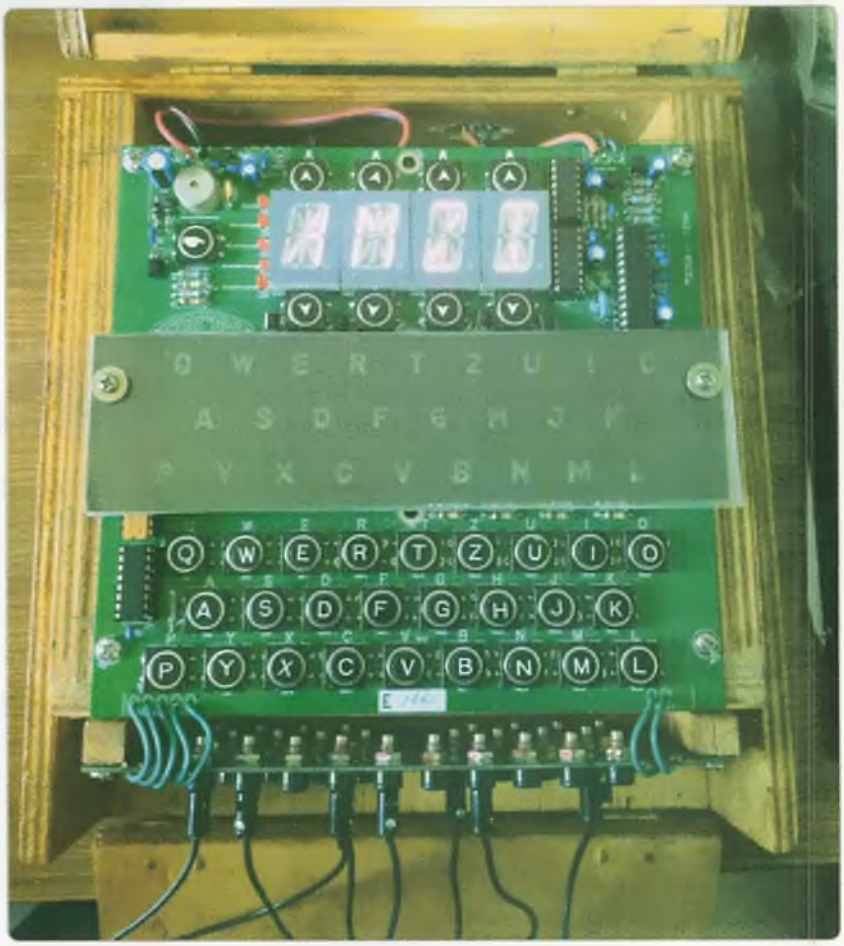
The Enigma Machine pictured above is the electronic version constructed from a kit by Geoff VK2GL who presented it as a working display and lecture at Westlakes ARC.

Once you've seen a real Enigma machine, you're likely to have fallen in love with it, making you want to have one. Given the low number of machines available today and their high price, that won't be an option for most of us. Therefore an electronic variant of the Enigma Machine using modern electronic components has been created. This electronic variant is called the Enigma-E.

It is a small electronic replica of a real war-time Enigma machine. It is fully compatible with the 3 and 4-wheel machines used by the German Army during WWII.

The Enigma-E comes as a complete kit containing everything you need to build a working Enigma machine: a professionally made double-sided through-plated PCB and all electronic components. It also contains a 65 plus page manual with detailed building instructions. All you need to supply yourself with is a soldering iron, solder, a power supply and some soldering ability.

Depending on your experience, you should be able to complete the kit in a few hours or a few nights. Once it is completed, the kit can be put to test by trying one of messages supplied in the manual. As most electronics hobbyists aren't skilled wood workers, the hard work has been done and nearly complete pre-built Enigma-E cases, made from genuine oak wood can be supplied. The Enigma-E was designed as a fund raising project for some very interesting museums. Currently the Enigma-E is only available in the UK and the Netherlands.



Enigma Machine constructed from a Kit.

OK, how much does the kit cost? Around £150.00 UK - cheap!

If you are interested, contact Geoff VK2GL at Westlakes. He will give you a private demonstration and tutor you through the Enigma-E construction.

Ciphers and Codes.Brigades

Have you ever wondered what is the difference is between a **CIPHER** and a **CODE**?

(01) A **CIPHER** is a secret means of communication. A **CODE** is a non secret means of communication and is used for abbreviating the original text.

(02) The following rules will govern the process of ciphering and deciphering messages.

1. The text of a cipher message will never contain words in plain language.
2. Ciphers or deciphers will never be written on the same sheet of paper as the original message.
3. Replies to cipher messages will be in cipher, except when the reply is in stereotyped

form, such as "Acknowledged", "Yes", "No", "Understood", etc., when they will be sent in clear.

4. Letter ciphers will be written in block letters in five-letter groups; figure ciphers will be written in five –figure groups.
5. All papers used in the process of ciphering and deciphering will be destroyed.

(03) The transposition cipher is a simple form of cipher which may be used in an emergency when no other cipher is available.

In this cipher the letters of the original text are not changed, but their order is altered according to a key obtained from a keyword.

The following considerations should be borne in mind when selecting a keyword.

1. It should contain between 8 and 18 letters.
2. It can consist of more than one word.
3. It should be easy to remember and spell.

As the security of this cipher depends on the keyword, knowledge of the keywords used must be restricted.

Keywords should be changed frequently to maintain security.

(04) To illustrate the procedure of ciphering the following example is worked out with the keywords **FIRST DIVISION.**

1. From these keywords the transposition key is obtained as follows:- Reading from left to right the first letter of the alphabet to occur is "D" under this letter the figure 1 is written. The next letter of the alphabet to occur is "F" under this the figure 2 is written. The next letter is "I" ; there are four "I's"; the figure 3 is written under the first " I " to occur reading from left to right, the figure 4under the second " I "and so on until all the letters of the keyword have been numbered according to their position in the alphabet. The transposition key obtained from "FIRST DIVISION" would therefore be:

F	I	R	S	T		D	I	V	I	S	I	O	N
2	3	9	10	12		1	4	13	5	11	6	8	7

2. Under this key the message now be written, figures and punctuations being in letters.
The sample message to be ciphered is "Right leading coy is advancing on pt 300 no opposition encountered."
This is written under the key as follows:

2	3	9	10	12	1	4	13	5	11	6	8	7
R	I	G	H	T	L	E	A	D	I	N	G	C
O	Y	I	S	A	D	V	A	N	C	I	N	G
O	N	P	T	T	H	R	E	E	N	O	U	G
H	T	N	O	U	G	H	T	N	O	O	P	P
O	S	I	T	I	O	N	E	N	C	O	U	N
T	E	R	E	D								

N.B. The last line of letters should never be a complete line; if necessary dummy letters should be added to make the line incomplete.

3. The message is now transposed by reading the letters in the columns, the order in which they are read being indicated by the figures in the columns, the order in which they are read being indicated by the figures of the transposition key. The cipher message will therefore begin with L D H G O which are the letters under the figure 1 of the transposition key, followed by R O H O O, the letters under figure 2, followed by the letters under 3, 4, 5, etc.
4. The transposed message is written in groups of five letters.
5. The total number of letters in the text will be given in figures immediately before the first cipher group.
6. The above message ciphered ready for dispatch will therefore be:
70 LDHGO ROOHO TIYNT SEEVR HNDNE NNNIO OOCGG PNGNU PUGIP NIRHS TOTEI CNOCT ATUID AAETE.
7. If the last cipher group contains less than five letters, NEVER complete it to a five letter group.

To Decipher, Number off the keyword to form the key as in para (04)

Divide the total number of letters of the cipher text by the numbers of letters in the keyword; this will give the number of complete lines of letters and the number of letters in the bottom line. In the example given above 70 /13 =5 complete lines of 13 letters and 5 letters in the 6th or bottom line.

Underneath the key construct a frame containing 5 lines of 13 spaces and a sixth line of 5 spaces.

The letters of the cipher text are then written vertically in the frame, beginning with the column under figure 1 of the key:

2	3	9	10	12	1	4	13	5	11	6	8	7
R	I	G			L	E	A	D	I	N		
O	Y				D	V		N		I		
O	N				H	R		E		O		
H	T				G	H		N				
O	S				O	N		N				
T	E											

Check Message

Original Message

TWO SECTION TO LEAD ATTACK START ZERO SIX FIFTEEN TARGET FUEL DUMP

Keywords: BRIGADESHQ

Encoded Cipher message reads as follows.

55 EAAFG PTCCO NLCDR IETAT FTSET XRMOT EEUOL SIAUN AREEW OKSTD ITZTF

Hint it pays to construct a transposition key as in para: 1 and then draw a grid with blank squares underneath it.

Remember you know how to calculate the number of rows you will need.

December Foxhunt

Anthony Benbow VK6AXB

"...not to mention that a lone gumboot-clad figure wandering in the dark wouldn't look half-suspicious..."

I'd had a busy day in the lead up to the final VK6 foxhunt for 2015 on 5 December 2015 and was somewhat under-prepared as I left my home QTH. The starting point for this hunt was different - Wireless Hill instead of the traditional Kings Park due to the scheduled Christmas Pageant and other events in the CBD. As it happened, the weather was unusually wintry for December and the Pageant was cancelled, but too late to change from the Wireless Hill arrangement. Also, I was flying solo, as my teammate had become unable to attend at short notice.

Fox for this hunt was VK6ZMS who had advised Basil would be hiding within a five km radius of Wireless Hill. This did not bode well - VK6ZMS has been known to set foxes near the water's edge, and some of these have been a real challenge to find (for me, anyway). He was likely plotting another dastardly hiding place - and there were numerous options - the 5 km circle from Wireless Hill includes large parts of the Swan and Canning Rivers, and extends to the northern end of the North Lake and Bibra Lake wetlands. It wasn't looking good. I packed the gumboots.

Arriving at Wireless Hill somewhat late, I greeted fellow hunters in the VK6FCJB, VJ6FJON and VK6FMTG teams, and hurriedly set things up. I had lent my usual FT-817 foxhunting RX to VK6FMTG and was relying on my crusty - but trusty - old FT-290R. The poor thing has a screen fault and the LCD display is nearly unreadable, but it still receives fine. Otherwise the setup was my usual 3-element Yagi mounted off the side of the roof rack (Armstrong rotation from the passenger seat), 0-to-50 dB stepped attenuator, and snoop-loop for close-in work once near the fox. Eventually all was connected up, and at about 1935 VK6ZMS advised that Basil was key-down.

Not the strongest signal. Swinging the beam, I thought "south". Hmmm! Maybe I won't be wading through the Swan River after all - however, can't rule out North Lake or the Canning. I asked the other teams: "Can you all hear it?" with affirmative responses. I started the car and headed off, amid shouts from some of the others *"he's off - where's he going?"* (Where do they think?: to look for the fox, of course!)

Not having a beam turner was awkward. I decided to go a few km, then stop and take another bearing. I left the Yagi facing forward of the vehicle as I headed out of Wireless Hill and down Almondbury Road. The signal began to fade somewhat. Headlights on my tail; the other teams were on the march. Turning right on to Riseley Street, the signal picked up. Still south, it seems - possibly North Lake.

Approaching Leach Highway, which way to go? Murdoch Drive seemed a quicker option for the North Lake area, so I turned left, then right onto Murdoch a short distance down the road. Signal still audible. Proceeding down Murdoch Drive, I noted a signal peak as I drove past Piney Lakes reserve off to my right... interesting. It was time to take another bearing, perhaps.

I turned right into Somerville Boulevard and headed into the suburb of Winthrop. There were other cars on the road and no obvious spots to pull over. I tried a couple of side streets with no luck, and then found the shops near the corner of Jackson Avenue. Parking up and swinging the beam, I was puzzled - the signal was gone. Maybe I was behind a hill? I headed off up Jackson and found another car bay near a park, off a side street. Still no signal! This was odd. Back to basics!

A quick check revealed I hadn't lost the Yagi on a low-flying tree. All connections seemed fine. I switched the FT-290 to VFO B, and the Wireless Hill information beacon at 5/9+60 dB nearly blew me out of the car. Ouch. Should have checked the volume! Means the RX is still working though. Back to VFO A and the problem became clear - I had somehow bumped the radio and knocked the VFO off frequency - and couldn't properly see the error due to the faulty screen. QSY back to 144.600 and Basil came in loud and strong. Now we're cooking.

Swinging the beam, I confirmed the signal was now behind me. Definitely in Piney Lakes somewhere! I recalled I'd earlier driven past the Piney Lakes entrance off Leach Highway, and set off in that direction. Turning into the entrance, I realised the gate was closed - daylight entry only for vehicles. Should I get out of the car and hike in? I was not familiar with the area. How far would I have to walk? And should I take the gumboots? Could be a long trip back to the car if I needed them - not to mention that a lone gumboot-clad figure wandering in the dark wouldn't look half-suspicious....

Checking the map again, I noticed there were several side streets on the other side of the lakes reserve, where I had just been! No barrier to vehicle access

there. Cursing my stupidity, I set off again back the way I had come. My QSY error and back-tracking had cost valuable time. The signal was strong, and giving a clear direction on the beam. Surely the other teams were all there by now. Hopefully I wouldn't be too far behind.

Back into Winthrop, and I headed down a side street off Whitfield Terrace - the signal was still straight ahead, so I did a U-turn and tried a different side street. Getting warmer – signal stronger, even with 40 dB of attenuation in. I parked up, got out the snoop-loop and walked into the reserve, following my last bearing.

However, the snoop-loop failed to hear even a trace of the signal. I must still be too far away. Back to the car and set off down the road for another bearing - but all indications were, I had been in the right spot. Back-track and park up again. Maybe the snoop-loop had gone deaf. I got out a handheld, thinking to use that with my attenuator and Yagi instead of the loop. Fumbling around looking for the right patch cable -more time wasted. The others are probably packed up and in the coffee shop by now.

I set off again, in the same direction as before, and this time the fox was just audible on the snoop loop, so I followed where the signal led. Through the park eastwards, down a path and past a playground, much stronger now – as the snoop RX became swamped on 2 m, I switched to 70 cm, third harmonic. I was now looking out onto Murdoch Drive, surrounded by bushes and garden beds. Fox could be concealed anywhere.

However, the signal led me away from the hedges toward a car park - and over by a tree, on the roof of a familiar-looking sedan, was the fox! Hiding in plain sight! *"Congratulations"* said VK6ZMS. *"You're first"*. Unbelievable! The time was about 2030, nearly an hour since I left Wireless Hill, less than 4 km away. I got lost, couldn't use my equipment properly, went round in circles and still won. What was everyone else doing?

Similar to what I did, it seems. The VK6FMTG team had also taken the scenic route and arrived about 20 minutes later followed shortly afterward by the VK6FCJB team. The VK6FJON team retired with antenna trouble. Fox and hounds then travelled in convoy to Gelare cafe in Applecross where an enjoyable hour was spent drinking coffee, swapping notes and talking fox hunting, resistors, portable operation, baluns, antennas and radios generally. Thanks to Carsten, Jake, John, Jo, Martin, Merton, Michelle and Warren for turning up and making it a great night. And I didn't need the gumboots!

Who wants to set the next one?

(More information about fox hunting in VK6 can be found at *www.vk6fox.org.au*

Memoires of a Signaller

(Extracts from Memories of a Signaller by Harold Hinkfuss MM)

Barry Abley VK3SY

Introduction

Harold Charles Hinckfuss was born at Kangaroo Point Queensland in1893, the second of five children. He left school at the age of twelve and two years later joined the engineering branch of the Post Master General's Department as an apprentice mechanic.

Having been in the cadets and militia since the age of eighteen, he attempted to enlist following the declaration of war in 1914, but was rejected, being in a reserve occupation. In May of 1915, following the Gallipoli debacle, he tried again and was quickly accosted by a Signals Officer of the 26th Battalion AIF, who indicated they were leaving in a couple of weeks and were short of trained men. Harold's rejoinder, *"I agreed to join the Australian Signal Engineers."* (1)

Gallipoli and the Western Front

Harold and his Company disembarked at Port Said early in August 1915 and three weeks later were loaded into barges to be landed on Gallipoli. Harold, whose nick-name was Lulla, survived the following four months on Gallipoli and the reorganisation of Divisions within the Australian Imperial Force in Egypt before moving to the Western Front in June 1916.

We catch up with Lance-Corporal Harold Hinckfuss in the weeks prior to the Battle of Poziéres.

They were resting up in Rue Marle, a little rural village south of Armentieres, when Harold was approached by his Company Commanding Officer who indicated problems were being experienced in an old Barn used as a Sig's HQ. *"...have a look at it Lulla."* (2)

Photo 1: Cpl Harold Hinckfuss MM in 1919.

"I promised I would do my best, and told him what I would require; three different kinds of screwdrivers, a couple of pairs of small pliers and an instrument called a 'BPO' detector and some small-gauge insulated copper wire. He drove me to the shopping centre, handed me some money and said. 'Go and have something to eat, and then buy what you require'." (3)

Later with the help of another fellow they tackled the Barn.

"I tidied up the lines running into the barn, identified and tagged them, and made a test of all circuits. One was faulty, showing a resistance of 500 ohms to earth. We overhauled the switchboard and rearranged the small Leclanche cells in series and parallel, to provide longer life for the Morse instrument and switchboard. We installed a handset Ericson wall telephone for other uses, leaving the switchboard free for outside calls. (4)

In July 1916, late in the afternoon, carrying our signalling gear, we walked to Sausage Gully; it was the main avenue to the fighting front. Our signalling materials, switchboards, Morse equipment, field telephones and lamps were most up-to-date. We were issued with signalling insignia, a blue and white arm band, a jack-knife and pliers, which we wore on our belts. The open-line wire was being replaced wherever possible by underground cables. It was wonderful compared with the poor equipment we had on Gallipoli. (5)

Our Section comprised of approximately seventy-two men. It was responsible for providing and maintaining communications to the battalions, artillery and medical sections. Communications was a vital exercise in the army and the life blood of all units. The (invention of) magneto telephone was a boon to commanding officers... thousands of these telephones were taken from civil sources and used in the battle areas." (6)

Poziéres

Because of his skill level, Harold was refused a request to join his company during the early days of his battle of Poziéres as he was needed at HQ 7 Brigade. Some days later he was permitted to join his Sig's Company.

"Eventually I found my unit. Only three were left holding the communications post. The others

Photo 2: Signallers at Pozieres. AWM E00798.

had left the front line or had been wounded or killed. The sergeant told me to take over. The trenches had been knocked about and in parts a shambles. The dead lay in shell holes and in the trenches. Boxes of Mills bombs lay where carriers had dropped them when wounded. The flower of Australian youth had been massacred. (7)

Westhoek Ridge in the Passchendaele sector

"I went to check on four men at an observation post. I was just returning when there was a huge explosion behind me. I rushed back and found the four men had vanished-buried under tons of earth. I started scraping away at the earth with my hands when the signalling officer came up and said 'Corporal all the communications have gone, get back to the dugout and see what you can do. I'll take over here.'

When I got back to the dugout I found the switchboard operator as white as a ghost. There was only the light of a single candle to work by. The explosion had moved the switchboard and the electric batteries were in disarray. We soon sorted that out and were in communication with the rear. The lines to the rear had held, these were all buried cables. The forward line however was open circuit. (8)

I reported this to the officer and he suggested I go and find the fault. He replied that I would have to go alone, as there were no men to spare. I set out with my field telephone. The line was cut in several places, so from then until the break of day, I was out on the field repairing lines. When I got back the officer said I had done a good job. In the afternoon we buried the four men. Sometime later, I found out that I had been awarded a Military Medal for my action on that night of the attack." (9)

War's End

Harold continued to serve with the 26th Battalion Signals until the capture of the Hindenburg Line on 7th October 1918 and the Armistice.

"I went over to the sig station on the morning of 11 November 1918. As I reached the door, I could hear a message in Morse coming through. It was from Marshall Foch, the supreme allied commander, announcing a cessation of all hostilities as from 1100 hours on that day. The War was over." (10)

Harold was twice wounded and received a Military Medal (MM). He embarked on the Euripides on 3 March 1919 and arrived in Morton Bay Queensland on 19 April. With the exception of two years on a soldier's settlement farm at Stanthorpe, he worked with telephone communications all his working life. He and Beryl had six children.

Harold Hinckfuss died in January 1983, shortly before his book was published. This narrative does not do justice to the service of Harold and his fellow signallers, nor his book. It does however, during this centenary year of Australia's participation in battles on the Western Front, offer an opportunity to remember with gratitude those who served this fledging Nation.

Quotations

1 Hinckfuss H.C. (1982) *Memories of a Signaller* Queensland University Press p3.
2 *Ibid*, p 47
3 *Ibid*, p 48
4 *Ibid*, p 50
5 *Ibid*, p 50
6 *Ibid*, p 51
7 *Ibid*, p 70
8 *Ibid*, p 125
9 *Ibid*, p 125
10 *Ibid*, p173

GenSweep

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

Part 2: The Software

Paul McMahon VK3DIP

Introduction

In part one I gave an overview of the GenSweep system and details of the hardware required. Like most technology these days however a lot of the heavy lifting is done in software, so this part will primarily deal with the software components.

The Generic Interface Code.

As documented in (1), the Interface between the PC and the various bits of hardware is a Microchip PIC16F88 microcontroller with some firmware to do the work. Communications between the PC and PIC is via RS232 serial over a USB serial converter. Despite the fact that this USB converter happily supports high baud rates (57.6k), this serial communications pipe is actually still the limiting factor when it comes to how fast you can get a sweep to go with GenSweep. Going faster however will mean going to a PIC which would support native USB rather than the RS232 flavour of most of the cheap microcontrollers. Anyway the format of the serial communications between the PC and Interface is a command-and-response style using human readable characters to aid in debugging and programing. The PC sends a command and the Interface executes it and sends a reply back. When the Interface is not executing a command it is sitting in a loop listening for the next command. The two command-and-responses relevant to GenSweep are the, DDS Set frequency or "D" command, and the new Analog multi-sample command "A". Typical examples of these two commands as used by GenSweep would be as Table below.

The "D" Command

You will find more details of the "D" command in (2), however one of the important things to note is that the five hex bytes after the D represent the five 8 bit Data/Control Words (W0, W1, W2, W3, W4) as listed in the AD9850/AD9851 data sheets, they are in the same order as the parallel load case, even though we are actually using the serial load technique which has the bits in the reverse order. The interface does the reversal as it sends the data to the DDS, so you don't have to. In particular the first word (called W0 in the data sheets, with value hex 00 in the example here) contains the phase, power down, and control bits, (W1, W2, W3 and W4 define the frequency). For GenSweep we don't care about the phase so we set it to zero, and of course we don't want it powered down so that is also zero, so it is only the control bits (two least significant bits of W0) that are relevant for GenSweep. These control bits also represent the only really important difference between driving the AD9850 and AD9851 DDSs. In particular for the AD9850 the control bits should always be both zero, whereas for the AD9851 the last bit (i.e. least significant bit of W0) controls the reference multiplier and is normally set to "times 6" or 1. With the most common reference oscillator of 30 MHz this gives 6 x 30 MHz, or an effective clock frequency of 180 MHz. Sending a W0 of 00 to an AD9851 is non-fatal, you just end up with a reference multiplier of 1 and thus a much lower output frequency than you may have expected. Sending 01 to an AD9850 however can be fatal to the DDS as this is, according to the data sheet a "factory reserved code" which in the words of the data sheet are; *"used for factory test purposes, that render the AD9850 temporarily inoperable. The user must take deliberate precaution to avoid inputting the codes"*. There is an amount of anecdotal evidence out there on the net that suggests that the "temporarily" can in fact in many cases be permanent, especially if you don't notice what you have done for a while and cook the chip.

I have made one change in the interface code specifically to make the DDSs work more reliably. When an AD9850 or AD9851 is first powered up (or reset) it starts off in the parallel load mode. We want it in serial load mode. To get it into serial mode requires a specific code on the parallel data lines (that's why some are tied high and some are tied low in the DDS hardware,

Command (PC to Interface)	Response (Interface to PC)	Function
D 00,14,7a,e1,48 <LF>	OK<CR><LF>	With a 125 MHz reference clock this sets a AD9850 DDS to run at 10 MHz
A 00,40<LF>	A00=fa00<CR><LF>	Read sum of hex 40 (64) repeated samples of port 0 as being hex fa00 (64000)

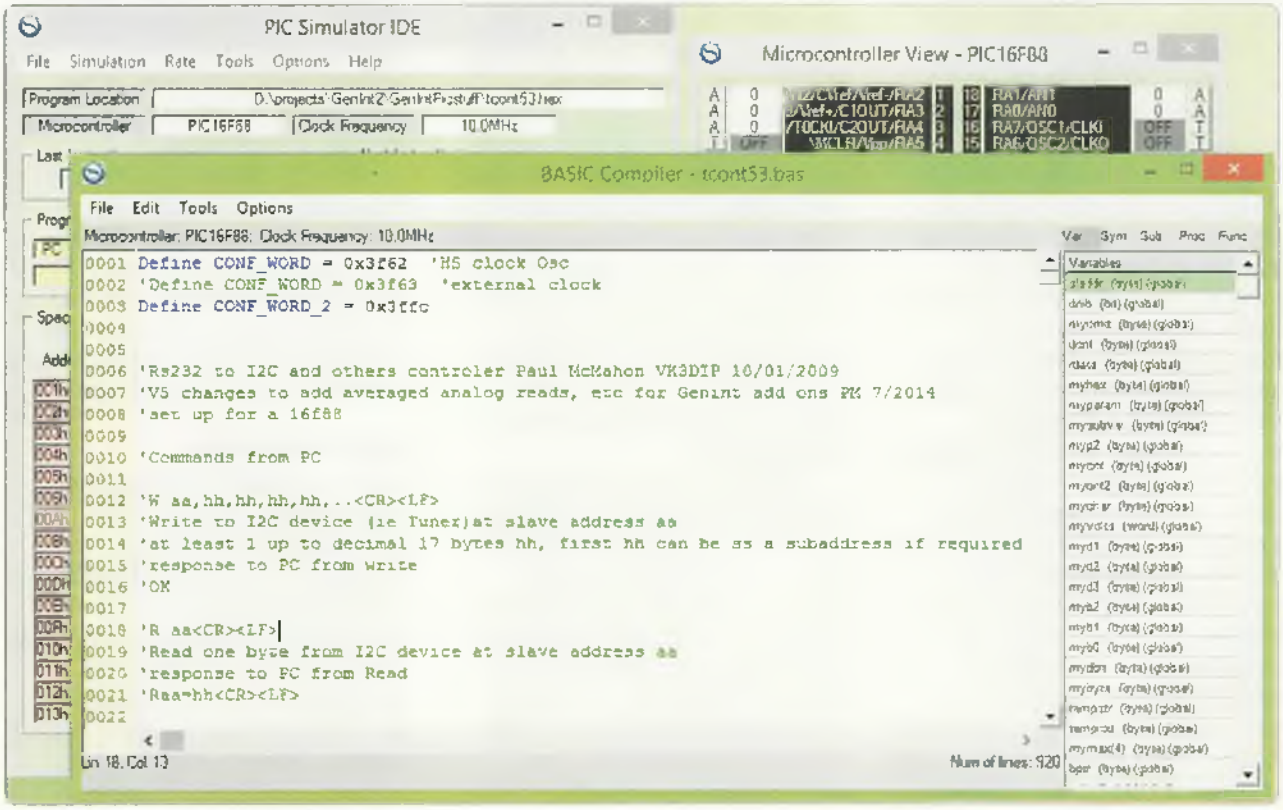
Note: <CR> and <LF> represent the non-printing carriage return and line feed characters respectively.

and some toggling of the clock and update lines. Luckily the toggling is exactly the same as when we send a serial load sequence, however we want parallel data load line 7 to also be low for this set-up. Because however D7 happens to be also the line used for all serial data feed, we can't just tie this pin low. We can however have the same effect by just sending all zeros for data so that D7 stays low. So a mechanism to ensure a good start-up and transition to serial mode is (shortly after powering up) to send one (or more just to be certain) DDS set frequency to 0 Hz commands (all Data/Control words including W0 of 00 so also it is safe if you are using either an AD9850 or AD9851). Rather than having to have these sent by the PC, I have added as a part of the interface power-up sequence a number of (in fact three) automatic DDS 0 Hz sets. In the old interface code if you forgot to do this initialization from the PC first thing, the DDS would play up and sometimes require repeated sends of commands before it woke up or did anything, or in extreme cases get stuck in parallel mode and thus just sit there and do nothing. So if the DDS plays up at all, a quick power off and on of the interface (which also powers the DDS so it gets cycled also) should result in the 0 Hz commands being resent and the DDS getting placed into serial mode.

The "A" Command

The new "A" command is similar to the old "V" command in that it is basically going to return a value in hex corresponding to the count obtained on one of the three analogue input ports. As the 16F88 has a 10-bit A/D converter this would normally be a value from hex 0000 to 03ff (or 0 to 1023 Decimal) corresponding to the voltage input relative to the reference voltage, which in our case is set at about 2.56V. So 0000 would correspond to 0Volts and 03ff would correspond to 2.56 Volts, with each count in between representing roughly 2.5 mV. This is basically what the "V" command does (see [2] for more details). The "A" command adds the extra ability to rapidly repeatedly sample the same input port (number of samples provided in the command) and sum the results, and return that sum. The maximum number of repeat samples you can have is 64 (hex 40) and still have the maximal sum fit into the four hex digits of the 16 bit word coming back from the interface. The idea is that if you ask for a "A" of say analogue port 0 for 64 times (as in the above example) and then (in the PC) divide the resultant sum received by 64, you end up with an average value for the voltage that is to a higher level of precision than you would expect from the 10-bit A/D in the PIC for a single sample. This is explained at great length in Microchip Application Note AN1152 (3), but basically it is down to one of the few cases where random noise can actually help. If you consider a voltage that you want to measure that lies somewhere between two

Figure 1: PIC Simulator IDE with Generic interface code open in editor.



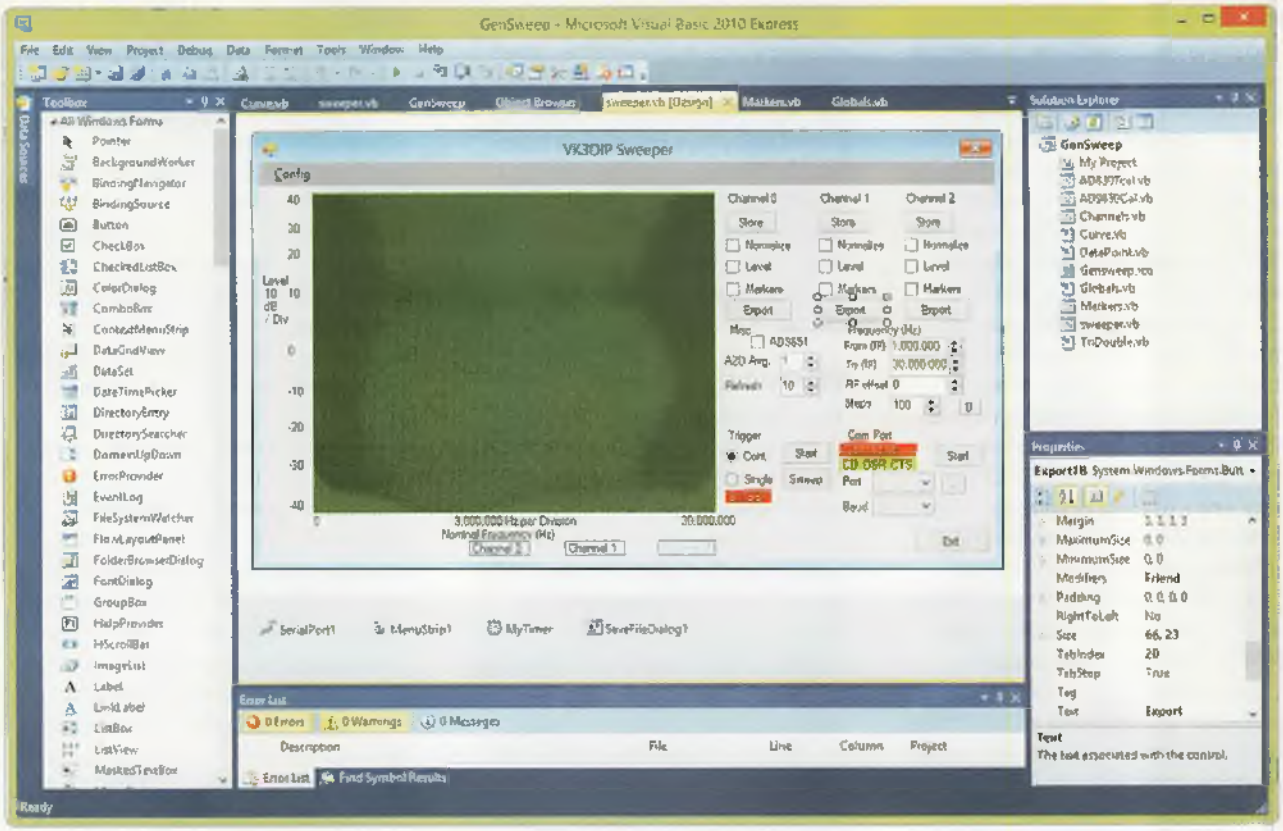


Figure 2: GenSweep PC project open in Microsoft Visual Basic 2010 Express.

quantised values, e.g. 1 and 2, the A/D can only return either a 1 or a 2, if there is no noise it will always return the same value perhaps 1, and you can average for ever and not see any improved resolution. If however there is a small amount of noise present which at any one time may be adding or subtracting from the voltage we are trying to measure, and if that noise is evenly distributed then there is just as much chance of it adding as it is subtracting. When the noise adds we may get a 2 returned, and when it subtracts a 1. If the voltage that we are trying to measure is exactly halfway between the two quantization levels, and if the noise is evenly distributed, then there should be exactly as much chance of getting a 2 as a 1. In this very simplified case if we took two samples we might get one 1 and one 2 which if we sum (3) and divide by the number of samples (2) we get a better estimate of the voltage of 3/2 or 1.5 i.e. halfway between the two levels. If alternately the actual voltage is closer to one quantization level than the other, then the probability is we would receive correspondingly more of the values on that side, which would then skew the average towards that value. The advantage for us here is that we end up with a more accurate as well as a more smoothed result. Using the "A" command with oversamples and averaging has a similar effect on the display as turning on the Video filter for an analogue piece of test equipment.

The down side of using the "A" is that each voltage read effectively takes longer as it samples multiple times. Luckily I have also been able to increase the rate at which the interface can resolve a sample by decreasing the A/D conversion time per bit (Tad) from 4 uS down to the minimum value for a 16F88 of 1.6 uS. As we still have the speed bottleneck being the RS232 transport of the end result back to the PC, and as the sum result still fits in the same 4 hex digits, we can actually get at least some of the extra precision without too much in the way of extra delays.

As in (2), the Interface PIC code was created and tested using a tool called PIC Simulator IDE (4), which can be seen in Figure 1. The full source and hex files suitable for programming a 16F88 with this modified code can be found on my website in the projects area (5).

GenSweep main

Apart from the PIC firmware the main software component of GenSweep is the PC code. It is here that the majority of the work of GenSweep takes place. The GenSweep PC software is produced using one of the free Microsoft Visual Studio Express packages (6). There are Visual Studio Express versions for most programming languages available including C++

and C#, which I also use depending on the situation, but for GenSweep I chose to use just the VB version as it makes some of the screen tasks I wanted to do easier. The current version is 2013, but I am still using 2010, which is also available from the same site. If you want to use 2013 then my 2010 source should import fine. Figure 2 shows the main form in GenSweep open in the editor of Visual Basic Express 2010. The environment is very simple to use and there are very few restrictions on what you can do with it.

Yes this does mean that GenSweep is primarily targeted at Windows environments, and yes it is designed for a reasonably current Windows OS with as recent as possible a .net runtime installed, i.e. not Windows 98. I personally have run it in Windows XP, 7, 8, and 8.1, and it works fine.

Having said that I have had some contact with people who have been successful in getting, while not this actual software, the considerably more complicated YagiCAD suite which I produce using the same compiler etc., going under WINE in LINUX, so don't give up if you are not a Windows person.

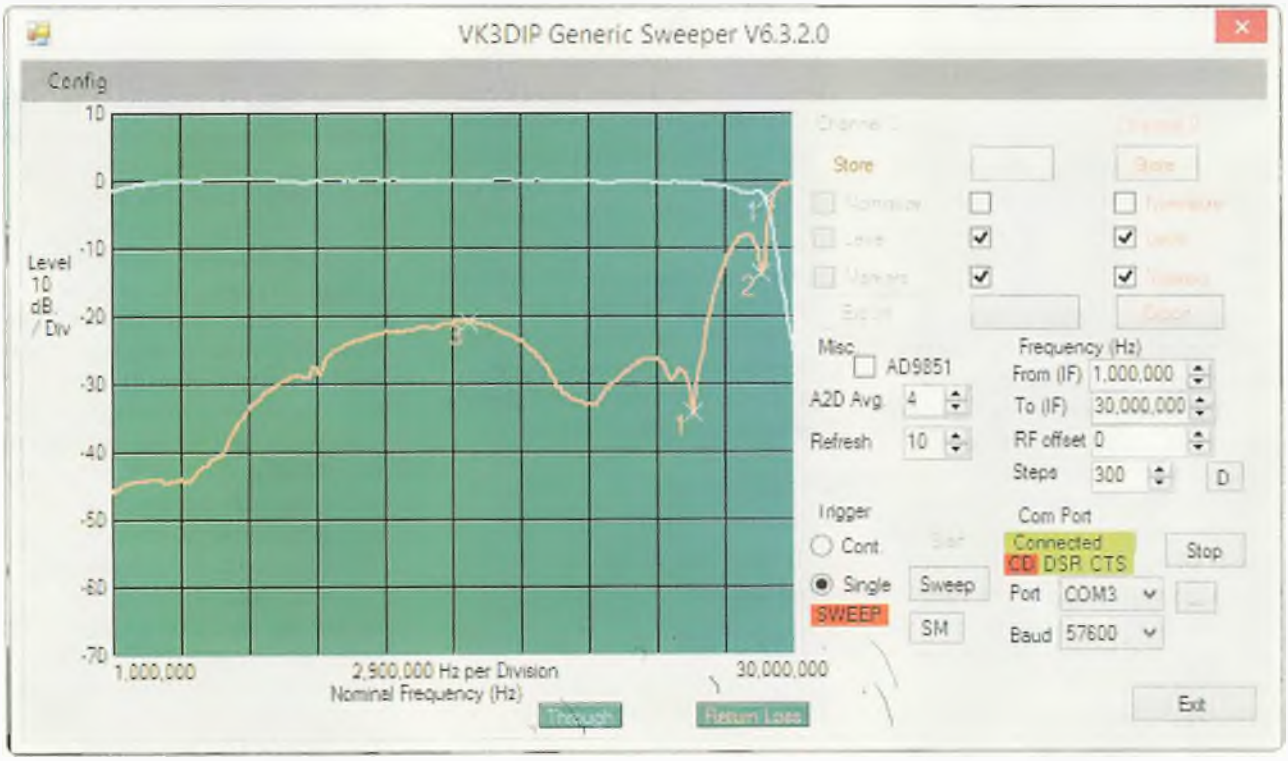
Program Flow

The core program flow is the sweep itself. For each sweep the code:

1. Calculates the step size based on the From, To, and Number of Steps parameters.
2. Allocates some memory to store the sweep results.
3. Changes the sweep light colour from red to green. (to indicate that a sweep is in progress)
4. For each frequency step
   a. Calculate the appropriate "D" command based on the configured DDS reference frequency.
   b. Send the "D" command to the Interface. And wait for the OK.
   c. For each active channel.
      i. Send an "A" command using the current averaging number.
      ii. Wait for and receive the sum result, divide by the averaging number, and convert to a dB level using the conversion factors stored for that channel.
      iii. Save the result as the raw level for that channel.
   d. Apply Levelling and Normalization as configured to the raw levels to obtain the display levels.
5. At an interval determined by the refresh rate take what data we have and convert it to co-ordinates suitable for plotting on the screen, and plot it using the configured colours.
6. At the end of the frequency sweep change the sweep light colour back to red to indicate the sweep is finished.

The full GenSweep project including all source, or just the complied executable if you don't want to make any changes, can be downloaded from the projects area of YagiCAD.com (5). While I wish to maintain copyright on the code as written, and also would prefer not to find it turn up in something

Figure 3: Basic GenSweep main screen.



else that someone charges money for, and of course it is intended for basically amateur radio and other electronics hobbyist use, not for any sort of critical or life-support application, I am not making any other restrictions on the use of this code and executables, i.e. it's free.

To install the executable, just copy GenSweep.exe to a convenient directory and double click it to run. The first time you run it and change some of the default options the program will create some configuration files in the same directory as the exe. If you want to move it around and not lose your specific configurations afterwards just make sure you copy/move those files with the exe. If the program grumps when you start it about needing an updated version of the .Net runtime you may need to download this from the Microsoft web site, or via Windows Update.

The Screens and what they are for

Figure 3 is an example of the main screen of GenSweep at run time. In this case showing the traces for a commercial HF (30 MHz) low pass filter. We will now go through this screen a bit at a time to discuss what the various buttons and other controls are for.

The first bit to look at is in the Com. Panel located in the bottom right hand corner (See Figure 4). As discussed the communications between the PC and the Interface use RS232 either directly or over, as in my case a USB/RS232 dongle. This panel controls this connection. The drop down lists labelled Port and Baud are hopefully self-evident, you need to select the values that correspond to your particular set up. The Interface firmware, unless you have modified it, is set up for 57600 Baud so the Baud defaults to that, the ports list will contain all valid Com Ports that were active on your PC when GenSweep started and will default to the first one found. If you didn't connect your USB dongle until after starting GenSweep, the button with the three dots on it will do a rescan of the PC looking for valid ports.

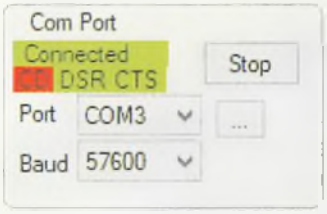


Figure 4: Comms. Panel.

The section shown in green and red indicates the current status of the Com Port, and some of the control lines coming from the interface. In this case the green Connected is saying that the port is connected (open), the CD (Carrier Detect) control line is low (Red), while the DSR (Data Set Ready), and CTS (Clear To Send) lines are high (Green). These values will change as the relevant states change. GenSweep doesn't require any particular combination of control signals, they are presented just in case you have problems with your particular connection. The final button in this panel is the one in the example labelled Stop (it will alternately say Start if the Com Port is not connected). This button will, as the label suggest Start the Com Port if it is not started, and stop it if it is. You should obviously ensure the Com Port is started before trying to do a sweep etc. If you forget (or if for some reason it stops) you will be reminded to start it whenever you attempt an operation that requires a connection to the interface.

The next panel just above the Comms is the Frequency Panel (Figure 5). You use these controls to set frequency related items.

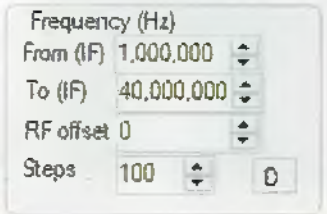


Figure 5: Frequency Panel.

All frequencies are entered in Hertz, and you can either use the up-down arrows to step or type directly into the boxes. The "From (IF)" and "To (IF)" are the frequencies that the DDS sweep will start at (From) and end at (To). Conventionally the "From" is less than the "To" so the frequency will increase as it goes across the display, however it is perfectly allowable for the "From" to be greater than the "To". then the frequency will decrease (i.e. negative steps) as the scan goes across. The IF part is to imply that this is the base frequencies of the DDS, in the future I plan to build a mixer attachment (similar in concept to the wideband up converters used with SDR dongles to give HF access, just other way around) to take the DDS output and mix up to a higher set of frequencies. This is where the RF offset field comes in, if for example I used a mixer that had a 125 MHz local oscillator the resultant output would be 125 MHz +/- (0 to 60 MHz assuming an AD9851). Just looking at the addition for the moment (assuming say a simple high-pass filter at 125 MHz) this would end up with an output sweep of 125 MHz to 185 MHz. In this case you would set the RF offset at 125000000 Hz (125 MHz) and the frequencies would be displayed correctly on the screen. This is only a cosmetic effect of course, and if you don't have a mixer this value will remain at the default of 0 MHz. You could of course also consider the subtraction case of the mixer where your 0 to 60 MHz would give you 125 MHz to 65 MHz, nicely filling in the gap, in this case you would set the RF offset to be -125000000 Hz (-125 MHz), you could also then set the "From (IF)" to 60000000 Hz (60 MHz) and the "To (IF)" to 0 Hz and the resultant frequency scan shown on the screen etc. would be 65 MHz to 125 MHz. Note there will be negative signs in front of the frequencies to indicate this is not a usual mode. The "Steps" field is hopefully

obvious, this is the number of frequency points that each sweep will contain, strictly speaking it is the number of frequencies minus one, as there will be a frequency at both the "From" and "To" frequencies at the ends. Obviously the more steps you have the finer the resolution, but the longer each sweep will take.

Note: The display will draw lines between whatever discrete points you have, this is not an analogue unit where the frequency ramps from one point to the next, the display in this case does not tell you anything about what happened between one point and the next, despite what it may look like. So with a smaller number of steps especially over wide frequency ranges it is easy to miss narrow items. For example a sweep of a crystal in a parallel fixture may just show a straight line, until you get enough steps or get lucky with a frequency point just happening to be in the right place.

The final control on this panel is a small button marked "D", this is just a quick way to get the "From" and "To" etc. back to the Defaults for that particular DDS (0-30 MHz for an AD9850, and 0-60 MHz for an AD9851).

Note: As with any of the controls on the screen which would directly effect a scan, if you start to change any values the current scan will end, and if you are in continuous scan mode it will be stopped until you have finished your edits and you explicitly start it again.

This brings us to the Trigger Panel (Figure 6) which is located immediately to the left of the Comms. Panel.

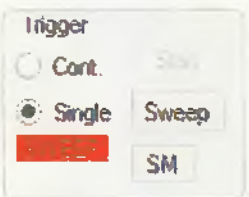


Figure 6: Trigger Panel.

The Trigger Panel contains two radio buttons to select between Single and Continuous sweeps. If you select Single (the default) there will be a button enabled marked "Sweep" which when pressed will initiate the sweep. As discussed in the program flow the red background around the word sweep will change to green while the sweep is actually taking place. If you select Continuous then the "Sweep" button will be disabled and the "Start" button will be enabled. Once "Start" is pressed the caption will change to "Stop", and a sweep will begin and shortly after ending another sweep will be commenced and so on until either you explicitly press "Stop" (which will turn back into "Start") or as mentioned before, you go to edit any parameters anywhere on the form that would affect the scan underway, and effectively the stop will be automatically pressed. With Continuous scans the SWEEP light will blink Green and Red.

Irrespective of single, or continuous sweeps, as mentioned earlier the maximum rate the sweeper is capable of is limited first and foremost by the throughput bottle neck of the serial connection. I have tried various speeds with the interface and the fastest I can run it without starting to have problems with lost data etc. is 57600 Baud. This may be a limitation of the PIC, the PIC clock rate I am using, the particular USB/RS232 dongle, or some combination of them all, you may have better luck with your set-up. Anyway at 57600 Baud the theoretical maximum rate with just a single channel active and only considering the serial data transfer would be:

57600 Baud = 5760 Chars/Sec ; A frequency set and one analogue read as per the examples above needs 38 characters to be transferred; which therefore gives about 151 measurements a second max. Adding another channel increases the total characters required to 56, which takes us down to 103 measurements a second, and adding the third channel with 74 characters total takes us to 78 frequency points per second.

This calculation is just to transport the data and does not allow any time to capture and process. In practice the best possible I have achieved with this interface without resorting to tricks is about 116 frequencies per second for one channel, 84 with two, and 66 with all three.

The last button in this Trigger panel is one of those tricks. It is labelled "SM" in honour of those optimistic lovers of performance cars for "Sports Mode". Pressing this button turns Sports Mode on, pessimists of course in the car case would see this button as turning traction control off, and the analogy holds good for GenSweep, which is why it isn't on all the time. In the GenSweep case when on, Sports Mode compresses all serial messages to remove any white space characters, and decreases the time slice available for all things other than the work of the actual sweep. The net effect of this is that you can get somewhat faster sweep rates, I have achieved over 130 frequencies per second for a single channel with only one sample (compared with the 116 with SM off), but the responsiveness of the rest of the interface is considerably affected, you have to be very careful to click and wait for the result, because if you are not sure and start clicking multiple times then it is very easy to get out of control and have the computer equivalent of a crash.

Leaving aside Sports Mode for the moment, an example of the performance I have achieved is shown in Figure 7 which is a graph of the number of frequency points per second versus the averaging or oversampling level for a two channel sweep.

As can be seen, up to about an oversample of 6 there is hardly any change in available rate (this is due to the serial speed bottle neck

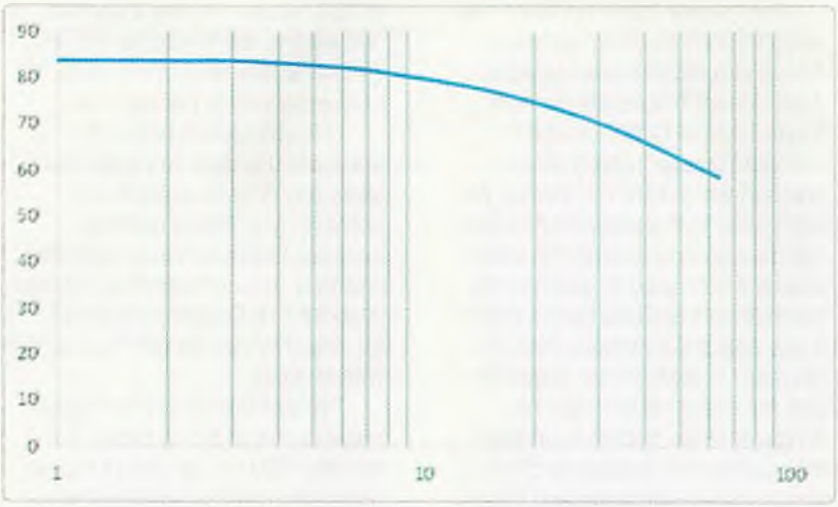


Figure 7: Frequencies per Second for 2 Channels vs. Oversamples.

discussed earlier) and we are only down 5% at 10. An analysis of this data (and other equivalent tests for one and three channel cases) shows that the underlying analogue sample acquisition time is about 40 uS per sample which is pretty much what we would expect from the data sheet and the Interface firmware.

Key factors that affect the effective rate you see are; how many channels are active, what the refresh rate is, what oversample (average) is used, and of course what serial baud rate is set.

The refresh rate is found on the Misc. Panel (Figure 8) which is just to the left of the Frequency Panel. The Refresh value is basically how many times per sweep will the display screen refresh (or as Microsoft calls it Paint). The default value of 10 means that the display will refresh ten times per sweep or once every division. On long sweeps with lots of steps and or high averaging you want the refresh rate higher so that you see the trace effectively move across the screen, at lower steps and/or averaging, and especially if you are doing real time tweaking of something like a filter and want immediate feedback you might want a refresh value of 1, i.e. the display doesn't update till it has all the data for the sweep.

The "A2D Avg." value is the number of samples averaged per analogue read, the value of 4 here, as discussed above, will have practically no impact on rates though the default is 1. The maximum value for average is 64.

The AD9851 check box is just to tell GenSweep that you have an AD9851 connected. When you check (or uncheck) this box a warning message will come up to tell you to be sure that it really is a AD9851 connected, as discussed above sending some AD9851 codes to a AD9850 could cause damage to the AD9850. There is no way for the program to tell what sort of chip is actually connected so the onus must rest with the user.

The last item on the Misc. Panel is the TPS value or Transactions Per Second. This is an indication of the rate of frequencies achieved per second for the sweep just finished.

The final set of control Panels is the Channel Panels (Figure 9), there is one panel for each of the three channels 0, 1, and 2. Each channel is highlighted in the colour chosen for the associated trace

Figure 8: Misc. Panel.

on the display and each has the same items. The "Export" button will open a file browser dialog to select a location to store, and what to name, a file in comma separated variable format of the data for a particular trace, or instance of a sweep, for that channel. There is a heading with Version and Date and Time information, and some column headings. Then there will be one line for each frequency which will include:

- The Raw Frequency
- The Raw Level
- The Display Frequency
- The Display level
- If present the Marker number at that point

Figure 9: Channels Panels.

The "Store" button will save the contents of the last trace for that channel for subsequent Normalization. When a trace is stored for a channel the store button background will be green. A trace store will become invalid if any parameter (such as frequency range or number of steps) that would make a future normalization impractical, is changed. Normalization is selected for a particular channel by selecting the normalization box. When a trace is normalized there is a point-for-point subtraction done between the new trace currently being captured and the saved trace. So Normalization is similar to Levelling but uses information from the same channel (from the past). Normalization is possible with only a single channel active and captures precisely what that channel sees. Its most annoying limitation is that it is a two-step process that you have to repeat every time you change

something. A classic example of normalization would be to normalize the Return loss channel. You would first set up the frequency etc. parameters of interest, and do a single sweep with either a short or open on the RLB test port, then you save this trace with the save button, and select normalize. A test scan with either single or continuous sweep with the short or open still present should now produce a pretty much straight line at 0 dB. Subsequent traces with the Device under Test should display the true return loss in dB verses frequency.

The "Level" checkbox will perform similar actions to normalization but no saved trace is necessary as the comparison (i.e. subtraction) is done against the reading on the current sweep for the channel marked as the reference. This means that Levelling will track and work even when you change frequencies etc. but is reliant on there being a constant relationship between the reference channel and the underlying level of the channel being levelled. Both Levelling and Normalization, when used by themselves, work against the raw level information of the trace (and saved trace) to produce the display level information of the new trace. If however both Levelling and Normalization are selected for a channel then it is assumed that the saved trace had been levelled before saving. In this case the normalization is done based on the saved trace levelled (i.e. display) levels.

The final check box in each channel panel is the Markers one. Selecting this will display the Markers window (if not already displayed) and enable the user to mouse click against a trace on the display to add a marker indication at that point. There will be more information on Markers in the later Marker window section of this article.

The Final thing to be talked about on the main GenSweep form is the Display itself (Figure 10).

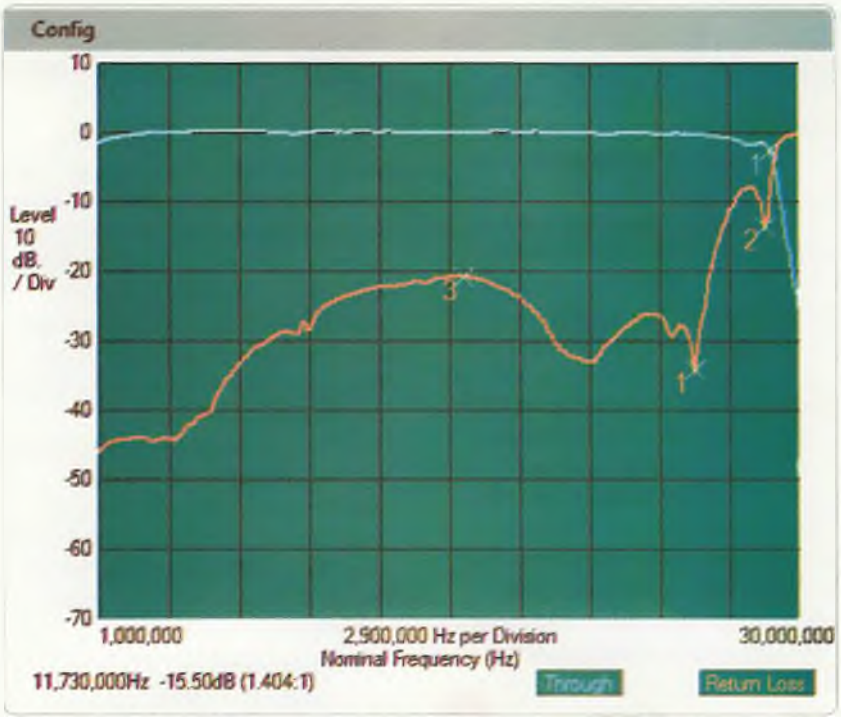


Figure 10: Screen Panel.

The Display is a classic 8 by 10 grid. 8 Vertical divisions representing the level in dB, and 10 Horizontal divisions representing the Frequency. Each active trace is plotted on the display in its chosen colour with any Markers indicated.

The axis values and per division values are indicated against the grid. At the base of the display is some further information. For each enabled channel there will be a small rectangle in the individual channel colours displaying the label configured for that channel. In the example here two channels are enabled and the orange channel is marked as Return Loss. To the left of these labels is a section that provides instantaneous readings of Frequency and Level of the point on the display under the current mouse cursor. i.e. as you move the mouse over the display this information will change. If so configured the level information will include a conversion to VSWR that will be made assuming the displayed level (without the negative sign of course) is Return Loss. In the screen capture here the mouse was over a point where the Frequency was around 11.7 MHz, and the level was -15.5 dB which would be equivalent as a Return loss of 15.5 dB or 1.404 to 1 VSWR.

Note: The entire main form can be expanded by grabbing a corner with the mouse and dragging it. Only the Display screen component will expand with the form, all other panels will just move up. The main form can also be shrunk but not below the minimum size required to fit all panels.

Each trace plotted on the display can (if so enabled on the relevant channel panel) have up to eight markers which will be show on the display, on the relevant trace as a cross and numbered 1 to 8, and in the Marker window in text format. Markers can be added by a mouse click on the relevant trace at the point of interest, and removed by a further click in the same place.

Note: the marker will be added at the nearest actual measured data point not just anywhere on the painted line. If you have a small number of steps the marker may appear to be not where you

expected it to be. Increasing the number of steps and reselecting the marker will usually correct this.

The text view of the Markers in the Markers Window (Figure 11) shows a list which includes a Marker identifier in the format Trace_Marker e.g. 1_1 is Trace 1 Marker 1, 2_1 is Trace 2 Marker 1, and so on. The list also includes the display frequency and level, all in the same colour as the relevant trace. Markers can also be deleted individually via the marker window by a double-click on the relevant row in the list, or all at once by use of the clear all button on the Markers Window. As individual markers are deleted the remaining markers will be renumbered to ensure that the marker list for each trace is a continuous sequence.

Figure 11: Markers window.

The other functions available as buttons on the Markers Window are:

Zoom – If at least two Markers are present (can be just one marker on each of two different traces), the From and To sweep frequencies are set to the lowest and highest Marker frequencies (across all traces) respectively, and if in single sweep mode a sweep will be initiated. Existing Markers are cleared. If you have done a wide sweep and there is some small feature that you want more detail on, you can quickly click either side of the feature to position markers and hit zoom.

Peaks – Automatically scan all traces and position a Marker at each peak (up to max number of markers, i.e. 8).

Nulls - Automatically scan all traces and position a Marker at each trough or null (up to max number of markers, i.e. 8).

Like the main form the Markers Window is resizable, however it also has the additional property of being kept on top of all other windows so it cannot get lost behind something else. This is necessary as it is a true separate window to the main GenSweep form, and can remain open and active while doing things on the main form.

The final items to be discussed are the configuration dialog windows accessed via the drop down menu "Config" on the top left hand side of the main GenSweep Form. Configuration dialogs are provided for:

- Screen Options
- AD9850/51 Reference Configuration
- AD8307 Calibration

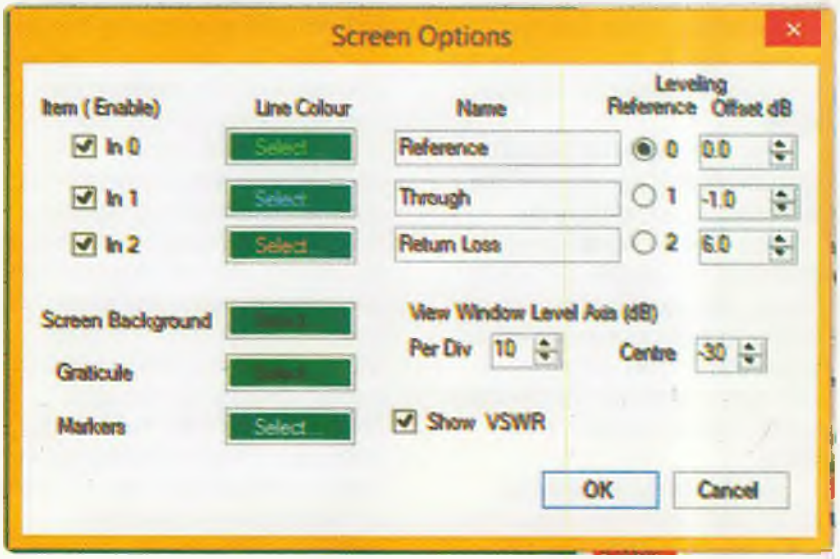
The Screen Options Dialog is shown in Figure 12. In the top half of this form are three rows, one for each channel or trace, 0, 1, and 2. The first item in each row is a check box to indicate if that trace should be enabled or not. The next item in the row is a button to allow selection of the colour to be associated with that trace. The next item is the name label to be applied to that trace, the next item is a radio button to select which trace is to be used as the reference. And finally a numeric entry box to provide a value to be used as an offset when the levelling operation is performed.

The bottom half of the form contains colour select buttons for the display screen background, the graticule, and the marker crosses. There is also a check box to indicate if the VSWR should be included on the text at the bottom of the main form that indicates the position of the mouse pointer on the display.

The final item on this dialog is a small panel used to configure how the vertical axis of the display grid is shown. The first figure (default 10 dB per division) sets the vertical scale, and the second sets the value for the display centre. These values only affect how the data is displayed not the actual level values.

The next configuration dialog to consider is the DDS reference oscillator configuration (Figure 13). GenSweep saves one reference oscillator value for an AD9850 and one for an AD9851, which of these is shown in this dialog depends on the AD9851 check box on the main page. The default for the AD9850 is nominally 125 MHz, and the AD9851 is 180 MHz. As typically the clock oscillators used are

Figure 12: Screen Options.



not variable and usually make no great claims for absolute accuracy anyway it is usually necessary to use something other than these nice round numbers for the actual reference clock.

Figure 13: AD9850/51 Calibration Window.

The setting process would involve connecting the DDS generator to an accurate frequency measurement device, setting the frequency out to a convenient value, and pushing the "Run" button. There follows an iterative exercise of adjusting the clock reference value until the DDS frequency out measured is exactly the same as the frequency selected. On pressing "OK" the reference frequency will be saved in a configuration file for future use, "Cancel" will not update the saved data.

Note: because the DDS has a finite resolution the actual frequency programmed may be slightly different from the frequency selected. The information line of Exact Freq. = in the above example indicated the actual frequency programmed in the DDS. In this example 1/100 of a Hz higher than requested. It is unlikely that your measurement system would detect this difference but it is noted for completeness.

It is important to consider that the crystal oscillators used are usually not temperature or otherwise compensated either, so allowing a period of time for stabilization prior to the calibration would be advisable, and even then it should be expected that there will be some drift over time. Regardless the frequency accuracy will most likely still be considerably better than the old analogue free running sweepers.

As an alternative to an accurate digital frequency meter preferably GPS locked. If you have a HF box that can receive say WWV on 10 MHz, draping an output of the DDS nearby when set to 10MHz should produce a beat note whose frequency you should be able to reliably judge down to within a few Hz.

The final configuration dialog is the AD8307 Calibration (Figure 14). The ultimate aim of this dialog is the entry of the factors required to convert between the A/D readings from the interface and the dB level being measured by the AD8307. GenSweep stores three sets of conversion factors, one for each channel.

Figure 14: AD8307 Calibration Window.

The format for these factors as used by GenSweep is a Divisor and a Constant. From the AD8307 data sheet we can see that the typical output characteristic of input in dB to output in volts is a simple straight line of more or less constant slope. While there is some rounding of the line at the upper and lower extremes, a reasonably simple model of the AD8307 performance would be a straight line with a slope of typically 25 mV out per dB in (or 40 dB per Volt if you look at it the other way around), which intercepts the 0 Volt axis at about -90 dB. Further as mentioned earlier if the 10-Bit interface A/D reference is 2.56 V, each count indicates about 2.5 mV (or 400 counts per Volt), the net effect of these two items says that the nominal slope of the conversion between dB in and A/D count out would be about 0.1 dB per count (or 10 counts per dB), with the offset being around -90 dB. For convenience GenSweep expresses the slope as a divisor rather than a gradient thus the nominal conversion factors in each case would be a divisor of about 10 and an offset around -90. Put mathematically dB = (A/D Count) / Divisor + Offset. It is unlikely that any particular AD8307 will be exactly in agreement with the typical values but as can be seen from the example above the factors I have calculated for channel (or port as it is described in this dialog) 1 are quite close to 10 (9.829) for the divisor and close to -90 (-89.323) for the offset.

If one is happy with being roughly correct you can simply accept the default values GenSweep sets for the conversion factors, they should be quite close. Alternatively there are basically two ways to find more accurate values. The first involves connecting the detector to be calibrated to a signal source of known amplitude that can be varied accurately between the ranges of say 10 dBm down to -70 dBm in several steps. At each level one or the other of the two Get-> buttons (it doesn't matter which in this case) are pressed to return the A/D count measured by the interface, and a graph is made of input dB vs A/D count. A typical example is shown in Figure 15 produced in this manner and plotted using a MS Excel spread sheet. One can calculate the gradient of the line and extend it to the axis to see the

intercept, but Excel offers the ability to superimpose a trend line with an equation to work it out for you. In this case the equation has the x and y the opposite way around so the transposition of the formula would give 9. 9612 as the divisor (close to 10) and the offset would be (-894.72/9.612) or -93.084 (which is about -90). These factors can be directly typed into the relevant fields.

The main advantage of this method is that it also provides a confidence level of how close the measured values were to the straight line approximation in terms of the R^2 value, which in this case is exactly 1 which indicates a perfect match.

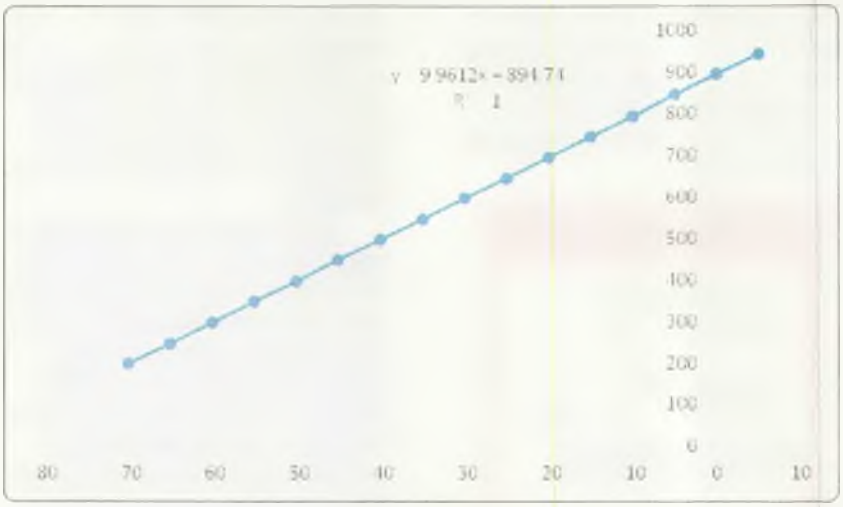
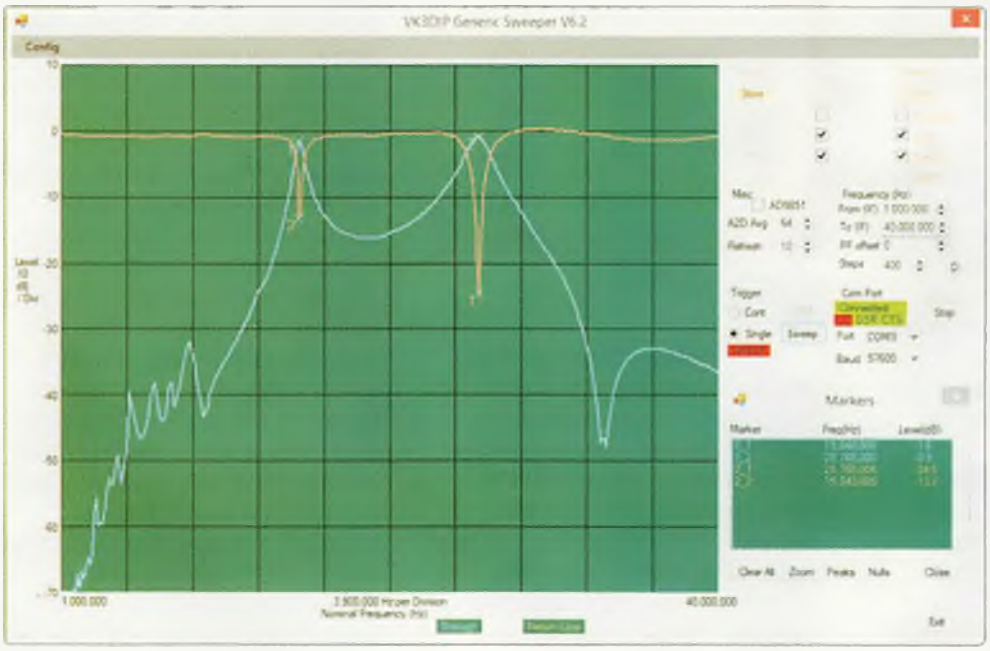


Figure 15: AD8307 Calibration via Excel Graph.

The other somewhat simpler method only requires a source with two known levels, say at 0 dBm and -60 dBm. The Source is set to 0 dBm and the "get->" button next to the 0 dBm is pressed, the source is then set to -60 dBm and the other "get->" button is pressed. This will have calculated the two A/D count values, and on pressing of the "Calc Factors" button GenSweep will assume a straight line between those two points and calculate the relevant factors. The actual levels used do not have to be 0 dBm and -60 dBm (so long as they are correctly set up in the appropriate "In level dBm" boxes, higher in the upper one lower in the lower) you can use whatever is convenient so long as they are within the linear range of the AD8307 (approximately +10 dBm down to -70 dBm), the calculations will be more accurate the further apart are these two values.

Note: if you do not have a calibrated signal generator, one possible alternative is something like the 0 dBm calibrator output from another piece of test equipment for the high level, and the same source through say a 40 dB attenuator (i.e. -40 dBm) for the low level. As an aside it is sometimes possible to purchase old HP power meters such as the HP 435b quite cheaply without a detector head, it is the detector heads that tend to be very expensive, and which tend to get broken or lost. Without a detector they of course cannot measure power but they do have a very good calibrate out signal available on the front of the box, that can be very useful as suggested here.

Figure 16: Sweep of supposed low pass filter.



GenSweep Example of use

To finish off after that very long description of the GenSweep software I provide one last example of how GenSweep can be useful in the shack. Figure 16 shows a screen capture of the GenSweep software in use measuring what was supposed to be a HF low pass filter.

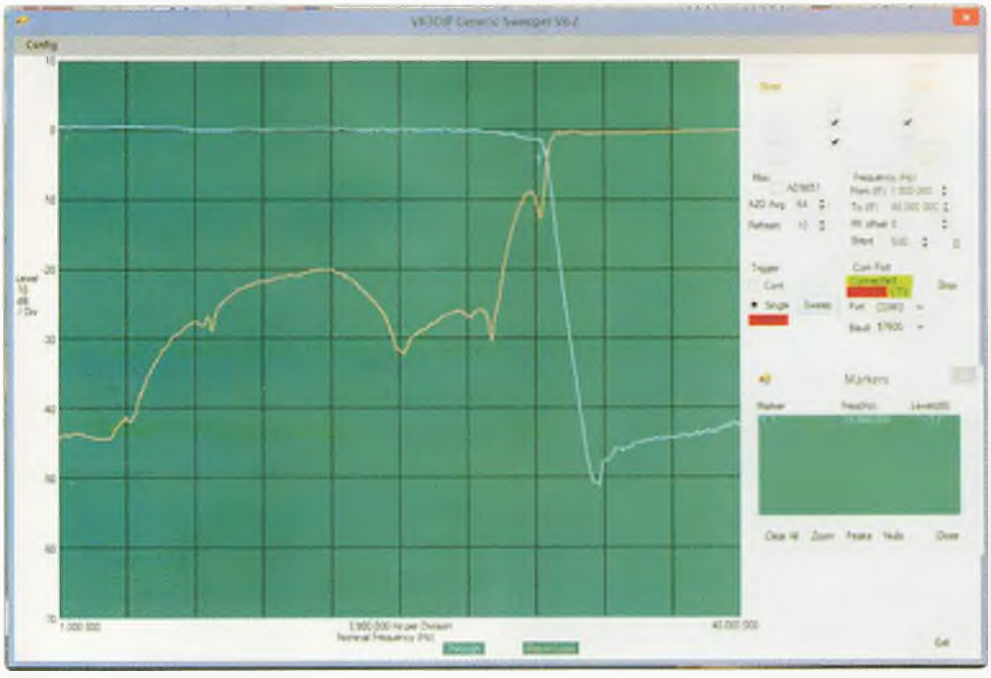


Figure 17: Fixed Low Pass Filter.

This filter had been obtained "as is" and while it was of a typically good quality brand I had been suspicious (from what the provider said and the fact that it was free) that it might have a few problems. Opening it up at home a quick look inside and all seemed in good condition, but rather than connect it up to the rig and put a hundred watts through it, I put it on GenSweep first. As you can see from the result, unless I had happened to test it at either about 15 MHz or 25.7 MHz I would have been risking the HF box to try it out. From the Through response we can see a pretty much band-pass filter response rather than a low-pass with relatively sharp sides between the 15 and 25 MHz figures. Yes the response did drop off pretty nicely above 30 MHz, but the return loss other than at those two narrow frequencies was pretty horrible. This filter would have been a trap waiting to destroy a transceiver. Even if you had cautiously tested it on receive first between HF box and antenna, it would have seemed to sort of work with good attenuation of signals over about 30 MHz and at least some quite strong signals below this, you possibly would not have noticed that they were strongest around 15 and 25 MHz. So when you started to transmit, unless you very quickly noticed the VSWR problem, there go the finals.

Anyway after pondering what could be causing this and tracing out the filter circuit I guessed that at some stage in the past the filter had probably had a problem, and had been opened and the PCB with the large wound coils and capacitors on it had been completely removed from its box to fix it. Sometime later when the PCB was being replaced in the box, whoever it was (and I assume it was a different person to the one who took it out) had simply soldered the external coax connector pins on the metal box back up to the "obvious" connections on the middle of each end of the PCB that were right next to the connector pins. In fact it turns out that the correct attachment points to the PCB are actually some distance from where the connector pins end up, and you need a couple of short wire links to make the correct connections. Adding the links and connecting it back up to GenSweep now gave the somewhat more conventional response shown in Figure 17.

This is much more like what we would expect. The Through response is very flat with virtually no loss from virtually DC up until it falls of the sharp cliff at about 28.8 MHz. From there on up there is over 40 dB attenuation. The Return Loss also shows a much better picture with better than 20 dB Return Loss (up to about 25 MHz) (1.2:1), though at around 10 metres the return loss is getting up to 10 dB (1.9:1), so continuing my theoretical hypothetical previous repair story perhaps this had been the original problem that was never fixed but only made much worse by someone having a play. I must admit I only have this reassembled wrong theory because I have done similar things myself in the past. These days I always take a photo of the innards of things with my mobile phone before I disassemble them, this proves very handy when it comes to putting them back together, especially if they have ended up sitting in pieces on the bench for a couple of months till I get back to them.

Figure 18 shows where I ended up with this filter. I replaced a few of the more suspect-looking fixed capacitors with trimmers and set GenSweep up for continuous sweep. In this case I used frequency steps of about 80 and "SportsMode" to get reasonably close to real-time feedback, so as I tweaked the trimmers I could see immediately on the display what effect I was having. Once happy with the result it was out of "SportsMode" back to single sweep with 400 steps, over 40 MHz, to check I hadn't missed anything. The

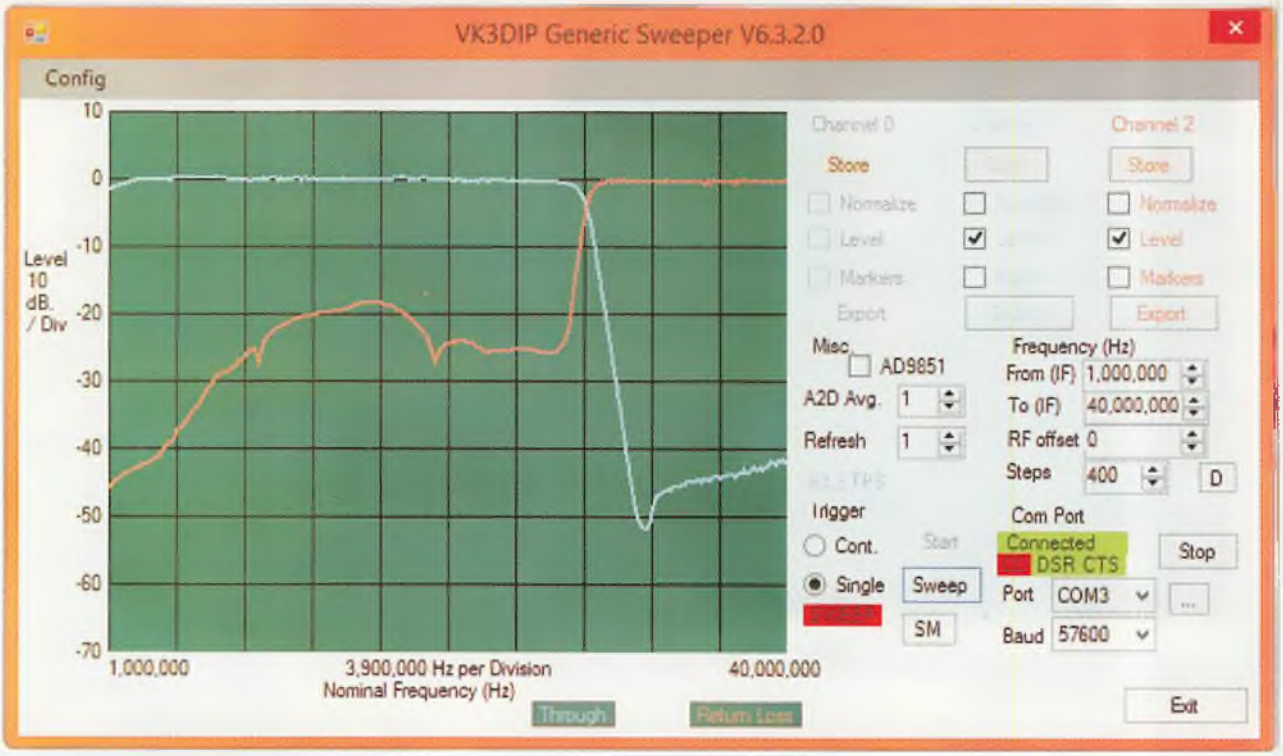


Figure 18: Really Fixed LPF.

result now has a much better return loss profile, and retains the sharp cut-off and I can use it with some confidence it will be helping things not harming them.

Conclusion

Hopefully you will by now have a good idea of the sorts of things you can do with GenSweep and how useful it can be for the radio amateur. This is really just a somewhat extreme case of an example of the sorts of things that can be done with the generic interface, minimal additional hardware, and some PC software. I trust it will prove as useful to others as it has been to me, and that if anyone has any comments, questions, or just wants to let me know how they get on with it, please feel free to do so.

73 Paul McMahon VK3DIP

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DX Talk

Luke Steele VK3HJ

After all the excitement of the very rare DX in the first quarter of this year, the "normal DX" seems a little tame. However, there is still some good DX to be worked, even in the declining conditions. On most days, 20 m still seems quite good, with the usual long path openings to Europe in the late afternoons, and even some Africa into the early evening. With the less crowded bands, one can enjoy a decent long conversation to the other side of the world, rather than the mostly very short contacts commonly experienced in busier times and with DXpeditions.

Later in the evening, 40 m has been quite reasonable to North America, as has 20 m, and even 80 m with the reduced storm static going into our winter. A VK2 station reported that one morning in May he worked a couple of Dutch stations on 80 m SSB low in our phone segment of the band. This is a bit unusual, as most of the DX phone activity on 80 m is in the "DX window" in the 20 kHz or so below 3800 kHz.

On the subject of 80 m, CW DX appears mostly towards the low end of 3500 – 3535 kHz. Band plans vary considerably around the world for this band, so a common segment was established for phone DX between 3794 -3800 kHz, later expanded to 3776 – 3800 kHz. This segment is available for use by Advanced licensees only.

North America is commonly heard during our evenings, and sometimes South and Central America, with some Asian and Pacific stations also. In the mornings until around sunrise, Europe may be heard. The 80 m band should see increased activity as interest moves away from the higher bands on the decline of Cycle 24. All modes are fairly active on this band, with CW and SSB predominant, but an increasing number of stations are using JT65 for their DXing on this band. Antennas used range from dipoles and loops to multi-element vertical arrays, and even 2 and 3 element Yagis.

Notable DX the log in May were E6AC Nuie, 9M0Z Spratly, XR0YS Easter, J68GU St Lucia, AT5P Rameswaram (India), all of them islands, and C5NX The Gambia was active in early June. Hopefully you had a chance to work some of the many Norfolk Island stations active around the end of May, or had the opportunity to operate from there yourself. Your author spent eleven days with the VK9NT DXpedition, the team's fourth activation there. More on Norfolk Island activities in next month's column.

A few upcoming activations of note are:

S79V Seychelles, Mahe Island (AF-024). A group of UAE operators will be operating all bands and modes from 1 - 10 July. See their website for more information. *http://www.a6dx.com/index.html*

YJ0GA Vanuatu, Efate Island (OC-035). Geoff ZL3GA will be returning to Vanuatu, and plans to operate 40 - 10 m. Geoff is seeking donations with OQRS and direct QSL requests to support a charity in Vanuatu. For more information see *http://www.qrz.com/db/YJ0GA*

The **RSGB Islands On The Air** contest is on over the weekend of 30 - 31 July. Watch out for activity before and after the contest. For a list of announced contest activations see *http://www.ng3k.com/misc/iota2016.html*, and for the contest rules see *http://www.rsgbcc.org/hf/rules/2016/riota.shtml*

A handy and up-to-date site to bookmark is NG3K's "Announced DX Operations" *http://www.ng3k.com/misc/adxo.html*

Just announced has been a large DXpedition to Bouvet Island, planned for late 2017/early 2018. Ralph K0IR, Bob K4UEE and Erling LA6VM have been working on this one for the past ten years.

The sunspot cycle continues to decline, with a few days in early June where the smoothed sunspot number was zero. Even with such numbers, there is still DX to be worked, so don't let the low solar indices deter you from turning on the radio.

73 and good DX,
Luke VK3HJ.

Help us

Contribute to the Weekly WIA News Broadcast. See our website for details.
www.wia.org.au/members/broadcast/contribute/

CW Today

Louis Szondy VK5EEE
vk5eee@wia.org.au

Thanks to many CW operators having returned to activities as well as growing and renewed interests in CW for the reasons we delved into in past issues of **CW Today**, we are now all enjoying more Quality Telegraphy Time. At the same time an insidious erosion of our CW bands is under-way, already started in USA and on the map in Australia and some other places, to do away with exclusive CW bands.

Irrespective of legislation that allows the use of USB on 40 m, LSB on 20 m and any mode to be used on any frequency, if gentlemen's agreements are no longer respected and radio amateurs cannot administer their own internal affairs, then legislative protections would become necessary, and some of us feel that is already required in the planned remake of the Australian amateur radio licence.

It is thus essential for us to remember the reasons that exclusive CW bands are required for users of the CW mode.

Why CW exclusive sub-bands?

The reason that CW is the ONLY mode to have exclusive bands until now is because unlike other modes, CW suffers the most from incompatible QRM. The reason why CW is the only mode to be allowed across the entire amateur bands is because other modes are not disabled, generally speaking, by CW. I will explain these two points in a little further detail:

CW by its very nature is a very narrow mode, on-off keying. It is generally used as an AURAL mode, as digitally it is inefficient. That means we decode it by EAR. Which means that we have to listen. Our human brain can easily separate out multiple CW signals at different pitches and our narrow filters can cut out other CW signals that are off frequency, should we wish.

However, an SSB signal, even in a narrow filter, will still cause interference to CW as it is broad banded. However, as the power of the SSB transmission is dissipated across a broader bandwidth, the power per hertz will be less but this is generally compensated by higher power allowance for SSB. But still the voice is not constant and it is thus possible to copy CW through SSB QRM, though very taxing upon the brain and frustrating because off-frequency SSB is a nasty sound. Our hobby isn't about being tortured, it's about enjoying, and hence SSB isn't allowed on the CW bands.

Even WORSE however, are data modes: because a data mode is usually constant and narrow in frequency, if zero beat with a CW signal, this will render the CW signal unreadable. Therefore, although SSB is incompatible to share frequency with CW without causing the CW interference, a data signal is generally far, far worse in its harmful interference to CW, so digital modes are more QRM than SSB.

The reverse however is not proportionally true. It is asymmetric and this is why CW is allowed anywhere on the band: if an SSB station is on a frequency and there is a CW signal, the CW signal can be quite effectively notched out - still leaving the SSB signal intelligible. If the CW is off frequency the pass band tuning may also be adjusted to filter it out and not one sound of it will remain.

For data modes, especially those that are efficient and have error-correction and are thus robust, a CW signal on the exact same frequency will at worst slow down the data throughput but no operators' ears will be harmed. Digital mode users generally are looking at their monitor screens, not listening to the data signal!

Another problem and reason that no other modes have ever been tolerated in the exclusive CW bands and the very reason also for their necessary exclusivity, is because if you are experiencing QRM from another radio station, you should have a right to know who that station is and to report them or complain to them. SSB, easy to tune in and complain, many of us have microphones but even in the CW position, provided on the correct side band, we can hear SSB and understand it if on roughly the same frequency; CW, even more easy to tune in, can be heard and understood by other CW operators at ANY audible pitch – basically as wide as is your filter, unlike SSB and Data modes where you have to be on the same frequency to communicate. Data modes, on the other hand, cannot be listened to without extra equipment and even then, not necessarily immediately, requiring fine tuning and many of the data modes cannot be interrupted by a third party no matter how urgent. This is why originally data modes had to send CW identification so interference could eventually be complained

against via alternative avenues to a radio amateur or to the authorities.

Now that CW Ident is not required and not used in Australia, we already suffer harmful QRM from digital modes and can do nothing about it. If a data signal causes QRM to a CW operator, the CW operator can NOT contact the data operator and tell them: a) he does not know who they are and b) they won't be listening anyway and c) they probably can't decode CW without switching to digital CW mode and even that won't be reliable – why should they – they'd have no idea the station is complaining and asking them to QSY. If a CW operator causes QRM to another CW operator, even if off frequency, a "QSY" can easily be understood.

The above are the main reasons, a simple logical reality fact check, as to why CW bands are EXCLUSIVE and why CW is however allowed across the entire HF frequency bands.

Now however, there are moves afoot to violate the rights of all human aural CW operators by lumping CW in as a "data mode" and/or extending the entire exclusive CW bands to being shared with Data modes. No good can come of this at all. It can only be perceived as, at best, ignorance of the above mentioned facts or at worst an attempt to push out the pleasure of CW and attempt to do the impossible: kill off the mode, so that more expensive radios can be sold, and to allow anyone passing the simplest of exams to get onto HF with a computer and use the limited HF resources, more money for ARRL/WIA, government tax, radio manufacturers etc. but at OUR expense, denying us the historic right to operate CW without interference from other modes.

Remember too that HF resources are now cut in half for the coming decade due to sunspot minima putting more pressure on 20, 30 and 40 m. We are already struggling for space and CW is after all undergoing a revival for several reasons not least the reason that techno and electronic music will never eradicate or replace human music generated by live singing, playing musical instruments, and all the benefits that brings to both the musician and the listeners, in addition to many other practical aspects detailed in past issues.

It is now high time for CW unions and associations to defend our rights against these insidious encroachments and the erosion of our rights and freedoms – 40 m is already often rendered almost unusable from non-CW QRM in the evening and night when it is often the only DX band available with modest means for the majority of Australian CW operators. And yet the top end of the SSB band on 40 m is empty bar a few broadcast splatters. We therefore hope that we won't have to migrate from the bottom 50 kHz of every band to the top 50 kHz of every band to avoid not only SSB but even worse, digital modes, as sharing with SSB is certainly the lesser evil. Bureaucrats without knowledge of the basics appear to be behind trendy ideas to lump CW in with Data, based on "bandwidth" or "on-off keying" or some other irrelevant comparison. What actually matters is the intelligibility and intercommunication compatibility between the modes, which is precisely why CW requires protection and exclusivity from all other modes.

Selection of CW Contests in July

Saturday 9 July 2016 1200 UTC to Sunday 10 July 2016 1200 UTC IARU HF World Championship: single and multi-operator stations contact as many other amateurs, especially IARU member society HQ stations, around the world as possible on all non-WARC HF Bands. Categories include CW or SSB only, mixed, high, low and QRP power levels. Exchange is signal report and ITU Zone (58 for VK6, 59 for VK1-3 and VK5, and 55 for VK8 and VK4) or for HQ Stations the abbreviation of the national society. Official rules at *www.arrl.org/iaru-hf-championship/*

Saturday 30 July 2016 1200 UTC to Sunday 31 July 2016 1200 UTC SWL and RSGB IOTA Contests: exchanges from Australia are RST, serial number, and OC-001 (if on the mainland island of Australia). CW, SSB or mixed. For details of rules please search the web.

Your comments, questions and feedback on CW Today are as always welcome via email to *vk5eee@wia.org.au*

73 & 77 de Lou VK5EEE

Erratum Steampunk antenna

Unfortunately, the reference list for the Dale Hughes article in the June edition went missing. The list is provided below.

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Silent Key

John A Sheard VK5JA

John Sheard VK5JA was born 20 June 1924 at Gawler, South Australia. He died 26 April 2016 at the age of 91.

His early interest in amateur radio was sparked by his father who built radios as a hobby and of course young John began by building crystal sets and battery powered wirelesses. Unfortunately batteries proved to be a big problem for John – hard to get and expensive.

At one of his many moves as a child, he had a special room for his experiments – it was known as the "Goofy House" because of all the strange noises that came from it.

A move to Mt Gambier followed when his father bought a business in the town. His dad's homemade radiogram was unusable as John discovered that the town supply was DC. A friend built a DC to AC converter to overcome this problem but there was so much interference that the radio was unusable, so steps were taken to convert the set entirely to DC. On one occasion John tried the unit at his work but successfully reversed the positive and negative supply – he told his friends that he had a sore backside for some days. Perhaps as a result he became very interested in building wireless sets and one of his early successes was powering the latest build from the DC light socket.

A move back to Adelaide followed, his father leaving a manager at Sheard's Shop and while there John left school and began work with a clothing manufacturer. With the rise of Hitler at this time the world situation looked uncertain, so John, not wishing to miss the action, joined the Air Training Corps. By this time he was 17 and wondering if the war would last long enough for him to enlist. At the age of 18 he went to the enlistment depot hoping to be a pilot. Because on the enlistment form he had indicated an interest in radio and the Air Force needed radio mechanics, he was directed to radio training at the Melbourne Technical College. John later reflected

on his improved skills in tower climbing and tuning of antennas with a handheld "standing wave" meter taking readings as he climbed.

His first posting was to the radar school at Richmond where John enjoyed the privilege of complete access to the new secret technology. Postings to radar stations at Albany, Busselton, Noonkanbah, Cockatoo Island and Archerfield followed in quick succession. At this last posting there was not much to do, so John and one of his mates busied themselves making short wave radios to listen to the action. A shortage of funds meant that parts were recovered from crashed aircraft. Enough parts were scrounged to make two short wave receivers.

From Archerfield, John and his teammates were put on a ship for Moratie on Halmahera, north of Indonesia, where they were put ashore with their sheets of plywood to construct storage. Later they sailed to Brunei Bay in North West Borneo where their job was to setup radar installations within a few hours of arrival. Armed Service ended when he was discharged to Melbourne then to Adelaide and it was there that he gained the callsign VK5JA.

Later he worked for the Decca Company in London servicing marine radar. It was here that he was licenced as G3GYO. He could not believe that London still had DC power in 1950. The Decca radar system was a precursor to today's GPS.

John returned to Mount Gambier with his fiancé Jean in February 1951 and they married 2 February 1952. He opened his own radio and electrical business in Gray Street, Mt Gambier. His shop became a mecca for the local boys seeking galena crystals and other parts.

With television starting in 1956, John built his own TV from disposal parts and used an antenna on a 20 foot (six metre) pole to receive the Melbourne Olympics TV broadcast.

A back to Mount Gambier event resulted in many people bringing old radios to display. They were given to John and he rebuilt and renovated them to start his extensive collection of vintage radios. John built from scratch a pedal generator unit as used in the Traeger RFDS radios. He used this to power a restored RFDS radio. At the same time as collecting vintage radios he built many replicas including those of the early Marconi Radios used in the Titanic.

John maintained his enthusiasm for his hobby and at the age of 80 accompanied a group of his amateur friends on a trip to the USA where he met astronauts involved in the space program and visited the Dayton Hamvention. He easily kept up with his younger mates on his trip of a lifetime.

John is survived by two sons and a daughter.

John was a kind and gentle man, very knowledgeable and generous, a true craftsman.

RIP John, your friends at the South East Radio Group will not forget you.

Prepared by Trevor Niven VK5NC.

WIA Contest Website

To keep up to date with all of the major Australian contests, including rules and results, at the WIA Contest Website at:

www.wia.org.au/members/contests/about

WIA AGM and Open Forum

Phil Wait VK2ASD

The WIA held its annual general meeting (AGM) and Open forum was held last weekend on Norfolk Island. The AGM is the formal part of proceedings where the Silent Keys are remembered, the new elected Board members are formally announced, and the Directors' and Treasurer's reports are discussed and voted on. Both reports were accepted by the meeting, with two minor items from the Treasurer's report referred back to the Treasurer for clarification.

Following the Open Forum the WIA Service Awards were announced.

Life Membership was awarded to Ted Thrift VK2ARA, for his contribution to the WIA and Amateur Radio in Australia in his work in Affiliated Club coordination and managing the Affiliated Club Insurance Scheme since its inception.

The GA Taylor Medal, the WIA's highest award, went to Dale Hughes VK1DSH for representing the Amateur Service internationally for many years, and for his leadership role in the official Australian delegation to WRC-15 in Geneva, which led to a new Amateur allocation at 5.3 MHz.

The Chris Jones Award was given to Jenny Wardrop VK3WQ/VK5ANW for her consistent support of the WIA and ALARA over five decades, as well as her historical research work, particularly on women in Amateur Radio.

The Ron Wilkinson award went to David Scott VK2JDS for his activities in 1296 MHz moonbounce, helping to maintain a profile of Australian participation in this leading-edge amateur pursuit.

The WIA Technical Excellence awards were awarded to Andy Nguyen VK3YT for his work with Pico Balloons especially circumnavigating the Southern Hemisphere, together with David Learmonth VK3QM and Lou Blasco VK3ALB for the re-purposing of ex-commercial 3.5 GHz equipment which increased activity on the 9 cm amateur band.

This year we had two new WIA Merit Awards: the Michael J. Owen Distinction given for outstanding service to the WIA, and the Foundation Award for excellence demonstrated in the true spirit of the Foundation licence. The inaugural Michael J Owen Distinction was awarded to Peter Wolfenden VK3RV for his exceptional voluntary service for the WIA over many decades, his role as Coordinator of the Historical and Archive Committee, and articles to Amateur Radio magazine on Australian amateurs in WWI and WWII for the ANZAC Centenary.

Inaugural Foundation Awards were given to Onno Benschop VK6FLAB for his enthusiastic work on helping newcomers to the hobby, and Damien Clissold VK5FDEC for enthusiastic, consistent participation in QRP, portable and Field Day activities in the best traditions of the Foundation licence.

Publications Committee awards are given to those who have made a standout contributions during the year to both the content and production of *Amateur Radio* magazine. These include:

The Higginbotham Award to Evan Jarman VK3ANI for 37 years' service to *AR* magazine, the Al Shawsmith Award to Peter Wolfenden VK3RV for his series of articles commemorating the ANZAC Centenary, and the *AR* magazine Technical Award to Jim Tregallas VK5JST for his article "A VHF/UHF Aerial Analyser".

This year, President's Commendations were given to: Adrian Addison VK5FANA, John Bates VK7RT, Lloyd Butler VK5BR, Mike Charteris VK4QS, Ron Cook VK3AFW, Noel Higgins VK3NH, Peter Cossins VK3BFG, Peter Gibson VK3AZL, Tony Hambling VK3XV, June Sim VK4SJ, and Roy Watkins VK6XV.

In the Open Forum segment where any item of interest to members concerning amateur radio and the WIA can be discussed, this year centred on youth and amateur radio, the future format and delivery of *AR* magazine, potential for website advertising, and how to grow WIA membership including the possibility of giving 1-year free Associate memberships to all new radio amateurs.

The WIA named 39 accredited Assessors who had played a key part of the WIA Exam Service and gave them certificates to signify their 10 years of service. The DXer of the year awards were also announced.

Appointment of WIA Office Bearers for 2016

WIA Office Bearers are appointed at the first Board meeting following the Annual General Meeting. That meeting was held on the Sunday morning following the AGM.

The 2016 appointments are as follows:

President:	Phil Wait VK2ASD (unopposed)
Vice President:	Fred Swainston VK3DAC (unopposed)
Secretary:	Jim Linton VK3PC
Treasurer:	Murray Leadbeater (practicing CPA)

The Board would like to thank all those who attended the AGM weekend and helped make it such a successful event. This year we trialled video streaming of the event for those who could not attend Norfolk Island, and from all reports it seems to have gone very well.

We will be placing more information about the AGM and the Open Forum on this website shortly.

I am very pleased to announce that the next AGM will be held in Adelaide.

Participate

Northern Corridor Radio Group 2016 Hamfest 7 August 2016

An overview of the WIA Annual General Meeting

Jim Linton VK3PC

Photo 1: The view south from Mt Pitt towards Phillip Island in the distance, with the township of Burnt Pine visible to the left. (Peter VK3PF).

Photo 2: Monique VK6FMON/9 activating Mt Bates VK9/NO-001. (Peter VK3PF).

Photo 3: Luke VK3HJ in action at the VK9NT station. (Peter VK2KNV).

The Wireless Institute of Australia (WIA) held its Annual General Meeting and associated events on Norfolk Island 27, 28, & 29 May, while many enjoyed visiting the tourist attractions.

The first main activity was an informal evening at the Norfolk RSL. It was reformed as a Sub-Branch in 1945 after the end of WWII - a part of the local heritage.

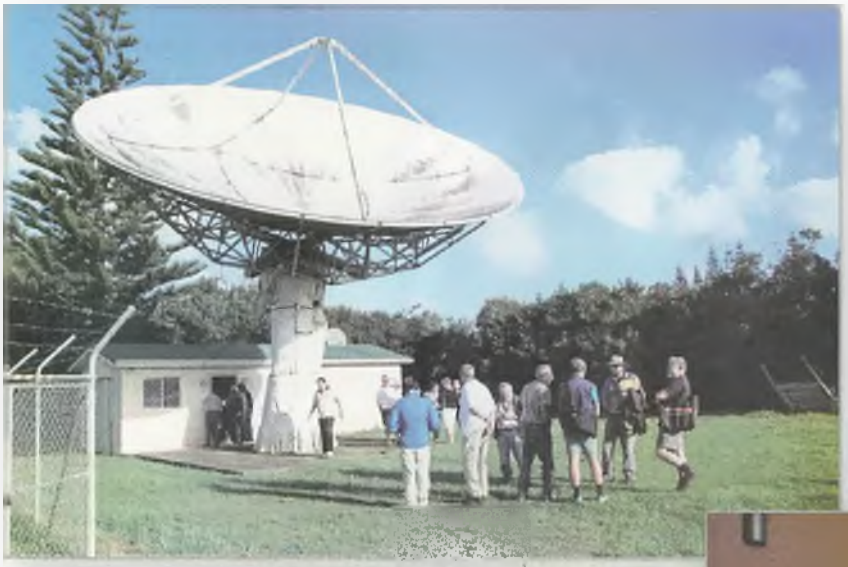

Photo 4: A group visited the local Earth Station, the telecommunications link to the rest of the world for Norfolk Island. (Peter VK2KNV).

WIA President, Phil Wait VK2ASD, gave a short welcome speech while there was enthusiastic support for the traditional RSL raffle.

A few later ventured to the recently opened Jolly Roger night spot that has become an attraction for locals and tourists alike, featuring a guitarist dressed as a pirate complete with a live parrot on his shoulder.

Photo 6: David VK5KC and Peter VK5APR chatting and listening on the accommodation balcony. (Peter VK2KNV).

Photo 5: Liz VK2XSE on her first successful SOTA activation with Ross VK2VVV watching, Mt Bates. (Peter VK3PF).

On Saturday 28, at 9 am in the Paradise Hotel was the formal, statutory AGM, followed after morning tea by the Open Forum with some informative interactive exchanges between the audience and the WIA Board. Lunch was followed by a two-stream speaker program over the afternoon.

Photo 7: Keith VK5OQ/9, Peter VK5APR and Phil VK2ASD/9 on Mt Pitt. Phil is having his first contact on 3.4 GHz. (Peter VK3PF).

During this time, the partners enjoyed a choice of two tours of the island - Craft and Food, or Island History.

All came together for the annual dinner at 7 pm at the Paradise Hotel. Keynote speaker for the dinner was the Honourable Gary Hardgrave, Administrator of Norfolk Island, who spoke about the island's intriguing history and the challenging time of change ahead.

Guest speaker at dinner was Doug McVeigh VK0DMV, who gave an illustrated talk about his recent time at Casey Station in the Australian Antarctic, its abundance of wildlife, the science carried out, and how many nations shared their resources on the icy continent.

Earlier the Norfolk Island repeater VK9RNI was in action and believed to be the first UHF amateur repeater on the island.

Photo 9: Paul VK5PAS/VK9PAS operating as VI9ANZAC from the station at Paradise Hotel. (Marija VK5FMAZ).

Photo 8: Ron VK3AFW/9 activating Mt Bates VK9/NO-001 on 20 m CW. (Peter VK3PF).

From Tuesday 24 May it had a news broadcast each evening at 5.30 pm local time with a rebroadcast on 7.105 MHz at 6 pm. This informative session was presented by Fred Swainston VK9DAC with many check-ins.

Qualifying contacts for the Norfolk Island Award, including Foundation licence holders, kept the repeater busy. Other QSOs were on 2 m simplex and HF.

A station was set up in the Norfolk Room at the Paradise Hotel for use by any radio amateur on a roster basis during the week.

Photo 10: Heath VK3TWO/9 operating at Puppys Point in the late afternoon. (Monique VK6FMON).

It was used also for the commemorative VI9ANZAC callsign that had around 400 contacts. Some of those were logged at the station and others out in the field, with one such operation at Puppy's Point.

All VI9ANZAC contacts are eligible for a QSL card that will be provided via the bureau or via e-QSL once arranged.

ALARA hosted a special afternoon tea for Kirsti Jenkins-Smith VK9NL, who was pleased to meet the many who attended. Kirsti VK9NL was happy with the EchoLink contacts possible during the occasion.

On Sunday 29, a number of groups walked to Mt Bates, which included a SOTA activation. A planned visit to Jacky Jacky, the peak on nearby Philip Island, was not possible as the trip had to be cancelled due to the windy weather.

During the weekend, a number visited the highly elevated Mt Bates on more than one occasion. Among them were those monitoring 146.5 MHz looking for simplex contacts for the WWFF program and SOTA activations.

Also on Sunday two microwave enthusiasts, Keith Gooley VK5OQ and Roger Harrison VK9NJ (VK2ZRH), ventured out to check out the local propagation.

Keith VK5OQ/9 took a 3.4 GHz rig and a 10 GHz rig to the lookout atop Mount Pitt, while Roger VK9NJ took a pair of rigs for these bands out to the historic ruins of the old gaol at Kingston, ferried around by Ross Masterson VK2VVV. Unsurprisingly, 59 contacts were had on both bands and it seems a 10 GHz DX record was established over the 5 km path!

On that day and later on the Monday there were tours of the local Norfolk Island Telecom dishes, the Radio Norfolk transmitter and studios.

At dusk on Sunday evening, a traditional island Fish Fry was held at Puppy's Point, a promontory overlooking the sea on the northwest side of the island.

Besides the food and music, a highlight was a performance by three traditional Tahitian dancers, who later gave lessons with many from the WIA joining in.

The WIA AGM weekend was highly successful, and had excellent coverage in the Norfolk Islander weekly newspaper with a front page photo and inside story.

More details about the AGM are to be found in this edition with the President's Comment, and elsewhere in this edition of *Amateur Radio* magazine.

Photo 11: Luke VK3HJ, Andy VK4NDY and Phil VK2ASD learning the male version of the Hula from a local at the Fish Fry. (Peter VK2KNV).

ALARA

Christine Taylor VK5CTY – Publicity Officer

ALARA AGM 2016

As you have been informed the AGM for ALARA was postponed to May 16 2016 and it was well attended. It really is great to see so many of us interested in the AGM.

There were 17 YLs present including Marilyn VK5DMS who checked in from Prague!

The meeting started with a few people on 80 metres while most of us were on EchoLink but when Helen VK2FENG managed to get EchoLink working, she and Christine VK5CTY moved onto EchoLink. There are people who don't think EchoLink is really part of amateur radio, but when it makes it possible for everyone to hear everything that is said at an AGM, we can see that it does have a place.

Our Secretary, Jean VK5TSX, is a trained shorthand typist so it is even more astonishing for the committee to have an email that same night with the complete minutes of the meeting. Most of the committee is as it was during 2015/16 but there are a few changes. Shirley VK5YL is now our President and Tina has moved to Treasurer. Our new Contest Manager is now Dianne VK4DI.

Thanks to the out-going committee, including Leslie who was Treasurer for most of the year and best wishes to the incoming committee.

Something to follow up if you live in VK3

A new Museum group has formed called the Women's Heritage Group. The aim of the Group is to celebrate women who have led the way by being the first Woman to take up a particular career or to show special leadership qualities.

One of the women mentioned in the first exhibition, at the Melbourne Town Hall during May, is Florence McKenzie, the first YL amateur licensee. Unfortunately this particular museum show will be over by the time you read this but you can find more information and on-going information at *http://www.herplacemuseum.com/*

I doubt if this will be the only showing of the place women have held in society, and it is possible that the other states will copy the idea. As YL amateurs, we are a special group of women in a mostly man's world.

Photo 1: Ngaire ZL2UJT.

VK/ZL YL contact on FreeDV

From Jenny VK3WQ/VK5ANW:

On 30 April 2016 at 0512 UTC, a two-way digital voice contact was made on FreeDV on 14.153 MHz by Ngaire ZL2UJT and Jenny VK5ANW.

Ngaire was in New Plymouth on the North Island of New Zealand and I was in Murray Bridge about 80 km east of Adelaide, South Australia. Conditions initially were good, but unfortunately the band started to drop out soon after the first over.

The equipment I used was my elderly Icom transceiver, together

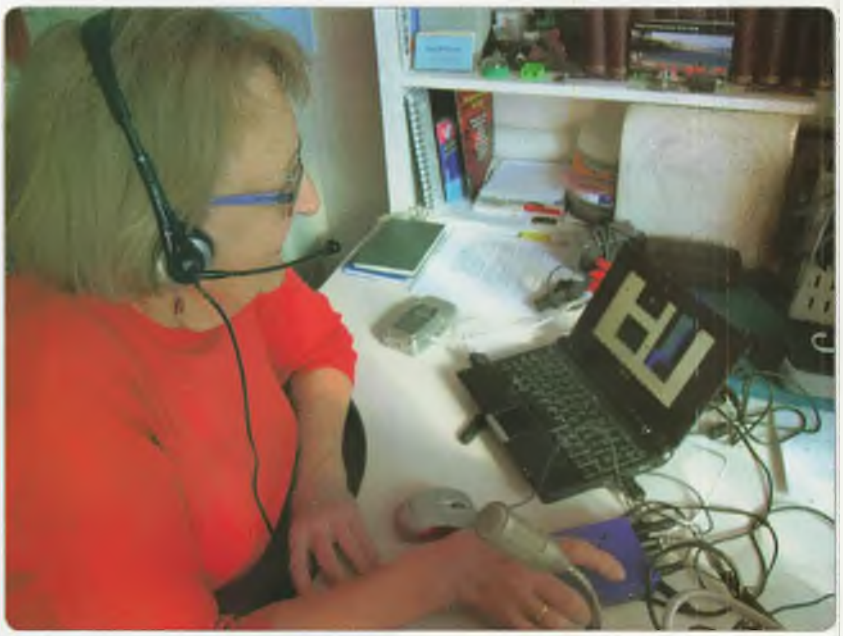

Photo 2: Jenny VK5ANW.

Photo 3: ASUS computer running FreeDV software to monitor signals.

with a Rowetel SM1000 Smart microphone (used for encoding and decoding the digital voice signals) and a 20 metre Inverted V Dipole. An Asus Notebook computer was also used to monitor the incoming signal.

We are not certain but we think that it was the first time that YLs have worked across the Tasman using this relatively new mode.

ALARA at Norfolk Island

ALARA members have been arriving on Norfolk Island this week (late May 2016) to attend the WIA AGM 2016 and to enjoy Norfolk Island's views and tourist delights.

On Thursday, we were well represented by Shirley VK5YL, Lesley VK5LOL, Jeanne VK5JQ, Christine VK5CTY, Cecily (Gary's YL) and Kaye VK3FKDW when we met up with Kirsti VK9NL. Bev VK6DE and Lyn VK4SWE then joined us on EchoLink.

Kirsti (and her OM Jim (SK)) has been a resident of Norfolk Island for many years and they were both well-known contacts around the world. EchoLink was new to Kirsti and she was delighted to speak with Bev VK6DE who has been a regular visitor to Norfolk Island in the past.

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Christine Taylor VK5CTY

Photo 4: ALARA meeting Kirsti. Back: Shirley VK5YL, Lesley VK5LOL, Cecily XYL and Kaye VK3FKDW. Front: Christine VK5CTY, Kirsti VK9NL and Jeanne VK5JQ (Photograph courtesy Robert Broomhead VK3DN).

Photo 5: Kirsti VK9NL using EchoLink (Photograph courtesy Robert Broomhead VK3DN).

VK5news Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY

AHARS AGM

The general meeting on 19 May 2016 was to have been a lecture on Archery but unfortunately the lecturer did not turn up. Graham VK5ZFZ stepped into the breach and outlined what he intended to cover in the series of lectures on Arduinos and shields instead.

Graham is to run a series of teaching sessions at the Shack in June about the uses of some of the new "caterpillars" microprocessor chips. The series he will be demonstrating can be used for many different devices with programming tools that are all freeware. All the students need to bring along is a laptop and themselves. They do not even need a vast knowledge of electronics or technology. Graham has run this course for a group like the U3A who have no prior understanding of the theoretical background.

What is more, they all succeeded in making a working device. There were CW generators, amplifiers and various clock systems. None of the microchips or additions are expensive such is the complexity of the microchip themselves.

For the AHARS members Graham will add a technical component to the course for those that are interested.

Graham also gave us an overview of the new Windows 11 that is on the horizon. Watch out for this later this year.

Graham is also involved with a laser lab which may be visited by the club later in the year. For those interested in building equipment themselves or etching circuit boards, this sounds like the place that could help.

Mid-Year Dinner

As usual this will be a luncheon to which wives and partners are invited, so we don't have to go out at night in mid-winter. It will be held at the Victoria Hotel at located on O'Halloran Hill on the Main South Road. The date is Sunday 17 July 2016 and the time is 12.00. Put it in your calendars now.

International Lighthouse Lightship Weekend

As mentioned last month, this weekend is approaching. If you have not yet put your name down please contact Paul VK5PAS at *vk5pas@wia.org.au*

Other Events

It is time to make sure your equipment is all working well ready for the Remembrance Day (RD) contest and two weeks later, for the ALARA Contest. Details of both can be found in the June issue of *AR*.

73

Christine Taylor VK5CTY

AMSAT-VK

AMSAT Co-ordinator
Paul Paradigm VK2TXT
email: *coordinator@amsat-vk.org*

Group Moderator
Judy Williams VK2TJU
email: *secretary@amsat-vk.org*

Website:
www.amsat-vk.org

Group site:
group.amsat-vk.org

About AMSAT-VK

AMSAT-VK is a group of Australian amateur radio operators who share a common interest in building, launching and communicating with each other through non-commercial amateur radio satellites. Many of our members also have an interest in other space based communications, including listening to and communicating with the International Space Station, Earth-Moon-Earth (EME), monitoring weather (WX) satellites and other spacecraft. AMSAT-VK is the primary point of contact for those interested in becoming involved in amateur radio satellite operations. If you are interested in learning more about satellite operations or just wish to become a member of AMSAT-Australia, please see our website.

AMSAT-VK monthly net
Australian National Satellite net

The net takes place on the 2nd Tuesday of each month at 8.30 pm eastern time, that is 0930 Z or 1030 Z depending on daylight saving. Check-in starts 10 minutes prior to the start time. The AMSAT-VK net has been running for many years with the aim of allowing amateur radio operators who are operating or have an interest in working in the satellite mode, to make contact with others in order to share their experiences and to catch up on pertinent news. The format also facilitates other aspects like making 'skeds' and for a general 'off-bird' chat. In addition to the EchoLink conference, the net will also be available via RF on the following repeaters and links.

In New South Wales
VK2RBM Blue Mountains repeater on 147.050 MHz

In Queensland
VK4RIL Laidley repeater on 147.700 MHz
VK4RRC Redcliffe 146.925 MHz IRLP node 6404, EchoLink node 44666

In South Australia
VK5TRM, Loxton on 147.175 MHz
VK5RSC, Mt Terrible on 439.825 MHz IRLP node 6278, EchoLink node 399996

In Tasmania
VK7RTV Gawler 6 metre repeater 53.775 MHz IRLP node 6124
VK7RTV Gawler 2 metre repeater 146.775 MHz IRLP node 6616

In the Northern Territory
VK8MA Katherine 146.700 MHz FM

Operators may join the net via the above repeaters or by connecting to EchoLink on either the AMSAT or VK3JED conferences. Past experience has shown that the VK3JED server offers clearer audio. The net is also available via IRLP reflector number 9558. We are keen to have the net carried by other EchoLink or IRLP enabled repeaters and links in order to improve coverage. If you are interested in carrying our net on your system, please contact Paul via email. Frequencies and nodes can change without much notice. Details are put on the AMSAT-VK group site.

Become involved

Amateur satellite operating is one of the most interesting and rewarding modes in our hobby. The birds are relatively easy to access and require very little hardware investment to get started. You can gain access to the FM 'repeaters in the sky' with just a dual band handheld operating on 2 m and 70 cm. These easy-to-use and popular FM satellites will give hams national communications and handheld access into New Zealand at various times through the day and night. Currently only SO-50 is available.

Should you wish to join AMSAT-VK, details are available on the web site or sign-up at our group site as above. Membership is free and you will be made very welcome.

VK3news Geelong Amateur Radio Club

Tony Collis VK3JGC

Centenary of the Battles on the Western Front

With the support of the WIA the Geelong Amateur Radio Club will activate the special event call sign VK100ANZAC to commemorate Australia's first major engagements on the Western Front at Fromelles and Pozières. This will be the third project undertaken by the GARC having received a Commonwealth ANZAC Community Grant. This activity was project managed by GARC member Barry VK3SY. *(See separate related story in this issue.)*

Photo 2: Barry VK2SY also received an Ambassador certificate.

The GARC is liaising with the Radio Club du Nord de la France F8KKH, situated in the city of Roubaix close to the battle fields, to exchange messages and enable French language students in Geelong to speak with their counterparts in France. The activation on HF and VHF will occur from midday Tuesday 19 July 2016 until midday Thursday 21 July 2016 from Osborne House in Geelong, Australia's first Naval College.

The GARC members endorsed the appointment of Ken Jewell VK3NW as our ANZAC Ambassador for this activation. Ken is the doyen of DXers within the club, with an intimate knowledge of military history.

Background: Australia's first major engagements on the Western Front

On 19 July 1916, the Australian 5th Division assaulted the German trenches at Fromelles, where they suffered grievously from enemy machine-gun fire as they attempted to cross No Man's Land. Small parts of the German trenches were captured, however devoid of flanking support and subjected to fierce counter-attacks, they were forced to withdraw. By 8 am on 20 July 1916, the battle was over.

The Division suffered 5,533 casualties, the worst day in Australian military history.

The village of Pozières was captured by the 1st division on 23 July 1916. The Division clung to its gains despite almost continuous artillery fire and repeated German counter-attacks.

Photo 1: Ken VK3NW with his Ambassador certificate.

By the time it was relieved on 27th July 1916, it had suffered 5,285 casualties.

SK: For two GARC members

It is with a great sadness that I report the recent passing of Graham Hill VK3MAP and Peter Ward VK3ZAV; both of whom will be sorely missed by the club members for their sense of humour and enthusiasm in all aspects of amateur radio, particularly that of antenna design and construction. See page 40 and 41 for more details.

Can you contribute?

Our **SWL** contributor has retired.

Are you able to put together regular contributions on this subject, or on a topic not already covered in the magazine?

Please read the information on how to contribute (*http://www.wia.org.au/members/armag/contributing/*) and then send an expression of interest outlining your interest to: *armag@wia.org.au*

Silent Key

Peter Ward VK3ZAV

Peter was born on 20 January 1939 and passed away on 12 May 2016 after a short illness. Peter obtained his amateur radio licence in July 1955 at the age of 16.

In his early career he worked for the SEC.

At his funeral at The Uniting Church in Ocean Grove Victoria on 24 May 2016, reflections on Peter's life came from his daughter Jenny and grandson Shane, his local priest where Peter was also a lay preacher, and the amateur radio community.

From Calvin VK3ZPK, on behalf of the Geelong Amateur Radio Club:

Peter Ward was part of the very fabric of the Geelong ARC and of amateur radio in general. He will be missed for many reasons, as much for his warmth and humour as for his technical skills.

Peter was not only interested in the history of outmoded technology but he embraced state of the art technology such as:

Antenna-analysing with a computer tool called MMANA-GAL, and Arduino, open-source computer hardware and software.

Microcontroller-based modules, digital devices that are interactive that anticipate and that can sense and control the physical world. This was the subject of his last talk at the GARC.

Peter was just so knowledgeable and full of enthusiasm, especially in VHF/UHF radio.

I first met Peter at the Geelong ARC in 1959; I was a newcomer then and had just commenced my apprenticeship in two-way radio.

Peter was also a real Christian Bloke, he never forgot a friend and if you needed help he was there.

From the GARC President Lou VK3ALB:

Peter gave me my first on-air contact when we moved down to Geelong and at the Club he would always make an effort to greet visitors to our club as soon as they walked in the door, speaking at length about our hobby.

From Ray VK3ACR:

I am so saddened by the news. I have known Peter since 1957. My first memories were of his Barrabool Radio shack; he was a great teacher and mentor in my early days. Peter was instrumental in getting me

into study for my amateur licence and also to RMIT for the start of my education into radio and electronics.

Then from another amateur:

Peter helped me to get my first 2 m AM transmitter going, a WW2 radio and, from my log, Peter was my second contact at 2110 on 9 January 1961.

I have had a lot of interesting discussions with Peter over the years and will miss him. I shared many interesting conversations with Peter. We had a common interest in many things including valve history. He organized scanning and publication of AWA Radiotronics magazine along these lines. He will be sadly missed.

And all the way from Holland, Frank Philipse:

Yes, indeed he sent me lots of AWV Radiotronics. I have some more AWV copies and I still have to add them to the Web page that Peter started.

So sorry to hear that he has passed.

Peter was also working on a mysterious and exotic antenna design, the crossfield antenna. This had applications as a compact broadcast antenna for limited space where low frequencies usually call for physically large radiating elements.

Some reflections by Barry VK3SY:

When asked a question about an obscure component particularly a valve, say it was required for refurbishing an old radio, not only would he divulge the type, its function in the circuit, manufacturer, American equivalent, its history when first used and for what purpose, but also who might have one.

His desire to digitise magazines which are decades old was not only to preserve history but he felt a sense of justification if one person found the answer to a perplexing problem encountered in the restoration of an antique radio receiver or transmitter.

Peter had the habit of interrupting a lecture with a humorous aside the significance of which was beyond most of the listeners. He was the epitome of the spirit of friendship and cooperation within the amateur fraternity. He will be greatly missed.

If you needed a bit of say technical information from Peter, you would get the bit you wanted and a whole lot more in a short time if he sensed you were in a hurry, or the whole story, chapter and verse as well as the history behind it , the inventor/discoverers name and all if you had the time. Peter was an absolute font of knowledge.

One anecdote stands out that captures the essence of Peter:

It was an Open Day at the GARC in the old rooms at the rear of the Congregational Church in Gheringhap Street Geelong on a Saturday morning in 1960. Peter and some others were setting up a beam antenna on a short pipe mast attached to a fence for 2 m AM when an onlooker, just a shopper who had called in for a look, asked as a joke, why don't you use the Cross: there was a slender cast iron cross on the spire. Instead of just replying on the impracticability, as near as I can remember this was Peter's reply:

"Because we'd be much worse off; the cross is vertically polarised, partly top loaded therefore we would have losses due to polarisation and we would suffer a 20 dB increase in ignition noise on our received signal. No we prefer to use horizontal polarization."

The onlooker stood in total amazement.

We'll all remember Peter for a long, long time. God Bless you Peter.

Silent Key

Graham Hill VK3MAP

I'm saddened to report that our friend and GARC colleague Graham John Hill VK3MAP, who was born on 26 July 1940, passed away unexpectedly in the early hours of the morning of Monday 2 May 2016.

Graham is survived by his wife Marian, son Lachlan and daughter Georgia.

Graham became a member of the GARC in September 2014 and after attending the Foundation Licence training programme obtained the call VK3FAIC in November 2014. He then continued with the GARC's training programme and acquired a Standard call VK3MAP in October 2015.

Graham had progressed quite a way from the first time he came to the GARC. His dogged determination to learn more and improve his radio station was impressive; he never gave up.

In his last months he had installed a tower and rotator and up to 1 May he was still working on assembling his three

element beam for HF, to replace his original dipole.

Of a morning he could be heard on 40 m taking part in the regular interstate nets; he was also a big contributor to the Club's Wednesday group and thoroughly enjoyed his time at the club and his journey into amateur radio. He was readily approachable and fitted well in our club; it will be tough not to see him and his cheery disposition around anymore.

Graham grew up in Geelong and was a qualified printer and a real estate salesman.

Amongst his many hobbies, in addition to amateur radio, were membership of the Bellarine model aircraft club, archery, hot air balloon piloting, crystal set construction and he was also a member of the Geelong MG Car Club.

Up until his passing he was enthusiastically looking forward to pursuing his overseas radio contacts with a new mast and beam antenna system, having had some success with his initial dipole set up.

A funeral service was held at Graham's farm on 5 May 2016 and then attendees moved to the Queenscliff Bowling Club to share refreshments, fellowship and memories of Graham. A private cremation was then held.

GGREC HAMFEST

Saturday 16th July 2016

Gippsland Gate Radio & Electronics Club invites you to our annual Hamfest at the CRANBOURNE PUBLIC HALL, located on the corner of Clarendon and High St. Melway 133 K4.

See our web page at *http://grec.org.au/hamfest.html*

40 tables of new and used Electrical, Electronic and Amateur Radio equipment.

- Everything is under cover.
- Tea and Coffee available during the event.
- A selection of hot & cold food will be available.
- Great Door Prizes will be drawn at approx 1:00 pm.
- Doors open to sellers at about 8.30 am & buyers at 10 am.
- Buyers can gain entry for $6.00.

VK7news

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

PS-64/VK9WI pico-balloon visits VK7

During the WIA AGM weekend on Norfolk Island, Andy Nguyen VK3YT released a pico-balloon that was transmitting special telemetry for the AGM. The balloon even did a tour of the VK7 East Coast before heading across the Tasman Sea and into the South Pacific Ocean at the time of writing.

			Rx Frequency	
UTC	dB	DT	Freq	Message
0623	-20	-0.4	1656	@ 1/2P20M 56 03
0633	-25	-0.4	1657	@ 1/3C2OO 55DOH
0102	-17	-0.2	1858	@ VK9WI21C3MW89
0104	-17	-0.2	1858	@ WIA AGM VK9WI
0122	-15	-0.5	1858	@ VK9WI21C3MW89
0123	-16	-0.5	1859	@ 1-?S1/EA582DF
0302	-13	-0.2	1859	@ VK9WI2273JXRB

Photo 1: Special telemetry to celebrate the WIA AGM on VK9. (Screen grab courtesy of Justin VK7TW).

North West Tasmania Radio and TeleVision Group (NWTR&TVG)

The NWTR&TVG held a fox hunt round the central coast area of VK7 with about 10 chasers participating. The fox did a good job broadcasting call sign, noises and the occasional cryptic clues. The first chaser reaching the fox about an hour and half after starting; congratulations to first fox David VK7DC. Once all chasers arrived there was a BBQ and social chat. More are planned!

Tony VK7AX lets us know the streaming addresses for the regular broadcast as below:

Video Stream: *http://www.batc.tv/streams/7ax*

On Demand audio streams:
VK7 Regional News: *http://www2.vk7ax.id.au:8000/VK7Regional.mp3*

VK National News: *http://www2.vk7ax.id.au:8000/wianews_64.mp3*

RAOTC Monthly Broadcast: *http://www2.vk7ax.id.au:8000/RAOTC.mp3*

A reminder that the club caps are now available with the name of the club and your callsign embroidered on the cap. Contact the President Tony VK7AX if interested and thanks to Rod VK7EH and his workplace for sponsorship of the caps.

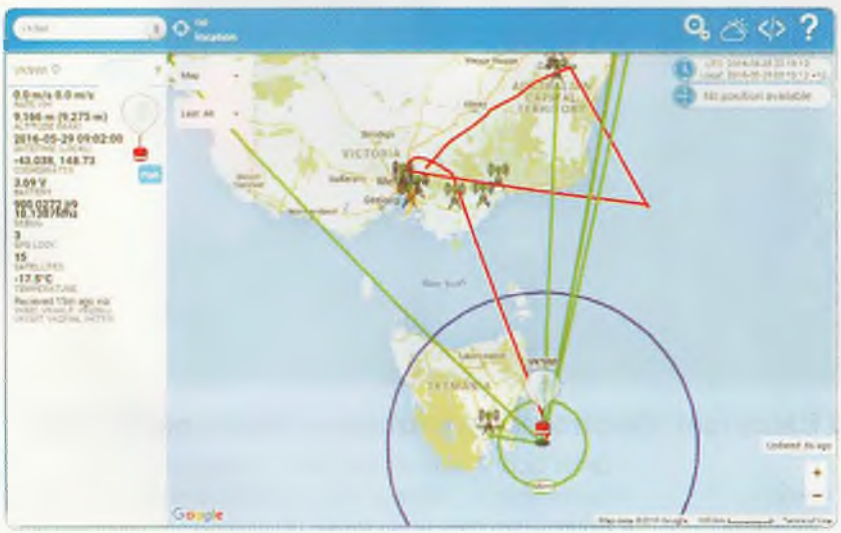


Photo 2: PS-64's tour of Tassie! (Screen grab courtesy of Justin VK7TW).

Northern Tasmanian Amateur Radio Club (NTARC)

Congratulations the Alan VK7BO who came second with the VK Team 1 in the RSGB Commonwealth Contest 2016. This is a worldwide contest and the two VK teams came second and fourth; well done to all involved.

NTARC's May meeting commenced with a BBQ lunch, general meeting and then into an excellent presentation by David VK7JD on digital voice modes. The presentation included a demonstration of the current equipment used and the various modes that are popular. These devices included the hotspot devices that allow any amateur with an internet connection to operate digital voice through reflectors and repeaters available worldwide.

The equipment demonstrated included a Yaesu DR-1 dual band digital voice repeater which can cover both conventional FM analogue and the Yaesu Fusion C4FM digital voice modes. Thanks David. In general business NTARC agreed to purchase a Yaesu DR-1 repeater for the Mt Arthur repeater VK7RAA. The afternoon was completed with the traditional NTARC afternoon tea.

NTARC provided safety and checkpoint communications for the Lebrina equine endurance ride on Saturday 21 May. Despite a few late changes to starting time and course changes the crew was ready and operation was seamless during the ride. Thanks to Norm

VK7KTN, Peter VK7KPC, Alvin VK7ADQ, Idris VK7ZIR, Tim VK7TS, Andre VK7ZAB, Stuart VK7FEAT, Ken VK7KKV, Wayne Hodge, Peter VK7KPC and Alvin VK7ADQ.

Photo 3: Alvin VK7ADQ at Eagles Lair checkpoint (Photo courtesy of Idris VK7ZIR).

Radio and Electronics Association of Southern Tasmania

Strong involvement in the 23 cm QSO parties with an average 5-6 participants each Sunday morning. This was despite heavy rain and North-South digital signals appeared to be enhanced from the rain scatter and variable SSB signals up to a 55 levels. Experimentation continues with feedline losses being eliminated, scatter from our passive reflector called Mt Wellington and wide rain scatter signal spreading.

REAST's May presentation night saw David Craig, President of the Hobart Hacker Space and other members, come along and tell us more about the organisation and the hacker community. David was quick to define hackers as people who can come up with a clever solution to a problem and not people trying to break into your bank account! The Hobart Hacker Space located in New Town is well

Photo 4: David Craig from the Hobart Hacker Space presenting to the REAST audience. (Photo courtesy of Ben VK7BEN).

equipped with a CNC mill, laser cutter and 3D printers for members use. Underlying principles are very similar to amateur radio – the hackers before hackers...HIHI. A reciprocal presentation on amateur radio is planned. Thanks David.

Our DATV Experimenter's nights have been a combination of DATV and social nights starting with Scott VK7LXX and his Red Pitaya. Described as the Swiss Army knife of test equipment and started as a crowd funded project, it ended up an open-source-software measurement and control tool that consists of easy-to-use visual programming software and free of charge, ready-to-use open-source, web-based test and measurement instruments running on a powerful, credit card-sized board. This includes a web-based dual trace oscilloscope, spectrum analyser 0-60 MHz, signal generator, LCR meter, Bode analyser and many other applications. Scott demonstrated many of these functions, thanks Scott. Our video theme continued with further historic Hydro Electric Commission videos thanks Bob VK7ZL.

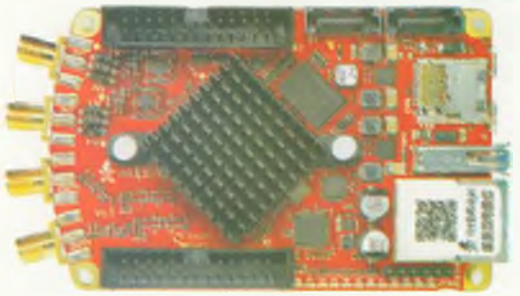


Photo 5: Red Pitaya Open Source Analysis Board. (Photo courtesy of Elektor Online).

Guy Fletcher Gridsquares Table

Unfortunately, we have not had space to include the latest Gridsquares Table in the magazine last month or this month. Those interested can find the Table at the following site:
http://www.vk3hz.net/gridsquares/index.html

Results John Moyle Memorial Field Day 2016

Denis Johnstone VK4AE
Contest Manager, JMMFD 2016

24 Hour Portable Operation – Multiple Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Place /Award
VK5LZ	Multi	All	All	587	10,675	1/*/**
VK3ER	Multi	All	All	839	5,606	2/*
VK3YVG	Multi	All	All	262	1,121	3/*
VK4IZ	Multi	All	HF	616	1,484	1/*
VK2WG	Multi	Phone	All	415	2,190	1/*
VK3JNH	Multi	Phone	All	310	1,434	2/*
VK3CNE	Multi	Phone	All	186	1,125	3/*
VK2HZ	Multi	Phone	All	327	806	4/*
VK4WIT	Multi	Phone	All	125	468	5/*
VK6NC	Multi	Phone	All	170	398	6/*
VK2JQ	Multi	Phone	All	133	268	7/*
VK6WI	Multi	Phone	All	116	255	8/*
VK4WID	Multi	Phone	HF	528	1,056	1/*
VK4QD	Multi	Phone	HF	478	952	2/*
VK5KDK	Multi	Phone	HF	208	416	3/*
VK5BAR	Multi	Phone	HF	180	360	4/*
VK6AHR	Multi	Phone	HF	160	320	5/*
VK6WW	Multi	Phone	HF	57	114	6/*
VK2NJP	Multi	Phone	HF	55	110	7/*
VK2SCJ	Multi	Phone	HF	36	72	8/*

24 Hour Portable Operation – Single Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Award
VK2IO	Single	All	All	215	474	1/*
VK5ZT	Single	All	VHF	269	4917	1/*
VK5KK	Single	All	VHF	272	4917	2/*
VK4BZ	Single	All	HF	98	218	1/*
VK3UA	Single	All	HF	100	208	2/*
VK2FAAD	Single	Phone	All	196	1,921	1/*
VK5KBJ	Single	Phone	All	257	1,805	2/*
VK3ANL	Single	Phone	All	53	115	3/*
VK2AWJ	Single	Phone	All	27	62	4/*
VK2JUB	Single	Phone	VHF	204	3,792	1/*
VK2RP	Single	Phone	HF	678	1,346	1/*
VK3VTH	Single	Phone	HF	334	650	2/*
VK5AKH	Single	Phone	HF	266	532	3/*
VK2BBQ	Single	Phone	HF	223	446	4/*
VK5GR	Single	Phone	HF	217	434	5/*
VK4VW	Single	Phone	HF	146	292	6/*
VK1JP	Single	Phone	HF	118	234	7/*
VK2ZCM	Single	Phone	HF	85	170	8/*
VK4CHB	Single	Phone	HF	27	54	9/*
VK8HPB	Single	Phone	HF	18	36	10/*

/ Certificate Awarded*
*** President's Cup*
/ Participation Certificate*

Six Hour Portable Operation – Multiple Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Place /Award
VK4GYM	Multi	All	All	89	221	1/*
VK2BV	Multi	All	HF	142	284	1/*
VK2LE	Multi	All	HF	113	228	2/*
VK3SAT	Multi	Phone	All	171	761	1/*
VK2EWC	Multi	Phone	All	101	321	2/*
VK6SVB	Multi	Phone	All	52	116	3/*
VK6WH	Multi	Phone	All	26	80	4/*
VK3BEZ	Multi	Phone	VHF	31	310	1/*
VK5GRC	Multi	Phone	HF	241	482	1/*
VK2AOJ	Multi	Phone	HF	119	238	2/*
VK2SF	Multi	Phone	HF	106	212	3/*
VK4BRC	Multi	Phone	HF	104	208	4/*
VK8AR	Multi	Phone	HF	66	128	5/*
VK2MA	Multi	Phone	HF	52	104	6/*

Comments on John Moyle Memorial National Field Day 2016

This year's entries came from every Australian mainland call areas with several from Tasmania and from New Zealand. The total number of eligible logs submitted was 154. This was a significant decrease (16.3%) from the 184 logs received last year.

Well done to all who took part and took the effort to submit a log. This year there were however, only 2 YLs or XYLs entered a log. Many more were listed as taking part with a club station.

I have included in the results, all of the logs that I received and if any are missing, they are completely lost. I can only offer my apologies to anyone so affected. If your log is missing, it did not get it to me, for it looks like the WIA Mail forwarding system was for a time blocked or delayed all e-mails sent via that path. Some logs were resubmitted and those are included.

Based upon submitted logs, there were some 17,836 contacts, (a 16.8% decrease from 2015) accumulating some 71,511 points claimed, (a 3.1% decrease from 2015). This was successful contesting for an Australian field day contest resulting from 154 logs being received. More than 1,268 Australian individual call signs were logged during the contest.

Unfortunately, the numbers of Club Stations who took part in the contest and then not submitting a log as an entry are still a disappointment. Barely 51% of club stations that have participated in recent contests and were logged as active in the contest submitted a log. Some multiple operator stations did get very big scores and this simply reflects the great and varied planning and implementation efforts required to assemble and operate a multi operator station.

Six Hour Portable Operation – Single Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Award
VK4SN	Single	All	HF	75	135	1 /*
VK3YE	Single	All	HF	63	130	2 /*
VK1AT	Single	Phone	All	46	531	1 /*
VK3KTO	Single	Phone	All	30	100	2 /*
VK3VL	Single	Phone	VHF	7	34	1 /*
VK5PAS	Single	Phone	HF	229	458	1 /*
VK1VIC	Single	Phone	HF	146	292	2 /*
VK4GH	Single	Phone	HF	119	238	3 /*
ZL3VZ	Single	Phone	HF	113	222	4 /*
VK5MTM	Single	Phone	HF	92	184	5 /*
VK5KX	Single	Phone	HF	77	154	6 /*
VK2ZB	Single	Phone	HF	70	140	7 /*
VK5AR	Single	Phone	HF	60	120	8 /*
VK2XLJ	Single	Phone	HF	46	92	9 /*
VK5YX	Single	Phone	HF	33	66	10 /*
VK3PMG	Single	Phone	HF	29	58	11 /*
VK4MON	Single	Phone	HF	28	56	12 /*
VK3ARR	Single	Phone	HF	27	54	13 /*
VK4JRD	Single	Phone	HF	22	44	14 /*
VK3NCC	Single	Phone	HF	21	42	15 /*
VK6WE	Single	Phone	HF	20	40	16 /*
VK6CG	Single	Phone	HF	19	38	17 /*
VK7HKN	Single	Phone	HF	12	24	18 /*
VK6MB	Single	Phone	HF	10	20	19 /*
VK5LOL	Single	Phone	HF	8	16	19 /*
VK6PCB	Single	Phone	HF	8	16	21 /*
ZL2GVA	Single	Phone	HF	5	10	22 /*
VK2PN	Single	CW	HF	11	44	1 /*

Home Station – 24 Hour (Part 1)

Call Sign	Operators	Mode	Band	Contacts	Score	Award
VK2ACD	Home	All	All	167	417	1 /*
VK5FD	Home	All	All	27	64	2
VK7GN	Home	All	HF	143	240	1 /*
VK3XFX	Home	All	HF	106	174	2
VK1NS	Home	All	HF	95	164	3
VK7GD	Home	All	HF	91	160	4
VK4NP	Home	All	HF	83	142	5
VK1MT	Home	All	HF	80	139	6
VK2GDG	Home	Phone	All	123	676	1 /*
VK3AV	Home	Phone	All	183	537	2 /*
VK2IE	Home	Phone	All	278	417	3
VK3FMAA	Home	Phone	All	272	410	4 /$
VK3FS	Home	Phone	All	101	246	5
VK3UX	Home	Phone	All	60	218	6
VK5FDEC	Home	Phone	All	91	183	7 /$
VK3JL	Home	Phone	All	33	112	8
VK6QS	Home	Phone	All	60	112	9
VK3CG	Home	Phone	All	32	104	10
VK2YJS	Home	Phone	All	44	78	11
VK4PQ	Home	Phone	All	39	70	12
VK6HAD	Home	Phone	All	33	59	13
VK6ZIC	Home	Phone	All	22	45	14
VK4OE	Home	Phone	All	27	42	15
VKVBU	Home	Phone	All	24	41	16
VK6AS	Home	Phone	All	11	21	17
VK6AXB	Home	Phone	All	11	21	17
VK2ELH	Home	Phone	VHF	207	875	1 /*
VK3OIP	Home	Phone	VHF	73	678	2
VK2AGC	Home	Phone	VHF	114	628	3
VK2BBR	Home	Phone	VHF	126	599	4
VK2WDD	Home	Phone	VHF	104	513	5
VK2ZDR	Home	Phone	VHF	34	238	6
VK3WT	Home	Phone	VHF	39	156	7
VK3KQ	Home	Phone	VHF	28	91	8
VK3AKG	Home	Phone	VHF	31	91	8
VK5ZBK	Home	Phone	VHF	18	72	10
VK3PZ	Home	Phone	VHF	31	69	11
VK5FPAW	Home	Phone	VHF	16	25	12 /$
VK3FAFC	Home	Phone	VHF	6	17	13 /$

Check Logs	VK3BBB

Activity was carried out on all bands permitted under the rules. There was a decrease in activity on HF, and there was less activity on the higher HF frequencies as would be expected by the decreasing sunspot cycle. This sunspot cycle is decreasing from top at the moment and conditions on some bands did appear to change in line with the decrease. Activity on 20, 40m showed some reduction. The other lower bands seemed to be only marginally affected by the QRM.

In the higher UHF and Microwave bands there was a big increase in activity in VK5; since it obviously follows a weather cycle, rather than the solar cycle? The weather in VK/3/7 was very wet and windy conditions with some severe thunderstorms, while in VK2/4 was better, so there was increased activity. So activity overall was somewhat increased.

The scoring in the VHF range was down a bit compared to last year. Though the scoring as a ratio of contacts per station was the same as for 2015. The absence of many club stations, because of the miserable weather in some parts of VK certainly reduced activity, with most portable stations making such comments.

The other major change noticed this year was the decrease in both Portable and Home Station operation as seen by the submitted logs.

The '10 Contact Rule' was devised to facilitate the checking and verifying of submitted logs. It was not devised to irritate and anger people who chose, for whatever reason, not to submit a log, but it was designed to encourage those who in the past did not see the need to submit their log – 'as they were not going to win anything'. Submitting their log is really being to help others as well as themselves.

The participation across the various call areas was patchy. There was a decrease in Portable stations in most areas with only VK6 showing an increase. Home Station logs were greatly decreased from last year in most call areas with the exception of VK4, VK6 & VK7.

Home Station – 24 Hour (Part 2)

Call Sign	Operators	Mode	Band	Contacts	Score	Award
VK3SIM	Home	Phone	HF	492	714	1/*
VK4KY	Home	Phone	HF	130	204	2/*
VK2FHRK	Home	Phone	HF	129	175	3/$
VK2NP	Home	Phone	HF	101	172	4
VK7QP	Home	Phone	HF	81	138	5
VK4HEC	Home	Phone	HF	71	123	6
VK3VT	Home	Phone	HF	58	102	7
VK2FAIB	Home	Phone	HF	81	99	8/$
VK3YYR	Home	Phone	HF	68	98	9
VK2VE	Home	Phone	HF	43	74	10
VK7BEN	Home	Phone	HF	41	68	11
VK4ATH	Home	Phone	HF	31	57	12
VK2BO	Home	Phone	HF	31	53	13
VK4BRT	Home	Phone	HF	29	49	14
VK2LEE	Home	Phone	HF	23	36	15
VK5DP	Home	Phone	HF	19	32	16

Home Station – 6 Hour

Call Sign	Operators	Mode	Band	Contacts	Score	Award
VK6FBLJ	Home	All	All	7	28	1/*
VK4ADC	Home	Phone	All	134	874	1/*
VK6BMW	Home	Phone	All	9	13	2
VK2YAC	Home	Phone	VHF	2	8	1/*
VK2PR	Home	Phone	HF	268	334	1/*
VK2X_M	Home	Phone	HF	106	143	2/*
VK2HOC	Home	Phone	HF	87	130	3
VK3FADM	Home	Phone	HF	73	126	4/$
VK6CSW	Home	Phone	HF	58	94	5
VK2PWR	Home	Phone	HF	54	76	6
VK4IAA	Home	Phone	HF	36	55	7
VK4FEMO	Home	Phone	HF	24	41	8/$
VK6YTS	Home	Phone	HF	13	25	9
VK6VAX	Home	Phone	HF	13	23	10
VK2FSWN	Home	Phone	HF	10	17	11/$
VK1CT	Home	Phone	HF	5	9	12
VK5HEL	Home	Phone	HF	3	6	13

All of the portable stations that went to the effort to send in a log will get a certificate. The WIA believes that those who make the effort to set up and operate a portable station should be acknowledged. In line with previous years, the Foundation License logs who did not achieve a placing were instead awarded a Participation Certificate for encouragement.

There were eleven Foundation Licensed operators who submitted a log. (Four from VK2, three fromVK3, one was from VK4, two from VK5 and one from VK6.) There were many more foundation calls stations were operating and who were logged during the contest, but they chose not to submit a log. All logs submitted by foundation operators were awarded a participation certificate. Logs from club stations did also show that a few 'F' Calls that also took part as part of the club station efforts. Well done.

This year, the rules again stated that EXCEL is the preferred submission format. A sample linked EXCEL logging report was prepared and was available on the WIA Contest website. (Contact me at vk4ae@wia.org.au if you would like a copy of my linked spreadsheet in EXCEL for next year.) Other suitable file submission formats are WORD, or LogToSubmit.txt output file from VKCL (VK Contest Log).

PDF format is not acceptable as are JPG and TIFF or any other image type, as though a picture might be worth a 1,000 words to you or I, an image file of your

Band	S/UHF		VHF		HF	
	Points	Contacts	Points	Contacts	Points	Contacts
47 GHz	**0** (32)	**0** (8)				
24 GHz	**2,179** (91)	**97** (19)				
10 GHz	**2,644** (640)	**148** (66)				
5.7 GHz	**2,155** (574)	**101** (63)				
3.4 GHz	**2,528** (1,100)	**140** (103)				
2.4 GHz	**2,438** (1,016)	**132** (116)				
23 cm	**4,737** (4,066)	**423** (399)				
70 cm	**8,120** (9,412)	**770** (957)				
2 m			**13,453** (19,170)	**1,379** (1,787)		
6 m			**6,796** (4,907)	**692** (529)		
10 m					**49** (132)	**28** (72)
15 m					**717** (1,292)	**359** (664)
20 m					**3,373** (7,154)	**1,597** (3,760)
40 m					**18,135** (22,922)	**9,735** (12,221)
80 m					**4,106** (1,217)	**2,184** (627)
160 m					**96** (28)	**58** (14)
Total	**24,801** (16,931)	**1,811** (1,731)	**20,249** (24,077)	**2,071** (2,316)	**26,461** (37,788)	**13,954** (17,358)

Table should be read – **2016 results in bold** (with (2015 results) in brackets)

Call Area	Portable		Home		Total	
VK1	3	4	3	3	6	7
VK2	21	21	21	28	42	49
VK3	15	25	17	26	32	51
VK4	13	14	11	9	24	23
VK5	15	18	6	13	21	31
VK6	10	9	10	8	20	17
VK7	1	1	4	2	5	3
VK8	2	1	0	0	2	1
P2	0	1	0	0	0	0
ZL	2	1	0	1	2	2
Total	82	95	72	90	154	184
	2016	2015	2016	2015	2016	2015

log contains no more information readable by a computer than a picture of a flower, hence the file is unreadable and unusable for the contest. Hence the contest manager would have to manually enter your file into the database. This is particularly unpalatable when an image is sent of the file that can be used and the operator declines after repeated requests to send that file without any sensible reason.

The majority of other logs submitted in an electronic form this year, were usually fully readable, but a few stations had to resubmit their log in an acceptable format. I thank them for their speedy cooperation.

There were still only 96% of logs submitted electronically this year, similar to last year. This has been due largely to the excellent work by Mike Subocz (VK3AVV) and his worthy program VKCL (VK Contest Log). Those that submitted a log in the VKCL export format were as usual very easy to work with. Those that simply forwarded the text output file of VKCL were also rather simpler to work with than any form of posted paper log or a log completed by hand.

Paper logs may also be used. A small log from an individual operator is, and will remain, completely acceptable. Large paper logs can require a very considerable manual work on the part the contest manager to input the data into the contest database and are not permitted. It is so much better to forward the computer files used to print the paper log, as part of an e-mail, for the data can then be easily extracted and used for checking purposes.

A note for all HF Stations;
- All HF contacts are valid HF scoring contacts, whether they are from VK ZL or P2 stations or stations from overseas.

Overseas stations cannot submit a log to the contest, but can exchange numbers with stations participating in the Field Day Contest. They are to be scored as a Portable station contact.

Comparison between 2016 and Earlier Years

Year	Logs	Contacts	Points
2016	154	17,836	71,511
2015	184	21,405	73,796
2014	179	23,799	74,172
2013	111	18,047	61,213
2012	140	22,173	88,270
2011	129	20,857	71,736
2010	122	23,573	80,087
2009	124	20,773	71,041
2008	104	17,258	98,940
2007	76	12,535	64,028
2006	78	10,865	61,387
2005	67	8,423	44,080
2004	66	8,602	49,855

Comments Regarding this Year's Contest

1. The comparative difference in score and scoring between HF and VHF/UHF contacts.

In fact, within the John Moyle Contest, the rules allow for some 60 possible alternative categories as shown below. Each category is actually completely independent from every other category and so there are in fact 60 parallel contests. In this way it is completely different from any other contest presently in Australia. This year only 32 of the different categories were contested.

For this reason it is not possible to have overall winner in this contest, as scores from any category, especially between different bands and different modes are not directly comparable. Only scores within the same category are correctly comparable. To reduce the number of certificates awarded to Home Stations – the contest is a Field Day after all – only 1 certificate for every 10 logs received in each category will be awarded again this year.

The award of the Presidents Cup is a further parallel contest. It is awarded to the highest score from a Club Station, affiliated with the WIA, in any category. This year it was awarded to VK5LZ.

2. The number of logs submitted to the contest is down compared with previous years

The number of logs entered in this year's contest is significantly decreased compared to the last few years of the contest. The number individual stations taking part in the contest and the number of their contacts seems about the same as for last few years, it is just that the number of logs submitted in 2016 was well down compared to 2015 and this reversed the trend seen over the last 10 years where the number of stations has continued to steadily rise. This drop was reversed by the introduction of the 5 Contact rule but has not continued and

the rule will be re-instated for next year. The additional logs increased the percentage of verified contacts during the contest, making the contest manager's task of checking the logs just a little bit easier.

In 2016 a total of 154 logs were submitted from 82 portable stations and 72 home stations.
In 2015 a total of 184 logs were submitted from 94 portable stations and 90 home stations.
In 2014 a total of 179 logs were submitted from 88 portable stations and 91 home stations.
In 2013 a total of 111 logs were submitted from 67 portable stations and 44 home stations.
In 2012 a total of 140 logs were submitted from 77 portable stations and 63 home stations.
In 2011 a total of 129 logs were submitted from 83 portable stations and 46 home stations.
In 2010 a total of 122 logs were submitted from 73 portable stations and 49 home stations.
In 2009 a total of 124 logs were submitted from 63 portable stations and 61 home stations.
In 2008 a total of 104 logs were submitted from 59 portable stations and 45 home stations.
In 2007 a total of 76 logs were submitted from 48 portable stations and 18 home stations.

3. The issue of scoring for CW contacts.

The number of All Mode contacts was significantly higher than in the recent past. A good sign!

While CW is no longer a precondition for obtaining an Amateur licence, it is a skill that is still widely distributed among existing operators and a skill that should be nurtured among the newer licence holders as communications is still possible under very trying conditions.

The rules were adjusted in the past to allow doubling the score for a contact on CW. For HF this was simple. However, for VHF contacts where there is a significant score already for the distance involved, the rules were amended for scoring VHF contacts on CW.

However, the use of computer generated/decoded CW is prevalent and it is felt that hand generated code that is decoded by ear alone should only qualify as true CW. This has caused some concern among the contest aficionados, but as this is a field day contest and so the emphasis on hand sent and ear decoded CW is seen to be preferred and computer sent and decoded CW is not endorsed. This is hard to police however, and it requires the cooperation of the operator to indicate in their log if the CW is hand keyed or not.

Any computer method is simply just another digital mode and so should not score the same as hand CW, but only the same as any of the other many digital modes.

Table of Existing categories

Operators		Modes				Bands		
	Time							
Multi	24	Phone	CW	Digital	All	HF	VHF	All
Multi	6	Phone	CW	Digital	All	HF	VHF	All
Single	24	Phone	CW	Digital	All	HF	VHF	All
Single	6	Phone	CW	Digital	All	HF	VHF	All
Home	24	Phone	CW	Digital	All	HF	VHF	All
Home	6	Phone	CW	Digital	All	HF	VHF	All

4. The number of people who submitted logs claiming 'All Modes' and only logging contacts using SSB or FM.

The Modes allowed in the rules are PHONE (SSB or FM), Morse (CW) (Manual) and DIGITAL (Computer) Mode.

The PHONE (Voice) only Modes are SSB, DSB, FM, PM or AM. That is the modulation is an audio signal derived in the first instance from a microphone.

The alternative is hand CW Mode, which is one where the operator simply turns the carrier on and off according to the Morse code. Digital CW by a computer is still not acceptable as CW and is only another digital mode.

DIGITAL mode is one which uses a computer to control the transmitter and to decode the information to allow the operator to complete the contact.

ALL MODE, is any combination of the above modes.

5. Club Stations

Club Stations were well operated and made some very big scores as a result of their combined efforts. Well done!!

The absence of a more than 25 club Stations (49%) was noted for this year. Many of the missing clubs had their club call sign used during the contest and probably would have achieved significant scores. However, the club involved chose not take the time to submit a log. This is a sad reflection upon the efforts made by some, not being fully supported by other members of their club.

6. Low Power Contest

The suggestion was again made by a few stations that a QRP category could be allowed. The suggestion was that only a station that can be carried in a backpack should be allowed for the operation of the station. Again there were only five logs entered indicating that all of their operation was on low power. They are acknowledged on their certificate. It is still thought not to be necessary to create another category just yet (see above) but if interest keeps growing and it may soon require a rule change.

It is interesting to note, the scores produced by some of the Foundation licences that submitted a log, does indicate that plenty of contacts were made on the

restricted lower power permitted by their LCD.

7. The Future

Now it is over to you. There are always ways to improve anything, but scrapping something because it does not suit you is not possible. But if benefits are shown to be available, further changes can be made to the contest to better serve the amateur community. But changes to force the majority to follow what suits a small minority is definitely not a good idea.

If you have any contribution to these topics, the Rules for this contest are available at the WIA web site at *http://www.wia.org.au/members/contests/johnmoyle/* which already contains my contact information and please feel free to contact me with your submission for further consideration.

Well done to all of those stations that participated in the contest and well done those who bothered to submit a log. It is hoped that the number of logs to be submitted next year will resume after this year's decreased log numbers.

I wish to thank those who did send in photographs of their equipment set-up and personnel involved for inclusion in the *AR* magazine. These have been submitted to *AR* along with this report, so please give Peter Freeman via e-mail at *(editor@wia.org.au)* anything else you have for later use for the magazine.

Further analysis of the band usage and the number of contacts in each state can be found in the report published on the WIA website.

SOTA & Park Activation News

Allen Harvie VK3ARH

Recent highlights

The third anniversary of the VK5 National and Conservation Parks Award was held on Saturday 2 and Sunday 3 April 2016. 25 activators in SA took part. There were about 65 Parks activated.

Around 1,200 certificates have now been issued in the VKFF program since its inception in March 2013.

Congratulations to Tony VK3VTH VK3XV on the receipt of the WIA President's Commendation announced at the WIA AGM.

The action for May was from VK9N – Norfolk Island.

With amateurs converging on Norfolk Island for the WIA 2016 Annual General Meeting, it was a given that there would be activations both organised and ad hoc.

Organised activations were conducted by VK9NT, consisting of a team of five Australian radio amateurs. The team established a base as well as conducting activations qualifying for the SOTA and WWFF awards programs.

Some attending the Annual General Meeting gained VK9 call signs (VK9PAS, VK9NG, VK9DAC) and many took advantage of the conditions to complete ad-hoc activations of SOTA or WWFF sites. Call signs included regular SOTA and Parks activators (VK3PF, VK3AFW, VK3TWO, VK6FMON, VK5FMAZ, VK2XSE, VK2VVV) as well as the special call sign VI9ANZAC. From all accounts it was a successful and beneficial exercise.

New SOTA hardware

It appears we are spoilt for choices with new radios being released aimed directly at the SOTA market. Many radios fall into the category of portable and will work just fine for a portable activation. The question of battery or antenna is also a factor. While the Yaesu FT-817 and Elecraft KX3 are popular QRP SOTA rigs, there are those chasing extremes activations using Elecraft KX1, MTR or HB1B devices. Whilst those chasing DX or Park activations will use the larger heaver and powerful 12 V powered portable 100 W offerings including the Yaesu FT-857/FT-897, ICOM IC-7XXX, Kenwood TS-480 and Elecraft K3 devices the SOTA market is always looking for smaller, lighter and rugged options.

Recently there have been several companies releasing devices aimed at the SOTA market. A detail review of the current offerings is warranted but a brief look demonstrates the quality and effort going into this area.

Elecraft have released the KX2: covering 80-10 m SSB/CW/Data up to 10 W with internal auto tuner and internal 2.6 Ah Li-ion battery; at 370 g with receive current as low as 135 mA.

With the MTR devices from Steve Weber KD1JV desirable but hard to obtain, the news that LNR have released the MTR5B Mountain Topper was well received. The MTR5B 5-Band 40 – 15 m CW only weighing in at 180 g (+ battery) and consuming 15 mA Rx current and 4 W output. The LNR range includes SSB and CW LD devices. The LD-11 is a QRP Multimode HF+6 m transceiver with 160 m to 6 m coverage. The LD-5 is a HF (40, 30, 20, 17 and 15 m), 5 W output in CW/SSB, 350 mA receive and 1.5 to 2 A typical in transmit.

None of these new radios are going to be cheap at the current exchange rate though!

As far as SOTA operations are concerned, the weight and RX current drain are of major interest.

These new devices are making the tried and proven Yaesu FT-817 look a bit old and heavy. However, in defence of the FT817, I have personally activated over 200 SOTA activations with a non-ND model. This device has survived drops, falls, snow, rain and ants. I recently acquired a KX3. Whilst proven in the field, this device still has a long way to go to displace the FT-817.

Portable does not have to mean HF only operations. A SOTA activation does not have to be on HF using an HF transceiver. A hand-held can get you on the air from a SOTA summit. Best to upgrade the stock antenna but even with the distances of VK, many have successfully completed V/UHF only activations.

Device	Bands	Mode	Weight	Rx Current	Output
FT-817	160 m – 70 cm	All	1170 g	450 mA	5 W
KX1	80 m – 20 m	CW	311 g	34 mA	4 W
KX2	80 m – 10 m	All	370 g	135 mA	10 W
KX3	160 m – 6 m (2 m option)	All	700 g	150 mA	15 W
LD-5	7000 kHz – 22 MHz	All	540 g	350 mA	3.5 – 8 W
LD-11	160 m to 6 m	All	540 g	350 mA	5 – 8 W
HB1B	80 m – 20 m	CW	380 g	60 mA	4 W
MTR 5	40 m – 15 m	CW	180 g	15 mA	4-5 W

Another ZL association

ZL3 South Island went live on 1 May. In total there are 3900 summits in ZL3. Congratulations go out to Warren ZL2AJ, Andrew VK3ARR, Richard ZL4FZ and Don ZL3DMC for the effort required to bring the South Island to SOTA.

Andrew VK3ARR happened to be in ZL on the launch date. Andrew VK3ARR and Warren ZL2AJ, whilst working closely on getting the ZL associations off the ground and expanding, had never met. Andrew met up with Warren to successfully gain access and activate ZL3/MB-093. Not alone on the big day, Paul ZL2RE activated ZL3/MB-278 and Andrew ZL3CC made it up to ZL3/CB-806 Coopers Knob to successfully activate on the day. VK activators came to the party to support with S2S opportunities as well as the growing band of chasers all to celebrate the launch of ZL3.

Upcoming events

SOTA Bonus period: Additional 3 points for higher summits dependent on Association.

Ian VK5CZ is organising the **FYBO Contest** set for 26th of June. Freeze Your Butt Off is run in America also as a mid-winter contest. The main purpose of this event is to encourage portable operations during cold and wet and windy weather conditions. For rules and more information contact Ian VK5CZ at *http://VK5CZ.wordpress.com*

October Long Weekend SOTA Event: Rob VK2QR is organising a weekend of SOTA and WWFF opportunities in the Snowy Mountains. Accommodation is at the Snowy Mountains Resort and Function Centre in Adaminaby. For more information, contact Rob VK2QR at *VK2QR@post.com*

VKFF Team Championship to be held across a 6-Hour period on Sunday 16 October. Information on the event can be found here: *http://www.wwffaustralia.com/vkff-team-championship.html*

Keith Roget Memorial National Parks Award activation weekend of 12 November 2016: The 6th annual KRMNPA activation period is Friday 11 until Monday 14 November, 2016. This is an extremely popular weekend with many travelling to operate from VK3 National Parks. For more information, contact Tony VK3XV or visit *https://www.amateurradio.com.au/awards*

Looking forward to the SOTA bonus period:

73 & 44

Allen VK3ARH.

VHF/UHF - An Expanding World

David K Minchin VK5KK

Introduction

Hello again. Despite the usual winter propagation "freeze", May saw some rare inland Tropo DX worked again. This time between VK5 & VK4, that report is first. This month's technical corner we have the continuation of "SDR on VHF and above" series as well as Kevin VK4UH's Meteor Scatter report.

UTC	From	SPOT	Frequency	Mode	RST	Distance
12-May-16 23:09	VK5AKK in PF94IX	=> VK4OX in QG63KF	144.200000	SSB	51	1634.1
13-May-16 22:41	VK5PJ in PF95MK	=> VK4OX in QG63KF wpshse 1st vk4 on tropo	144.200000	SSB	53	1581.4
12-May-16 22:07	VK5PJ in PF95MK	=> VK4RTT in QG53TC yes it really is 57	144.442000	BCN	579	1471.3
12-May-16 22:33	VK5ACY in PF95SB	=> VK4RTT in QG53TC	144.442000	BCN	559	1456.3
12-May-16 22:40	VK5PJ in PF95MK	=> VK4OX in QG63KF	432.200000	SSB	51	1581.4
12-May-16 22:03	VK5PJ in PF95MK	=> VK3KW in QF44MT	432.150000	SSB	52	918.5
12-May-16 22:04	VK1NW in QF44MT	=> VK5PJ in PF95MK qsb - tks Peter	432.150000	SSB	52	918.5

Photo 1: VK4 to VK5 Tropo contacts on 12/5/2016 courtesy of VKLogger.

Winter inland Tropo opening to VK4

Whilst the season (now past) did not deliver the same level of openings as previous seasons, it still has had its little surprises. In March we had the VK3 to VK6 144/432 MHz over the land Tropo, now in May we had similar occurrence this time from VK5 to VK4. On the morning of 12 May both Phil VK5AKK (PF94) and Peter VK5PJ (PF95) worked Adrian VK4OX (QG63) on 144 MHz. Peter VK5PJ also worked Adrian VK4OX on 432 MHz.

Leigh Rainbow VK2KRR reports: *"On 13/5/2016, Peter VK5PJ worked Adrian VK4OX on 144 and 432 MHz Tropo, a very rare inland path. The path was shown as a possibility on Hepburn and highlighted by large +19 dB 2 m WSPR signals between Wayne VK2XN and VK5PJ. I was able to see this information on the WSPR Database 2 m page and sent Peter a text message making him aware of the path as it was sunrise. Peter found he could then hear the VK4RTT 2 m beacon and eventually was able to arrange contact with Adrian VK4OX via the ON4KST Region 3 chat page. Phil VK5AKK also worked VK4OX on 2 m only. All distances are around 1600 km.*

I had very strong paths with VK5GF and VK5PJ on 70 cm WSPR and was heard by Michael VK5ZEA at Port Lincoln also on 70 cm WSPR at 1020 km. I detected a number of 162 MHz marine tracking signals into the Bight as far as 1788 km maximum."

Now if memory serves me (and happy to be corrected) that would be the first VK5 to VK4 432 MHz Tropo contact at 1581 km regardless of the time of year. Bill VK5ACY also copied the VK4RTT beacon at around the same time and signals were very strong to central/eastern VK2. The 1032 mB High was stationary at the time mid VK2, the bubble clearly extended well north and west. Hepburn was on the money.

10 GHz EME Portable in VK5

Rex VK7MO has commenced his 2016 10 GHz EME DX-pedition early in June starting from VK3 heading through VK5 to the outback north to lower VK8. More on Rex's complete trip will be reported next month.
On the weekend of 4/5 June 2016, David VK5KK and Wayne VK5APN went out portable with VK5KK's terrestrial 10 GHz 30 watt system modified with better elevation readout to track the moon. As luck would have it, a 10 GHz WR75 preamp ordered from DB6NT turned up Saturday morning a few hours before the first test so we were off to a good start!

Photo 2: VK5KK 10 GHz Portable EME Station.

Day 1 was just receive only from PF95ib (Coach Rd) but successfully received OK1KIR, G3WDG and OZ1LPR on JT4f, all around -18 dB on the 900 mm dish. Spreading was quite low (<30 Hz), noise degradation tests afterwards on the *.wav files revealed signals mostly had 10 dB of head room over noise. The temptation was there to transmit but a sequencing fault on the amplifier input relay needed looking into, we have all read stories about when you tempt fate!

Having to move the dish every three minutes you appreciate the compromise in dish gain vs. practicality when you are using crude manual tracking. To make things difficult it was a cloudy day so we had to use geographical references. The moon was tracking 2 degrees above and to the right of the sun so you could see sun noise degrade signals if you went past the moon a degree or so!

Day 2 the sequencing issue had been fixed (one line of code in the Arduino controller!) so ready to transmit. We also had far better azimuth and elevation calibration. We easily to work Rex from his portable location near Woomera (PF88lo - 428 km) via Tropo scatter 56/57 each way on 10 GHz SSB. That gave us an exact bearing! Once the moon was acquired in Europe three two ways were completed by VK5KK and VK5APN on JT4f to OK1KIR (4.5 m dish), G3WDG (3 m dish) and OZ1LPR (2.4 m dish). The best report was -15 dB from OK1KIR the extra gain of the 4.5 metre dish being a factor. An hour long JT4 vs. JT65 test from G3WDG was decoded with few drop outs over the period. Traces of Rex VK7MO's JT4 signal were seen on the waterfall but no decodes, spreading between at the time was >75 Hz. Not bad between a 750 mm and 900 mm dish.

A fascinating and challenging two days, next weekend it is off to Coober Pedy (PG71) to work more EME, Tropo and aircraft scatter.

SDR on VHF and above - Part 4

Last month we covered the various options around for VHF/UHF SDR and some design considerations. This month we will look at the various PC and STM32 software platforms available for SDR. Some of these involve new SDR projects, some of these are in references at the end of this section.

Just which way you go to control an SDR is up to what you want to achieve. A PC/Laptop controlling an SDR or a "one box" transceiver can do much the same things; the latter however is much more convenient.

Photo 3: WSJT-X screen with G3WDG and OK1KIR reports.

To get started it is highly recommended that you explore the PC software path, for home station use it's less of an issue if you have a couple of boxes connected. Having the software running on a PC also makes the radio available to be remote controlled using free programs like "Logmein", etc. The second "all in one box" option whilst more convenient for portable operation is also the more complex to develop. Such a project tips well into the digital domain however there are now some hardware platforms that can be used for our project with some modification to firmware.

For the exercise we are going to discuss software and hardware that can be used with popular SoftRock and UHFSDR RF "Gen 1" platforms. Gen 3 platforms usually have more specific software developed but I have included some of these for interest. I'm not going to get too in depth in discussions on what is better, more over there are plenty of web links below for your research! Even if you don't have an SDR radio yet you can still download some of the PC software to get a feel for how things look and work. Get a RTL USB stick and see what you can do!

PowerSDR is a good start for PC operation, those who have used Flex radios will be familiar with it. A stable recent version is PowerSDR-sr40, it is a direct branch from PowerSDR (*www.flex-radio.com*) and adds features for use with a SoftRock40 Radio. It will work with most Gen1 & 2 Quadrature SDRs. It features full TX capabilities, IQ sample correction, dual soundcard, filtering, etc. plus lots of support. Software is open source, you will find links on various websites however best to go to Sourceforge to get the more recent versions, here is the link *https://sourceforge.net/projects/powersdr-sr40/* PowerSDR supports communication to the SDR radio via USB or via a printer port (yes the old DB25 plug) using various lines

to select band options and drive Si570 SDA/SCL lines. It is a bit of an issue connecting a modern PC to a UHFSDR *http://wb6dhw.com/* but there are a number of USB drivers about to do that. One example can be found here *http://pe0fko.nl/SR-V9-Si570/*

HDSDR is another open source platform for SDR control. Formerly known as WinradHD, it is an advanced version of Winrad written by Alberto di Bene I2PHD. Software can be downloaded from *http://www.hdsdr.de/* It has similar features to PowerSDR plus a few nice features good for VHF/UHF operation like CAT control, programmable transverter offsets, record and playback, squelch, low speed waterfall, etc. Its key feature is that it will work with various RTL USB dongles so it probably is the first step for anyone who wants to just try SDR. It also works with a range of commercial sets (ELAD, etc) and newer projects like HackRF.

LINRAD is an open source software platform for direct sampling SDRs (GEN 3). It is fully functional albeit more bleeding edge software with various compiled versions for Windows, Linux and MacOS. For more information go to *http://www.sm5bsz.com/linuxdsp/linrad.htm*

QUISK is another direct sampling SDR (GEN 3) platform. It is a Linux (Ubuntu) based system and the preferred software used with HiQSDR systems. It has quite advanced features and will run on various systems including Raspberry Pi. Go to this link to see the software controlling a Lima SDR via a 7" touch screen! *https://www.youtube.com/watch?v=ef8FPPQlX8E*

WEBSDR is something slightly different, an Android based SDR platform that can be used with an RTL USB dongle! It works remarkably well and converts any Android phone tablet into a scanner! You just need a USB OTG cable (a few dollars on eBay) and a RTL USB dongle (a few more dollars on eBay!). For more information go to *http://www.yo3ggx.ro*

As you can see there are lots of PC software options. Unfortunately there are not so many hardware solutions at this point to create an all in one transceiver box! I have experimented with four platforms but one of those has proven the most accessible (mcHF) so I will describe that in more depth. One platform (SDR2GO) is no longer available so I won't describe it. A shame as it offered a basic controller with two line LCD readout sufficient to make a transceiver with a UHF SDR.

STM32-SDR is a 3.2" touch screen transceiver controller that works well with the UHFSDR or soft rock style transceivers designed by Dave VE7PKE and co. It replaced the SDR2GO and is supplied as a pre-loaded PCB that just needs through hole parts mounted. It can be configured for most of what we do on VHF/UHF and has a nice waterfall display. It also has a built in PSK31 decoder, you can connect a USB keyboard to transmit PSK 31 as well. The software development has slowed in recent times, though source code is available if you ask. For more information go to *http://www.stm32-sdr.com/*

The Russian Tulip SDR platform has great potential but has been a slow project for me as everything is in Russian! It has an amazingly attractive SDR touch screen radio that can use a 5" or 7" screen. Separate STM32 microprocessors are used for DSP and control with very compact firmware. It provides SPI out for a DDS LO (AD9951) so you can talk to a MiniKits DDS kit directly and lock to a 10 MHz reference. We will talk more about this in future episodes as the Si570 used in most SDR's is not stable enough for digital modes.

The main issue with the Tulip (other than Russian language) is no source code to customise controls. The latest versions do have provision for transverter operation so that covers the main reason we need to tweak the firmware. There is also a version of firmware to use with the Gen 3 HiQSDR go to this link to see a video *https://www.youtube.com/watch?v=Uy2yCzoUjm4 SP3OSJ* has re done the hardware to fit onto three PCB's, there is more English in his description go to *http://sp3osj.pl/* For more general information Google "tulip trx sdr radio"

My current (and recommended) platform is the mcHF UI controlling the GEN 1 UHF SDR. Originally put together by Chris M0NKA the Source code is open (Github) and being actively worked on by a team of 10 or so programmers in Germany. Written in C++ and complied in Eclipse I have modified the current stable release software to be a specific to the UHFSDR and 144/432 MHz operation, narrowing the waterfall, redefining control pins for amplifiers and sequencing, etc. It matches features of most commercial radios in features including CAT control (so WSJT-X CFOM is possible). The actual mcHF transceiver has a few (serious) noise and spurii bugs still being sorted out whereas this combo works far better with sensitivity better than most commercial sets (2 dB noise figure!). More information can be had on the basic controller at *http://www.m0nka.co.uk/* If anyone is serious about having a go I am happy to send you the latest compiled mcUHF version. Working on a version to drive the AD9951 DDS chip for more serious work

There is another SDR project I have been watching that is ground breaking stuff happening in our own backyard. David Rowe VK5DGR's SM2000 project is rapidly gaining momentum creating a FREEDV2400 VHF transceiver with 6 – 10 dB better performance than FM. A full kit will be available, take a look at *http://www.rowetel.com/blog/?p=5234#comment-79699*

Another new SDR radio project that is being crowd funded is Lime SDR out of the UK. It is quite an

ambitious project with $0.5 m US budget. Part of that money is to go towards a custom forged RF transceiver chip! 0 – 3.8 GHz operation, dual transmit and receive channels, etc. By the time you read this the first the crowd funding window will have closed but follow this link for more information *https://www.crowdsupply.com/lime-micro/limesdr*. A test review of the system can be found also at *https://myriadrf.org/blog/first-tests-limesdr-gqrx* While it is more a developer's kit than a transceiver at this stage, I suspect the platform will find its way into more commercial projects. Software to support includes GNU Radio, Pothos, SopaySDR and UHD.

Next month we will have a report on the SDRA 2016 conference in Friedrichshafen, Germany on 25 June, 2016. The program for the convention can be found here *http://www.sdra-2016.de/pages/programme.html*. Both Phil Harman VK6PH and I are presenting. If you are going to GippsTech (July 9/10), I'll be doing a session on "VHF SDR" hopefully with a demonstration of the mcUHF (it may be in a box by then!).

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

A fairly short report this month.

The Eta Aquariids Meteor shower was predicted to peak around 6-7 May 2016. This Class 1 Meteor Shower recurs annually as the orbit of the earth around the sun takes us through clouds of debris remaining from Halley's Comet. The peak of this shower can be fairly broad and meteor scatter conditions can be markedly enhanced over many days. The Zenith Hourly Rate (ZHR), an indirect index of meteor activity in each shower, was expected to peak at around 70 meteors/hour.

Unfortunately a regular work commitment took me away to a conference in ZL over the peak of the shower again this year. Returning to VK and operating on the Sunday morning activity session on 14 May (UTC), I still found significant enhancement of normal meteor scatter propagation, which is generally poor and in steep decline as winter approaches. Impossible to prove but I think it probable that I was seeing the waning effects of the end of the Eta shower.

On that morning I completed 2 m FSK441 QSOs with Arie VK3AMZ (QF22fe), Chris VK2DO (QF54ch) and Dave VK2WQ (QF56ng). On 6 m I went on to complete with Norm VK3DUT (QF32vf), Darrell VK2BLS (QF55kk), Allan VK2EFM (QF56pn) and Gavin VK3HY (QF22pd).

Arie VK3AMZ from QF22fe compiled the following report:

"It seems to me that the intensity of the ETA shower is progressively diminishing. Four years ago it produced spectacular conditions but conditions this year have been the poorest I've noted over this time. While there were some notable pings they were not consistent and there were many periods of empty frames (ref: FSK441). Despite this observation many QSOs were made plus a record numbers of stations were on-air to take advantage of the enhanced meteor count. Stations worked from here were VK4JMC, VK4MIL, VK4NE, VK4KSY, VK4CDI, VK4CRO, VK4LHD, VK4NWH and VK2XN. SE QLD is certainly very well represented and is a credit to those who, like me, suffer from insomnia".

The winter months will again bring the low-point of the year's background (random) meteor activity. Meteor numbers are never zero however, so MS operating will just take even more patience than usual. The Perseids and a number of other minor showers may give us some respite. Roll on Spring!

The next Meteor Shower on the calendar will be:

Perseids peaking around 12 August 2016

Dr Kevin Johnston VK4UH

Brisbane

VK6news

Keith Bainbridge
e *vk6rk@wia.org.au*

My pleas this month fell mostly on deaf ears it seems.

I left the compilation of the column until the very last moment in the hope something more would arrive, but.....

Anyway we will make do with what we have which is both interesting and hopefully informative. First in for the month was the latest update from HARG:

The Hills Amateur Radio Group

HARG conducted some interesting activities in May and June. Because of deadlines I am actually writing this on 29 May 2016, so hopefully everything planned will actually have happened by the time you read this news. At the 28 May 2016 meeting, John VK6AG demonstrated a DMR repeater setup including a connection to the DMR Network. Members were able to hear what the audio quality was like and listen to several QSOs around the world. Thanks to John for making the equipment available.

Recently Ham College invited clubs to one of their Foundation courses to talk about their clubs. Ray VK6ZRW and Martin VK6ZMS went along to wave the flag for HARG. Despite one of the season's big cold fronts that had taken out the mains making the slide show off-the-cards, the participants appreciated the chat, listening intently and asking some great questions. Martin hit the spot when he told the throng that the best thing he did when he first got his licence was to join a club. Ray sparked some interest describing some of the clubs RF campouts. He got a laugh when he compared HARG to the Hash House Harriers. He explained that they had been referred to as a drinking club with a running problem and that HARG could be likened to a camping club with a radio problem. Hi.

Speaking of RF campouts, we are planning another one on the June long weekend. A group will be going to Marrinup again, the site from which we operated the John Moyle Contest. No doubt some big wire antennas will be strung up, taking advantage of Alan VK6PWD's amazing precision with his fishing rod, complete with braided line and homebrew weights. With camp fires allowed at this time of the year, there are sure to be some great discussions and testing of earth improvement methods while sitting around the warm fire. Hopefully the propagation gods are smiling and we will make some great contacts.

On Saturday 30 July 2016, HARG will be holding their Annual General Meeting with elections for Office Bearers. This year Richard VK6BMW will be standing down from the Secretary position after 20 years of service to the club in the positions of President, Vice President, Secretary, and Treasurer. Richard is moving to the country where he hopes to chase DX without having to listen through S9 noise levels. In recent years Richard has set up a number of very useful administration systems based on Google Apps so that the incoming Secretary will have a firm foundation on which to move the club forward. At this meeting Bill VK6WJ, our current Publicity Manager, will also be standing down after five years' service in that position. I believe it is a positive thing for new blood to come onto committees every four to five years so that fresh ideas and concepts can be introduced to keep the club interesting and focused on new developments in amateur radio. I will advise the names of the new committee members in future correspondence.

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 and thanks to Ray VK6ZRW for most of the news this month.

Firstly I am very sorry to hear of Bill's decision to retire from the role of Publicity Manager as he has been a solid and tireless contributor to this column on behalf of HARG. Best wishes Bill and I sincerely hope the new Publicity Manager has your eloquence and passion!

Secondly, to the new replacement, keep the info coming PLEASE.

The next received this month was our other Mr Reliable, Norm for the Bunbury Radio Club:

Bunbury Radio Club

Disaster strikes. During the recent storms in the South West of the state, Mother Nature decided that we didn't need the 2 metre repeater, VK6RBY, at Harvey. Although it was still working, its performance was well down. A quick inspection

Photo 1: Working on VK6RBY at Harvey. A nice view.

revealed that it had been damaged beyond repair. Subsequently, the club acquired a replacement antenna from a deceased estate and an intrepid team travelled to the repeater's location to replace the offending item. All went well and VK6RBY is back on the air better than ever.

At our April meeting, Steve VK6HSB spoke about "Digital Electronics for Dummies". The talk was pitched at digital neophytes and opened up quite a lot of interest. The focus of the talk was on the many cheap digital computers, such as Raspberry Pi and other boards that are now readily available. Murray VK6HL followed with a brief explanation of SDR technology. The talk aroused such interest that he has been invited to give a full blown demonstration of the technology at our August meeting. Amateur radio is now evolving at a rate that it is hard for many to keep up with the changes and these talks are designed to help bridge the gap between the "knowledge rich" and the "knowledge poor". For example one listener has since acquired a Raspberry Pi to advance his knowledge of this technology. Such is life.

The next monthly meeting of the Bunbury Radio Club will be held on Saturday 11 June 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. This meeting will see Brian VK6TGQ presenting "Packet Radio for the Petrified".

The July meeting will be the Club's AGM and all members are requested to attend. Any member wishing to stand for election to the Club's Committee should contact our President Richard VK6VRO.

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

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 for the latest news Norm and I'm pleased to hear VK6RBY did not take too long to repair as it's a very useful repeater for travellers to the southwest.

Going in order of received reports this month, so next up was Bob VK6POP with a report on PerthTech 2016.

PerthTech 2016

Close to fifty amateurs gathered at the Bayswater Hotel in Perth at the end of April for the inaugural PerthTech Conference.

With a good selection of speakers and a wide range of topics, the programme kept the audience interested for the whole day.

We were able to secure three drawcard presenters. Phil Wait the WIA President, who spoke candidly about the WIA and was well received. Phil Harman spoke to us about critically coupled antennas and David Rowe introduced us to the open source digital voice project. Other topics presented throughout the day included working with satellites, DMR, All-star networks, how to perk up your club (Viagra for Clubs), and mentoring in amateur radio. The audience was appreciative and eagerly participated in the question and answer section at the end of each presentation.

During the proceedings, the raffle was drawn.

Photo 2: The audience at PerthTech.

We were pleased with the outcome of the raffle and impressed with the online sales of tickets, allowing us to reach a broader customer base. We are grateful to all presenters, especially Phil Wait and David Rowe, for travelling interstate to join us. Thanks to the WIA for covering Phil's costs and to a donor, who wishes to remain anonymous, for providing the airfare for David and for the major raffle prize. Thanks to Ross at Strictly Ham for assistance with raffle prizes and also Steve VK6SJ, of Future Systems, for the book buyer's prize.

WA Amateur Radio News was pleased to present PerthTech, and is already thinking ahead to Edition Two of PerthTech.

Bob VK6POP

Thanks Bob, it really was a great day, I learned a lot about critically coupled Antennas, a subject I thought I understood.

The food was excellent and the other presenters kept everyone interested. I just didn't win the raffle, Oh well!

I hope next year's offering will be to the same high standard and well done WAARN!

Every month I chase our contributors for the 10 days or so before end of month. I know this is a hobby and many are busy with day jobs, so I was pleased when Anthony VK6AXB's WARG contribution arrived in my inbox only 4 minutes after the deadline.

Thanks Anthony.

West Australian Repeater Group

On behalf of the West Australian Repeater Group, WARG Secretary Anthony VK6AXB reports that WARG's AGM took place on Monday 2 May 2016, with a good number of members putting their hand up to serve on the WARG Committee.

Ray VK6ZRW continues as President with John VK6JAH as the new Vice President, swapping jobs with Barry VK6SP who takes on John's previous duties of Treasurer and Membership Officer. (John will continue to assist with this work as required). Anthony VK6AXB continues as Secretary, as does Bob VK6ZGN in the Technical Officer role.

Chris VK6PII, Duncan VK6GHZ, Steve VK6VHZ and Trevor VK6MS continue to serve as Committee members, with Martin VK6ZMS and Peter VK6PM joining WARG's Committee and Rob VK6LD electing to stand down at this AGM.

Congratulations to all who were elected and thanks to Rob VK6LD for his work on the past Committee.

Also in May, batteries at the Mt William repeater site were replaced thanks to Mac VK6MM, and VK6AXB attended the Busselton repeater site, carrying out work to improve the WIA news broadcast link.

Work was also done on the VK6RBP HF beacon, part of the IARU International Beacon Project and housed at WARG's Roleystone repeater site. A repaired transmitter has been installed and the beacon appears to be operating normally on all five bands; signal reports would be appreciated however.

WARG meetings continue 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 4 July, 1 August and 5 September 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*

Thank you again Keith, for your efforts in compiling VK6 Notes.

Anthony, as long as you send in the reports, I will keep reporting.

As usual **NCRG** brings up the rearguard:

NCRG

A lot of time and planning has gone into the Remote Station being set up at the club premises. At present it consists of a Stepplr DB 18 (my old beam) which looks so much better at 18 m than swamping my backyard.

We have also changed the rotator to a Yaesu 1000 to allow computer control and added many other items of gear into the rack ready for full remote control of the station. A final decision on the radio to be used and the means of controlling the whole thing is in the offing and we hope to have the whole thing operational for club members who can't get out there or who have difficulties with antennas at home, in the very near future.

We also have problems at the club with interference from our own 10 m beacon, 2 m and 70 cm repeaters and the IRLP/EchoLink setup when we are contesting. This has been solved with the acquisition of a new site quite close to house all of the above! Work is taking place over the first weekend in June to establish this site with new antennas, revamped repeaters and no co-interference. Members are still experimenting with Loop antennas with a great deal of success, well apart from myself.

I bought two Inac loops from Spain which arrived extensively damaged and a battle with the freight company began. Seems they made it all the way to leaving Customs control in Australia before they were wrecked, the drama is still in progress.

We have also been working hard on the planning of this year's NCRG Hamfest, taking place on the first Sunday in August 2016.

Usual place, Cyril Jackson Rec Centre, Fisher St Ashfield 6054.

Start time is 9 am for the public and 7.30 am for Exhibitors. Admission is still $5 each and tables are still free if booked well in advance.

We had almost 60 tables taken last year so please contact us to book ASAP.

There are changes in the wind, which are proving very challenging and hopefully we can pull them off for this year's Hamfest rather than the next one.

So that's it for this month, hopefully the winter weather is not bothering you too much and warm nights in the shack means plenty of time to operate the radios!

73 de Keith VK6RK

VK4news BARG

Les Neilson VK4FAEB

Life Membership awarded

At our 2016 AGM we celebrated Kevin VK4ZR's Life Membership with a comedy roasting from club President Les Neilson but finished with a heartfelt citation from Les VK4SO relating some highlights of Kevin's dedicated and wide range involvement with the club and some personal insights as well. Kevin was then presented with a certificate of BARC Life Membership.

Well done Kevin.

BARCFEST 2016 went well and as always most of the action happens in the last week of preparations. The committee is pleased to put this behind us now but well pleased to have raised enough money to keep the club financial for another year. Great people, good gear, fantastic food and a top location equals a wonderful event. Exhausting yes, but can't wait for next year or is that the coffee that is talking?

Kevin VK4ZR with his Life Membership certificate.

Friday Night Social Meeting talks

As promised to provide members with interesting topics we have planned the following topics:

On 10 June 2016, we are planning to have Dave Prince VK4KDP give a talk on a small part of his vast collection related to Coast Watcher radios and their use in the field. This will be quite interesting to those who are not familiar with this subject.

On 8 July 2016, Jan VK4EBP will talk about ground wave propagation and its uses and limitations with a practical demonstration.

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

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.

Laurie Gordon VK2GZ

Ham Radio on the Ferries

The Sydney Amateur Radio Ferry Contest will be held on an annual basis following the success of the inaugural event in March. The contest, organised by the Waverley Amateur Radio Society (WARS), entails operators making contacts while travelling on ferries or from ferry wharves on Sydney Harbour.

Next year's event will be on 12 March, 2017.

"We had dozens of contesters criss-crossing the harbour on a beautiful Sunday, talking with each other using hand-held radios," said Laurie Gordon VK2GZ, one of the contest organisers.

"Points were awarded according to how many contacts were made and how many ferries and wharves were used. As a VHF/UHF contest, all modes were permissible during the six-hour event using simplex or repeaters".

The Waverley Club has been in existence since 1919 and meets at Rose Bay.

"Many of our members live in the Eastern Suburbs and our clubrooms are virtually on the harbour at so we thought it was about time we put the two together," said Laurie.

"Although contesting is an important part of amateur activities, this one is unique since everyone has to be on a ferry or a wharf, or contacting someone who is. We haven't heard of any contest like this anywhere in the world."

Awards were issued for a number of categories including "Worked All Ferries", Highest Number of Contacts Made and Highest individual point score. Contacts were also encouraged from home or mobile stations. All participants in the inaugural contest received a "Billy Blue" certificate for sending in their electronic logbooks. Billy Blue, a former convict, was Sydney's first ferryman and was appointed Harbour Watchman by Governor Macquarie in 1811.

Connor Edwards VK2FCAC receives the special check-in award from Ferry Contest organiser Laurie Gordon VK2GZ. Connor, who travelled from Wollongong to take part in the ferry contest, also received one of the club's PowerPole DC distribution kits.

A popular feature of the contest was "eyeball" contacting where operators could add to their scores by meeting face to face. Contestants had to shake hands and exchange written confirmation. Many operators met for the first time, though they may have spoken on air to each other for years.

A base station was set up near the Rose Bay wharf to co-ordinate the event with participants encouraged to check in either by radio or in person. As well as attracting radio enthusiasts from all parts of Sydney, a number had also travelled from other parts of the state including the South Coast and Central Coast in order to take part.

"Because of the special NSW Transport Sunday travel concessions and the Opal Card, it meant we could ride the ferries for the whole day for $2.50," said Laurie. *"At first we were worried that a bunch of guys with two-way radios might alarm the public, but Sydney Ferries, Transport for NSW and the Police got right behind us to help make it a success".*

"We're looking forward to even greater participation next year, once word gets around about what a great day it was."

Information about the contest can be found on the club's website *VK2BV.org*

Plan Ahead

GGREC Hamfest | 16 July 2016

Henry Sutton: the innovative man

Lorayne Branch

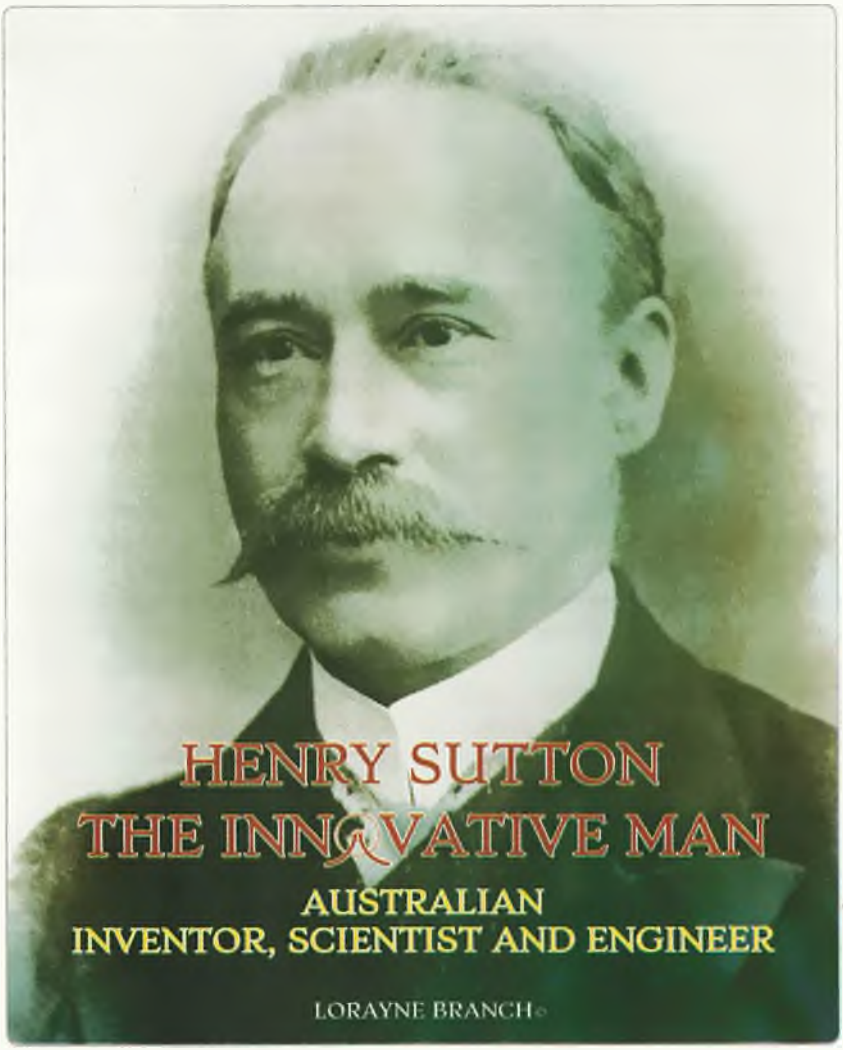
Australian Inventor, Scientist and Engineer

Henry Sutton's biography is a must read for all Australians and records for the first time this extraordinary man's life and inventions. The book documents all the triumphs and tragedies of his life and inventions and records in great detail his amazing contributions to Australian and world scientific and technological history.

After seven years of searching through thousands of old scientific journals, newspapers and patent books from libraries and archives all over the world, my journey to uncover the truth about my great grandfather Henry Sutton has now been completed and fully documented. This amazing biography and extraordinary account of previously unknown, scientific and technological history is an important contribution to Australian and world history.

Henry Sutton was one of Australia's greatest inventors, his story is one that should be taught in schools and should become part of Australian folklore.

Henry was born in Ballarat in 1855 and grew up on the goldfields around bakery hill. He was the first born son of Richard and Mary Sutton who started Sutton's Music Stores, which once was one of the largest music businesses in Australia. Schooled by his mother Mary until age ten, science was Henry's passion and by fourteen he had read every book on science in the Ballaarat Mechanics Institute. When Henry was ten years old he began to study the theory of flight and began inventing many things. When he was fourteen he had completed his theory on flight and a few years later in 1878, his papers on flight were published by the British Royal Aeronautical Society. At the same age he invented the first continuous current dynamo three years before Gramme, and invented a torpedo both of which were not patented due to lack of funds.



The cover of the Sutton biography.

A student of the Ballarat School of Mines he went on to make Australia's first telephone in 1877 and by 1878 he had invented the first telephone handset. It was during this time that he began corresponding with Alexander Graham Bell and they became life-long friends. In 1910, Dr Bell came to Australia and visited Henry. After the telephone he went on to invent the light globe but Edison announced his sixteen days before henry. Many inventions followed, various vacuum pumps and

batteries all were given freely to the world for the benefit of everyone. The Sutton storage battery was the first battery in the world to store electricity and it was this invention that brought henry world acclaim. Thomas Edison said it was the best battery in the world, which was the view of many scientists at the time.

After the world-wide success of his battery, Henry was invited to become a lecturer at the Ballarat School of Mines. The student had now become the teacher and taught applied electricity and magnetism, which was the first class of its type in Australia. History has recorded that henry was one of the best lecturers the School of Mines had employed. His inventing continued while he was a lecturer, making improvements to many inventions and donating them to the School.

Henry's inventions eventually led him to travel to England in the 1890s where he set up a new company based around a new half-tone photographic process he had invented. While there he met many notable scientists including Nikola Tesla and formed a great friendship with him. It was during Henry's time in England that his paper on the first feasible television system was published which he called the "telephane". The principles of Henry's invention were later used by John Logie Baird. Today Henry Sutton is still credited around the world as being the inventor of the first feasible television system.

After returning to Australia Henry invented a new combustion engine and carburettor, and designed and built a number of Australia's first motor cars. He was a founding member of the RACV and was responsible for writing the motion that officially formed the club in 1903. He was also instrumental in organising the first official car races in Australia in 1904.

In 1908, Henry's inventions once again brought him world acclaim when he invented the world's first portable radio, a new wireless system and many other wireless telegraphy inventions which were used by many countries including the Australian, American, Japanese, and British navies.

Henry Sutton died in 1912 and although he was never officially recognised at the time, he is still revered and known by many in the various fields of science and technology with which he was associated. Henry Sutton remains unknown to most Australians but his innovative genius is recognised by science journalist Robyn Williams and Professor Mark Dodgson from Queensland University and many others.

Recent discoveries show that Henry did hold a callsign, so radio enthusiasts may find additional interest in this work.

This book has been over 160 years in the making, and finally the remarkable account of this important untold Australian scientific history is ready to be published, but donations are needed to ensure that Henry Sutton's life and work is available for all to read.

This book will not be published without the aid of corporate and private donations. Please help, all donations are very gratefully accepted.

All donations large and small are very much appreciated, your generous donations will ensure that Henry Sutton's biography is published and is available in all schools, universities and libraries in Australia and is available for everyone to buy and read in Australia and overseas.

Rewards

For donations of $1,000 to $2,000, an autographed copy of the book will be donated in the donor's name, or the donor's company or organisation's name to a high school of their choice.

For donations over $2,000, an autographed copy of the book will be donated in the donor's name, or the donor's company or organisation's name, to a high school of their choice, plus the donor or their company or organisation will have the unique privilege of being acknowledged in this very historic and important book.

Online donation page: *https://www.gofundme.com/27w2b4k*

Donations can also be made by contacting Lorayne Branch Email: *lorayne.branch@gmail.com*

Hamads

FOR SALE – VIC

Yaesu FT-480R, 2 m all mode transceiver E.C. with manual, $300. Mirage 2 m amplifier B-108 E.C. with remote control, $200.

Phone Brewster Wallace VK3YBW on 03 9527 2661 after 6 pm, if no answer please leave a message.

WANTED – VIC

Relay for 2 m linear amplifier model ELH 230. Battery valve type 3A5 twin triode.

Icom IC-730 HF transceiver handbook or copy of the same and any information regarding circuit and Service Manual.

Any information on ICE Inoue Communications Equipment Corp. 6 m transceiver model FDAM 3 circa 1968.

Word Processor Citizen model CBM 10WP, working or not but the LCD screen must be complete and undamaged.

Any one that can repair old model Yaesu and Icom gear.

Phone Brewster Wallace VK3YBW on 03 9527 2661 after 6 pm, if no answer please leave a message.

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*

About Hamads

- Submit by **email (MUCH PREFERRED)** or if written and mailed please print carefully and clearly, use upper AND lower case.
- Deceased estates Hamads will be published in full, even if some items are not radio equipment.
- WIA policy recommends that the serial number of all equipment for sale should be included.
- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from those who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
- Commercial advertising on these pages Contact admanager@wia.org.au
- Copy to be received by the deadlines on page 1 of each issue of Amateur Radio.
- Separate forms for For Sale and Wanted items. Include name, address STD telephone number and WIA membership number.

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It is impossible for us to ensure that the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore, advertisers will appreciate the absolute need for themselves to ensure that the provisions of the Act are strictly complied with.

VICTORIAN CONSUMER AFFAIRS ACT
Advertisements with only a PO Box number address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

ADVERTISERS INDEX

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 VK4CZ

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)

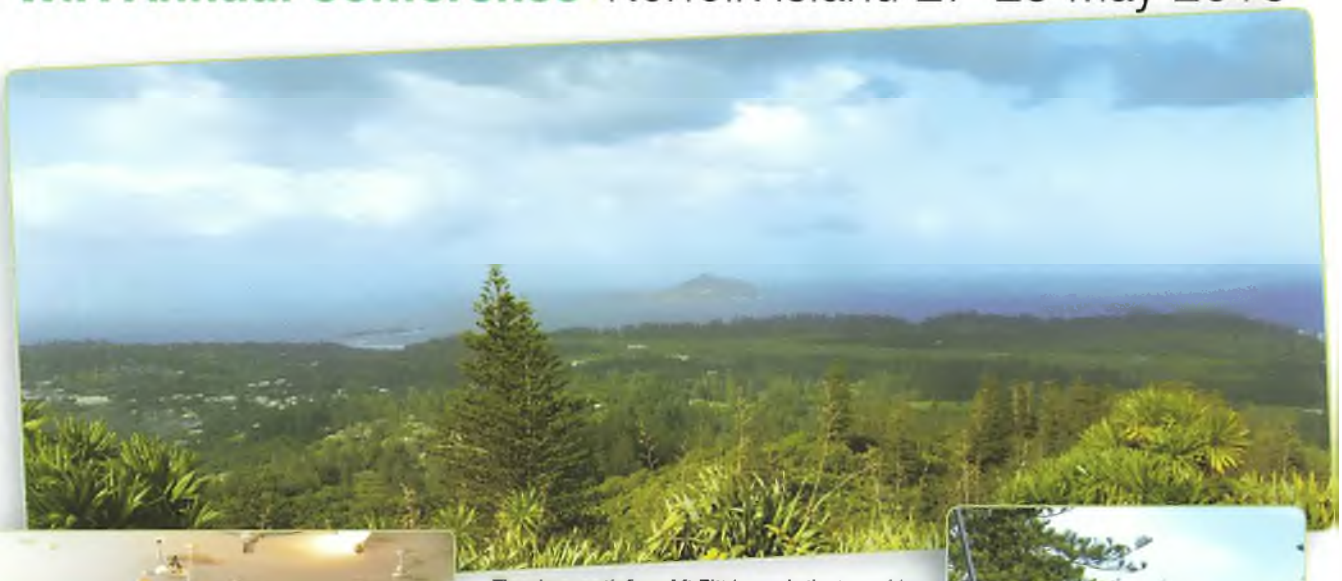
- Think-tank ideas and initiatives to advance amateur radio and WIA membership.
- On approval by the Board, run proof of concept trials.

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.

WIA Annual Conference Norfolk Island 27-29 May 2016



The view south from Mt Pitt towards the township of Burnt Pine with Phillip Island in the distance.

A view of proceedings at the WIA AGM.

Paul VK9PAS operating at Emily Bay, near Kingston.

Heath VK3TWO/9 operating at Mount Bates VK9/NO-001.

Marija VK5FMAZ/9 operating at Mount Bates VK9/NO-001.

Peter VK3PF, Heath VK3TWO, Trent Christian (ex-VK9TC) with his child and Paul VK9PAS enjoying discussion and the entertainment at The Jolly Roger Restaurant & Bar.

The VK9NT team with a group of visitors.

The WIA Board during the Open Forum.

Top photo: Peter VK3PF.
Second row: Marija VK5FMAZ, Marija VK5FMAZ and Monique VK6FMON.
Third row: Paul VK9PAS, Marija VK5FMAZ.
Bottom row: Marija VK5FMAZ.

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THE INNOVATIVE COMPACT HF/50MHZ TRANSCEIVER

NOW AVAILABLE

Introducing the IC-7300 Transceiver.

The unit features a high quality real-time spectrum scope and features top level performance in resolution, sweep speed and dynamic range. The IC-7300 is fitted with a new RF direct sampling system, the latest high performance technology seen in Software Defined Radios.

To find out more about Icom's Amateur products email sales@icom.net.au

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