Amateur Radio

Volume 88
Number 1 ▶ 2020
Price: $12.50 incl GST

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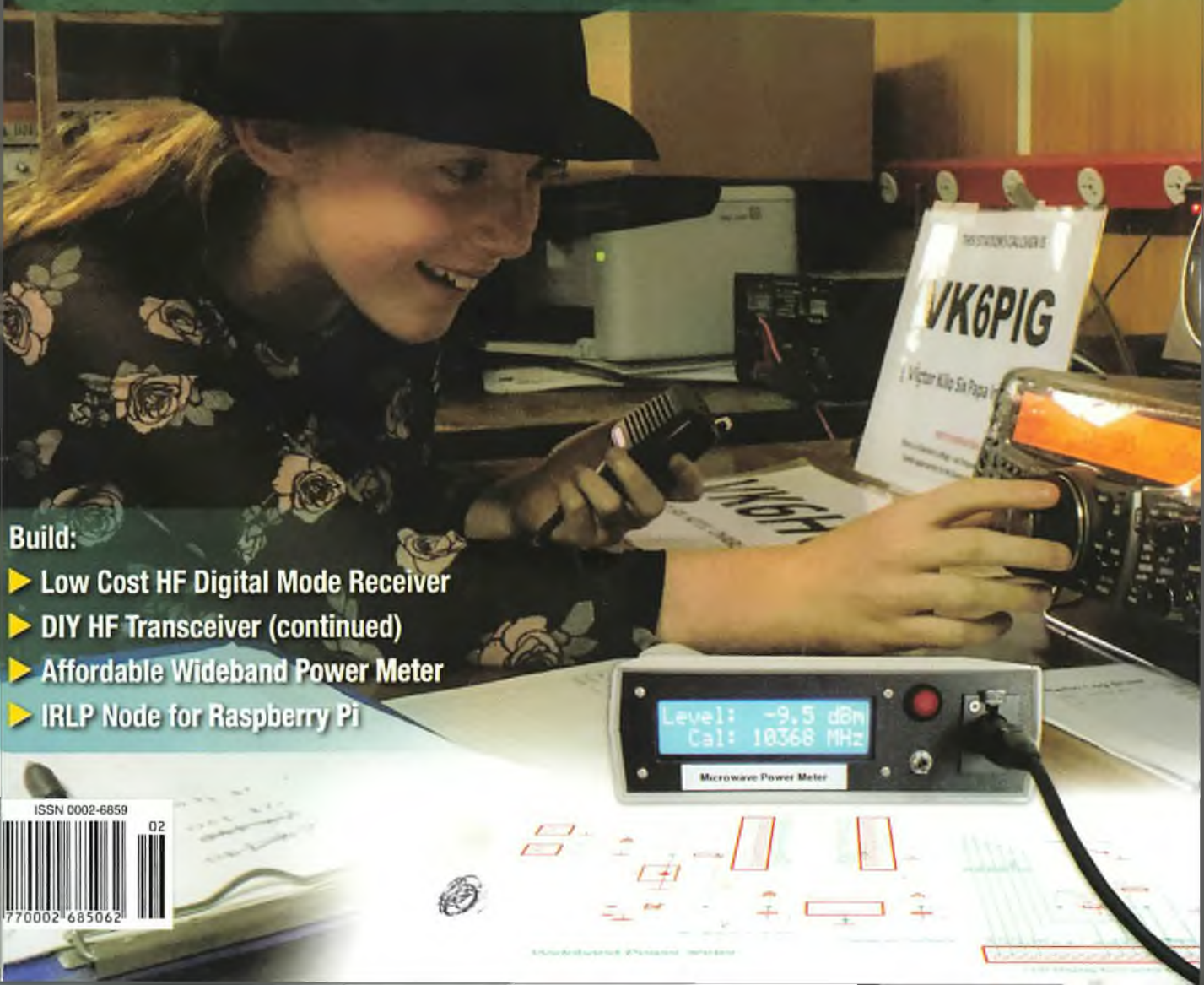
WIRELESS INSTITUTE OF AUSTRALIA

WIA 110 Year Anniversary

Radio Amateur Callbook History (Part 1)



Build:

- Low Cost HF Digital Mode Receiver
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- 3kHz Crystal roofing filter (MAIN and SUB bands) included

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Volume 88
Number 1
2020
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 for the next issue by **21 February 2020.**

Technical

This month's cover.

Main Photo: Elsa VK6FZEB, on the air, recently passed her Foundation Licence, aged 10. Insert: DIY Wide Band Power Meter, see article on page 21.

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 (including 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
The Australian Amateur Radio Service
Member of the International Amateur Radio Union

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Editorial

Brian Clarke VK2GCE

New Year Greetings: It's that time of year again when we had all hoped someone had been thinking of us sufficiently to supply more radio and electronics goodies for us to enjoy. For some of us, during our work, school, college or university holidays, it's been a time to get all the components together to build up that latest Arduino kit, or to connect up all those pre-assembled boards we purchased from China, or restart communication with that CubeSat we had launched from Cape Canaveral in Florida, Rocket Lab's site at Mahia Peninsula in New Zealand, or Plezetsk in Russia.

For many, holidays are almost a memory; did you collect all those components for building an RF amplifier, assembling a UHF high-gain antenna, making up an interface kit for connecting your transceiver to a tablet and testing that latest digital mode with all that new software? Perhaps you got out all that Field Day gear to test it to make sure it would be operational for the next contest – spare fuses, cables, headphones and microphones, fully-charged batteries, all the parts for the antenna, a battery or gas powered soldering iron?

Radio Amateur Service: In January 2004, the predecessor to the Australian Communications and Media Authority (ACMA) agreed with the removal of the need for Morse Code competence; it was anticipated this would lead to an increase in numbers of radio amateurs, and it did. In October 2005, under the new ACMA, the restructuring of the multitude of other licence categories (e.g. Novice, Limited) into just two was permitted; this change was also expected to be accompanied by a further increase in numbers of radio amateurs; Standard Licence holder numbers shifted up by 9, Advanced retreated by 230. When the WIA bought the Foundation Licence package from the RSGB in January 2006, this turned out to be the greatest thing since sliced bread! 915 new radio amateurs gained their Foundation Licence holder in the initial year.

After the introduction of the Foundation Licence, there was a 6-year period of year-on-year growth in Foundation and Standard licence holders and a continuing fall in Advanced Licence holders. The fall in Advanced Licence holder numbers has not abated since 2005. The upward change in Standard Licence holder numbers has hovered around 3 per annum. The numbers of Foundation and Standard Licence holders upgrading has hovered between 50 and 100 per annum, ie, about 0.35 to 0.7% of total radio amateurs per annum. So, the dream of a 'pipeline' of Foundation Licence holders converting to Standard and Advanced levels is not really happening. When your dream does not become reality, what do you do? Kid yourself the numbers are 'statistics, bloody statistics' (the Winston Churchill defence), change your expectations, or change your licence upgrade plan?

Time for Reinvention: Almost all countries' national Amateur Radio associations have the word 'radio' in their title. If you ask any youngster what is understood by 'radio', you will get a blank look. But mention 'electronics', 'wireless' ,'coding' and 'Information Technology', and suddenly the

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Board comment

Greg Kelly VK2GPK

Welcome to 2020, another year has just flown by! I would like to take the opportunity to wish everyone a happy and healthy new year for 2020.

110 Year WIA Anniversary: The WIA looks forward to a significant anniversary in 2020 – 110 years young! Few organisations have such longevity – especially a not-for-profit, volunteer organisation in a rapidly evolving electro-technology sector. Remember the WIA is a member based organisation – the WIA is you and only exists to support the Australian Radio Amateur Service cohort nationally and internationally. The WIA board thanks the membership for their continued support.

Whilst the current national WIA was incorporated as a public company relatively recently in 2004 – superseding the prior state based federated model - the WIA's formation dates back to 1910. The magazine will be running a number of historical articles during the year highlighting events across this timeline, starting this issue with the history of the 'callbook' that we hope you find interesting and informative.

Bushfire Emergencies: At this time bushfires are raging widely across large areas of Australia with the loss of both life and property. This is occurring on an unprecedented scale due to the catastrophic combination of record low rainfall, heatwave conditions and high fuel loads – and increasing average temperatures due to climate change.

As a society, we continue to be indebted to the emergency services personnel and many volunteers involved in fighting these fires and assisting the many communities directly impacted. And special thanks to those radio amateurs volunteering either directly or via organisations such as WICEN. I sincerely thank those in our emergency services who often put their own lives at risk to protect our society.

Bushfires have now decimated vast tracts Australia across most states, with many tragic deaths of both residents and emergency services personnel, the loss of thousands of homes, infrastructure, crops and farm equipment. The short and long term impacts on the native flora and fauna are at a scale it is difficult if not impossible to comprehend. The likely economic impacts are only now beginning to be quantified. Whilst the weather conditions have eased somewhat in the last week with lower temperatures and higher humidity, the fires continue to burn. Over 100 fires are still burning in my state and 40 of those still uncontained at the time this news item was composed. If and when it rains water supplies are likely to become contaminated from the fire residue. Smoke is at hazardous levels in many areas. This is hardly a happy New Year for many.

Governments, especially the Federal Government, have been slow to react to the unfolding national disaster but are now starting to act with urgency. At my location in regional NSW in the Southern Highlands, the fires have twice come within a few kilometres from different directions over a two-week period. The whole town has been seen subject to emergency evacuation notices on each occasion. Whilst my residence has so far been unscathed, other neighbours have not been so fortunate. The anxiety of not knowing whether it will be there when you return takes a heavy toll. And the bushfire season is far from over. And then there is the smoke!

Emergency Communications

What the bushfires have shown the wider population is how fragile our communications and energy infrastructure are when subject to extreme events. Loss of power will result in most networks exhausting battery supplies in 6 – 8 hours. It was telling to see photos of people queuing to use the one or two public phones still working in some of the isolated townships, with no mobile phone, power or internet.

The only phones operating at that time were POTS phones – those still using 100-year-old copper line technology. Satellite phones were dropped into these areas, but some days after they were isolated. The lack of access to email was raised as a concern by those isolated. This is where early access to WINLINK[1] by those isolated would have been so useful to contact emergency services, relatives and workplaces.

Call to Action: How relevant is Amateur Radio today in Australia for last-resort emergency communications? In other countries it remains very relevant, due in no small part to regular natural disasters. For example, regular EMCOMM tests are held in the US which have two benefits, one is

[1] WINLINK is a worldwide system for reliably sending and receiving e-mail via radio in the AR RF spectrum. It is used extensively in maritime by sailors in the AR bands and in other RF spectrum by specialist agencies, such as MARS (Military Auxiliary Radio Service) in the US.

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Board comment

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it educates politicians, the public and emergency services of what Amateur Radio is and it formalizes the mechanisms to instantiate an EMCOMM response to a disaster.

This AR engagement would most likely be more feasible here with local councils and their emergency response representatives, rather than state or federal government. This should be a distributed model, where local clubs (singularly or jointly) could assist. This would be most effective if there was a standard framework of EMCOMM capabilities to start the dialogue and facilitate interoperation. The WIA proposed a framework some years ago called RAVEN (Radio Amateur Volunteer Emergency Network), but it didn't gain traction from members at the time – I believe now a window of opportunity exists for a year or two to establish an EMCOMM frame work that will help with the long term relevance of the Radio Amateur Service. Your constructive input will be greatly appreciated, please email *nationaloffice@wia.org.au*

ACMA Syllabus Review: The ACMA Syllabus review panel is meeting for the first time at the end of January. The WIA has three representatives from our Education Team on the Panel. The WIA goal is to update the syllabus for the three licence classes in line with current technology (eg. digital modes) and ensure compliance with HAREC requirements for at least the Advanced Licence class. The RSGB has just completed a review and update of their three licence classes, which came into effect in the UK last September. The RSGB update was the result of thousands of hours of volunteer effort.

Nomination for Directors: By the time you read this, nominations would have either closed or be about to close at the end of January for the half-board election. If there are sufficient nominations that exceed the available vacancies, an election will ensue.

WIA 2020 Convention Hobart: Don't forget to register, it is May 8 -10. This is an important yearly forum for members to provide input and feedback to the incoming WIA Board. Plus lots of great tech-talks and events and tours. It is also a great opportunity to spend some time in the island state, so if you can make it, see you there!

73

Greg VK2GPK

Editorial

Continued from page 2

eyes light up. Is it time to refashion ourselves as the experts in electronics, wireless and IT? The WIA is already along the path with its name; is it time to change the name of its flagship magazine to attract more members? Changing the WIA's media image is one thing; but how effective will that be without some other motivators? In at least one country, school children start playing with small, pre-assembled printed wiring boards to make their own projects, such as light shows or operate robots or drones. In other words, these school children meet electronics and wireless communication at a very early age.

Next Steps: In preparation for a series of editorials on this topic, I have made contact with the Presidents, Vice-presidents and Youth organisers of WIA-like associations in China, Germany, Indonesia, Japan, Korea (South mainly because there are only 3 radio amateurs in North Korea), New Zealand, Russia, South Africa and Taiwan. I have asked them:

1. What is the Chinese Radio Sports Association (CRSA) doing to attract members?
2. What proportion of Chinese radio amateurs are members of the CRSA?
3. At what rate and in what direction is CRSA membership going?
4. What does the CRSA do to debrief members who choose to leave?

Instead of CRSA, I have substituted DARC, ORARI, JARL, KARL, NZART and so on. Like the WIA, office bearers in all these organisations are volunteers. So, it may be a wee while before I have some suggestions. I hope to have more for you in the next edition.

Stop Press: It is with great sadness we advise our readers of the recent (15 January) passing of Kaye Wright VK3FKDW, having lost her battle with Motor Neurone Disease. Kaye was a respected member of the Amateur Radio Community - contributing substantively not only to the WIA but also ALARA and her home club the Moorabbin and District Radio Club. She was the long serving secretary of this magazine's publishing team known as 'PubComm' and only stepped down from this volunteer role a few months ago. Kaye was the unsung hero of this group. Her organising skills were amazing, her persistence, good humour and commitment to keeping the team on track - akin to 'herding cats' apparently – will be sorely missed.

73

Brian VK2GCE

Acting Editor

WIA news

World Radio Conference WRC-19 Concludes:

Sharm El-Sheikh, Egypt, 21 November 2019

WRC-19 Concludes with no loss of Amateur Spectrum – although proposals for WRC-23, such as the 23cm (1240-1300MHz) proposal from France for removal of secondary access to this band due to navigational satellite interference potential demonstrates the need to be vigilant.

Short Duration Satellites: There is still no agreement on how to protect existing services and uses of the uplink frequency band proposed for telemetry, tracking and command of these "simple" satellites.

5725-5850 MHz: This part of the amateur secondary allocation, which includes an amateur-satellite downlink at 5830-5850 MHz, is the subject of an unresolved conflict over parameters for wireless access systems including radio local area networks.

Frequencies above 275 GHz: This upper frequency range is not allocated but several bands are identified for passive (receive-only) use and administrations are encouraged to protect them from harmful interference. With that in mind, WRC-19 has identified other bands above 275 GHz for the implementation of land mobile and fixed service applications. The use of these bands for applications in other services, including amateur experimentation, is not precluded.

50Mhz Region 1: WRC-19 has approved an allocation in the 50 MHz band for amateurs in Region 1.There are provisions to protect the other existing services that use the band in Region 1 and neighboring countries in Region 3. The existing primary allocation of 50-54 MHz in Regions 2 and 3 is unaffected.

The WRC-19 decision on its agenda item 1.1 (50Mhz) is the culmination of years of effort by the IARU and its member-societies, mainly in Region 1 but with support from the other two regions. The ITU Radiocommunication Sector working group in which preparations were conducted was chaired by Dale Hughes, VK1DSH, of Australia who was chosen to chair the sub working group dealing with the item at the WRC.

Through their dues the members of IARU member-societies in all three regions, and especially the Deutscher Amateur Radio Club, Radio Society of Great Britain, Japan Amateur Radio League, Radio Amateurs of Canada, Wireless Institute of Australia, and ARRL have helped to field the IARU team. *[Ed: all of these member-societies directly sponsor their representatives on their respective national delegations].*

Without your membership's support there could be no effective representation of the amateur and amateur-satellite services at WRC-19 and other international meetings and conferences.

See video IARU President Tim Ellam, VE6SH: *https://www.youtube.com/watch?v=gqphjb0Cds4&t=6s.*
Source: IARU WRC-19 delegation

Youth on the Air Camp Coming to Oceania – IARU Region 3 Update

On the 2nd and 3rd September 2019 the IARU Region 3 Directors met in Tokyo.

The directors reviewed progress on tasks directed and identified at the last Directors' meeting and the Regional Conference that were held in Seoul, Korea in September 2018.

The modified interim Region 3 band plan proposed by the Region 3 Band plan Committee was approved in this meeting. A notable change was addition of a satellite portion in 15m Band as agreed at the last Region 3 Conference.

It was decided that an IARU Region 3 YOTA activity will take place in Pattaya, Thailand in October 2020, and we hope all the IARU Region 3 member societies will send their delegates to this event. *[Ed: Australia is a founding member of IARU Region 3]*
Source: IARU Region 3.

Youth on the Air Camp Coming to the USA

The Electronic Applications Radio Service has announced that the first Youth On The Air (YOTA) camp in the United States will be taking place next June. Sponsors hope the camp will become an annual event.

The inaugural summer camp will take place June 21 – 26 at the National Voice of America Museum of Broadcasting in West Chester Township, Ohio. The West Chester Amateur Radio Association (**WC8VOA**) will host the event. Operating the camp will be Electronic Applications Radio Service, Inc. (**EARS**), a 501(c)(3) charitable organization dedicated to wireless technologies and activities.

According to the announcement, the camp will focus on building peer and mentor relationships and taking amateur radio "to the next level." Campers will attend workshops and activities in multiple STEM-related subjects, such as radio contesting, electronic kit building, D-Star, APRS, satellite communication, antenna building, and radio direction finding and orienteering. A high-altitude balloon launch is also being planned. Campers will learn and exercise on-the-air skills at special event station W8Y. YOTA USA 2020 Camp director is Neil Rapp, WB9VPG
Source: ARRL

WIA DX Awards Start Dates Normalized

The WIA Awards Committee has decided to normalise the effective start date for ALL DX awards to the same date, using the first of January 1946 as the "reference date". This rationalises the date handling and removes unnecessary complications about eligibility from the DX award process.

All QSO's from this date onwards are now eligible for all awards.

Previously, awards had different start dates, depending on when they were first created.

This means participants in the awards program may now qualify for new awards and/or endorsements. To ensure all your QSO's are now eligible, simply upload all your QSO's

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WICEN and 2019-20 bushfires

Neil Fallshaw VK2XNF, WICEN NSW Vice-president

WICEN (NSW) Inc. has been called upon to help in many areas of communication during the recent bushfires throughout the State. Some members have volunteered to answer the phones for **BFIL**, the NSW Rural Fire Service (RFS) Bush Fire Information Line (BFIL). Other members have been deployed to Glenn Innes, Port Macquarie, Kempsey, Wauchope, East Maitland, Shoalhaven and Hawkesbury RFS Fire Control Centres (FCC) as Communication Operators. Logistical support was provided at Quirindi and an Aviation Radio Operator at Kempsey. Communication Operators and technical support were provided at Bega, along with the setup of a radio network task force.

The following are accounts from several of our members of their deployment to Bega and BFIL.

BEGA: On Friday 3rd January, WICEN NSW personnel were deployed to Bega to provide communications in support of fire response. On arrival in Bega, Irene VK2VAN and Jan VK2FEB commenced setting up the Communications bus (on loan from RFS in Dubbo) whilst Compton VK2HRX, Craig VK2BTQ and Matt VK1MA travelled up to Peak Alone (SOTA summit VK2/SC-008 for those SOTA fanatics) to deploy portable midband VHF and commercial UHF repeaters.

The midband VHF repeater far outperformed the UHF repeater and UHF users were migrated to the VHF midband system. The WICEN NSW role involved the handling of GRN (Government Radio Network) and midband VHF traffic in support of the VRA (Volunteer Rescue Association) as well as assisting the Bega Valley Shire Council with communications into Bermagui on our systems. The repeaters were housed in one of the WICEN repeater trailers, with a solar array to charge the onboard batteries. The use of APRS enabled battery voltage to be monitored remotely, resulting in a reduction of trips needed to visit the site to check on battery status – important to us as it avoided a three hour return trip through an active fireground. Of technical interest, we observed that the L band signals for Thuraya satellite phones and midband VHF signals were able to penetrate incredibly thick and dense smoke (visibility was down to approximately 20m at times) without observable attenuation.

Whilst enroute to Narooma for other tasking, VK2HRX and VK1MA also assisted the SES (State Emergency Service) by redeploying their SES-500 satellite ground station within Bermagui which at the time had no power, mobile phone coverage and very intermittent radio communications through the GRN. The redeployment of the SES-500 provided the NSW Ambulance service with reliable communications to the world outside of Bermagui.

Matt VK1MA, Compton VK2HRX

Bushfire Information Line (BFIL)

BFIL is run from the RFS headquarters at Olympic Park in Homebush, Sydney. Operators take phone calls from the public seeking information about the state of the fires in their area, whether it's safe to drive from A to B, whether they can have a barbecue today and so on. Using the RFS website, *Fires Near Me*, and Roads and Maritime's *Live Traffic NSW*, we could answer 90% of incoming enquiries. This was essentially Message Passing 101, something all WICEN members learn; the only difference is we are using a telephone instead of the radio. The brief is to be a calm voice, providing concise, accurate information to a stranger who is possibly stressed by their situation. I have put in the equivalent of two working weeks. Half a dozen other WICEN members have also put in time at BFIL.

Richard VK2SKY

Your local WICEN. Today we can identify a number of WICEN groups across the country, most accessible from the web page at *https://wicen.org.au*.2 They all will welcome your participation in a worthwhile cause.

- **WICEN ACT** - part of Canberra Region Amateur Radio Club
- **WICEN NSW Inc** – An Incorporated Association, with Charity Status
- **WICEN Victoria** - WICEN (Vic.) Inc.
- **WICEN Queensland** – Brisbane Area WICEN Group (Inc), WICEN Bundaberg, Ipswich & District Radio Club Inc. WICEN Group
- **WICEN South Australia** – WICEN SA Inc
- **WICEN Western Australia** – WICEN West Australia
- **WICEN Tasmania** – WICEN Tasmania (South)
- **WICEN Northern Territory** – Does not appear to be operating.

WIA news

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between this date up to and including 1/1/1990 into the online Awards system. Alternatively, just upload your whole log. Then perform a "Show Award Status".
Source: Graham Alston, VK3GA, WIA Awards Manager, on behalf of the Awards Committee

19th Anniversary of ARISS Operations

On November 13, 2000, the ARISS amateur radio payload was turned on and the first operations occurred over Russia and the United States.

Our ARISS team is working feverishly on the final certification of our next generation radio system: the Interoperable Radio System (based on Kenwood hardware, now no longer distributed in Australia). We thank all those that have supported this development effort through team support as well as donations!! We continue to move closer to a planned March 2020 launch of the hardware on SpaceX CRS-20.
[Thanks Frank Bauer, KA3HDO, AMSAT Vice President for Human Spaceflight and ARISS International Chair for the above information]
Source: AMSAT

RadioAnalogue ICOM IC-7300 Add-on RF Module

RadioAnalogue has released a RF output module for the ICOM IC-7300 which enables the connection of an external SDR (Software Define Radio). Unlike its bigger brother the IC-7610, the IC-7300 doesn't have an I/Q output, a feature used for, among other things, wide-band morse decoding, contesting and external SDR panoramic displays (aka. panadapter). The PRTX-7300 is designed to be easy to fit internally, with no soldering, modification or alignment. This high performance module allows the user to obtain a buffered **wideband RF output** to drive ANY external SDR, including SDRplay, AirSpy, etc.

PTRX-7300 utilizes active high impedance probing technique to sample the IC-7300 bidirectional TX/RX signal line. Fortunately, IC-7300 has a connector on its PCB designated as J1431 where you can sample TX/RX signals. Because circuit is just sniffing (not loading RF signal line), thanks to its high input impedance amplifier, it cannot be sensed by the rig and has no adverse effect on normal operation. There is no 3 dB or more loss as in the case of alternative power splitting methods to sample the signal. The amplifier draws only 30mA, well within the 1A capability of the regulator. Available via distributors, the PRTX-7300 is described as not cheap, but very reasonably priced for such high quality custom engineering. *[Ed: Note installation of this, or other 3rd party products, may impact your ICOM warranty]*
Refer website *www.radioanalogue.com*

2020 CubeSat Developers' Workshop

The 2020 CubeSat Developers' Workshop will be held May 4 – 6 at the Cal Poly Performing Arts Centre in San Luis Obispo, California. *www.cubesat.org*
Source: ARRL

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Homebrew HF Transceiver

Part 1 Receiver Second article

Luigi Destefano VK3AQZ

This project is being published over six editions of the magazine. The Nov/Dec edition covered the receiver from the front end to the noise blanker. This edition covers the remainder of the receiver. Later editions will cover the transmitter, vfo system, construction and testing.

Part 1G Crystal filters

The noise blanker feeds the crystal filter section. The circuit is shown in **Figure 10**. This section contains an SSB and an AM crystal filter selected by relays. Provision has been made in the switching and front panel controls for a future FM module. The SSB filter is a KVG 8 pole symmetrical filter with a nominal bandwidth of 2.4KHz. It is used on USB and LSB modes by switching the BFO crystals on either side of the filter pass band. The BFO crystals are matched to the filter and are +1.5KHz (for LSB), and -1.5KHz (for USB) of the 9.000MHz centre frequency. They are positioned some distance down the slopes of the filter, which helps reduce the carrier even further than the suppression provided by balanced modulator section. In this design, the USB crystal is used on the LSB mode, and the LSB crystal on the USB mode. This is because the VFO frequency is on the high side of the incoming signal frequency resulting in sideband inversion.

The AM filter crystals were purchased as a matched set of 5 crystals in a kit from a local kit supplier (**REF.9**). The cost was quite reasonable when one considers the effort required to find suitable matched crystals with the right parameters. The values of the crystal tuning components were part of the kit. If you wish to use this filter and components, you will need to refer to the kit supplier. This filter has a centre frequency which is 4kHz above 9.000MHz, and a bandwidth of around 5.4KHz. The VFO system software has provision to correct for the 4KHz offset on receive and transmit. The filter has a few ripples in the pass band but it is acceptable. The overall attenuation is not as good as the SSB filter. The low side is only around -40dB at around 10KHz away from the centre frequency. As a result, when listening to AM broadcast signals around 8MHz using the 40 metre dipole, I can hear adjacent stations in the background. However they are not strong enough to be a problem. They are not there when using the SSB filter so in order to improve that aspect of the AM filter, I would need a much better filter. Since it really only happens in the broadcast area around 8MHz with strong Asian signals at night, I don't worry about it.

Both filters contain buffer stages which provide some gain compensation for the insertion loss of the filters. They also assist in matching the filter input and output impedance. Crystal filters require to be correctly terminated in order to achieve the design pass band and skirt responses. The 2 filters have different terminating requirements. The AM filter requires a low 50 ohm source and load impedance hence the buffer stages are different to the SSB filter buffers. It also has a larger insertion loss that needs to be compensated for. The gain of the buffer stages, and the insertion loss of the filters, results in an overall module gain of around unity for both filters

The SSB crystal filter is also used in the transmit SSB mode for removing the unwanted sideband. Although not strictly necessary, the transmit AM modulation is also passed through the AM crystal filter. Doing so restricts the modulation sidebands to the width of the filter.

Part 1H Intermediate or "IF" amplifier

The IF amplifier circuit is shown in **Figure 11**. The IF amplifier contains an AD603 RF gain controlled amplifier. The gain of the IC can be varied in a log linear manner from +9dB to +51dB. The unusual feature of this device is that the gain control is achieved by varying an internal resistor network. This ensures the linearity of the amplifier is maintained as the gain is varied. In this design, the amplifier has tuned input and output circuits. These offer a bit of voltage gain as well as restricting the noise bandwidth. One stage of IF amplification is sufficient in this design due to the use of a mixer with some gain. The amplifier is quite stable and has a pretty good dynamic range. With previous homebrew designs, I have tended to use IF amplifiers with too much gain and limited headroom. As a result, strong signals would go into clipping prior to the AGC system kicking in. This resulted in some forms of distortion which tended to affect the quality of the recovered speech. In this design, the IF signals can swing as high as 4 or 5 volts before clipping occurs, and this results in a cleaner sounding received signal.

The gain of the AD603 is controlled by DC voltages on pins 1 and 2. These are called GPOS and GNEG inputs. The gain of the amplifier is varied by varying the voltage on pin 1 with respect to pin 2 by plus and minus half a volt.

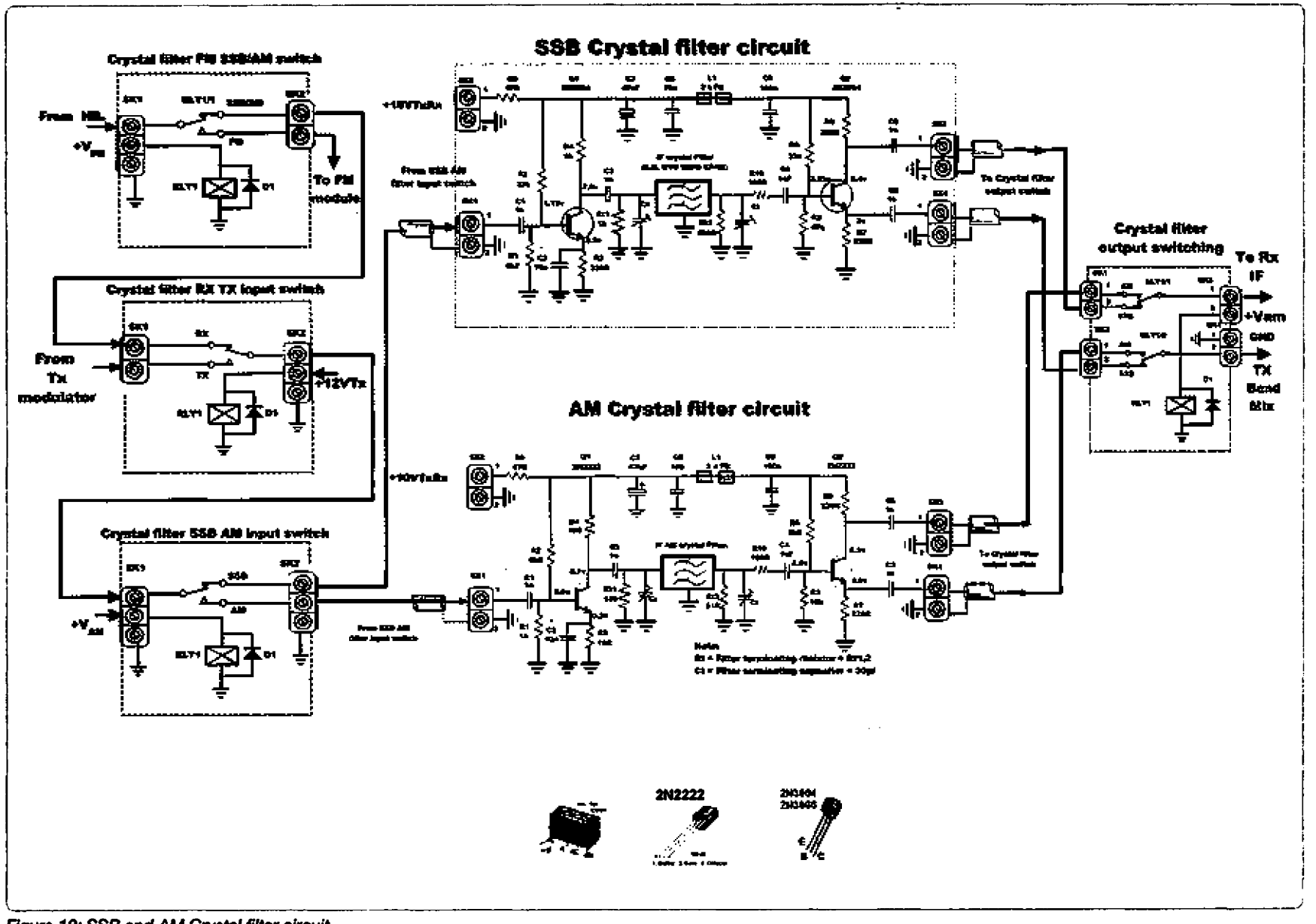

Figure 10: SSB and AM Crystal filter circuit.

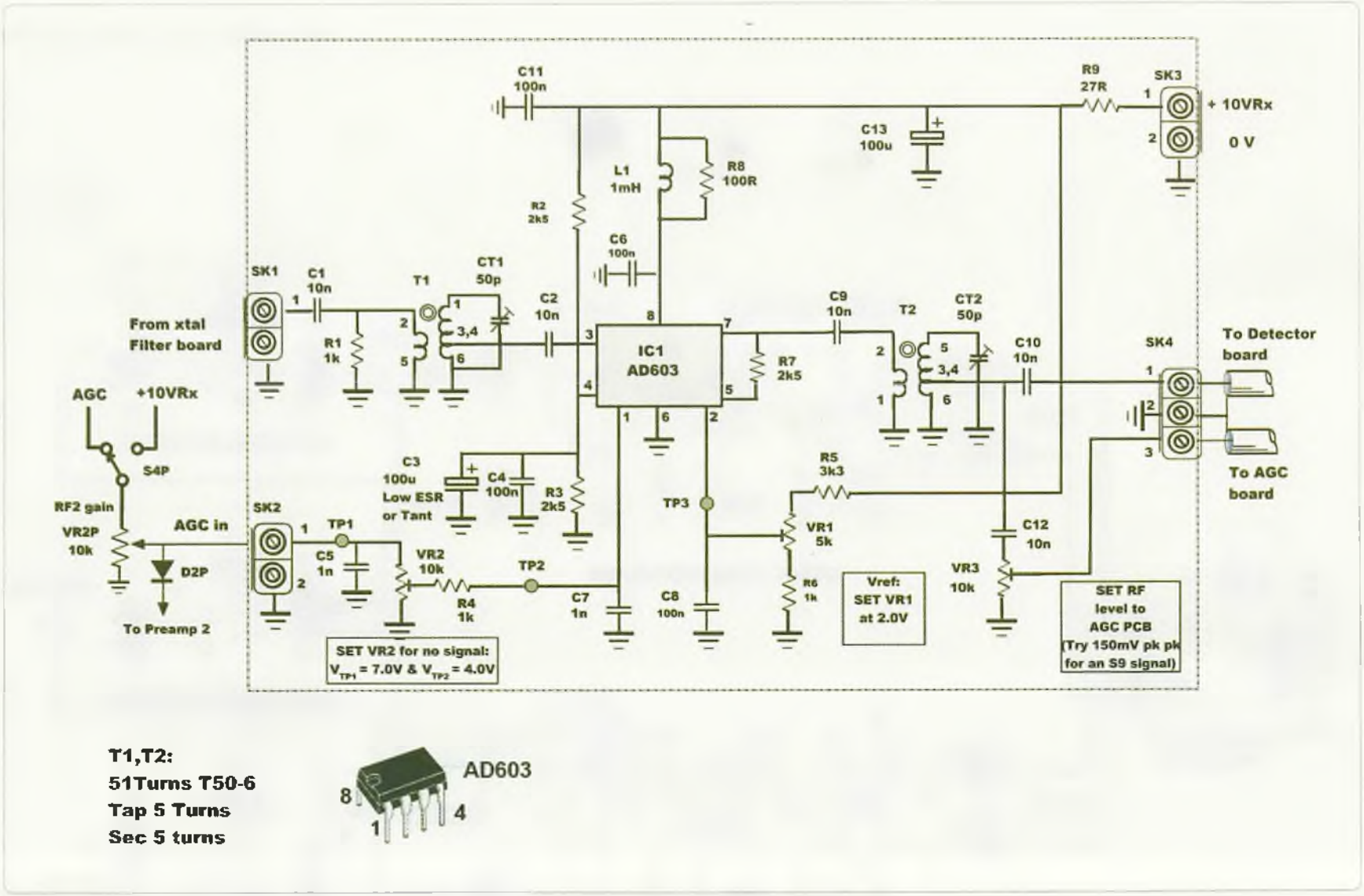

Figure 11: IF Amplifier.

The 1 volt change results in a gain variation of 40dB. However, a thing to note is that the gain response has an undesirable effect if you exceed the 1 volt change. If the voltage on pin 1 continues to go further negative than the half volt difference, the gain starts to rise again. This is what is referred to as a "hockey stick" response. The normal "sweet" spot for the pin 2 reference voltage is around 4 volts. However in my design, the voltage on the reference pin is set at 2 volts so as to minimise this effect when AGC is applied to pin 1. The AGC line can vary from several volts down to maybe 1.5 volts depending on the incoming signal strength. So setting the reference voltage on pin 2 at a low 2 volts, helps overcome this issue without complicating the AGC circuitry to the IF stage. Other stages in the transceiver use a wider swing for control which is not compatible with the AGC requirements of the IF amplifier if the reference voltage on pin 2 was set to 4 volts.

Under AGC control, the measured gain of the amplifier varies from around 54dB at maximum, and falling to around 0dB at minimum. The maximum gain was tested at 9MHz with an input level of 10mVpp. This produced an output level of 5.5Vpp. In this case, the voltage on pin 1 was 0.8 volt higher than the reference, which is higher than the recommended 0.5V. I found that when pin 1 and pin 2 were at the same voltage, the gain was around 30dB. The noise figure is not as low as some IF amplifiers and it varies with gain. The data sheet contains graphs of noise figure versus gain. However, since the IF amplifier is preceded by several gain stages and a mixer, the noise figure is not an issue here.

I did try a 2 stage AD603 IF amplifier but I found it was unstable under some conditions. And I think there was too much IF gain. As it stands, the one stage seems to be adequate and signals passing through it are very clean.

Part 1I AGC

The AGC circuit is shown in **Figure 12.** The AGC system in this design is a combination of IF and AF derived signals. The design is from **REF 1 page 6.25** with changes to suit my components and signal levels. Front panel controls select fast or slow AGC action for IF and AF derived AGC. The IF derived AGC attack and release times are determined by C6, R10, plus C7 for slow. The AF derived AGC attack and release times are determined by C16, R31, plus R32 for fast. The AF derived AGC acts via Q5 and R11 to alter the release time of the IF derived AGC producing an AGC "hang" followed by a fast release action.

The derived AGC voltage is fed to the signal strength meter via one section of IC1. The second section of IC1 feeds an inverted voltage to the AGC line connected to the RF preamps and IF amplifier. The no signal AGC voltage, set by bias control VR1, is around 7 volts. With a received full strength signal, the AGC voltage falls to around 1.5 volts. There are 3 gain controlled stages in the receiver line up. The IF amplifier requires a 1 volt change, the Preamp 1 requires a 1.3 volt change, and Preamp 2, requires a 1.5 volt change. The no signal voltages for each of these stages is slightly different. These differences are catered for by setting reference controls and gain trimpots in the IF amp and the preamp 2 stage. Series diodes in the AGC line to the RF preamps provide a degree of delay in gain reduction in the RF stages. This helps the receiver maintain the best signal to noise ratio. The AGC system will require careful adjustment of the reference voltages if the best AGC performance is to be achieved. On strong signals you may experience popping on voice peaks if the AGC voltage is not carefully balanced between stages. Also, the meter response will not be very linear in terms of S points. However, I intend to use an AD8307 as a linear signal strength indicator as a future addon so I have not spent a lot of time trying to obtain a log linear meter indication. The attack and release times are important in obtaining good AGC action without overshoots or slow release. The final setup depends on several factors such as the required AGC voltage changes to each stage, the AGC response curves of each stage, and the resulting closed loop transfer function. There are integrated circuits available which are designed to produce effective AGC action in receivers and audio applications. The timings, and the resulting AGC voltage waveform can be quite complex. However, the design in this rig seems to work quite well. The attack and release times are shown in **Table 2.**

Part 1J BFO

The BFO circuit is shown in **Figure 13.** It consists of 3 crystal controlled oscillators used to recover SSB signals on receive, and produce DSB signals on transmit. For clarification, a crystal with a frequency on the low frequency side of a crystal filter will produce an upper side band signal, and similarly, one on the high side will produce a lower sideband signal. The 3 crystals I am using are marked 9.0015MHz (LSB), 8.9985 (USB), and 9MHz. In this design, the VFO is on the high side of an incoming signal which results in sideband inversion.

The 9.0015MHz LSB crystal is used to resolve USB signals, and the 8.9985MHz USB crystal resolves LSB signals. The 9.0MHz crystal needs to be 4KHz above 9MHz and was selected from a batch of low cost crystals. The KVG 9MHz crystal was not able to be pulled the 4KHz necessary to match the AM filter centre frequency. It is used for CW signals and to transmit a carrier for tuning purposes. It is not switched on for AM reception. Each crystal is selected by front panel mode switches which provide power to each oscillator via separate 8 volt regulators. The same

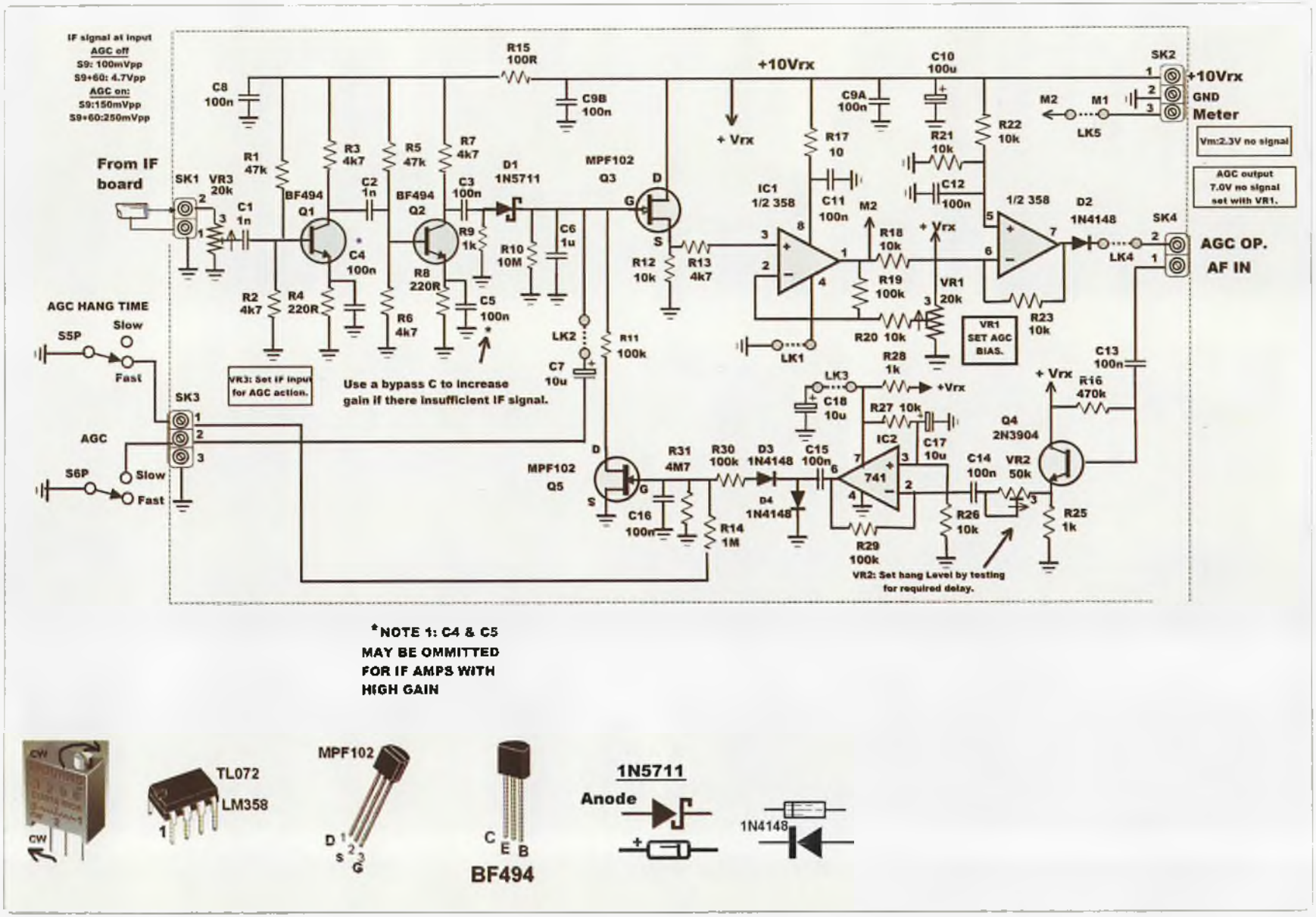

Figure 12: AGC Circuit.

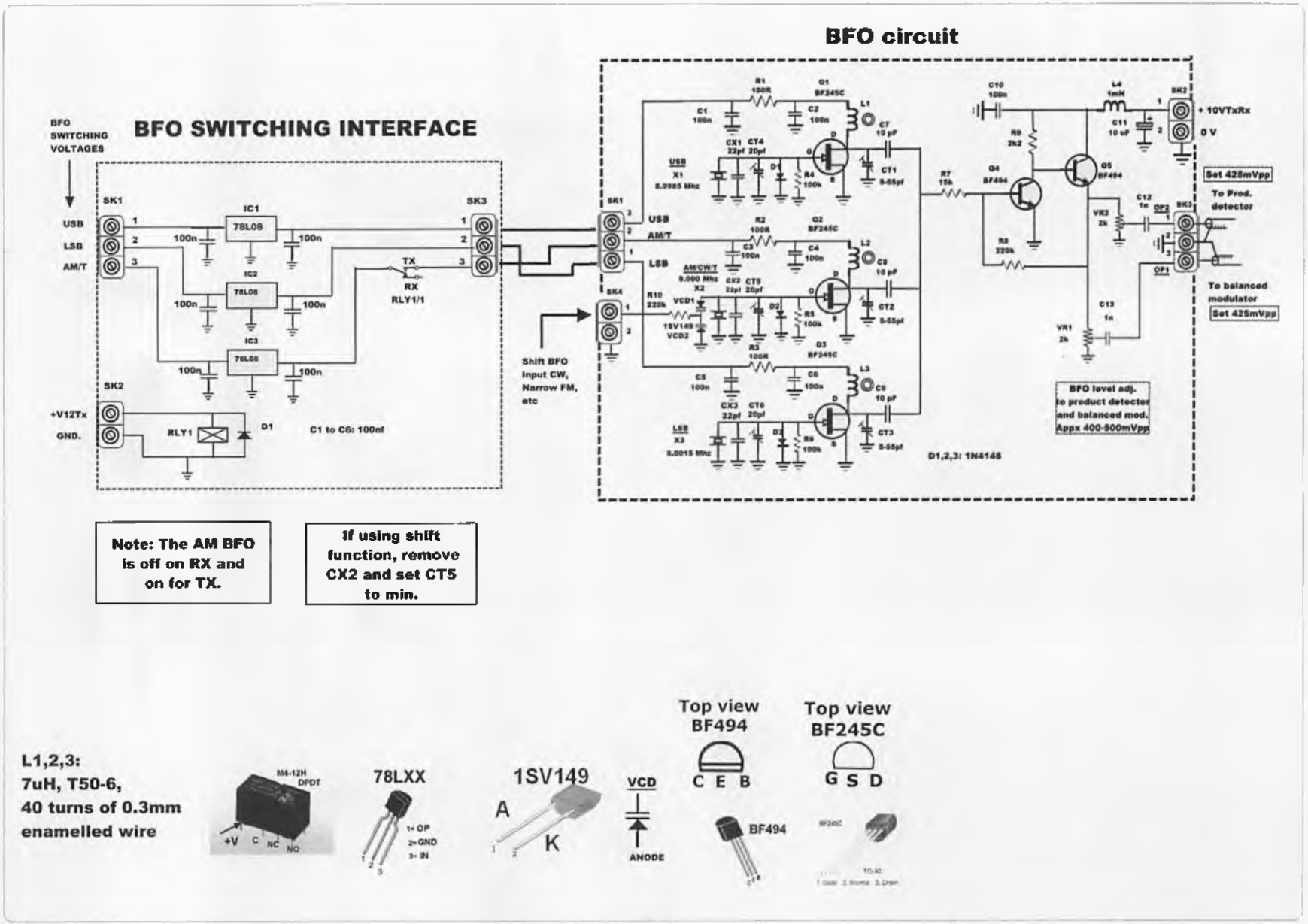

Figure 13: BFO Circuit.

mode voltages are also reduced to 5 volt logic level, and activate pins on the Arduino processor. These mode logic signals alter the VFO frequency so that the display is correct for each mode, and also indicate the mode on the LCD display. Note - the software does not control the BFOs. However, it is not difficult to include code which can be used to switch the BFO crystals from the VFO system for each mode and band.

Each crystal oscillator has its own FET and is activated by switching the supply to the FET. The frequency can be trimmed with small ceramic trimmers and each FET has a tuned circuit output which helps produce a low harmonic signal. Adjusting the tuned circuit however will alter the frequency slightly. So after peaking the tuned circuits, adjust the crystal trimmers for the right frequency. A buffer amplifier consisting of Q4 and Q5, configured as a feedback pair, feed the product detector and balanced modulator. The product detector and balanced modulator are both 1496 mixers and require around 350mVpp to 450mVpp carrier levels. The buffer amplifier is capable of several volts of output if one wants to use mixers requiring higher levels of drive.

In use, the stability of these FET oscillators is not as good as I expected and have a tendency to shift around 10Hz from switch on. After a short while they remain stable. So that is an area that can be improved.

Part 1K Receive SSB and AM detector

The SSB and AM detector circuit is shown in **Figure 14**. It consists of a 1496 configured as a product detector, and pair of OA91 or 1N5711 diodes as an AM envelope detector. The 1496 gain can be adjusted with the trimpot between pins 3 and 4 used to match the output of the AM detector. The AM detector also requires an extra amplifier consisting of Q1. For improved sensitivity and linearity, the AM detector contains a bias adjustment, VR1, which is used to

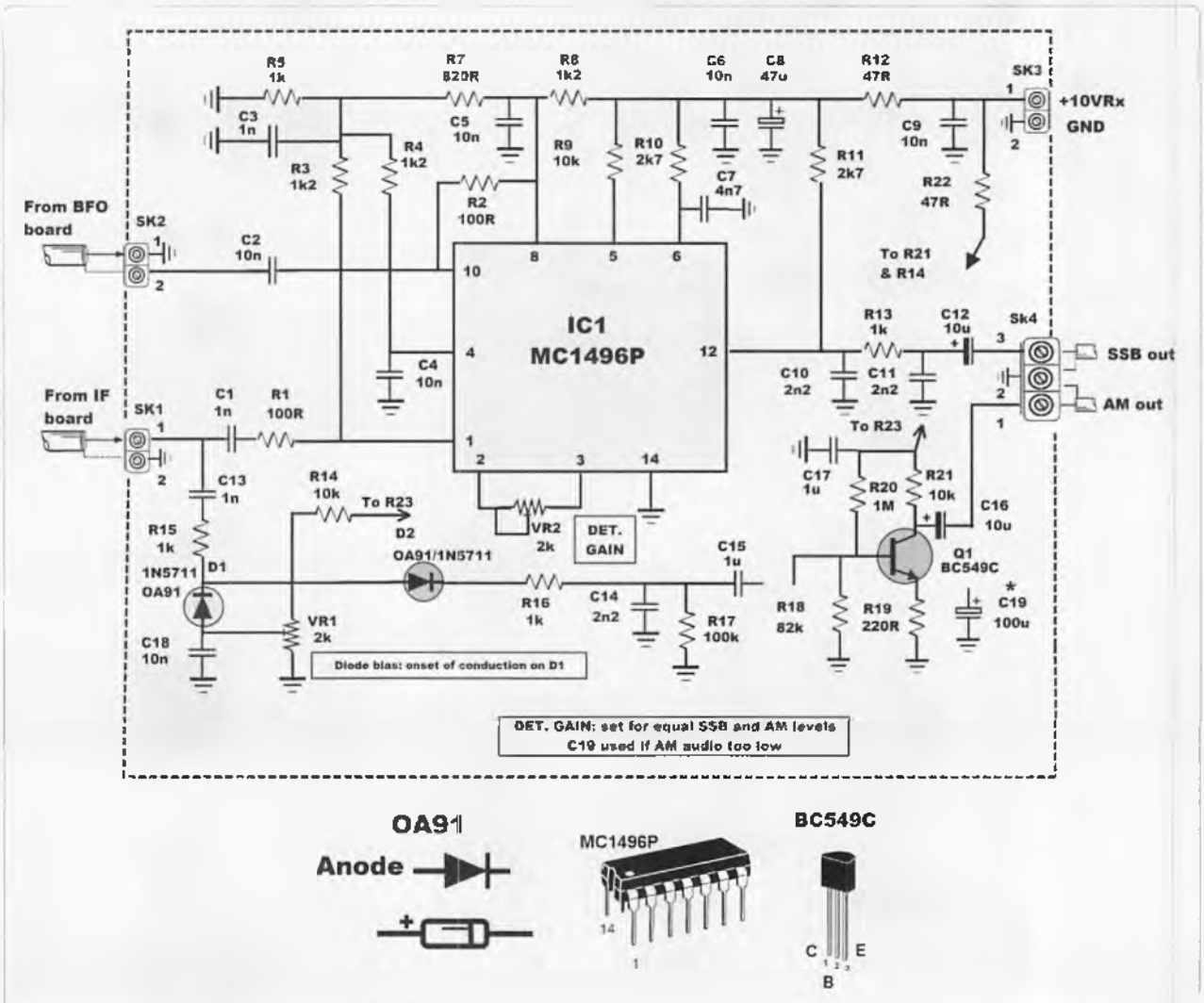

Figure 14: SSB and AM Detector Circuit.

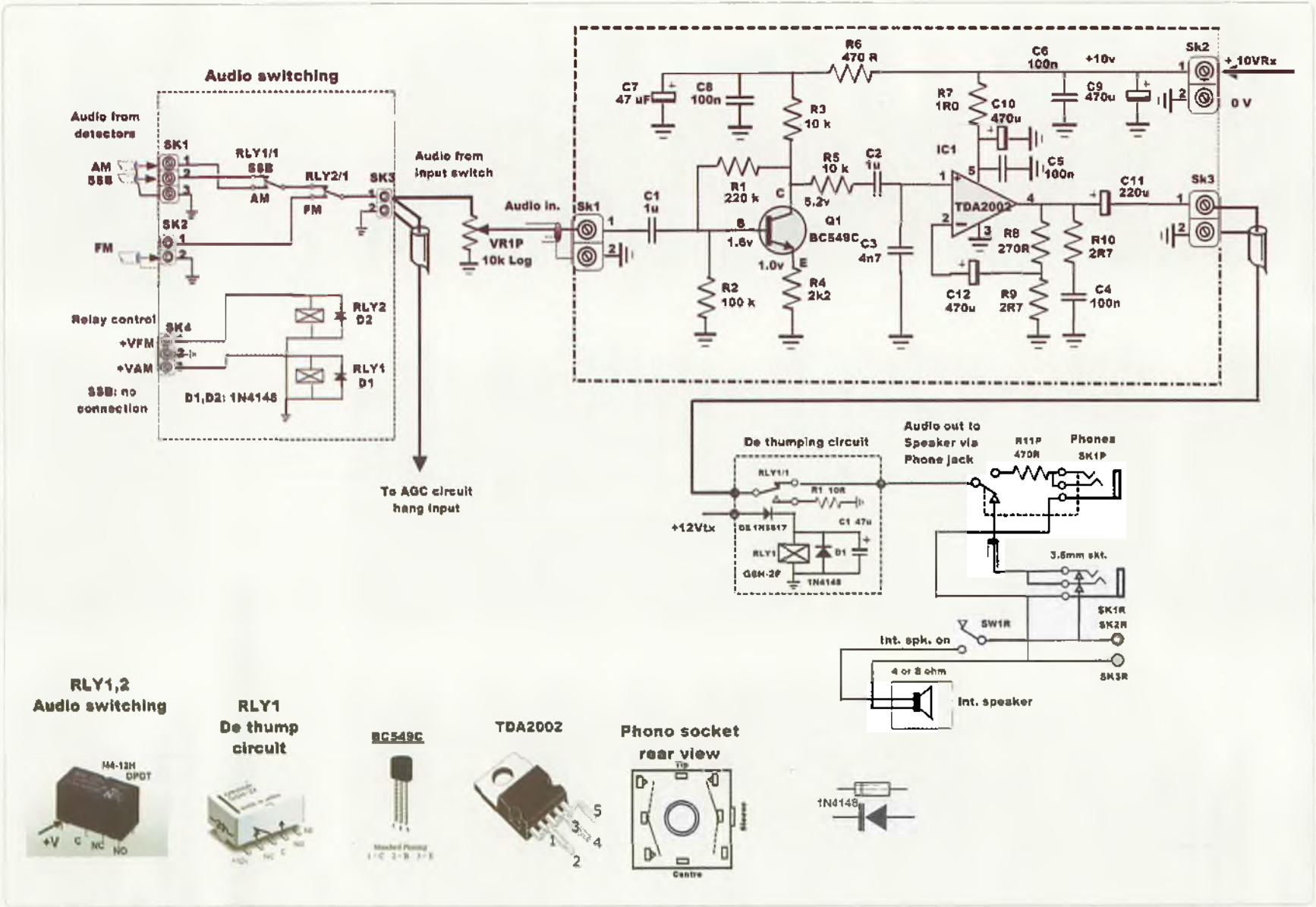

Figure 15: Receiver Audio Amplifier Circuit.

overcome the small turn on voltage of the diodes.

Part 1L Receiver audio speaker amplifier

The receiver speaker amplifier circuit is shown in **Figure 15**. The receive audio amplifier consists of a TDA2002 8W power amplifier. It has a gain of around 40db, distortion of 0.2%, low noise, and stable. The TDA2002 is driven by a BC549C transistor with a voltage gain of 4. The BC549C has been chosen because it is a good low noise audio transistor. SSB, AM, and FM (future) audio signals are fed to the amplifier via a relay switching unit controlled by the front panel mode switches. The output of the speaker amplifier feeds an internal speaker, a switched headphone socket, and some external speaker connections at the rear of the case. The output incorporates a relay which switches the amplifier from speaker to a 10 ohm dummy load on transmit. The audio amplifier output has a DC component so the audio signal is coupled to the speaker via a large coupling capacitor. On transmit, removal of the supply voltage to the TDA2002, can cause the coupling capacitor to discharge through the speaker and internal devices in the TDA2002, resulting in a thump noise. Disconnecting the speaker on transmit with a small relay minimises the thump. Some audio power amplifiers with bridge output configurations do not suffer this problem. In addition, wiring and the discharging of various decoupling electrolytic capacitors across the 10 volt receive line, have a tendency to remain charged for a short moment on transmit, which can produce clicks and pops heard on the speaker.

The TDA2002 has a metal tab incorporated into the package. That, in conjunction with the high power handling ability, results in an audio amplifier with plenty of headroom and dynamic range. As a result, speech peaks, which can reach around 8db higher than average, do not go into clipping, resulting in a cleaner sounding output. The metal tab also helps in keeping the chip cool during these peaks and thereby maintain the high dynamic range. This metal tab, in intimate contact with the internal die, is also important in producing a nice clean low distortion audio. In my experience using smaller audio amplifier packages such as the LM380 and LM386, can cause a form of distortion on speech peaks which are often blamed on other parts of the radio, or originating in the transmitted audio. So in order to avoid distortion due to clipping on speech peaks, I recommend the use of a speaker amplifier device with a metal tab, and plenty of power handling ability. With the TDA2002 and BC549C combination, the noise is so low, you will think it is not working when powered up and without an input! **Photo 1L** shows the speaker amplifier and input switching boards prior to wiring.

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WIA news

Continued from page 7

CCW Tactical HF Antenna and HF/VHF/UHF Multi-coupler

Cross Country Wireless has announced that the company has made significant further developments on some of its antenna products, with a new product about to be released.

This is the Tactical HF Broadband Antenna. It is actually an antenna kit, which allows operators to build a wide range of transmitting and receiving antennas, to fit whatever space they have available. CCW also have designed an HF/VHF/UHF Multi-coupler that allows a single antenna to be shared with up to five receivers.

The Multi-coupler has in-built lightning surge and over-power protection on the antenna port with over-power protection on each receiver port. For more information on these and other CCW products: *http://www.crosscountrywireless.net*
Source: Chris Moulding, CCW

Callbooks: Their continuing value

Peter Wolfenden VK3RV, WIA Historian

(Part 1)

Australian Callbooks contain a surprising amount of historical information covering a wide range of subject matter. Through them it is possible to track many aspects of the history and evolution of the Radio Amateur Service in this country.

Callbooks, or listings of call signs and locations of amateur experimental stations, have been part of amateur radio in Australia, almost from the inception of licenced operation.

Research indicates that these listings of stations came about for two interwoven main reasons. Initially, to enable amateurs to locate the whereabouts of like-minded experimenters with whom communication might be possible, and secondly, to help minimise interference or potential interference between users of the spectrum – or "the aether" as it was referred to by most in those early days.

As time progressed a third aspect developed and that was "the final act of a QSO or contact", to confirm in writing, by mail, the contact event. It usually took the form of a hand written or printed exchange which included signal reports, date and time of contact, together with some information of the station sending the report, the equipment and operating conditions. In the case of very early QSLs, not all detail was included – if you received a written report from a distant station, then it was considered a privilege, and obviously a confirmation by the station hearing you.

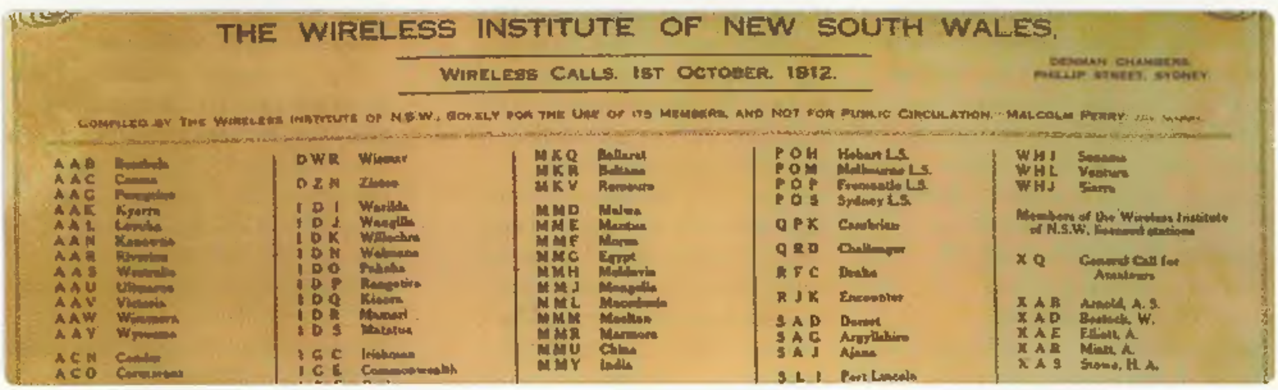
Not only were local callbooks published, i.e. those issued by, or at least provisioned by the country's licencing authorities, but also, in time, a combined *"International Callbook"*, became available for the keen DX operator.

1912, A Listing by the Wireless Institute of NSW

The earliest published listing of amateur stations was made by the *Wireless Institute of New South Wales* in October 1912. In hindsight, it appears that this publication was largely a fit for the first reason mentioned above, as the only experimenters it contained, were stations owned by Wireless Institute of NSW members. It was in effect a membership list albeit with some additional information, and was perhaps even used as an incentive to attract new members. The listing also provided limited information to help any aspiring "wireless" operator to identify the signal source and perhaps the location of the sending station, even if only a partial callsign was received.

That first known 1912 listing of callsigns also contained some 158 ship and 18 Land Stations, both international and within Australia. There were only six Australian Government Stations listed, plus MKI Cocos Island and MQI Macquarie Island together with MAL Adelieland, established for Mawson's Antarctic expedition. The list Included 33 licenced Members of the Wireless Institute of NSW, but no non-members, as the list was prepared for Members only: *"Compiled by the Wireless Institute of NSW, solely for the use of its Members and not for public circulation".* [1]

This article has purposely differentiated between "Callsign Listings" and "Callbooks". The 1912 NSW "wall-chart", a listing, was a single sheet designed to be attached to the experimenter's wireless-room wall. At that time of low frequency spark communications, only a few


THE WIRELESS INSTITUTE OF NEW SOUTH WALES.

WIRELESS CALLS. 1ST OCTOBER. 1912.

DENMAN CHAMBERS
PHILLIP STREET, SYDNEY

COMPILED BY THE WIRELESS INSTITUTE OF N.S.W., SOLELY FOR THE USE OF ITS MEMBERS, AND NOT FOR PUBLIC CIRCULATION. MALCOLM PERRY

AAB [illegible]
AAC [illegible]
AAG [illegible]
AAK Kyarra
AAL [illegible]
AAN [illegible]
AAR Riverina
AAS Westralia
AAU Ulimaroa
AAV Victoria
AAW Wimmera
AAY Wyreema
ACN [illegible]
ACO [illegible]

DWR Wismar
DZN Zieten
IDI Warilda
IDJ [illegible]
IDK Willochra
IDN [illegible]
IDO [illegible]
IDP Rangatira
IDQ [illegible]
IDR Mamari
IDS Matatua
IGC Irishman
IGE Commonwealth

MKQ Ballarat
MKR Beltana
MKV [illegible]
MMD Malwa
MME Mantua
MMF Morea
MMG Egypt
MMH Moldavia
MMJ Mongolia
MML Macedonia
MMM [illegible]
MMR Marmora
MMU China
MMY India

POH Hobart L.S.
POM Melbourne L.S.
POP Fremantle L.S.
POS Sydney L.S.
QPK Cambrian
QRD Challenger
RFC Drake
RJK Encounter
SAD Dorset
SAG Argyllshire
SAJ Ajana
SLI Port Lincoln

WHI Sonoma
WHL Ventura
WHJ Sierra

Members of the Wireless Institute of N.S.W. licensed stations

XQ General Call for Amateurs

XAB Arnold, A. S.
XAD Bostock, W.
XAE Elliott, A.
XAR [illegible], A.
XAS Stowe, H. A.

Photo 1: Extract of 1912 WI NSW Callsign List.

amateurs succeed in receiving, and/or transmitting to distant stations. Most experimentation involved relatively short range contacts, in the order of 1 to 100 miles (1.5 to 150 km), however, there are the odd reports of long distant contacts being made by experimenter's of about 1600 miles (2500 km) and some of these were with ships at sea and official or government stations. [2][3]

Gradual change was taking place during the years immediately pre-WWI as witnessed by the increasing number of licences being issued. The interest in receiving ships at sea coupled with the growing number of Australian Government coastal stations, together with increasing numbers of licenced private experimenters, all helped spur on interest in wireless. It also stimulated many more individuals to become involved in transmitting - a great challenge to the enquiring school-boy's mind and relatively easily achieved by the use of modified door buzzers and the like, but very costly from the aspect of licencing, especially if you were indeed an average schoolboy! Fees were in the order of $435 today (£3/3/- in 1910), dropping in 1914 to about £1/1/- or $145 in today's value. There was no licence exam.

The rapid increase in involvement (both legal and illegal) obviously caused concern for those attempting to regulate the spectrum, to protect the effectiveness of the newly established government assets, and presumably raise revenue from all aspects of wireless including collecting the annual licencing fees from individuals.

So by 1913/14, we see a melding of the needs of experimental radio amateurs and the emerging professional users of the spectrum who demanded protection and separation from other users. Simultaneously, was the positioning of the Regulator attempting to interpret and administer the 1905 Wireless Telegraphy Act of Parliament. There was indeed a multifaceted need for a National Callbook which was duly achieved in 1914. In reality it was of limited use because World War One broke out a few months after it was published.

Photo 2: Cover of 1914 Call Book.

1914, Wireless in Australia – A National Callbook

The first comprehensive callbook to be published here, was in May 1914. By then wireless interest was certainly on the increase. For example the total number of licenced NSW experimenters, (receiving and transmitting), had grown to 166 and one must remember that this was 10 years before Broadcasting commenced, so all "listeners in" during 1914, needed to be able to "read" (or de-code) Morse code to get any intelligence at all from the wireless signals they were receiving.

Wireless in Australia, was published by the *Wireless Institute of Victoria*. Included in its Preface, is that the information contained in it was obtained from: *"..official and other authentic sources in order to fill a long felt want by Wireless Experimenters...."* [4]

The publication largely came about because of meetings held between the Commonwealth Wireless Director, John Balsillie and the WI Vic. During an April 1913 meeting, Mr. Balsillie promised the WI Vic.: *"...a copy of call signals recognised by the government...so that interference to official stations by experimenters, could be minimised..."* [5]

Therefore our first callbook, fits into both the first and second categories listed in the opening comments. It provided information for, and about, the wireless experimenters. It also assisted in minimising interference, or potential interference, between users of the spectrum. And lastly, it would also have been of considerable assistance to the "Radio Inspectors" of the day, by providing them with a small, portable list of stations which they could easily carry and access. Mr. Balsillie would have been well aware of that advantage!

The callbook contained information about 401 Australian Experimental stations (of which 5 were Wireless Institute and school, or university stations), 14 Navy Stations, a total of 33 Land Stations, (including 8 Military Pack Sets) and 293 other ship's call signs. The Australian Coastal Service stations as shown in the WI NSW 1912 listing, were initially allocated callsigns such as POS (Post Office Sydney) POB, (Brisbane) etc. By 1914 there were 20 of these stations, which now operated as VIS (Sydney), VIB

etc. Preparation for war and security requirements caused the installation of coastal stations to be accelerated. *Wireless in Australia* also provided general operational information appropriate to the day. [6]

Side-tracking briefly, to look at the other side of the world at that time. ***The Bright Sparks of Wireless***, an RSGB historical publication, contained an amended 1913 callsign listing of 382 Experimental Stations. It appears that all of these stations were permitted to transmit, sixteen were clubs, school and similar experimental stations.

A major difference between the UK and the Australian listings was the amount of detail included by the UK. As well as the callsign, name and address of the licencee; information was included on power, transmitting wavelengths, sending range (distance), receiving wavelengths, receiving range (distance), usual time of operating, radio club affiliation and even a contact telephone number.

The majority of stations stated that they operated in the 100m to 400m bands, although there was the odd one stating 25m, 80m and even 10m (which was probably a typographical error for 100m). Transmitting ranges shown, were generally in the 5 to 20 miles (7.5 to 30 km) with the occasional 100 to 200 miles (150 to 300 km). Very few were anticipating any distances over that.

The inclusion of the telephone number is interesting and perhaps indicative of the need for authorities of a densely populated country to be able to quickly contact a station if it there was suspicion, that interference was being caused by an experimenter to an official station. Not all experimenters had a phone or included a phone number! [7]

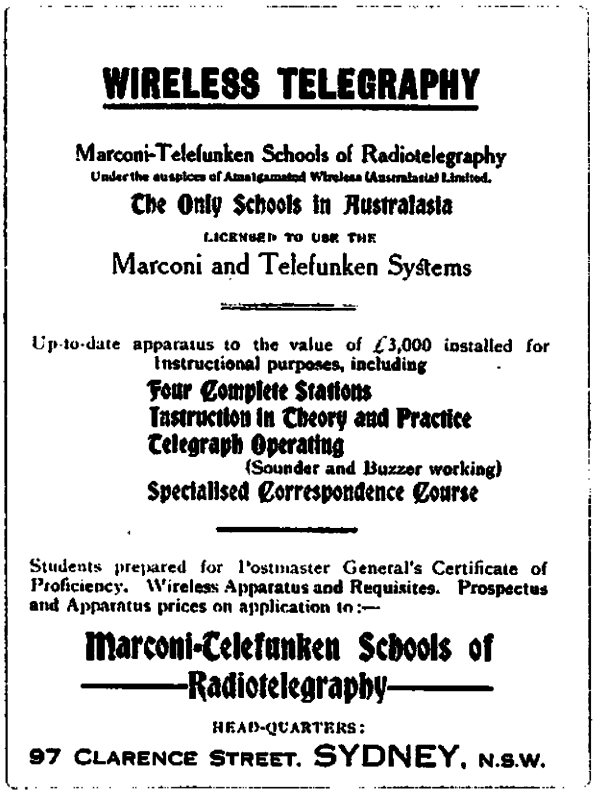


Photo 3 - Advertisment For Marconi - Telefunken School.

World War One, declared in August 1914, saw the closure of experimenter's stations in Australia and elsewhere around the world.

(1) ***Wireless Calls 1st October 1912***, WI NSW, Malcolm Perry Hon Secretary, (WIA Archive)

(2) ***Mr. Pike and the Makura talks 1400 miles from Sydney***, Evening News, Sydney, 21 Mar., 1919, p10

(3) ***Victorian Amateur Wireless Men Alert***, Herald, Melbourne, 17 Nov., 1913, p1

(4) ***Wireless in Australia***, Preface, WI Vic., May 1914, p1

(5) ***Restricting Experimenters***, Argus, Melbourne, 4 April 1913, p15

(6) ***Wireless in Australia***, WI Vic., May 1914, *http://www.wia.org.au/members/history/callbooks/documents/1914 WIV Call Book*

(7) ***The Bright Sparks of Wireless***, G.R. Jessop, Radio Society of G.B., 1990, ISBN 0 900612 9 59, p72

Post World War One

Although Armistice was signed on November 11, 1918, the formal end to WWI was not proclaimed until June 28, 1919, at the signing of the Treaty of Versailles. Following WWI there was great reluctance on the part of various authorities, especially Navies, to allow the return of operating privileges to many countries' experimenters, especially here in Australia.

On the positive side however, from October 1920, the Postmaster General's Department was firmly back in control, a situation which was seen as a distinct advantage by experimenters and other potential users of the spectrum. A new era in wireless had begun and experimenter's callsigns together with published callsign listings, were destined to enter a new age. [1]

But it took a deal of lobbying before limited access did became a reality about a year later, in September 1921. By then, officially there were about 500 stations licenced, but very few were for transmitting purposes. [2]

Transmitting licences did not generally become available until late 1922, well behind many other countries. Prime Minister Hughes made a very pointed announcement in the House of Representatives on July 28, 1922, in which he stated that facilities granted in other parts of the world, would be given to amateurs here, under proper control and that no restrictions other than those to prevent interference would be imposed. Mr Hughes also confirmed that he would see that the Wireless Company did not interfere in the enforcing of the wireless laws, and that the administration of the Wireless Telegraphy Act and Regulations is carried out by Government officers only. [3]

A new callsign regime was activated, together with more complex and focused licencing requirements. The new callsigns included a numerical State identifier. For example, 2CM was allocated to well-known Sydney experimenter, Charles Maclurcan, the "2" indicating that his station was located in NSW. Likewise, Lance Jones, licenced as XVB pre-WWI was allocated 5BQ, the "5" indicating that the station was located in South Australia.

There was still no identifier or prefix for the Country. It would appear that the authorities did not think that long-distance communication by experimenters was very likely. But all this started to change in 1924 after it became obvious that the higher frequencies were indeed capable of providing reliable, long distance, low powered communication. Then the prefix "A" was added to existing call signs, so 5BQ became A5BQ. A further change was implemented in 1927 when the additional prefix "O" was included making Australia "OA", so A5BQ became OA5BQ. The "O" indicating that Australia was in the Oceania area. "VK" commenced in1929.

It is notable that neither the "A", or "OA" prefix is included in any Archive held callsign listings published during the 1920s and it was1930 before "VK" was included in some lists, and even then, only as a general comment at the Head of the first page: *"Every call sign in this list below bears prefix VK"*. The actual callsigns were still printed as 5BQ etc.

Returning to our chronology. The earliest published post-WWI list of call signs in the WIA Archive is from ***Radio in Australia and New Zealand*** magazine of September 1923. It reveals that there were a total of 160 licenced experimental transmitting stations. Twenty-two were WIA, University, Schools and Club licences.

Interest continued to grow as reflected in the 1924 listing from the ***Sydney Evening News Wireless Handbook***. It showed a doubling of amateur transmitting stations to 354, of which 31 were WIA, University, Schools and Club licences. Some of stations were "Dealers" licences held by such organisations David Jones Ltd. (2DJ) in Sydney and New Systems Telephones (3ZL) in Melbourne. AWA also held licences in a number of States, amongst them, in Sydney 2ME, and in Victoria, 3MB for the Kooweerup, Gippsland field testing station.

The actual listings at this time were often just a few pages within the respective magazine or newspaper. They provided bare information of Callsign, Name and Suburb or District of the station. Sometimes an additional page of relevant wireless material might be included, but generally it was limited and presumably the call sign information was supplied by the PMG's Department.

1926 saw a noticeable change in the presentation of callsign listings. Amalgamated Wireless, Australasia (AWA) published and sold a comprehensive, quality hand-book/ catalogue entitled ***Radio Guide - "In Touch with the World"***, page one revealing that it was also a Price List.

This book contained 372 Experimenters' callsigns together with information about many other Australian and New Zealand wireless services. The book also contained an interesting collection of wireless related photographs and many pages of information together with an extensive catalogue of equipment sold by AWA. The book of 104 pages, sold for 1 shilling or about $4 today.

The following edition in 1927 was expanded to 176 pages. It listed 404 Experimenters and continued the 1926 approach to general wireless information for this part of the world.

The last Archive record we have Pre-WWII, is a 1938 ***Wireless Weekly*** listing which indicated a total of 1,985 licenced Australian Wireless Experimenters.

The declaration of war in September 1939, again saw all Experimenters' stations closed down.

Photo 4: Cover Of 1926 AWA Radio Guide.

(1) ***Wireless Stations Transfer to the Postal Department***, West Australian, Perth, 14 Sept., 1920, p6

(2) ***Amateurs and Wireless***, Argus, Melbourne, 13 Sept., 1921, p9

(3) ***Question to Prime Minister Hughes on Regulation of Wireless***, Hansard No.30, 28 July 1922, p917

Note: Part 2 of this 2 part series will continue from WW2 until present day.

Wide Band RF Power Meter: 50 MHz to 10.4 GHz

Jim Henderson VK1AT

Photo 1: Wideband Power Meter.

Background

My commercial microwave power meter is getting very long in the tooth and I worry that one day in the near future it will fail. As for alternatives, purchasing another second-hand unit in Australia is not really an option. I had previously used an ADL5519 Analog Devices dual input power sensor in a Scalar Network Analyser (AR No 2, 2019). To try an alternative approach I purchased a couple of Chinese AD8317 modules from Banggood as they are specified to work from 1 MHz to 10,000 MHz. I assumed that they would probably still work at 10,400 MHz. The end result of this project is a high performance, wideband power meter at relatively low cost.

Sensor Module Response

The AD8317 modules were tested at spot frequencies of 50, 1500, 4000 and 10368 MHz with the output of the module connected to an analog input on an Arduino Nano Board. The Arduino Nano is using an external 2.5V reference. The chart below (Figure 1) shows the A to D output in units versus the input Level in dBm for one module. The output is linear and independent of frequency at frequencies between 50 and 4000 MHz. At 10,368 MHz the sensitivity is reduced and the linearity is not as good, but the sensor remains quite usable.

Photo 2: D8317 Power Sensor.

Input Impedance

I measured the sensor input return loss. The return loss was poor (between 5 and 10 dB) between 500 MHz and 10.4 GHz. When the board was examined closely it was evident that the input terminating resistor was 75 ohms. The application note recommends a 52 ohm resistor for a broadband match. A 51 ohm 805 surface mount resistor was substituted. This considerably improved the return loss at lower frequencies (16 dB at 1000 MHz), but at frequencies between 1500 and 4400 MHz the return loss remained in the range 5 to 9 dB. A spot measurement at 10.4 GHz resulted in a return loss of better than 20 dB.

Arduino Sketch

An application was written for an Arduino Nano that displays the sensor input level on a 16 x 2 line LCD display.

To compensate for the variation in response with frequency, spot frequency calibration data is applied to the measurements. The builder is free to input as many sets of calibration data as they feel is necessary. A push button

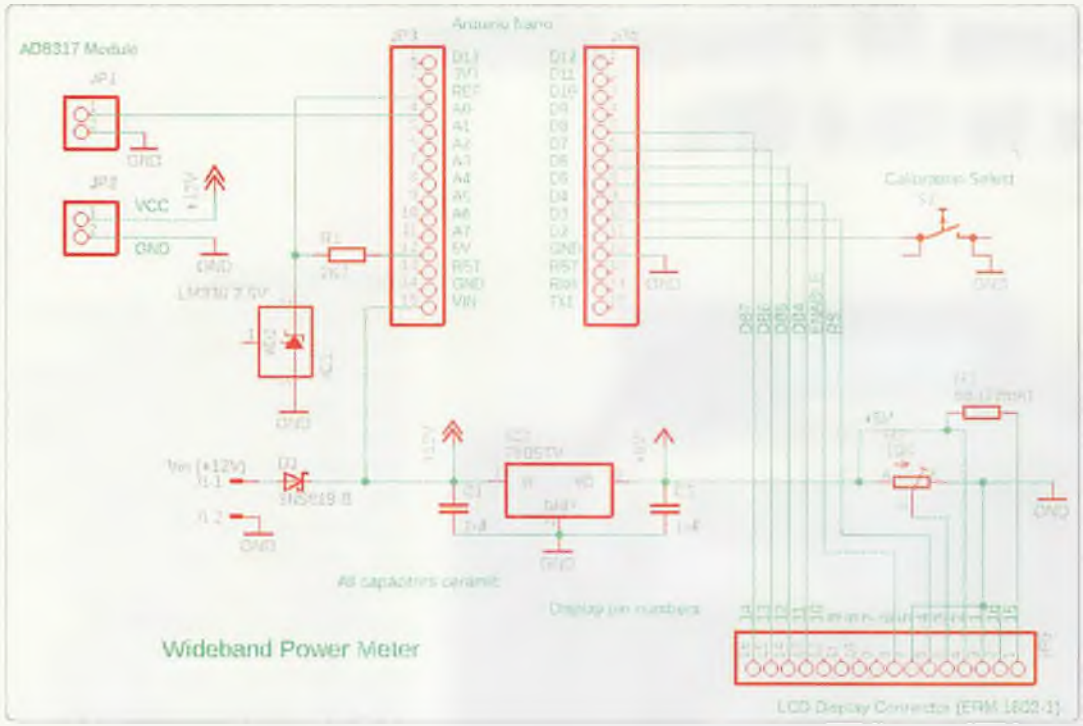


Figure 2: Microwave Power Meter Schematic.

switch allows the user to toggle between the sets of calibration data displaying the current calibration frequency.

If the input level exceeds the maximum allowed (-2 dBm) an out of range indication appears on the display.

Construction

Construction of the unit is straight forward. The AD8317 module (see photo below) is widely available from E Bay or Banggood.

A standard Arduino Nano is used with an external LM336 2.5V reference. The display is a large format LCD display type ERM1602-1. It has slightly different pin outs compared to a standard smaller format display. I have a standard Nano project board I use which includes a regulator and other components required to support the display. This is not essential. The schematic is shown below.

I built the unit in a standard Jaycar project case, with the sensor mounted in a separate diecast box. Given that I am operating the unit at 10 GHz I used an SMA connector as the sensor head external connector.

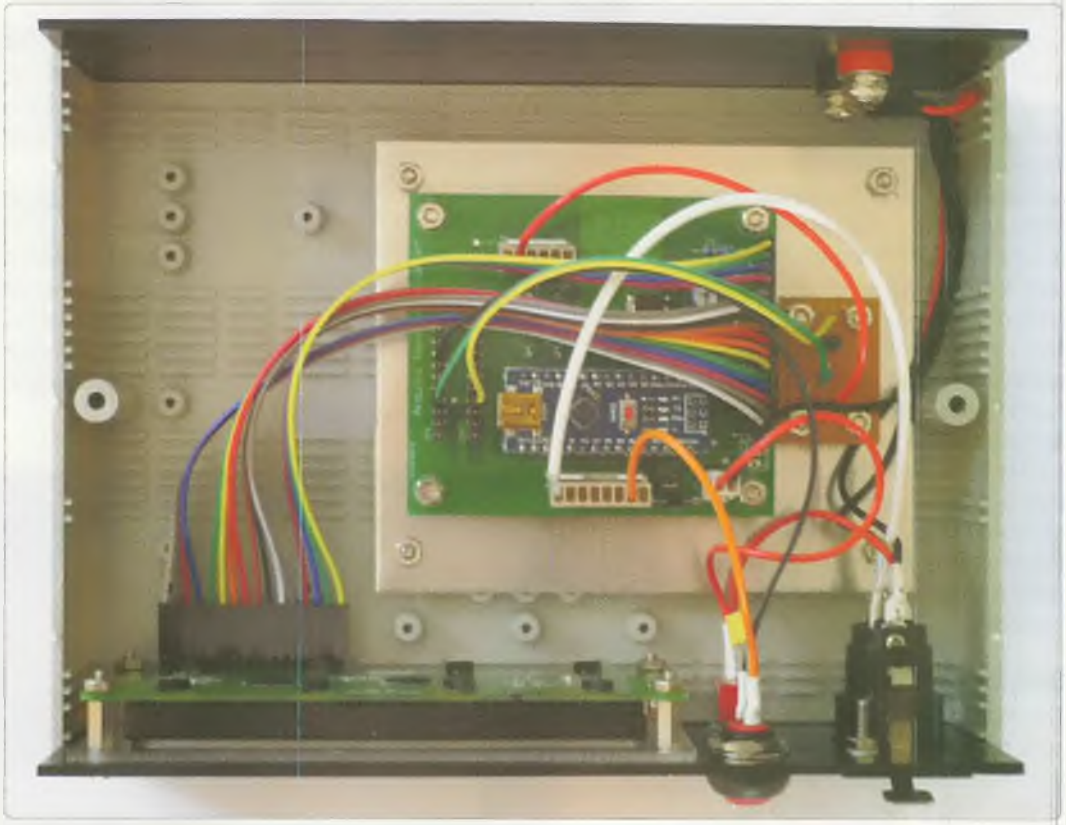


Photo 3: Internal Layout.

Calibration

To calibrate the sensor a signal generator with a calibrated output or a calibrated power meter is required.

A separate Arduino sketch "Microwave_Power_Meter_Raw_Output" is used to derive the calibration data to include in the Power Meter Arduino sketch. It averages the A to D output over 20 measurements before outputting the value to the LCD display.

The "Microwave Power Meter V1.0" sketch can include calibration data for a number of frequencies. The data is inserted in the sketch as shown below:

```
// Define the number of sets of calibration data
#define DataSets 2
.
.
.
.
//set up arrays with calibration values
  //Set one calibration data
  CalFreq[0] = 50;
  LowerCalAtoD[0] = 636;
  UpperCalAtoD[0] = 166;
  LowerCalInput[0] = -56.4;
  UpperCalInput[0] = -6.4;
  //Set two calibration data
  CalFreq[1] = 1500;
  LowerCalAtoD[1] = 619;
  UpperCalAtoD[1] = 178;
  LowerCalInput[1] = -55;
  UpperCalInput[1] = -5;
```

This example shows two sets of calibration data for frequencies of 50 and 1500 MHz. The #define DataSets statement defines the number of calibration datasets. The _CalInput values are the lower and upper levels in dBm used to calibrate the unit. The _CalAtoD values are the AtoD output levels measured with the Raw Output sketch corresponding to the _CalInput values.

At frequencies below 5 GHz select input values around -5 and -55 dBm as the calibration input values. At 10 GHz select values around -5 and -35 dBm as the calibration input values.

As the sensor response is linear the two calibration values at each frequency are used to derive a linear response function. Using this technique, with four sets of calibration data for frequencies of 50MHz, 1500MHz, 4000MHz and 10368MHz, the largest error measured was 1.5 dB. Errors are generally less than 1 dB. (Measurements were made between -5 and -55 dBm for the frequency range 50 to 4000 MHz. At 10368 MHz measurements were made between -5 and -35 dBm.) I suspect one major source of errors is the repeatability of connector losses as connectors are continually disconnected and connected. I have not tested the sensor below 50 MHz, it is likely to continue to perform well down through the HF bands as determined by the value of the input coupling capacitor.

Hardware and Software Procurement

The major items of hardware are listed below. If you would like a copy of the two Arduino sketches, please email me at *VK1AT@wia.org.au*. Note: The photo at the beginning of the article shows a homebrew signal generator driving the sensor module. This is based on a Chinese ADF5355 board controlled by an Arduino sketch I wrote to program the thirteen, 32 bit registers. It covers 54 MHz to 13600 MHz. This may be the basis of a future technical article if there is sufficient interest.

Major Components

AD8317 Module (E Bay)
Arduino: Nano (Ebay)
LCD Display: ERM1602-1 (Minikits)
Instrument Case: HB-5912 (Jaycar)

Conclusion

The performance of this unit given its modest cost is excellent. The unit is simple to construct with most of the work associated with the mechanical side of the project.

I find it convenient to use when large dynamic range and careful tweaking is required, for example when tuning pipe cap filters at 10.368 GHz. I actually prefer it to a spectrum analyser for these type of jobs.

The JS Eight Zero: Simple 3.5 MHz JS8 receiver uses cheap crystals

Peter Parker VK3YE

Want to receive HF amateur digital mode communication on a receiver you built yourself? Here's a project to try. Start construction in the morning and be decoding JS8 activity by evening.

Never heard of JS8? It's an efficient digital communications mode somewhat like the popular FT8 but with more features. These include the ability to have 'free text' contacts, relay and store messages and get automatic signal reports from stations on frequency. While there's less JS8 on the air than FT8, usage is growing.

JS8 is homebrew-friendly. Transceiver kits for it and related digital modes have become available. A stroke of serendipity is that its 3.5 MHz frequency is especially easy to build equipment for, as you will learn later.

The JS Eight Zero's build cost shouldn't much exceed $20. All parts are available from local sources such as Altronics and Jaycar. It would make an ideal group or club project. And, as will be described later, potential exists to cheaply add transmit capability. Recent rule changes mean that Foundation hams can also transmit with gear they have built themselves.

Circuit description

This unit is basically a receiving converter that shifts incoming 3.5 MHz signals to audio frequencies that are accepted by your computer's sound card and the free JS8Call software.

The conversion is done with a diode mixer and a locally generated signal set to 3.578 MHz (the recommended 'dial frequency' for JS8). A lower level signal whose frequency is equal to the small difference between the frequency of the incoming signal and the locally generated signal is present at the mixer's output. A transistor audio amplifier boosts this to match what the computer's sound card input requires.

A crystal oscillator provides a stable signal on 3.578 MHz. This is fixed since all 'tuning' with these narrow bandwidth digital modes is done on the computer. As luck would have it, 3.578 MHz is easily generated by using cheap 3.5795 MHz TV colourburst crystals that are just 1.5 kHz higher. The slightly lower frequency required is obtained by adding series inductance to pull their frequency downward. This is done in a 'super VXO' arrangement with parallel crystals for the necessary wider swing. The variable capacitor operates as a 'set and forget' control for precise frequency adjustment.

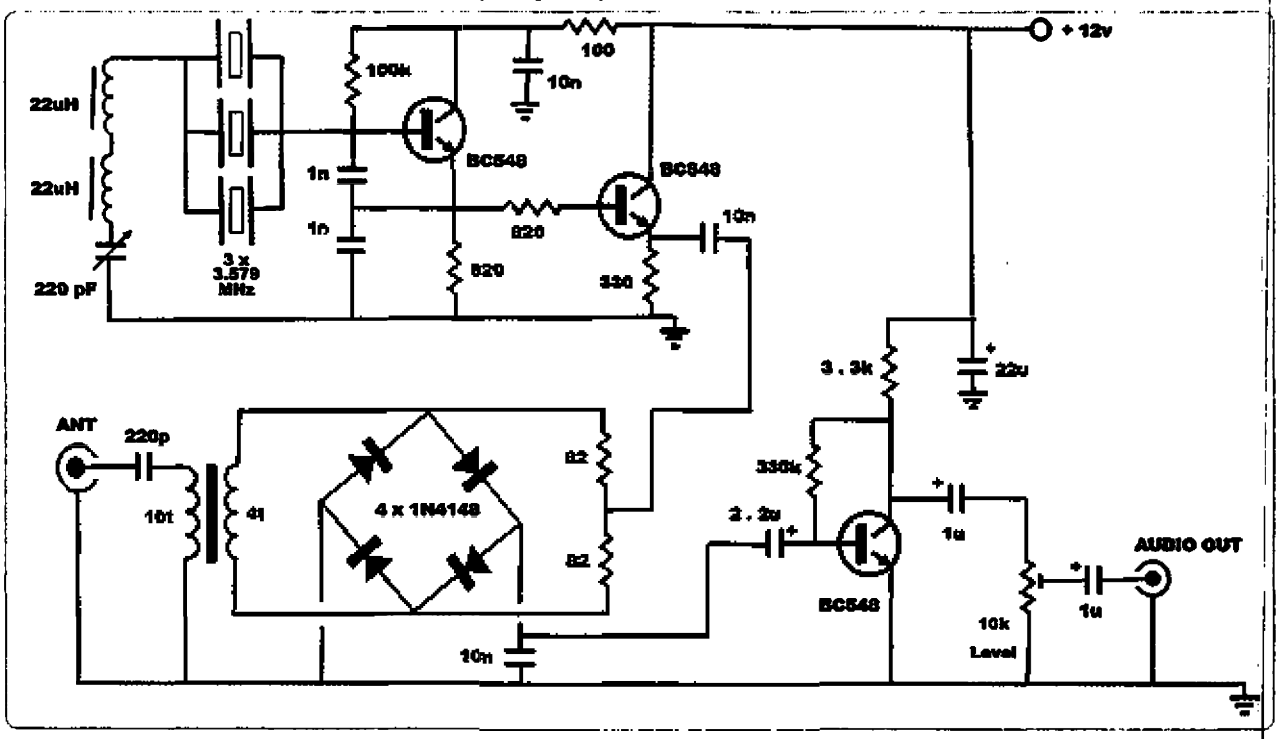


Figure 1: Circuit diagram.

```
2020-01-01 12:23:45-18  0.4  819 A  3vLVAlzaOSOJ          3    VK1MIC: HB AUTO RELAY SPOT QF44
2020-01-01 12:33:15  6  0.2  950 A  3vLuevHJv6om           3    VK2WTF: CQ CQ CQ QF88
2020-01-01 12:34:13  3.578 MHz  JS8
2020-01-01 12:34:00-18  0.4  570 A  3vLVAlzaOSOJ          3    VK1MIC: HB AUTO RELAY SPOT QF44
2020-01-01 12:35:13  3.578 MHz  JS8
2020-01-01 12:35:00  3  0.2  570 A  3vLuevHJu6op          3    VK2WTF: HB AUTO RELAY SPOT QF0B
2020-01-01 12:35:15-15  0.4  819 A  UgYI4wgMSbqU          3    VK1MIC: VK2WTF ACK -01
2020-01-01 12:37:13  3.578 MHz  JS8
2020-01-01 12:37:00  0  0.3  821 A  Ugbd9Qg98Jy0          1    VK2WTF: VK1MIC
2020-01-01 12:37:15  7  0.2  821 A  t0dOhH+vPDId          0    HI WADE YOUR -0
2020-01-01 12:37:43  3.578 MHz  JS8
2020-01-01 12:37:30  1  0.2  821 A  x3l4V+++++++          2    1 HERE
2020-01-01 12:37:30-23  1.2 2745 A  qhHC6AgT0B0Q          4    qhHC6AgT0B0Q
2020-01-01 12:38:15  3  0.4  569 A  3vMFePj-O64x          3    VK3YPE: HB AUTO RELAY SPOT QF21
```

Figure 2: Example text decoded with this receiver in use.

A buffer stage between the oscillator and the mixer provides the required amplification and isolation necessary for proper performance and stability. Conventional NPN transistors are used for this and other stages in the receiver.

The JS Eight Zero is direct conversion. That's good for simplicity but not for selectivity. The lack of opposite sideband rejection means that signals about 2 to 4 kilohertz the other side of the centre frequency (ie about 3.576 – 3.577 MHz) can blot out desired signals at 3.579 to 3.580 MHz. This small risk of interference and reduced signal to noise ratio of desired signals was not thought important enough to make the circuit more complex. However if you do want better selectivity it could be worth experimenting with crystal band pass or notch filters using 3.58 MHz crystals or ceramic resonators in the antenna connection.

Parts and construction

The receiver uses common parts. Those slightly more specialised include the three 3.58 MHz crystals, the two 22 uH RF chokes and the transistor radio variable capacitor to adjust the local oscillator's frequency. A two hole binocular ferrite is the only coil you need to wind, which, because of its broadband nature, is not very critical.

Component values are not particularly critical. However the two 82 ohm resistors in the mixer stage should be the same value to preserve balance (though it doesn't matter if they are both 68 ohm or 100 ohm). I would also stick with the specified values for the 1nF capacitors in the crystal oscillator circuit so its output can be adjusted to the right frequency. Its minimum value isn't very important but the variable capacitor's maximum value should be at least 160 pF and preferably higher. Connect two sections together if a single section offers insufficient capacitance. The oscillator will still work with insufficient capacitance but you will not be able to shift it low enough in frequency.

I built mine in a small metal box. Charity shops often have suitable containers (usually found near the metal biscuit tins). Most parts are mounted on a 4 x 6cm double-sided circuit board, with the unetched copper forming a ground plane to which their grounded leads can be soldered.

The crystal oscillator and buffer is on one side of the circuit board while the mixer and audio amplifier occupies the other side. If you lack double sided board you could use two single sided pieces with the copper sides outwards. A small wire link electrically connects both copper sides.

To provide adequate support for the heavier parts (eg the mixer's ferrite and the oscillator's crystals) their leads (except any connected to earth) are run to pads glued to the main circuit board. These pads, approximately 5mm square, are cut from printed circuit board material. The photos show the receiver's internal construction.

You don't need much test equipment to build and test this receiver. The most important item is a 3.5 MHz SSB receiver with an accurate frequency display. An RF indicator or probe, RF signal generator and utility audio amplifier (or high impedance headphones) are also handy.

Start by building the crystal oscillator and buffer. Transistors are the only polarised parts used. You also need to be careful of connections to the variable capacitor. Even the simplest plastic dielectric variable capacitors have two capacitors built in. One is a lower value type (up to approximately 60 pF) for the radio's oscillator and the other (up to approximately 160 pF) for the ferrite rod antenna. Usually these are the outer two connections with the centre connection (which is sometimes slightly thicker) connected to ground. Bridging both sections provides a higher value (approximately 220 pF) which is desirable to ensure sufficient downward tuning range.

The 22uH RF chokes are connected in series, between the parallel crystals and the variable

Photo 1: JS80 receiver with computer.

Photo 2: JS80 receiver with lead to computer.

capacitor. Only temporarily solder them during testing as you may need to change their values if what you have doesn't allow oscillation on exactly 3.578 MHz. It's worth buying chokes of other nearby values like 10uH, 15uH and 33uH in case they are needed.

Check oscillator operation by adding a short wire to the buffer's output, applying power and tuning an SSB receiver near 3.58 MHz. You should hear a loud carrier. Its frequency should change by a few kilohertz when the variable capacitor is varied. The exact range doesn't matter but you do need to zero beat it on to 3.578 MHz, which is JS8's centre frequency on the 80m band.

The process of zero beating is easiest if your receiver has an IF shift adjustment. Then you can tune above and below the zero beat frequency and find the exact centre. When you're very close the tone you hear will get increasingly low until it vanishes to become slow beats before eventually stopping. Mark that location on the tuning capacitor dial and case using white paint, correction fluid or similar.

What if you can't get exactly 3.578 MHz? After all this is about 1.5 kHz below the crystal's marked frequency and this amount of excursion can be difficult with crystals below about 4 MHz. Check how low you can go – you may be 500 to 1000 Hz too high. Add some extra inductance. For example instead of 22 uH in series with 22 uH you could have 22 uH in series with 33 uH. Or, if you want only a small increase in inductance 15 uH in series with 33 uH is another option. Adding more inductance will decrease the frequency hopefully without affecting oscillator start-up reliability or frequency stability too much.

Other possibilities include adding a fourth parallel crystal, or, if you're only very slightly too high, some extra capacitance (eg 220 pF) soldered across the variable capacitor.

The other half of the receiver is the mixer and audio amplifier section. The input inductor is wound on a two hole binocular-style ferrite often used in TV rabbits ears antenna or available from electronic retailers. These are typically about 10mm wide and either 5 or 10 mm long. Holes are about 4 or 5mm diameter. The exact size does not matter provided you are able to get all wires through.

The antenna side has ten windings of enamel copper wire while the diode side has four windings. Windings are through both holes. Enamelled copper wire can come from old power transformers. A diameter of about 0.3 to 0.5 mm is ideal; it's not critical provided sufficient turns can fit through the ferrite.

Polarised parts include the four diodes in the mixer, the transistor, electrolytic capacitors and the output level control. Construction can start with the audio amplifier. This can be tested on its own with a signal tracer or even high impedance headphones. A finger on the input should demonstrating that it is amplifying. There's little to go wrong here except for incorrect transistor or power polarity.

I've already discussed the winding of the mixer ferrite inductor. Because it is relatively heavy and most connections are not soldered to the ground plane, I suggest using glued squares of circuit board material to offer support as pictured. Do not forget the connections between stages, for example from the buffer's output to the diode mixer.

Testing

Test the receiver before plugging in the computer. Connect a full sized 3.5 MHz antenna and set the output level to maximum. Apply 12 volts power. If you have sensitive high impedance headphones (or a general purpose audio amplifier and speaker) you may be able to hear band noise.

Apply a carrier signal with an RF signal generator or CW transceiver set to 3.579 MHz. You should hear a 1 kHz tone if you've correctly adjusted the local oscillator. Because this is a direct conversion receiver with no image rejection, a similar tone will be heard if the incoming signal is moved to 3.577 MHz. Locally transmitted SSB on a dial frequency of 3.578 MHz should also be intelligible, with it becoming less so if the transmitter's frequency is moved several hundred hertz or more.

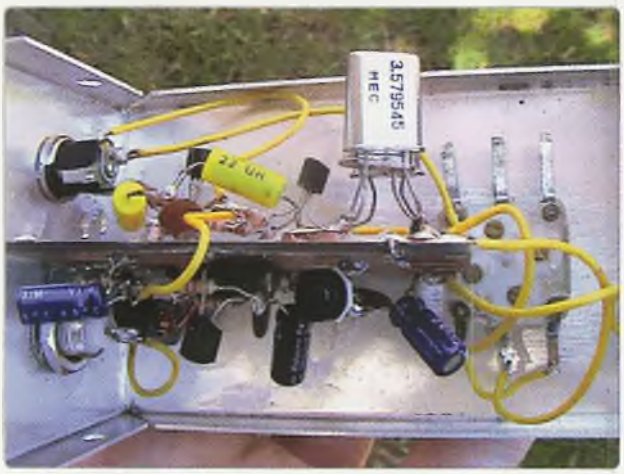


Photo 3: JS80 internal view showing both sides of board.

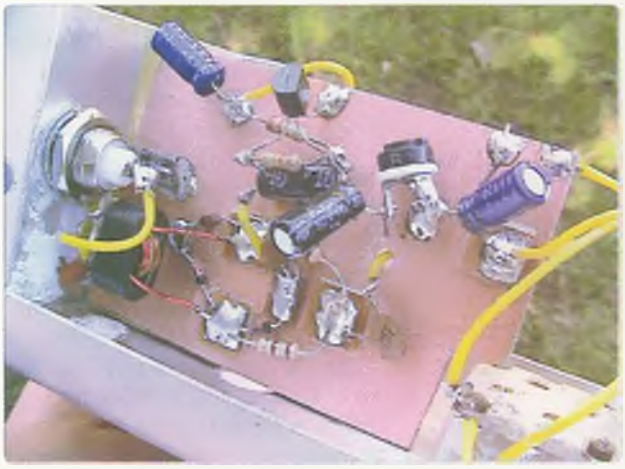


Photo 4: JS80 internal view showing mixer and audio amplifier.

What if you don't hear band noise, even with a good antenna and audio amplifier? You're either in a very quiet location, or, more likely, there's something wrong with the receiver. Check wiring again.

Another problem that can arise is front-end overload from a nearby AM broadcast station. You may hear one or more stations. The unselective front end of this receiver, a short-cut taken to aid simplicity, can exacerbate this. A high pass or band pass filter, set to attenuate frequencies below 3.5 MHz, can fix this. Or, for some partial relief without adding a full filter, try a lower value (eg 47 or 100 pF) for the 220 pF capacitor in the antenna line. An antenna coupler with a high pass or band pass configuration is another solution.

Although it's easy to use, I suggest getting a little familiarity with the JS8Call software (js8call.com) before connecting this receiver to the computer. Do this by monitoring JS8 activity with your SSB receiver. 7.078 MHz USB seems to be the most active frequency. You may have to wait a while until you see a signal as JS8 is less used than the very popular FT8. Note the bar on the left that shows the audio input level and how this varies as you adjust the receiver's volume.

Some computers have separate 3.5mm stereo sockets for their audio in and out connections. Others, particularly laptops, have a single 3.5mm 4 conductor socket. If yours has the latter a cable that converts this to three RCA plugs is handy. One of those plugs will be the audio input. It's this that will be connected to the receiver's output.

With the program set up connect the receiver to the computer. Apply power. Then connect the antenna. You should see a large increase in noise as shown on the program's input level display. If noise goes into the red area then you are overdriving the computer and can back off using the receiver's output level control. This is a preset potentiometer that doesn't need to be adjusted again. On the other hand, if you can't get much of an indication, check that the computer's internal audio level settings are appropriate.

Leave the receiver on for an evening. It's a good idea to be on line and set the program up to upload spots. Then others can see that you and your simple receiver are decoding their signal. If you have no luck decoding signals (even if it's just a callsign and 'HB') ask a station within about 500 or 1000 km to send transmissions. A message on the VK ZL JS8 email group *(https://groups.io/g/JS8VKZL)* will normally result in signals useful for testing the receiver. JS8Call generates a file called all.txt that records data received (Photo 6). You can find this file by opening the log directory in the program.

Local JS8 activity comprises of tests ('HBs' or 'heartbeats') and keyboard chats between people. The latter is probably of most interest. 80 m activity is quiet at the time of writing but will likely increase with more people discovering the mode. This receiver has worked quite well with signals from more than 800 km away being decoded. DX should also be possible under good conditions and in a quiet receiving environment.

Possible modifications and further thoughts

Described is what must be close to the simplest means of decoding JS8 transmissions.

However, once you've got it running many other modifications to improve its performance or versatility are possible.

Reception of other modes (including SSB) within 80 metres is possible if you change the local oscillator's frequency and/or make it frequency agile. You might just be able to pull the crystal oscillator down to the FT8 frequency (3.574 MHz) if you add more inductance or (possibly) more parallel crystals. An even lower excursion to 3.5686 MHz would permit WSPR reception. If you have no luck with crystals, 3.58 MHz ceramic resonators will easily swing down to cover both frequencies, though at some cost of stability. By the way, both FT8 and WSPR can be decoded on the free WSJT-X program. SSB activity is normally above 3.6 MHz but this can be heard if the series inductors are removed.

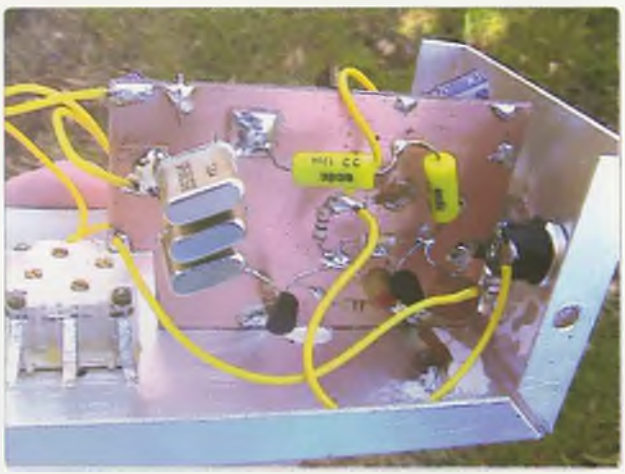
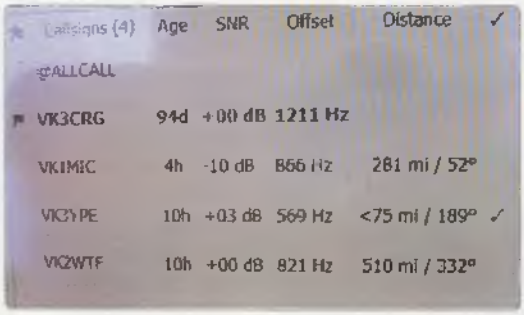


Photo 5: JS80 internal view showing local oscillator.

The audio output is very low but signals should be audible on high impedance headphones or even a piezo transducer.

Another possibility is a change of band. 7 MHz is more active than 3.5 MHz for both JS8 and FT8. As the front end is broadband all that needs changing is the crystal frequency. Again ceramic resonators can be pulled down but frequency stability will suffer, and especially for WSPR use, may be unacceptable. The logical solution then could be to add a DDS such as the small kit sold by OzQRP.

Selectivity is a flaw of this design. Both in terms of the wide front end (discussed before) and the audio image. While I've not tried it in this circuit, it could be worth experimenting with crystals or ceramic resonators to see if you can notch out unwanted signals below 3.578 MHz. A more elaborate approach, suitable for a small range of frequencies, could be to make this into a phasing method direct conversion receiver.



Callsigns (4)	Age	SNR	Offset	Distance	✓
@ALLCALL					
VK3CRG	94d	+00 dB	1211 Hz		
VK1MIC	4h	-10 dB	866 Hz	281 mi / 52°	
VK3YPE	10h	+03 dB	569 Hz	<75 mi / 189°	✓
VK2WTF	10h	+00 dB	821 Hz	510 mi / 332°	

Photo 6: Example of stations received (from all.txt generated by software).

Adding transmit capability is another option. While its output would be double sideband (suppressed carrier), JS8 signals using this mode are still easily detected. The receiver's mixer could double as the balanced modulator on transmit and the local oscillator would be unchanged.

All that is needed is an audio input connection (via a level control) and a small two or three transistor RF power amplifier. This should enable an RF output of 500 mW to 2 w. While the double sideband means you are throwing away half your power, what remains is still enough to be detected hundreds of kilometres away. A VOX circuit would allow automatic transmit/receive switching; a desirable feature to enjoy all features JS8 offers.

IRLP Node based on Raspberry Pi

Robert Campiciano VK2YMU

Background

The Internet Radio Linking Project, also called IRLP, links amateur radio stations around the world by using Voice over IP (VoIP). Each gateway consists of a dedicated computer running custom software that is connected to both a radio and the Internet. This arrangement forms what is known as an IRLP Node.

Amateur radio (or ham) operators within radio range of a local radio node are able to use DTMF tone generators to initiate a node-to-node connection via VoIP with any other available radio node in the world - and there are over 1,500 active nodes.

The original motivation behind this new Node design was driven by the relatively high cost of purchasing a turn-key solution from the original developer (David Cameron (VE7LTD). David did, however, develop software for his board to be used on a Raspberry Pi (RPi) Single Board Computer (SBC), providing the basis for a compact, cost effective standalone node device.

Getting involved with the Victorian Repeater Linking project, the need arose to develop a new kind of IRLP Node, to be used for repeater linking projects that could not be done using RF linking technology.

Design

The design parameters, required that the IRLP Logic and Audio circuits be built on a "hat" that would sit on top of the RPi, plus have the ability to recover itself during various system failures. This required some modifications to the original IRLP code along with hardware changes from the original IRLP hardware design. Auxiliary ports have been deleted as not required for the intended application as a repeater link, but the original I/O pins and software are retained.

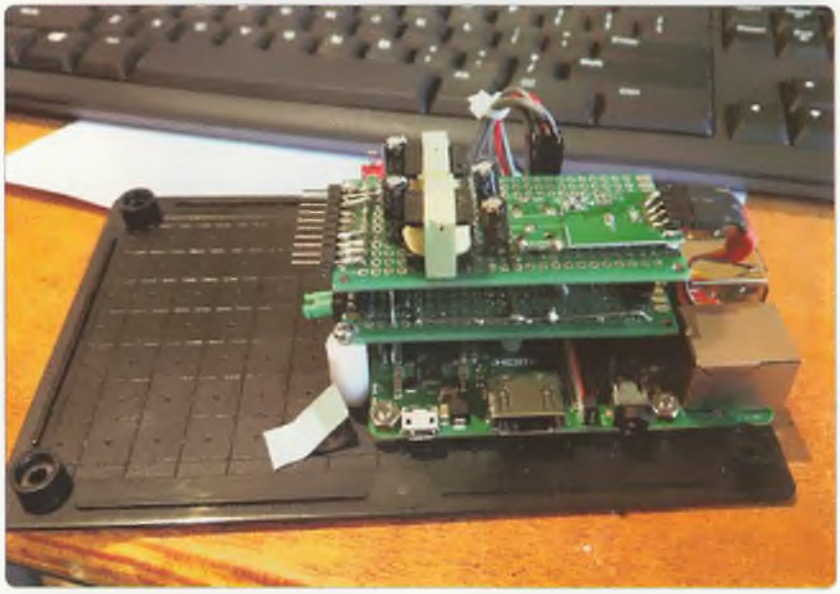


Photo 1: Vero Board Prototype.

The node is designed to connect to a selected host reflector (Home) on cold start, on no activity, or in a power fail recovery. *Note: Reflectors are a type of conferencing system used for IRLP. Most reflectors on the network have 10 channels (0–9) with channel 0 being the main channel.*

Using the onboard hardware timer, the node is also able to determine if the internet functional, should this not be the case the node will retry indefinitely to connect. VK3NA developed code that indicates if the node is connected, indicated by the Link Active LED.

External supervisory LED's have been included to the hardware with the required software changes to implement this, as an aid to indicate activity such as PTT, Valid DTMF, COS, SD access and Link Active.

SD card file corruption is usually caused by improper CPU shutdown, even if using prime quality SD cards such as Sandisk *[Ed: SanDisk Extreme SD cards feature wear levelling which will greatly extend the useful life of the SD card on an RPi]*. Code was developed by VK3NA that upon a power down or power fail the Node will do an orderly shutdown procedure. In hardware this is possible by using a back-up power supply that uses a super capacitor, this having sufficient energy for completion of the controlled shutdown of the RPi.

The Node utilises audio decoupling transformers and opto-couplers. For radio control, the aim was to reduce unwanted noise achieving the best possible audio quality whilst providing protection to the RPi SBC.

On RPi, is the 3 Volt onboard regulator is easily damaged - I chose to only use 5 Volts with current limiting on the I/O channels, with the benefit that the board will work with radios that use 3.3 V or 5 V logic levels.

The Build

A proof of concept Vero Board prototype, was put in service, it ran for many weeks, with reliable performance.

A PCB was designed with the ability to add other option

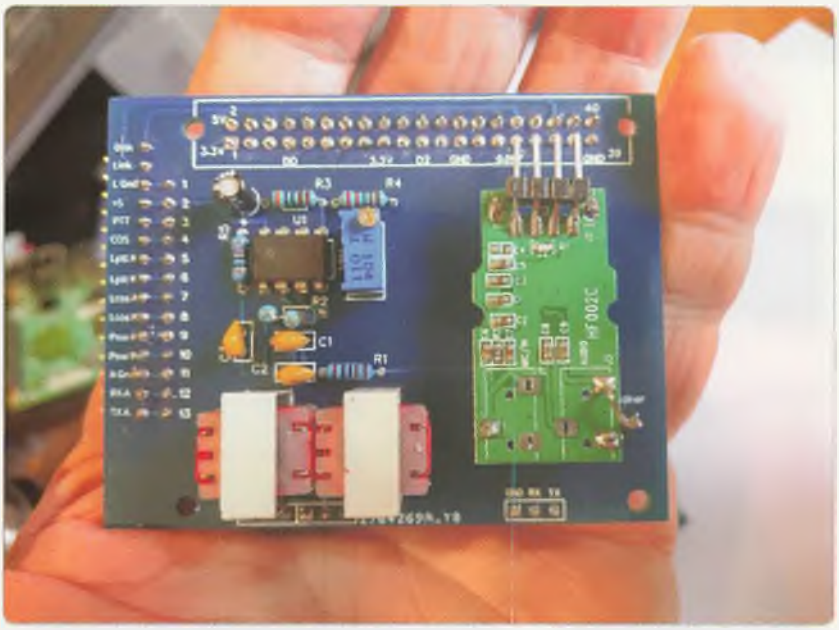


Photo 2: Final Active Pass Band Filter With variable gain & Sound Dongle.

boards, such as a bandpass active filter, allowing the decoupling transformers to be moved from the Node PCB to the option PCB. Should the application not require any transformers, links can be applied to the Node PCB routing the audio to the outside world.

Two option boards were developed. One was a compressor expander, but due to extra gain, the CPU noise became an issue and this feature has been abandoned.

The second option board is a pass band filter to controls the audio from the IP link to the radio, keeping the audio response within 300 Hz to 3 KHz.
This stops any CTCSS tones that could be present from the IP link going to the transmitter. Note that some radios have in-built filters.

The Power Supply

A commercial switch mode power module was used in the final design supplemented with a 250 Farad Supercapacitor. A variable shutdown time is achieved by sensing CPU activity. The supercapacitor used provides 5 minute backup - since the shutdown time is typically 1 minute it is more than adequate. The audio, as is in the original Canadian design, is derived from a USB Sound Dongle. The internals of this dongle are removed from the housing, and are hard wired to the RPi.

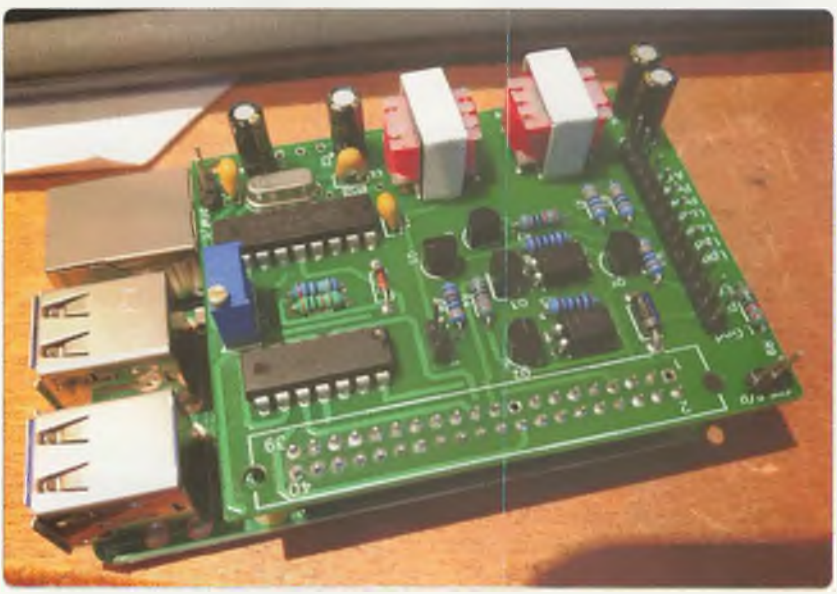


Photo 3: First Production Prototype.

Circuit Operation (referring to circuit diagrams)

PTT function

Upon a high signal from the I/O (GPIO17) 3V Q5 is saturated turning the LD 3 on, the same signal from the I/O turns Q2 on that drives the Opto Coupler U1 to saturate its output pin3 to Logic Low. D1 is protection against PTT Inductive spikes, R5 & R5B are there to increase the drive current to the Opto-Coupler if particular radios require more PTT current sink.

COS

Upon reception of a signal the radio will provide a logic low, this turns Q1 on, the output of U2 with Q3 form a Darlington configuration, when Q1is turned on, the Opto Coupler is turned on, the collector of Q3 goes Low, turning Q4 on, with LD2 on, this low signal is also fed to the I/O(GPIO10)

The IRLP Board also provides signal from the IRLP software indicating the link to a host to be active (GPIO16). (GPIO12) acts as a memory card access indicator.

DTMF

On the IRLP board the DTMF decoder MT8870 with a LED indication of a valid signal, the incoming DTMF tone, provides an output in hexadecimal form (Q1, Q2, Q3, Q4) corresponding to the audio pair of the tones received.

The hexadecimal code corresponding to the received tone pair, is applied to the 4081 AND gates. When there is no DTMF signal present, all the outputs (D0,

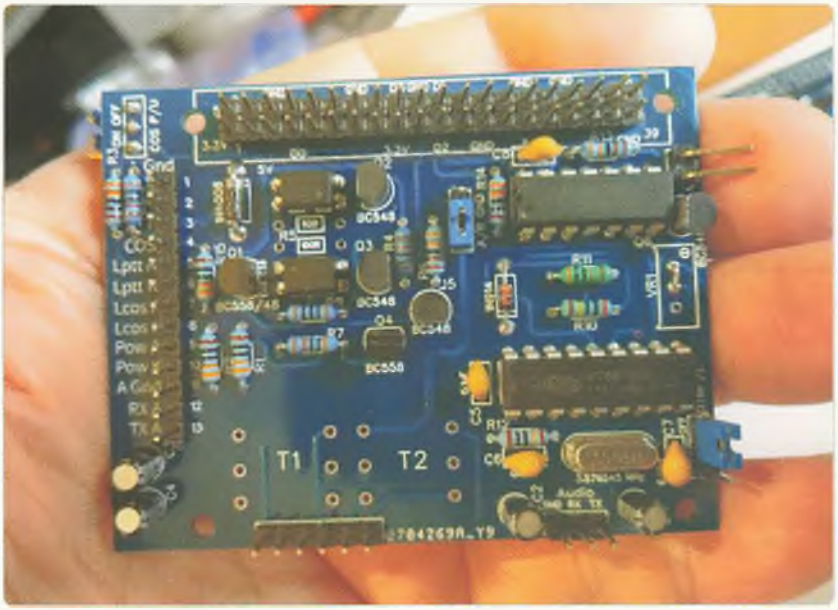


Photo 4: Final design.

D1, D2, D3) are at Logic 0, this is interpreted by the IRLP software has no code been received.

Upon reception of a valid code the StD (pin15) goes to logic High, thus the code representing the received valid tone pair on the Q output of the MT8870 are transferred to the D outputs of the AND gates, the IRLP software detects the presence of a tone and stores that numerical digit waiting for the next digit, when a set of valid numbers are received, the software then takes action.

The StD signal is also used to drive the LED by turning Q6 on.

Audio TX, RX

The IRLP board is designed to either have the coupling audio transformers in place on the board or placed on another PCB like the optional Band Pass PCB, the kind of radio used for the node, determines if the Band Pass filter is required. Another design feature of the board is that if the coupling transformers are not required, they can be linked out, completing the audio path to the radio.

I tested several USB sound card dongles, most work well with very minor differences, usually only levels which can be adjusted in the IRLP software. To keep the construction compact, the internals of these dongles are removed along with the sockets, with direct wiring to the RPi.

Pass Band Filter

Using an LM358 in a two-pole modified Butterworth style filter, R1, R2, C2, C3 forms the filter

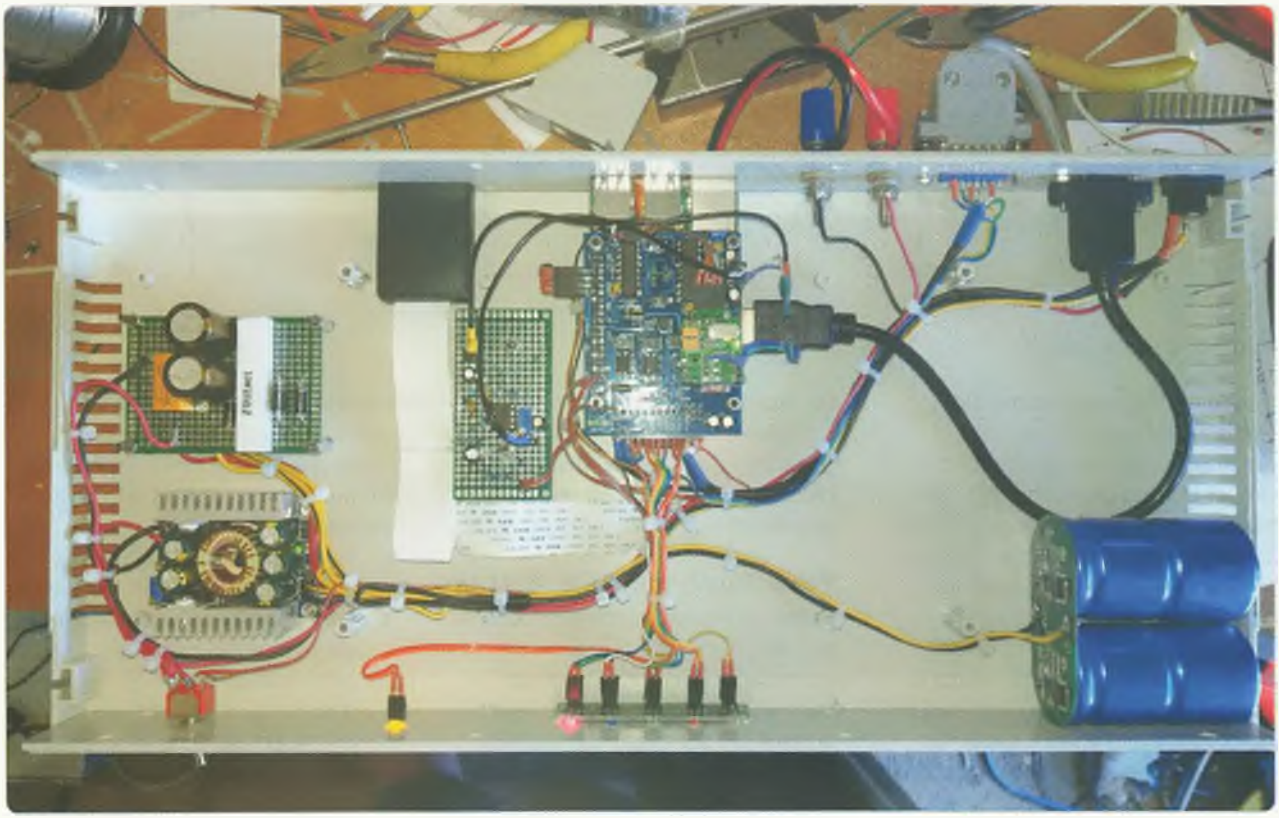


Photo 5: Prototype showing Switch mode supply with super capacitor.

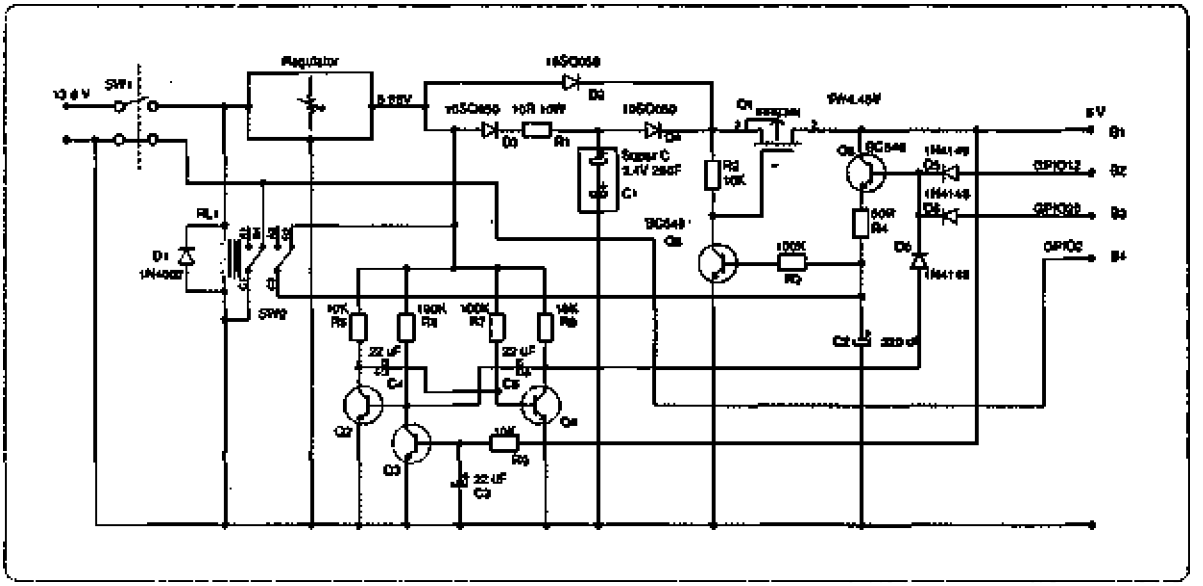


Figure 1: Power Supply.

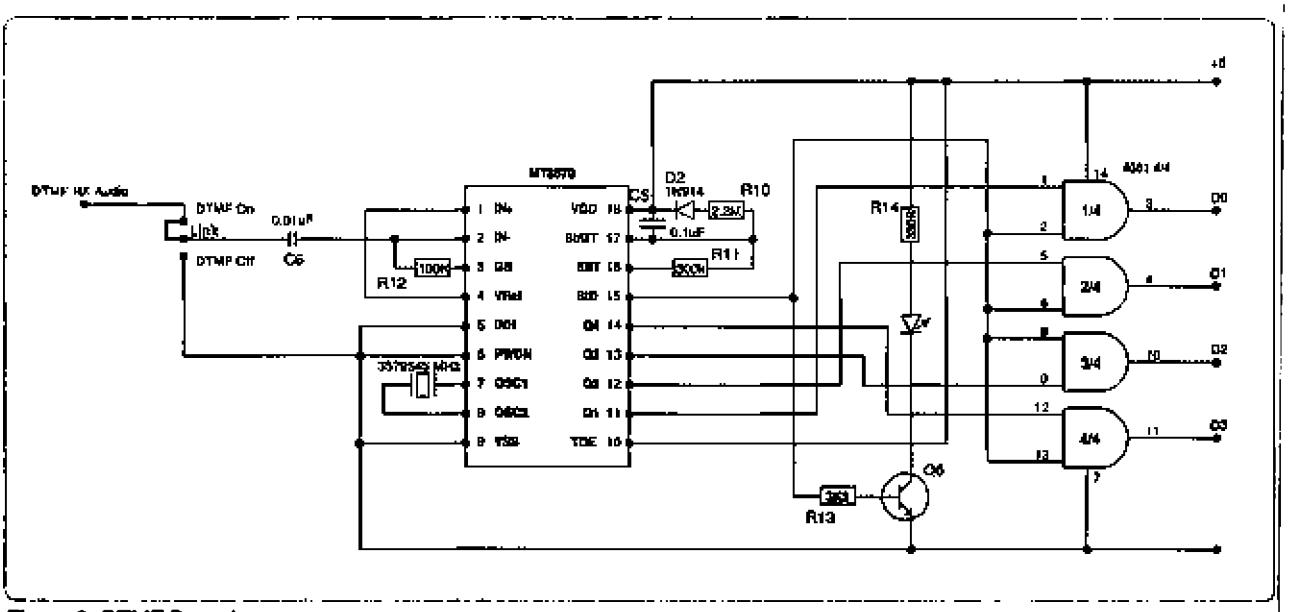


Figure 2: DTMF Decoder.

frequency response elements, Section B is an amplifier with adjustable gain of 100, R5 & R6 are for biasing purposes. This filter purpose is to eliminate any CTCSS tones that could be coming up from the internet, further attenuating any frequencies above 3000 Hz improving the signal to noise ratio.

The challenge was to design a narrow pass band with a bandwidth of 2700 Hz with a reasonable flat response across the pass band, with the required rejection to the unwanted frequencies, below 300 Hz, the compromise was to accept a slight lift in the mid range, of the pass band, in practice this has not created any unpleasant results when listening to transmitted audio.

Power Supply with "UPS" Back Up

Back-Up Power for the shutdown process is provided by a supercapacitor. Mains interrupt telemetry signals the RPi, triggering an ordered shutdown of the RPi. This interruption can also be user initiated. The power supply can also initiate an auto-boot sequence if there is power but the RPi is dormant. This is achieved by sensing a 500mS tick on GPIO26. (Note: Requires software to provide the clock tick).

i) Turn on - When 13.8 Volts is first applied, SW2(C) normally closed contact, fully charges C2, at the same time Q5 saturates and the gate voltage on the FET goes to 0 Volts, turns on, allowing 5 V on the B1 terminal. At the same time Q3 is saturated, C3 is fully charged, the astable flip flop is disabled from functioning.

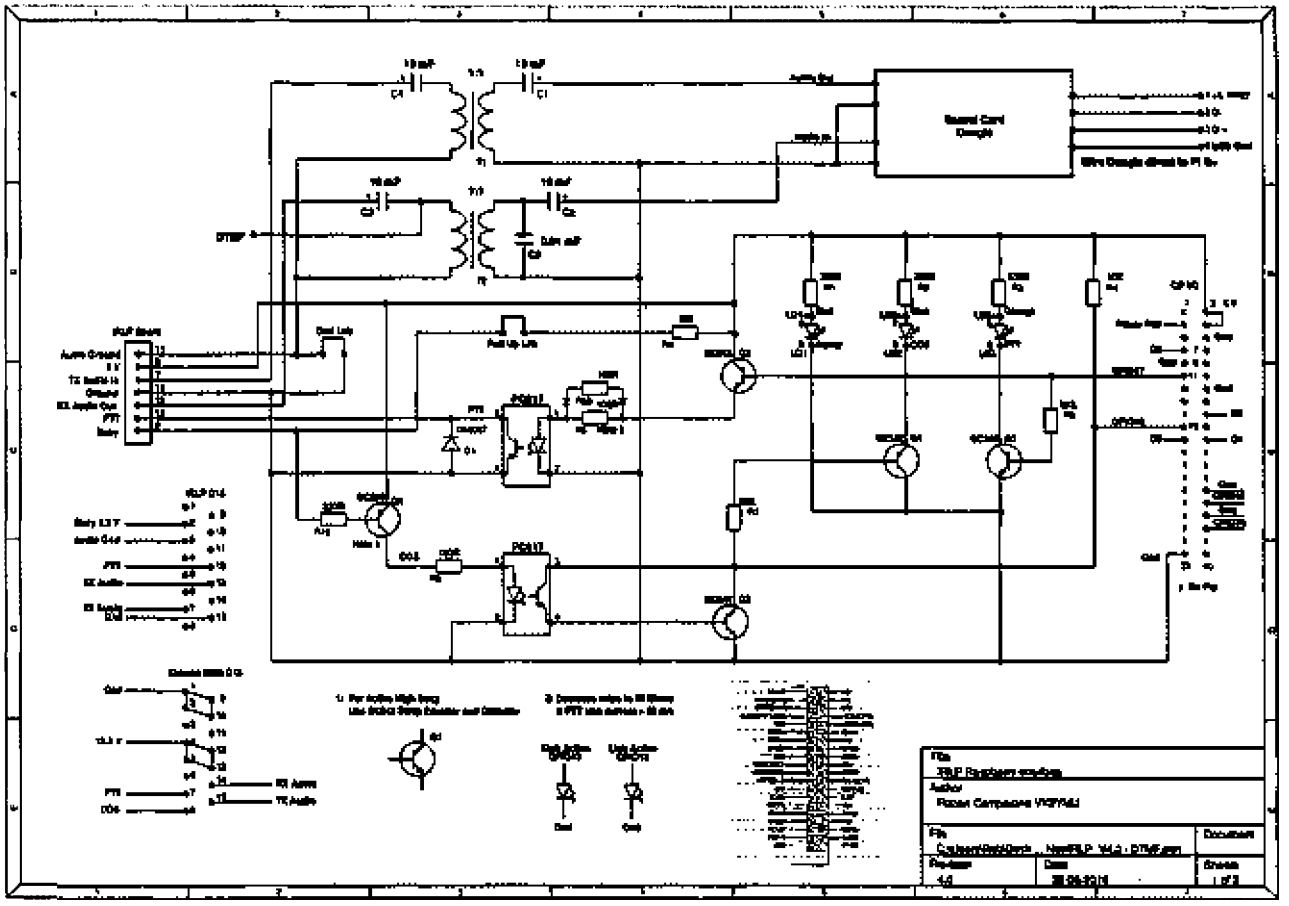


Figure 3: IRLP Board.

The charge in C2 is maintained by both the tick from GPIO26 or the signal from GPIO12 via Q6 Super Capacitor C1 is charged via D3 and R1, D4 is biased off as the voltage on its cathode is greater than the Anode.

ii) Power Off or Power fail - If the input power is removed, RL1 will de-energize, SW2(C) takes B4 to ground, initiating the RPi shutdown procedure, D4 turns on and the FET is now supplied with energy from the super capacitor, As long as Q5 is saturated the FET will continue to supply power to the RPi. Both the Tick and Activity signals keep topping up C2 extending the back up power for as long as required.

When both Tick and Activity stop (RPi is dormant) and C2 fully discharges, only then will the 5 Volts will be turned off.

iii) Glitch Condition - It is possible a power down sequence is initiated with a rapid toggle (or glitch) in the input voltage. This triggers an unwanted shutdown sequence even though input voltage is still present. The RPi will shutdown, but not reboot, unless power cycled. However, circuitry is included to provide such a power cycle in case of this abnormal condition being detected.

Q2 and Q4 form an astable flip flop, this is inhibited by the saturated Q3.

Should C2 fully discharge, turning the FET off, with the presence of input voltage, the astable will cycle once, fully charging C2 and turning the FET back on (Power cycling the Pi) There is an inbuilt delay when the FET turns off until when its turned back on by the time constant formed by R9 and C3.

Conclusion

As a final comment, the IRLP image S/W has had code added to it to provide the extra features.If you wish to implement for example the Power fail system you will need to patch your SD card with the extra code. This is easily done online.

Design and specifications are likely to be changed without notice as this is an ongoing project. PCB's may be obtained from VK2YMU as well as some of the hard to find parts.

The design also lends itself for a private node as it does for repeater use.

My thanks to the following people that contributed to the project: VK3TIM Tim, VK3NA Brad, and VK3YNV Ray.

WIA Conference Weekend | 8-10 May 2020

Antarctic Gateway Theme in Hobart Tasmania

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Choose sea over sky and sail from Melbourne to Devonport for the start of the **WIA Annual Conference 2020**. Spirit of Tasmania is pleased to offer special discounted fares to conference delegates and their travel companions. This is the perfect opportunity to plan a pre or post conference road trip in the comfort of your own car. So drive on board and set sail for a stress-free journey. This discount is open for two weeks before and after the conference weekend.

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cm handheld whilst on the *Spirit of Tasmania*. Some conditions apply and these can be viewed on the WIA website.

The weekend starts **Friday** at lunchtime with 30 lucky attendees getting a guided tour of the **Australian Antarctic Division** at Kingston. There will be an informal pay your own dinner Friday night at Mures Lower Deck on the Hobart water front.

Saturday will see the AGM and Open Forum before lunch then two streams of Presentations covering Antarctic management, research, medicine, weather, radio and many amateur radio activities. Partners will be treated to the huge Salamanca Markets and the Museum of Old and New Art (MONA).

Saturday night will be the Conference Dinner with a fantastic keynote speaker.

Sunday is a part or full day of tours including the Mawson's Replica Hut Museum, Tasmanian Museum and Art Gallery - Islands to Ice, Tasmanian Maritime Museum and the Grote Reber (Radio Astronomy) Museum and 26m Radio Telescope.

We finish the weekend with a BBQ at the historic Coast Wireless Station that was used by the Mawson Expedition to receive news from the icy continent via spark transmission relayed from the base on Macquarie Island. This includes tours of the Tasmania Maritime Radio monitoring station and maritime radio museum.

The weekend is centred on the Best Western Hotel in Bathurst St Hobart and we have been able to secure a great room deal. To book call (03) 623 262 43 or emailing *reservations97434@bestwestern.com.au* and quoting WIA to receive a $149 discounted room rate.

For more information and to book for the conference go to: ***https://www.wia.org.au/joinwia/wia/2020agm/***

Registration is now open and we look forward to seeing you there!

Plan ahead

Operate within the band plans:

http://www.wia.org.au/members/bandplans/about/

VHF/UHF - An Expanding World

David K Minchin VK5KK

Introduction

Welcome to the "twenties"! This edition will focus on the various records that have been broken both locally in VK/ZL and in Europe in the past month or so. Amongst the records are some commendable first time efforts (VK to ZL on 3.4 and 10 GHz) as well as a quantum leap on 134 and 245 GHz!

VK4 to ZL on 3.4 GHz

The VK to ZL Tropo path has been worked annually now for some years and 2.4 GHz has been bridged at least once but now it's been done now on 3.4 GHz in style! Kevin VK4UH reports ...

"Background information for the record breaking 3.4GHz (9cms) distance record between Kevin VK4UH, Scott VK4CZ and Colin VK4MIL from the Brisbane VHF Group team, operating as VK4UH/p at Mt. Mowbullan, Bunya Mountains, Queensland Australia and Stephen ZL1TPH at Cape Reinga, North Island New Zealand at 21:05 UTC on 22nd November 2019."

"Intending to activate a 24-hour, multiband, multi-operator, portable station VK4IF/p in the WIA Spring VHF Field day contest, three members of the Brisbane VHF group, Kevin VK4UH, Scott VK4CZ and Colin VK4MIL secured access to a site at Mt. Mowbullan in the Bunya Mountains, at 1092m ASL (QG53tc), 225km inland from Brisbane, for the duration of the contest weekend to be held on 23-24 November 2019."

Photo 1: Stephen ZL1TPH's 3.4 GHz portable system.

"For several months prior to the contest discussions and preparations had occurred between the BVHFG team members and Stephen ZL1TPH in New Zealand regarding an attempt to cross the Tasman, between mainland VK and ZL, on 3.4Ghz (9cm), a feat not previously achieved on that band."

"In the days leading up to the contest weekend, Hepburn predictions for tropospheric ducting and IPS observations for Sporadic-E propagation were very encouraging and plans were put in place to attempt, propagation permitting, a Trans-Tasman contact on 9cms during the Field-Day Contest period. Stephen ZI1TPH agreed to drive to the Cape Reinga (RF65jm) site, at 102m ASL, 420Km north of Auckland, the most north-westerly point of New Zealand and the closest geographic point to Australia."

"Arriving at Mt Mowbullan in the late morning on Friday 22 November, the day preceding the contest, the BVHFG contest station and antenna system were rapidly established. At this time, it was apparent that stations in the Brisbane area were already receiving signals at good strength on both 2m and 70cms from North Island NZ. Shortly after establishing the 2m station, contact was made with Stephen ZL1TPH/p on 144MHz at 5/9+ levels."

Photo 2: View towards VK from ZL on 3.4 GHz path.

"The VK4UH/p 9cms microwave system was put on air in CW-beacon mode and was immediately copied at the Cape Reinga end of the path at 5/2 level. ZL1TPH/p then activated a CW ident beacon, in the reverse direction, which was also easily copied at Mt. Mowbullan. A two-way SSB contact ensued with reports peaking 5/5 in both directions at 21:05 UTC 22nd November 2019."

Photo 3: Kevin VK4UH/4's 3.4 GHz portable system, Mt Coot-Tha, QLD.

"At the VK4 end the equipment consisted of a GPS-locked DB6NT transverter, driven by a Yaesu FT-817 operating at an IF of 142MHz, to transmit in the new band segment at 3398.100MHz, a 30-watt solid-state "Stealth" amplifier module, feeding a 1m tripod-mounted mesh dish with a ring feed."

"At the ZL end the equipment also consisted of a GPS locked DB6NT transverter, driven at 432MHz by an Icom IC-9700 IF radio, a similar 30 watt "Stealth" amplifier and a solid tow-hitch mounted 1m dish with a horn feed."

"Signals later peaked at S9, after the original contact was completed, and were characterised by slow "rolling" QSB. At one stage the 9cms signals were actually stronger than the 2m signals, over the same path. It is very fortunate that the QSO was achieved at that time. By the following morning, at the start of the actual contest, high winds at the Cape Reinga site prevented the dish antenna being erected and so a repeat event did not occur."

"This ground-breaking QSO, at a calculated distance of 2192 km, represents new national distance records on the 9cm band in both Australia and New Zealand, a VK4 State Distance Record, the first terrestrial 9cm between mainland Australia and New Zealand and the highest amateur frequency successfully used for terrestrial communication between the two countries".

Congratulations to both Kevin and Stephen on breaking Reg VK5QR and Wally VK6WG (both SK's) old 3456 MHz record from Adelaide to Albany (1,885 km) set in 1986. This record was also the world record up until 1991.

STOP PRESS: VK to New Zealand on 10 GHz!

As noted in the previous section, good Tropo conditions favouring 432 MHz and above started relatively early between eastern VK and ZL in the 2019/2020 season. This pattern continued through from late November to the end of December (and beyond) with a number of 432 and 1296 MHz contacts being recorded. Of particular note is the VK-ZL opening spreading from 28/12/2019 through to 1/1/2020. The longest distance recorded in this opening was 2567 km from VK3HP to ZL1SIX on 144 MHz on 30/12/2019

Between 30/12/2019 and 1/1/2020 VK7MO/2 and ZL3RC/3 achieved the first 10 GHz digital and SSB contacts between VK and ZL. The first Digital contact was made on 29/12/2019 at 2354 UTC with the first SSB contact on 30/12/2019 at 2158 UTC 55 both ways. According to Roger, VK7MO/2's signal peaked to 57 on 31/12/2019. These contacts set a new VK2 10 GHz record of 2040.4 km as well as a new national ZL 10 GHz record.

Rex VK7MO/2 was located at Crescent Head New South Wales, Lat 31.193450° South, Lon 152.979217° West, height 72 metres, Grid locator QF68lt. Roger ZL3RC/3 was 14 km North of Greymouth: Lat 42.329643° South, Lon 171.264907° West, height 47 metres, Grid locator RE57pq.

ZL3RC's equipment 1.13 cm cut-up petal dish (40.3 dBi 3 dB beamwidth +/- 0.9 Degrees) DB6NT LNA (0.7 dB noise figure) and DB6NT 60 watt PA, antenna alignment with Google Earth to a rock in the sea.

VK7MO's equipment: 10 GHz: 76 cm dish (36.9 dBi, 3 dB beamwidth +/- 1.3 degrees), DB6NT LNA (0.7 dB noise figure) and DB6NT 60 watt PA. Antenna alignment with VK3HZ differential GPS to within 0.1 degrees.

Well done guys, more details in the next column.

New World Record 432 MHz contact of 4562 km

Tropo conditions have not been restricted to the VK-ZL area. Unusually warm Northern hemisphere winter conditions caused by a stationary high pressure cell created very stable Tropo conditions in the North Atlantic to well south of the equator in late December 2019. From the EI7GL blog

"Back in September of 2018, G3SMT in the west of England managed to work D4Z on the Cape Verde Islands on 144 MHz to set a new IARU Region-1 Tropo record of 4,431kms."

"On some days, there are good openings on the VHF and UHF bands. Saturday the 28th of December 2019 was not only good,

Photo 4: 3398 MHz and 10368 MHz paths from VK to ZL.

it was exceptional. Some record breaking signals from the Cape Verde Islands were heard in the UK and Ireland on Friday the 27th of December. On Saturday the 28th of December, those Tropo conditions got even better. The day got started with Mark, EI3KD working D41CV on FT8 on 432 MHz at 09:06 UTC for a new IARU Region-1 70cms record of 4,170 km. Mark later went on to work the Cape Verde Islands on 432 MHz SSB."

"Like on previous occasions, the record only lasted a few hours. At 11:09 UTC, Ian GM3SEK in the south-west of Scotland managed to work D41CV on FT8 on 432 MHz

Photo 5: New 432 MHz World Record Paths.

extending the record distance to an amazing 4,562 km. GM3SEK was using 100 watts and a 23 element on 70cms. It would seem as if this is not only a new IARU Region-1 70cms Tropo record but also a new world record! To put that into context, the red dot on the map below shows the limit of the old record of 3,284 km which was between D44TS and CT1HBC back in July of 2014. This is a screenshot of the FT8 contact between D41CV and GM3SEK on 432 MHz."

Meantime Tropo conditions on 144 MHz saw even greater distances covered ..

"On the 28th of December 2019, Ian, GM3SEK worked D41CV from the same location on the Cape Verde Islands to extend the 144 MHz Tropo record to 4,565kms. On the 1st of January 2020, the New Year was hardly a few hours old when Calum, GM0EWX on the Isle of Skye in the west of Scotland managed to work D41CV on FT8 on 144 MHz. This now extends the IARU Region-1 Tropo record to an amazing 4,776kms. For the contact, GM0EWX was using an IC7100 with 400 watts into two 15-element long Yagi's about 15 metres above ground level. Mode of Propagation... It's very likely that the bulk of the path was due to a sea duct extending from the west coast of Africa, up past Portugal and up to the British and Irish Isles."

It is interesting to note that it was reported in several UK news sources and social media that "Freeview TV goes down across Britain because of unusual weather". Most of the bottom half of the UK had French and Spanish stations over powering local transmitters even as close as 10 km, such was the intensity of this Tropo opening!

New Australian 47, 134 and 245 GHz Distance Records

The previous records for 134 and 245 GHz were only 50 metres set in 2011 between VK3ZQB and VK3XPD using very basic harmonic diode mixers. On 5/12/2019 Stefan VK4CSD and Roland VK4FB set a new VK4 and National 245 GHz record of 3.8 km. A few weeks later, on 20/12/2019 VK4CSD and VK4FB also set a new VK4 and National 134 GHz record over the same path of 3.8 km. A quantum leap in distance on both bands with far better equipment!

From Stefan VK4CSD, "I think on 245 GHz power is minus 40dBm TX power as a mixer and RX NF 36db for one unit and 40db for the other. The dish unfortunately underperforms, net gain of 50dB only. Over 100m I can achieve near enough a full quieting FM signal 20db SINAD one way with a 30dB home build horn."

The current EU Record was set by Michael DB6NT and Matthias DK5NJ on 06. July 2019 at 16:50 UTC JO50TI29JL - JO50VF58PK = 19.94 km. The world record is 114 km set by WA1ZMS and W4WWQ in 2008

On 14/11/2019 Iain VK5ZD/3(QF23jl) worked David VK5KK (QF33jf) on 47088.150 MHz, 51 both ways on SSB over 181.2 km for a new national and VK3 record. A JT4g contact was also completed to set a new National Digital record.

Online path loss calculator for 24 GHz and above

As previously covered, Iain VK5ZD's website that displays the calculated path loss for 24, 47, 76, 134 and 241 GHz has become a well used resource to quantify mmWave band conditions. The website can be found here *http://weather.vk5microwave.net/Weather.aspx?State=H*

So how do you apply the calculated path loss and what is the actual limit? Firstly the calculation assumes an un-obstructed path however as we know radio waves do not travel in an entirely straight line due to normal atmospheric refraction. On lower microwave frequencies (10 GHz and below) a "Radio Refractive Index" is usually factored with the visual LOS distance to provide an actual expected radio horizon. Through averaging of various coefficients in play, k = 4/3 is usually assumed for frequencies well into the GHz region. This theoretically adds around 15% to 20% to the visual LOS distance provided there is no significant "bump" in the landscape along the path that then blocks.

Most path profile programs allow for a refractive index to be entered into parameters so path clearance can be analysed over forests, water bodies, etc. For *www.heywhatsthat.com* the number entered is = (k-1) i.e. enter 0.33 for k = 4/3, etc. In practice, the actual path loss will be slightly higher due to a range of factors but sometimes this is more than offset by some enhancement along the path. This is especially the case over water on 10 GHz with evaporation ducting during the day. K = 4/3 assumes fine weather; any storms, snow, heavy rain, etc along the path may reduce k=1 or worse.

Comparing 24 GHz with 10 GHz over the paths close to k=4/3 distances there is a significant increase over the theoretical path loss vs. 10 GHz. Water vapour absorption is now an issue that directly reduces the refractivity from molecules and short cycle random scattering (QSB) becomes a significant issue even on visual LOS paths. The average refractive index is now lower and has a wider range of values dependent on water vapour (and to a lesser extent oxygen). Some studies show that the average value could be around k = 1.15 for 24 GHz.

Going higher in frequency it becomes a more interesting trip into un-chartered territory. On the recent VK 47 GHz contacts over +180 km on a radio LOS path (k = 1.29) the difference in signal level between 24 GHz and 47 GHz once equipment, antenna and path loss differences are factored (-23 db worse case) the results within a few db. The path was ideal with no ridges in the middle to clear and stable weather conditions along the path. The measured atmospheric water vapour was high at ~8 grams/m^3 (7 deg C dew point). Whilst water vapour is less of a factor on 47 GHz vs. 24 GHz, oxygen absorption and free space loss increases so the calculated path loss is higher. On the same path, as expected with such a high dew point tests on 76 GHz were not successful. The calculated difference in signals (all factors considered) between 76 and 47 GHz was calculated to be around minus 10db should have meant signals were still recoverable (digital) however they were "lost in the mist". At this point in our investigation it looks like we can still apply an effective positive refractive index up to 47 GHz however your actual mileage may vary. More on that subject soon.

Meantime, Iain VK5ZD has updated the vk5microwave.net website with the provision of an actual path loss calculator that can be used for any frequency. The calculator assumes a visual LOS path using the same formulae used to translate BOM data to path loss. *http://weather.vk5microwave.net/Calculate.aspx*

The calculator allows actual site specific meteorological conditions to be added along with equipment power/noise figure, receiver bandwidth and link antenna gain. The result is the theoretical receiver Signal to noise ratio in db. It also calculates dewpoint, absolute humidity, Rx noise power, etc. Alternatively you can search current BOM weather station data as a comparison.

In closing

Feel free to drop me a line if you have something to report especially on VHF as we currently do not have a "VHF Editor"! It doesn't take much to put a few lines together and helps the diversity of this column. Just email me at *david@vk5kk.com*

73's

David VK5KK

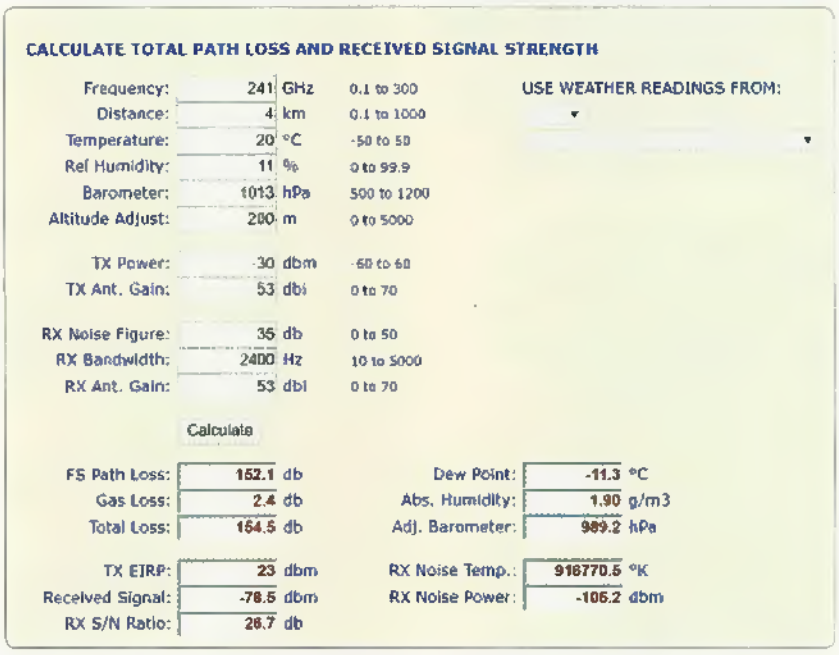

Photo 6: VK5ZD's Online mmWave path loss calculator.

Meteor Scatter Report

Dr Kevin Johnston VK4UH

This Month

Contest Meteor Scatter, New software versions, reports of Orionid Meteor Shower 2019, Forthcoming events and showers.

It has been a very eventful few months since the last edition of the Meteor Scatter column on a few levels.

This month the use of Meteor Scatter during VHF Field Day contests is discussed. Although, in theory at least, it was always possible to use digital modes for contacts in the VHF Field Days, this required the submission of a separate log and could not easily be combined with any other category of entry in the contest. Consequently, with the exception of a few "Lucky Catches" of phone exchanges enhanced by long meteor burns, meteor scatter contacts claimed in earlier Field Day entries were in the extreme hard-basket and virtually unknown. Recent changes to the contest rules, introduced in time for the Spring FD held over the weekend of 23-24 November 2019, allowed digital contacts to be included in all categories of contest entries. This of course opened the possibility of using digital Meteor Scatter modes for long distance, and potentially score-worthy, contacts in the Field Day.

As part of a multi-operator, all-band, 24-hour portable station entry, a team from the Brisbane VHF Group VK4IF/p (Scott VK4CZ, Colin VK4MIL and column-author Kevin VK4UH) secured access to a site high (1092m ASL) in the Bunya Mountains (QG53tc), about 200km inland from Brisbane, for the duration of the Spring Field Day weekend. The group planned to operate a competition grade station on all modes, including CW, Phone and digital on all bands from 6m to 10GHz. The portable station was assembled on the evening preceding the contest and was activated from this rare grid square on the Saturday morning before the start of the actual contest. The current versions of both WSJTx and MSHV were capable of dealing with non-standard callsigns including the /p suffix when running MSK144 mode. It was a pleasure to be operating from an elevated portable site, with good antennas and equipment, and an excellent radio-horizon to the south and activate a rare grid-square. General Meteor Scatter activity was low, as commonly occurs on most FD weekends as many of the usual MS operators are occupied in preparation for their own contest entries. Contacts were completed with VK3ZSJ, VK4FLR, VK1MT and VK3HY providing the new grid square to all stations. On the Sunday morning, during the contest proper, again around dawn, a number of high-scoring contest exchanges were achieved on Meteor Scatter with stations in southern call-areas. There were however a few unforeseen issues to be overcome. Although WSJTx and MSHV have provision for contest exchanges they were not easily implemented in the format required for VHF-FD rules. It was necessary to send a contest serial numbers and the full 6-digit grid-locator separately as a free text message to the recipient station. Easy enough with a little practice once the requirement was recognised. The second issue to be overcome was that the current version of VKCL, the commonest scoring software package used by contest stations, although now having a digital contact option in the pull-down menu, would not accept reports in the usual MSK144 format. The normal +dB report was rejected by VKCL which required a CW-type 599 format report to be entered into the log. A little work needs to be done on both software packages for the future. Some fine-tuning of the FD contest rules for the future, in regard to contest exchanges, may also be warranted. It is however possible and realistic now, following the recent rule changes, to implement Meteor Scatter and other digital contacts into FD Contest operations. The rewards in terms of scores for long-distance, high-value contacts will likely make this far more attractive for the future.

Also, this month is news of updates to both the WSJTx and MSHV software platforms. The new WSJTx version (ver. 2.1.1 released 25 Nov 2019) addressed some issues with various digital modes from previous versions. MSHV ver. 2.3.1 is now the current version. The most significate update in terms of MSK144, is that both of the new software versions now include support for the new Icom IC-9700 transceiver in the rig-option list. When appropriately configured the IC-9700 can run all MGM digital modes, including MSK144 for MS, with all necessary functions, audio in, audio out, PTT and CAT frequency control being managed via a single USB cable between rig and computer, with no external interface of level converters being required. Prior to the recent update, existing versions of both WSJTx and MSHV, did not support the new Icom rig. To run the earlier versions with the IC-9700 required a "workaround" involving convincing the programme that it was actually driving an IC-7300 rig and making the IC-9700 masquerade as a 7300 by manually changing the CI-V address from the default value of 94h for the new radio to A2h, the address for the 7300. Initial attempt at installation of the new software were unsuccessful however. Note to self, next time remember to close down the exiting WSJTx or MSHV before attempting installation of a new version. Even once the new software versions are installed, CAT control would not work properly until the CI-V address was reset to the default value (94h) for a 9700. If both new versions are installed then the operator can once again seamlessly change between programs.

As this column was being

prepared the Geminids meteor shower had just passed. The Geminids is a Class 1 Major shower which peaks around the 15th December each year. The Geminids Meteor Shower is considered one of the most important showers for radio propagation here in the Southern hemisphere, with a Zenith Hourly Rate (ZHR) of up to 120 meteors/hour although activity of this shower has noticeably declined over recent years. The shower occurs each year as the earth's orbit around the sun takes it through tracts of debris remaining after he passage of asteroid 3200 Phaeton across our solar system.

A report on conditions during the shower from Arie VK3ZL

"The 2019 Geminids shower confirmed to me that this shower has been progressively diminishing in intensity for the past 5 years. The shower this year produced an above average rate of intense pings but overall rate of pings was down compared to all previous years, very disappointing. The intensity was not there to even suggest that 70cm meteor scatter was possible. I concentrated on 2mx and the logbook entries for the 14th & 15th of December has two-way MSK144 QSOs with VK4s, NE, UH, CZ, EMS, MIL and VK2XN. I also include two-way 2m SSB QSOs with VK4OX and VK2XN on the 15th. The SSB QSO rate was very disappointing, in previous years regular QSOs rates of 4 or 5 an hour were possible, this year only 1 or 2. Several years ago it was possible to have an SSB QSO that would last 30 seconds or more due to the intensity of the pings, this year 5 seconds was the longest noted. For those that may be interested SSB QSOs are made by stations at either end of the circuit monitoring beacons as close as possible to the target stations QTH. When the beacon is detected due to the meteor ping the monitoring station transmits on a nominated frequency (usually 144.2 in this example) to the target station. If the ping is long enough (3 to 5 seconds) a two-way QSO can be completed. It does require a bit of patience but if conditions are suitable it is surprising how successful this method can be".

A further report is included from Mat VK1MT

"Across the weekend 14-15th December the Geminids shower didn't disappoint by delivering enhanced 2m conditions. The Geminids are considered one of the best viewing showers of the year, and are associated with an asteroid named 3200 Phaethon discovered in 1983. Phaethon is roughly 5.8km in size and orbits our sun every 1.4 years. At its peak, up to 120 meteors per hour can be seen. Though I cannot vouch for seeing them personally, but conditions were enhanced well above the norm. The Geminids produced a large number of small pings and at least a few full period burns (15 seconds). Also heard were a few harder to work stations that usually only pop into the decode screen when conditions are good. Stations heard from VK1 on 2m, in no particular order were: VK2NSS, VK2FZR, VK2XN, VK3II, VK3ZL, VK4UH, VK4GU, VK4NE, VK4MIL, VK4CZ, VK4EMS, VK4LHD and VK4CDI. PSK Reporter also yielded reception reports from VK4RF and VK4FLR.

This shower surprised me, maybe I missed it previous years? MS during the summer months typically for myself is short and poor. The colder darker months of the year seem to be more active and yield more contacts, but I suspect it is just the high number of dedicated operators that prefer the sound of a ping or burn to that of sleeping. Daylight saving certainly doesn't help. Aircraft Enhancement activities still start at 0800 local, so it leaves little time in summer for meteor scatter. It is no secret that the daily peak for meteors is the leading edge of the earth's rotation (sunrise), but who on earth would want to get up at zero four crazy o'clock (4:00 am) for those in QLD.

It is good to see some new DX stations being decoded and I have been approached directly by email by others who are keen to make their first contact.

My advice is - patience and perseverance. For any given ping on 6m, the same ping on 2m will be nine time shorter in duration and roughly 15dB down in signal strength. Evidence shows that Sh. Mode (Shorthand Messaging) is a much faster way of completing contacts even during predicted showers. Having SWL mode enabled within your preferred program will allow the reception of potential shorthand messages without being prompted to change modes."

Weekend Activity Sessions

The weekend MS activity sessions run on Saturday and Sunday mornings from before dawn (around 20:00 UTC or earlier) until propagation fails.

Focus frequencies: - 2m 144.230MHz, 6m 50.230MHz Current Preferred Mode MSK144 Version 2.0 running 15 second periods.

In VK we have a well-established protocol for which call areas use which transmission period during these weekend activity periods.

Southerly stations (VK1,3,5,7) **ALWAYS** run **1st period** beaming North, Northerly stations (VK4) **ALWAYS** run **2nd period** beaming South.

Stations in the middle call-areas VK2 and VK1 change period depending on the day. Saturday run 2nd Period beaming South, Sundays run 1st Period beaming north.

Forthcoming Meteor predictions and Showers

As this is published, we will be in the "best" period of the year for meteor scatter propagation. Optimum operating times remain just prior to dawn which makes it very early indeed at this time of year, particularly in VK4.

The next significant Major showers in the calendar will be the Quadrantids peaking around 4th Jan 2020 (ZHR 120/hr) and then the Lyrids peaking around 23 April 2020 (ZHR 18/hr).

Register with VK-ZL Meteor Scatter Facebook Page (Closed group of AR operators) for up to the minute advice and information.

Contributions for this column are as always welcome. Please e-mail to *vk4uh@wia.or.au*

Kevin (KJ) VK4UH

Amateur Foundations

How far can I talk on radio?

Onno Benschop VK6FLAB

A question that regularly hits the enquiring minds of people who are not (yet) radio amateurs is one about distance. For both amateurs and those who are not yet inducted into our community the concept of distance speaks in ways that other parts of our hobby don't. It's a simple concept, between these two points, how far can you talk?

The interesting thing to me about this phenomenon is that distance isn't a metric that we as amateurs use for anything other than calculating repeater coverage and then only for frequencies that are line-of-sight. If you're not an amateur then this might be unexpected or even illogical.

Let me give you two questions: *How far can you talk in amateur radio?* - and - *How far does light shine?*

If you're an amateur you'll know that those two questions are pretty similar, if not identical for certain frequencies, but if you're not, then these two questions appear completely unrelated to each other.

Let me start with something that you might not realise. If you tune to a local AM radio station, let's say ABC 720 in Perth. It's located in the AM broadcast band and the number of the station, 720, is the frequency at which it's transmitting. 720 kHz, or 720 thousand Hz. If you had a radio capable, you could turn the dial to the right, and after passing 810 Radio National, eventually, if you kept turning to the right, you'd find ABC Classic FM at 97.7fm in the FM broadcast band. The station indicator, 97.7 is again the frequency, 97.7 MHz, or 97.7 million Hz. So, 720 and 97.7 are both on the same dial, just at different ends.

Now if your radio was capable, you'd be able to keep winding it to the right, and after passing by Wi-Fi, at 2.4 GHz, or 2.4 billion Hz, you'd eventually come across light. Green light for example is about 560 THz, or 560 trillion Hz. You could keep going and end up with even more exotic stuff, like X-rays and Gamma-rays, in the exahertz range, a 1 with 18 zeros, but you get the point. Radio and light are the same thing. If fact, there are experiments around that are using light for Wi-Fi communications.

So, How far does light shine is the same thing as How far can you talk in amateur radio?

Before you start complaining about when it's different, let me point out that the only difference between these two is the frequencies at which we're comparing, with the characteristics that come with that. I'll get to that in a moment.

Look at light.

If you have a light bulb that's bright enough, you can see it in full daylight. If it's dark outside then you'll need less of a light bulb to see it. If it's raining, or if there is smoke in the air, you'll need more. If there's a wall between you and the bulb, you'd need a pretty bright light to shine through the wall, but you already know this. Covering up a torch with your palm shows the bones in your hand. Light gets through different parts of your hand in different ways.

Another thing you've seen is when you put a straw into a glass and it looks like it's broken. That too is related to how light travels through different materials. You may even have been underwater in a pool and looked up to see a reflection. That too is a phenomenon familiar in amateur radio.

Something that you might not realise is that something like an X-ray is identical to shining a light of a torch through your palm. Only X-ray's are used for diagnostic purposes, we shine an X-ray light at your body and some gets through and some doesn't. We take a photo of that and use it to figure out what's under your skin.

Back to radio.

The same phenomena happen in radio. Buildings are good at stopping certain radio frequencies, in much the same way as they block light, but other frequencies barely get noticed, they shine right through. Similarly, the ionosphere around the earth can act as a reflection like the surface of a swimming pool for some frequencies, but not for other frequencies. Interestingly this changes throughout the day, depending on the sun and a whole range of other factors which I'm not getting into today.

Finally, just like with light, you can turn up the brightness for different effects, you'll get further, but only if the conditions allow for it.

To answer the original question about how far you can talk on amateur radio becomes much harder and now you know why.

I'm Onno VK6FLAB

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VK4news Redcliffe and Districts Radio Club

Robert Thomson VK4TFN
e *www.redclifferadioclub.org.au*

The Redcliffe and Districts Radio Club, here in South East Queensland, has hosted REDFEST since its inaugural year, 2013.

Hamfests are an opportunity for friends to meet and socialise. Compare notes and swat-up on the latest trends in technology. Get some information on some perplexing techno problems and learn about the latest accomplishments and ask, how was it done?"

It's always been a good day out enjoyed by all and promises to be so again. This year because REDFEST 2020 is on the 18 April 2020, it of course coincides with World Amateur Radio Day.

At last year's REDFEST 2019 we inaugurated an idea which had been circulating around the club for some time. A technical display of the technical ingenuity and inventiveness of our club members.

This was organised and hosted by the very capable Peter Schrader VK4EA.

It was of course a club effort. We set up some tables at the other end of REFEST 2019. Club members then took the opportunity, to put the results of their DIY efforts on display. It was well received, so Peter intends to expand on it.

The previous display incorporated many aspects of the hobby ranging from simple HF test equipment, digital ATV, fox hunting, micro and milli-metre homebrew transverters.

We have sent out an invitation to amateur operators in South East QLD and Northern NSW, to come and contribute to our display of technical ingenuity and inventiveness.

The Club would like to make the event more interesting for visitors by expanding the technical display.

For buyers of second hand radio equipment the Club will be providing a test facility consisting of signal generator, power measurement and spectrum analyser so the buyer knows the state of their valued purchase.

A live HF and VHF/UHF station will also be active operating the VK4IZ/P callsign for those who would like to make a contact or two.

Fox hunting activities in the grounds will be available for the young ones (or not so young).

At REDFEST 2019 the club had three tables full of all the things we had collected over the previous year. Many a bargain was snaffled up by the hawk-eyed shopper. We'll have that again.

We had RF Solutions they'll at REDFEST again this year.

Also, this year we will have QSL Communications for the first time. Mark Roberts VK4AN has kindly donated a whole swag of equipment, which will be raffled by the club. We'll have Two dual band antennas, a DMR transceiver and an Icom IC7300.

So REDFEST 2020 promises to be a good day out. See you there!

DX Talk

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The lack of solar activity is now the point of interest at this stage of the sunspot cycle, in that there have been no sunspots since the beginning of November, these being visible for only two days, and showing a magnetic polarity signature of being Cycle 25 spots. Prior to that, it was a month since the previous spots were noted. In 2019, there have been fewer days with sunspots than during the last solar minimum in 2008/2009. Solar flux remains around 70, but seasonal cycles of propagation predominate. DX is now showing a summer pattern, with some propagation even up to 10 m. In early December, some Pacific DX was worked on 6 m, and some trans-Pacific contacts were made later in the month.

Around the bands

In November, all bands from 160 m up to 17 m were showing some activity, mostly around 20 m, with DX being worked from all areas of the world. Africa is starting to be heard again at last, mostly on 40 – 17 m bands. In December, higher bands up to 10 m were showing some nice activity again.

On 160 m, North America was being worked in November, fading out in December, but Asia continued to come in well. Also in November, 80 m was good to most parts of the world. Going into the early part of 2020, Europe should be workable on low bands from the early hours of the morning through to just after our sunrise.

DX Heard or Worked

DXpeditions active during November and December include; TX7T Marquesas, the Russian Robinson Club activated Vanuatu IOTA OC-104, OC-111 and OC-035. Returning to Cocos-Keeling was VK9CZ, Mats was active from Vietnam as XV9D, HV0A was active in mid-November. From Thimpu, Kingdom of Bhutan was DXpedition A50BOC (promoting sport – Bhutan Olympic Committee) and HRH Jigyel Ugyen Wangchuck (brother of the king of Bhutan) was on air for a short time as A5B.

December saw some excitement, as the United Nations Headquarters station 4U1UN was on air again after a very long time QRT. Activity was on 40 and 20 m CW, with a good chance of continuing activity with the station now working again.

In Ghana, the 9G2HO Ho Technical University station has been quite active on CW and FT8.

Upcoming DX

DXpedition activity scheduled for January to March includes the following.

VK9NK **Norfolk Island**, 2 January – 12 April. SP9FIH will be on air, 160 – 10 m, CW, SSB and RTTY. QSL via SP9FIH. For more information see: *http://vk9nk.dxpeditions.org/*

TI9 **Cocos Island** (NA-012), 20 January – 9 February. XE1B and HK5OKY plan activity on 160 – 6 m using SSB. QSL via LotW or Club Log OQRS.

HU1DL **El Salvador**, 30 January – 13 February. DXpedition team plan activity 160 – 17 m using CW, SSB, RTTY and FT8. QSL via LotW or Club Log OQRS. For more information see *https://hu1dl.mydx.de/*

5I5TT, 5I5ZZ **Tanzania**, 4 – 18 February. The Italian DXpedition Team will be on air from Zanzibar Island (AF-032) on HF bands using CW, SSB and RTTY with the callsign 5I5TT, and on FT4 and FT8 using the callsign 5I5ZZ. QSL via I2YSB.

5H4WZ **Tanzania**, 6 – 18 February. DXpedition team will be active from Pemba Island (AF-063) on 160 – 10 m using CW, SSB, RTTY and FT8. QSL via OM3PA.

TX4N **French Polynesia**, 11 – 17 February. AA4NC and AA4VK will be active on HF. QSL via EA5GL.

E4CC **Palestine**, 5 – 17 February. DXpedition team will be active from Bethlehem on 160 - 10m, using CW, SSB, RTTY, PSK, FT4 and FT8. QSL via LotW. For more information see *https://palestine2020.wordpress.com/*

VK9NR **Norfolk Island**, 20 – 25 February. AA4NC and AA4VK will be active on HF. QSL via EA5GL.

TI5/W1USN, TI5/AA1M **Costa Rica**, 20 February – 4 March. W1USN and AA1M will be active 160 – 10 m, using CW, SSB and FT8. QSL via LotW.

VP8/VP8DXU **South Orkney Island**, 20 February – 5 March. The Perseverance DX Group will be activating Signy Island (AN-008) on 160 – 10 m, using CW, SSB, RTTY and FT8. QSL via LotW. For more information see *https://sorkney.com/*

YJ0NC **Vanuatu**, 3 – 6 March. AA4NC and AA4VK will be active on HF. QSL via EA5GL.

J2 **Djibouti**, 4 – 16 March. DL7DF and team will be active 160 – 10 m, using CW, SSB and digital modes. QSL via LotW. For more information see *http://www.dl7df.com/j2/*

9J2LA **Zambia**, 5 – 15 March. DXpedition team will be active on 160 – 10 m using CW, SSB and FT8, with some RTTY. QSL via M0OXO. For more information see *https://9j2la.com/*

W8S **Swains Island**, 10 – 25 March .DXpedition team will be active from OC-200, on HF using CW, SSB, FT8 and RTTY with four stations over two camps. QSL via TBA.

There are many other activities planned in a very busy season of DXpeditions, and these are just some of them. For a complete list visit NG3K's "Announced DX Operations" website: *https://www.ng3k.com/misc/adxo.html*

Other News

VP8/VP8DXU South Orkney Island

The Perseverance DX Group continues to progress towards their activation from Signy Island in the South Orkney group. This entity was last activated in 2011 by the Micro-Lite Penguin DXpedition Team, and is now ranked at #16 Most Wanted in Club Log. The tentative dates for the activation are 20 February to 5 March, depending on conditions. For more information, including a propagation prediction tool courtesy of K6TU, visit the website: *https://sorkney.com/*

IDT DXpedition to Chad

The Italian DXpedition Team security clearance for Chad has been obtained and they plan activity around mid-2020 from N'Djamena with the callsign TT8RR on CW, SSB and RTTY, and TT8XX on FT8. More news to follow.

Please email me with any DX related news for inclusion in this column. I am particularly interested in hearing about DX worked or heard in other states, and from newer DXers.

73 and good DX,
Luke VK3HJ

SOTA and Parks

Allen Harvie VK3ARH
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Photo 1: Geoff VK3SQ in his shack.

The years end is usually a busy time for SOTA & Parks . Due to regular events on the calendar: the Keith Roget Memorial National Parks Award (KRMNPA) Activation Weekend and the annual VKFF Activation Weekend. And the improving weather.

Additional updates for the SOTA VK3 Association were also announced, with new summits in the southwest of the state, being added on 1st December.

Congratulations to Geoff VK3SQ on gaining SOTA Shack Sloth. This represent a dedicated approach to chasing however is not the end of the quest so looking forward to more contacts.

VKFF Team Championship

This weekend sees teams of two or more amateurs heading into the same Park (or Parks) for up to 24 hours and then working as many stations as possible. The 2019 event was held on the last weekend of October. Teams must register prior to the event and need to include a team name. The event forms a focus of activity with the aim of promoting the WWFF program.

The 2019 event saw seven teams participating: *The Tassie Devils* – Helen VK7FOLK and Jonathan VK7JON, *The VK4 WIPeouts* – Mark VK4SMA and Murray VK4MWB, *The Walky Talkies* – Paul VK5PAS and Marija VK5FMAZ, *QRS Dot Dash* – Ian VK5CZ and David VK5PL, *The VK4midables* – Rob VK4SYD and Scott VK4CZ, *TechoGeeks* – Sue VK5AYL and Richard VK5ZNC and QRParktivators – Gerard VK2IO and Alan VK2MG. All activator team members received a participation certificate.

The General section was taken out by *The VK4 Wipeouts*, with 49 contacts. The section for Two operators/single transmitter/40 m & 80 m/wire antenna/100 W or less category was *The Walky Talkies* with 157 contacts. Winners of the QRP section was *QRParktivators* with 82 contacts.

Full details can be found on the WWFF Australia website: *https://www.wwffaustralia.com/2019-results.html*

Photo 2: Peter VK3PF logging contacts on VKFF-2171 during VKFF Activation Weekend. Photo by Sergio VK3SFG.

VK3 SOTA update

Andrew VK3ARR, a member of the SOTA Management Team, working with Wayne VK3WAM and Peter VK3PF have finalise the changes announced via the OZSOTA Group on 30 October. The changes retired 15 summits, with most being replaced by new summits nearby. There were approximately 75 new summits added. VK3/VE-071 lost points (going from 8 to 6) due to a correction of the summit height by 100 m – the summit was originally listed as being 100 m higher than the actual height.

So, with new summits on offer, the quest to gain first activator status saw several head out.

Andrew VK3ARR headed out on Friday 1 November to activate Mount Gisborne VK3/VC-039. Andrew made his first two contacts on 2 m FM before moving to 40 m to work two stations on SSB and one on CW. 20 m SSB saw another three contacts.

Ron VK3AFW headed out for Archer Lookout VK3/VC-038, located west of Narbethong. Ron passed Mt St Leonards on his drive in but soon realised something was not correct. He had lunch, entered the summit coordinates in the GPS and found that he was about two kilometres beyond the summit. He backtracked to set up on the side of the road. By this time it was raining and the temperature was dropping to below 3 C dictating a quick activation. Ron spotted himself on 40 m SSB and started calling. Geoff VK3SQ replied just as

the drizzle turned to snow. Next was Gerard VK2IO/p in VKFF-0444, with Ron in VKFF-0556. The precipitation turned back to drizzle and Ron worked Ian VK5CZ and Linda VK7QP before he decided that the rain was too heavy to continue. He quickly packed up in the wet. On his drive out, there was snow on the ground above the 900 m contour. With the navigation error, Ron missed the other summits that had been activated earlier in the day.

Peter VK3PF headed northeast to bag 8 summits. Leaving home on Thursday afternoon to activate Mount McKay VK3/VE-007 on the way to the Pretty Valley campground for the night. In the morning he headed off on foot for the climb up to the summit of Mount Jaithmathang, soon to become VK3/VE-244. The approach is about six kilometres in distance, with a climb of about 370 m vertically. Peter reached the summit at around 2310 UTC and was set up out of the strong wind by 2330. Peter's mobile phone was misbehaving, so relied on old school scan of the bands to work Scott VK4CZ/p in VKFF-1480 cross mode: then calling on CW Steve VK7CW, who spotted Peter on SOTAwatch then soon had the summit qualified. During the next 12 days, Peter activated another eight of the new summits in the northeast plus several other summits.

Saturday 2 December saw Peter VK3ZPF activating Mount Useful VK3/VT-016 and another new summit – VK3/VT-083, where he worked 18 stations.

Further refinement of the VK3 summit list occurred on 1 December 2019, with four new summits added in the VS region. There were a number of minor changes to some of the existing summits, with name corrections, minor location and/or height updates.

Many thanks go to all involved in the work for these updates.

At the time of preparation of these notes, 17 of the new summits have been activated.

Keith Roget Memorial National Parks Award Activation Weekend

I am sure that Tony VK3VTH / VK3XV will have more details in the VK3 Notes elsewhere in this issue. At least 41 different VKFF References were activated over the period Friday to Monday, with 18 different operators active.

Of particular note is David VK5DG, who once again ventured into VK3 for the weekend. David headed to East Gippsland. By the end of the weekend, David was able submit a claim for the KRMNPA with endorsement for activating all 45 Parks via Satellite. Well done David!

VKFF Activation Weekend

The 2019 Activation Weekend was held on 30 November and 1 December. Initial indicate that Saturday saw 33 activators out in 50 different parks. A total of 1,873 contacts were recorded, with 593 Park to Park contacts made. Sunday saw 17 activators out in 25 different parks. A total of 1,000 contacts were recorded, with 216 Park to Park contacts made.

More details available from WWFF Australia web site - *https://www.wwffaustralia.com/2019.html*

Summer Weather and activating

At the time of writing activations has significantly decreased in VK1, VK2 and VK4 due to large bushfires spreading across the landscape. In most states, all Parks will be closed to the public on days of Total Fire Ban. In VK1, some large Parks have been closed until late March due to the fire danger and remoteness resulting in VK1 Activators agreeing not activate on days of Total Fire Ban.

There has been some useful discussion regarding the issues to be considered via the OZSOTA Group at Groups.io. Readers can read through the discussion, taking particular note of the thread Total Fire Ban Declarations and SOTA don't mix #weather. The consensus appears to suggest that a potential activator needs to take a detailed risk assessment approach as part of their planning before deciding to head out into the field.

Even on days that are not declared as being Total Fire Ban, all should be alert to the dangers associated with hot weather. Plan carefully, listen to or read the announcements on the appropriate websites and to remain alert. Even those sitting at home need to take a careful approach. Remain well hydrated and try to remain cool.

Annual SOTA Summit

Brian VK3BCM is again organising the annual SOTA Summit. This year the event will be based in Omeo at the Hill Top Hotel on 7 to 9 February 2020. Participants can stay in one of the Hotel rooms or camp in the grounds.

Participants typically gather by Friday evening. Discussions typically occur regarding which summits to attempt and small groups form for the following day. Usually you see a driver teaming up with other amateurs in one or more vehicles and heading out to activate several summits. Saturday evening will see an informal soirée in the early evening on Sam Hill VK3/VG-049 before returning to the Hotel for dinner. In addition to recounting the day's activations, plans will be made for Sunday. Whilst some will head home on Sunday, perhaps activating some summits en-route, others will plan to attempt more local summits and spend another night in Omeo.

Previous events have been excellent gatherings, with camaraderie and excellent experiences had by all. The gathering presents opportunities for less experienced activators to be guided to new and high point value summits and to operate together with more experienced activators – a great opportunity to learn new tricks for all.

Contact Brian on *bcmcdermott@tpg.com.au* for more information now.

So, don't forget the SOTA challenges;

- February 1st-7th 2020: Datamodes
- March 1st-7th 2020: Digital voice - C4FM / DSTAR / DM
- April 1st-7th 2020: LF - 160 m & 80 m

https://reflector.sota.org.uk/t/a-sota-challenge-for-2020-and-beyond/21101

73 & 44
Allen VK3ARH

VK7news

Justin Giles-Clark VK7TW
e *vk7tw@wia.org.au*
w *https://groups.io/g/vk7amews*

Rare Microwave EME DX

On 3 November 2019, Richard VK7ZBX and Rex VK7MO made contact via the moon to the dxpedition team A21EME on 3cm lead by Dan HB9Q in Botswana. Lunar conditions were good with degradation at 0.3dB and spreading was between 15-30hz. Local weather conditions were a challenge with wind gusts up to 60 km/h.

Richard VK7ZBX was using a 750mm diameter dish 3 cm system. The contact was using WSJT QRA64 and the signal reports copied in VK7 at -21dB and A21EME copied VK7 at -23dB. A quick QSY and Richard also worked OK1KIR, OK1CA and OK2AQ. Thanks to Richard for this report.

SSTV Update

There is a new HF SSTV cam established in VK7. This is a collaboration between VK7MAG and VK7OO and the new SSTV cam is on the ten meter band on 28.680MHz and operates 24 hours a day. Thanks to Steve VK7OO for this information.

VK7MAG is providing the antenna and receiving equipment while VK7OO is hosting the SSTV cam alongside of his existing 20 meter SSTV cam that monitors 14.230MHz. To see what has been received go to: *https://vk7oo.tasme.com/sstv10m/* for the 10m cam and 20M cam is at: *https://vk7oo.tasme.com/sstv20m/*

VK7 Events

Dani VK7FREQ reminds us that 2020 sees three big statewide events for VK7. Meet the Voice will be held over the third weekend in March, with Sunday being the main event, held at the Ross Recreation Centre. For more information take a look at: *http://meetthevoice.org/*. The second event is the 2020 WIA Conference weekend over the 8-10 May 2020. For more information take a look at: *https://www.wia.org.au/joinwia/wia/2020agm/*. The third event is the Hamfest in November and there will be more information about this event in future VK7 columns.

North West News

North West Tasmanian Radio and Television Group (NWTR&TVG)

http://www.nwtrtvg.com/

It is always great to see hams helping hams with Ron VK7HRM & Dale VK7NDH helping out Steve VK7EQ to get his 70cm beam erected and operating on the North West coast of VK7. The 6m repeater VK7RTV, originally at Gawler, has received its licence variation and is now operating from Dazzler Range under its new callsign VK7RDR.

Tony VK7AX lets us know that the VK7 Amateur Radio News and WIA news is now being broadcast via video stream to the DATV repeater of Mario KD6ILO located in San Diego, California. This repeater transmits on 1268 MHz, 6 MHz Bandwith HD using DVB-S2.

NWTR&TVG held its Christmas function on Saturday 30th November 2019 at the Lighthouse Hotel in Ulverstone and was well attended.

Northern News

Northern Tasmanian Amateur Radio Club (NTARC)

http://www.ntarc.net/

NTARC's end of year dinner was held at the Commercial Hotel in Launceston with 27 members attending. By all accounts it was a great night and all made their way home thoroughly satisfied.

NTARC's Safety Communications team provided safety comms for the 2019 Equine Endurance State Championships over two days of 22/23 November 2019. There were four events - 160km starting at 00:00, 95km started at 05:00, 40km started at 08:00 and the 20km started at 09:00. Three RFID readers were used. A pair of monitors displayed progress outside the Comms trailer

Photo 1: Meet The Voice (MTV) Group Photo. (Photo courtesy of Justin VK7TW)

Photo 2: Radio studio in a Ute – Sisters Akcousmatica's shack. (Photo courtesy of Justin VK7TW)

for competitors and their crews. The interstate Steward - Graham Dugmore reported that NTARC were the best that I have seen at any Ride. Thanks to Peter VK7SP, André VK7ZAB, Roger VK7ARN, Peter VK7KPC, Stefan VK7ZSB, Idris VK7ZIR, Stuart VK7FEAT, Lorraine and Norm VK7KTN.

Technical evenings have been popular with many pieces of equipment bought along by Ross VK7ALH, military sets & NanoVNA from Peter VK7KPC, Peter VK7PD and Andrew VK7DW with recently constructed 23cm antennas. VK7PD has also been playing with 2.4GHz transverter/amplifiers and SOTA antennas. Idris VK7ZIR with his Philips Wobbulator, David VK7YY with his immaculate Kenwood TS 520 SSB Transceiver, Nic VK7BEE with some QRP kits and many bought along their Grid Dip Oscillators.

Southern News

Radio and Electronics Association of Southern Tasmania Inc.

http://www.reast.asn.au/
https://www.facebook.com/reasttas/

Congratulations to Robert Dierckx VK7FRGD, Simon Dwyer VK7FAAF and Magai Mawein who recently all passed their Foundation Licence training and assessment. We look forward to hearing some new foundation calls on air soon.

REAST provides technical support and encouragement to local sound artists in residence, Sisters Akousmatica. Their latest installation included a narrowband FM broadcast license to broadcast on 97.1MHz FM from the Moonah Community Centre for four weeks. The studio was a modified ute with Pip and Julia interviewing people on air and streaming and playing works from well over 100 sound artists work from around the world.
http://www.sistersakousmatica.org/moonah-community-radio/

REAST has been successful in getting a Tasmanian Community Fund grant to install two new heat pumps in the Queen's Domain clubrooms. This will make the heating and cooling of the clubrooms much more energy efficient and make the clubrooms more comfortable in summer and winter.

The DATV Experimenter's Night highlights were: Glen Aldis and his restored AWA portable 450P, antenna tuning using the NanoVNA, review of the latest AR Magazine, LowKey and Dubus Magazines, interviews with Pip and Julia from Sisters Akcousmatica, lightning triggers with Ben VK7BEN, miniature insulin technology with Larry VK7WLH, Rex VK7MO presented many interesting analysis pieces supported with Powerpoint slide decks, Ron with Arduino projects, Paul VK7FPCL and his field day involvement, Alan VK7KAJ and his Leo Bodner GPS locked DDS, FT-736 TCXO adjustments with Richard VK7ZBX and Hayden VK7HH and as a Christmas treat we setup a vintage VideoBrain Pong game connected to an analogue TV Antenna Analyser tuned to channel 0. Everyone had a go of the pong game for some entertainment.

Reminder that the DATV Experimenter's nights happen on Wednesday from 7:30pm (AEDST) via the YouTube streaming facility. Just go to the REAST Website and go to the "Live Stream" page at *https://www.reast.asn.au/news-events/live-stream/*, or catch-up later on the REAST Youtube channel - *https://youtu.be/1PiZHJikNWg*

Photo 3: Vintage Pong game on vintage TV test equipment! (Photo courtesy of Justin VK7TW)

VK6news

Steve Kennedy VK6SJ

Northern Corridor Radio Group

We had our annual Christmas Party at the Henley Tavern with a great turn out of around 50 members and families.

John VK6NU has started CW classes on Sunday mornings at 10 AM and anyone is welcome to join in.

We are planning to replace the winch up mast used for our 5 element 20m monoband yagi. Our intention is to replace the mast with a heavier duty mast and replace guys and possibly anchor blocks.

Three of our members (Larry, Dean and Keith) are working on a rebuild of one of our Seatel Satellite antennas. The old Seatel tracking system has been replaced with new stepper motors for tracking, new gear boxes and new control circuitry, making the antenna much more accurate when tracking. This will be used for 10GHz EME from the club. Look forward to more detail on the system actually working by the next issue.

Ham College

Ham College finished the 2019 year with four (4) successful passes for the standard/advanced courses that the college has run through the year.

Of these four (4), three (3) passed the advance license and one (1) passed the Standard license. The college has also run two (2) Foundation courses over the last few months. Two (2) students will be sitting their exams over the next couple of months.

Ham College are intending to have a one-day planning workshop for the college. This is aimed at improving the standard/advance courses, and also making the college more sustainable through more instructors to spread the load, and a more process driven delivery of their courses.

Hills Amateur Radio Group

HARG held a fund-raising Sausage sizzle at Bunnings in Maddington recently and a good time was had by all. They were also involved in JOTA, hosting 2 groups of Girl Guides. We also hosted the Walleston Scout group working on their comms badge. We held some radio based activities including working the world on DMR, and outdoor activities using radio.

On Saturday 21st December, we held our annual Christmas barbeque which was attended by many members of the club.

In November, we held an RF camp out in the south west, in conjunction with the AusTravel network who whilst maintaining and

Photo 1: Current Club station.

operating a world class commercial HF network, are populated with a lot of hams as well.

Christmas Island Amateur Radio Club

The club recently held its December meeting. Work is underway to relocate the club station to a much better location near the highest point of the island (it is currently at the settlement and has a huge mountain shielding it from the East). This activity will require the assistance of all the club (of which the majority do not live on the island), as well as any others who might like to visit.

Kunio, JO1AEC recently visited the club and activated the station between the 16th and 23rd of November using the callsign VK9X/JO1AEC. He mainly operated CW. QSL via JO1AEC via bureau.

The CIARC is always looking for new members. You don't need to be living on the island to be a member. You just need to be interested in seeing the club grow and assisting wherever you can.

Photo 2: View from one of the nicer eating and drinking holes on the island.

Photo 3: Trevor VK6MS (the groups resident licenced and qualified rigger) on the tower after replacing the antennas.

Photos 1 and 2 of my trip to Christmas Island in July where I visit the club and some of the nicer parts of the island.

WA Microwave Group

The WA Microwave Group, whilst being an unofficial entity, is a vibrant group of amateurs, mainly in Perth, all interested in anything above 1GHz. Activities including setting up temporary uW beacons in the hills so members can test their own equipment. A number of the group are building EME stations for home QTH's on the 5.7GHz band.

West Australian Repeater Group

The major activity this month has been the repair of the Cataby repeater site, just north of Perth. We replaced the antenna and TB7100 repeater on the site during a working bee on the 21st December.

VK3 news Amateur Radio Victoria

Tony Hambling VK3XV
e *arv@amateurradio.com.au*
w *www.amateurradio.com.au*

Photo 1: ARVIC Mount View site.

VK3RTV Update

Peter VK3BFG reports that work is progressing to install **VK3RTV** at Mount View, an Amateur Radio Victoria leasehold location, at a prominent high spot in the Melbourne metropolitan area. An RFI vertical antenna for the 445.5 Mhz DVB-T output is being purchased and three 23 cm panels have been manufactured, but yet to be tested. Each of the panel pairs are to be set at 120 degrees and are planned to be installed on the three outriggers on the tower. The panels will be fixed to form a hexagon of antennas. Each antenna will feed a separate receiver which will have a new Minikits 23 cm pre-amplifier with a very nice 33dB of gain. Frequencies will be 1246 Mhz, 1255 Mhz and 1278 Mhz DVB-S with a Symbol Rate of 4000 Ks/sec and an FEC of ¾.

It is expected that the antenna installation will occur in late January 2020. The cost of the antenna project has been funded by donations from members of the Melbourne ATV Group and a very generous donation from WANSARC.

Volunteer professional Riggers have offered pro bono services for this project. **VK3RTV** is the only DATV Repeater licenced in Melbourne and only one of two in Victoria. Peter, VK3BFG, is the **VK3RTV** Project Co Ordinator.

Standard Licence Course

Amateur Radio Victoria is conducting a AOCP Standard Level course starting late January 2020

The course, to be held at the rooms at 40G Victory Blvd. Ashburton, will run from January 29 through to March 31 (7 pm to 10 pm) with assessments conducted on Saturday 4th April.

Anyone wishing to register their interest in attending the course contact, Peter Cossins VK3BFG *vk3bfg@amateurradio.com.au*

The popular ARV Homebrew Group commences February 2020!

The Homebrew Construction Group of Amateur Radio Victoria aims to promote the good fellowship and exchange of ideas between amateurs who are enthusiastic builders of their own equipment. It does this through monthly meetings in the ARV rooms located at 40g Victory Blvd., Ashburton on the first Saturday of each month (excluding January), at 2.00 pm.

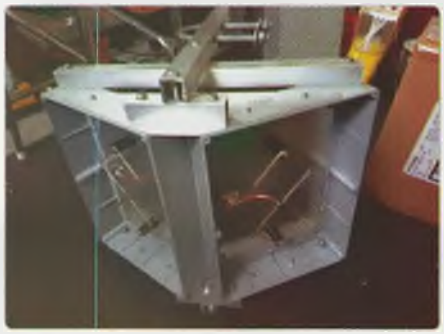

Photo 2: 23 cm Panel Antenna.

The meetings are generally very informal but commence with a "Show and Tell" session where projects can be displayed and described. The following discussion usually generates a wealth of ideas for the new corner and experienced constructor alike. The session is followed by a guest speaker, when possible.

Homebrewing encompasses almost every aspect of our hobby and those who might not necessarily regard themselves as dedicated homebrewers will find something of interest in this group.

Contact Rob: *vk3mq@ammateurradio.com.au*

KRMNPA activation period 2020

The Tenth annual Keith Roget Memorial National Parks activation period will take place across 4 days in 2020... Friday November 6 - Monday November 9.

This is the ideal method of increasing your VK3 National Parks tally for this prestigious Award.

VK3WI will get the ball rolling with an activation of the Brisbane Ranges National Park on Friday November 6.

All members are encouraged to participate in the Activation event. Please contact Tony: *vk3xv@amateurradio.com.au* for further information.

International Lighthouse and Lightship weekend 2020

VK3WI will be activating the Williamstown Time Ball Tower during the ILLW 2020 event to be held on the weekend of 22nd August to 23rd August 2020.

Preliminary information and world wide 2020 Lighthouse Registrations can be found here: *https://illw.net/index.php*

VK2news

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

Welcome to 2020 – the last year of this decade. It is also an anniversary year - when in March 1910 a gathering of Wireless Experimenters met in Sydney to seek a better deal from authorities. That meeting became the Wireless Institute of New South Wales to which today – 110 years later – both the current national WIA and ARNSW (previously WIA NSW Division) can trace their origins.

The Big Field Day

The next big VK2 event will be the Central Coast Field Day on Sunday the 23 rd February 2020 at the regular venue of the Wyong Racecourse. Check out their field day web site *www.fieldday.org.au* for all the details both there and on VK2WI News. You can also go to *www.ccarc.org.au* for club details. Talking about the VK2WI News it has become the practice on the field day morning not to have a bulletin, the broadcast team all want to chase up the field day bargains. In its place is a Saturday evening transmission - on the 22 nd - at 7.30 pm.

AGM & Elections

ARNSW members are advised that their AGM is scheduled for Saturday the 18 th April 2020 to be held at the VK2WI Dural site – 63 Quarry Road – with an 11 am start. Nominations for the incoming board will close on Saturday the 7 th March 2020 with the Returning Officer at VK2WI Dural at 11 am. Formal notification to ARNSW members will be given in the bi-monthly news letter *ALL ACCESS*.

The Summerland ARC is a small active club near Lismore with their own club rooms at Richmond Hill. They maintain several repeaters in the region. In this coming year they are considering some major improvements to their club house facilities.

On the Mid North Coast - the Oxley Region ARC maintain two repeater sites along with two meetings a month. Their annual – two day - mid winter field day in June will again be held at the Wauchope Showground. The Telegraph Point repeater – VK2RCN – is in the progress of relocating to a new, near by site.

Safe Disposal

How do you dispose of all those small batteries like AAA, AA, C, D and 9v? If you have been to an Aldi store - you will notice that they have a bin in the check area for these.

In last months AR Notes the dates for the ARNSW Trash & Treasure and Foundation weekends were given. T & T events are the last Sunday of the odd month, e.g. January 26 th and March the 29 th. The first of the Foundation weekends will on the 14 th and 15 th March 2020 with applications closing at 5 pm Friday the 28 th February 2020. Inquiries and bookings *education@arns.org.au* The remaining weekends are scheduled – also for the odd numbered months – usually two weeks before that month's T&T. Several Sydney clubs also provide training and assessments which are detailed on their respective web sites or as advised on VK2WI News.

Towards the end of last year ARNSW started to move their VK2RWI repeater systems at Dural over to the new 40 metre mono pole to replace an ageing triangular tower. The new installation has three antennas per band – 6 – 2 - 70 & 23 – for separate receive, transmit and other operations.

Milestones

It is ten years in March since ARNSW opened their Centenary Building at Dural. Some upgrading is now being considered to improve the comfort and flexibility of operations.

Work has also been untaken in the grounds of the five-acre property with landscaping and the construction of small covered area with tables which can double as a field day operating site. New chairs have been added to the meeting area which is used by the both the Experimenters Group after the T&T, talk fests, as well as the Foundation training weekends. Another Balun day is being planned for later this year with 9:1 kits.

News bulletins

The two Sunday VK2WI News Bulletins continue to expand facilities with a steady use of the streaming – arnsw.org.au/audio – to supplement some of the current poor propagation. The evening session is also on an Echo Link system with ANZEL. The evening session includes early editions of "What use is an F Call" produced by Onno, VK6FLAB. VK2WI News is also linked to the regional areas beyond Sydney – being Newcastle, Central Coast, Illawarra and Western Blue Mountains. We thank the various clubs for making their systems available for the expanded coverage. Callbacks logged from the various VK2WI outlets at times are 25 % of that week's national check ins.

We have no doubt all been touched by the adverse conditions that this country has and is going through with bushfires and other disasters and we need to be mindful of those from our ranks who have lost dwellings, shacks and other property. Like Clarence Valley ARC and their repeater site. Or the low act where a remote operating Bush Fire repeater trailer was totally vandalized. Not only was all the equipment stolen, the trailer wheels and axles went as well. WICEN NSW personal have been co-opted to be communication operators to various control locations through out the fire zones. 73 – Tim VK2ZTM.

ALARA

Jenny Wardrop VK3WQ

A Happy New Year to you all. I hope that Father Christmas brought you all the radio gear that you had hoped for, and that 2020 will be a happy, healthy and DX filled year with MUCH better band conditions!

Previously in this column we have touched upon the adventures of Jeanne VE0JS who, at 77 was aiming to become the oldest woman to sail non-stop, single handed and unaided around the world. Lyn VK4SWE describes the end of Jeanne's journey.

Photo 2: "Nereida" Dockside Melbourne Xmas 2018.

Photo 1: Jeanne VE0JS receiving special CCA Award Dec 2018.

Jeanne VE0JS Solo Circumnavigator back home in Canada

The highlight on air for the past few months has been chatting with our intrepid solo sailor Jeanne VE0JS who checked in regularly to the ANZA DX net, especially on Thursdays 'Ladies' Day' to update us on her circumnavigation. She has had lots of challenges to overcome on this trip – the knockdown she took when heading down to the S. Cape of New Zealand caused a lot of damage which she could only attend to when the conditions were favourable but she gradually and methodically worked her way through the repairs and kept on track. She had to dodge two hurricanes near Hawaii, then her final leg in to Victoria harbour, not far from Vancouver and Seattle, was thwarted by – of all things – no wind! She drifted around for days, how frustrating must that have been to see the land ahead so tantalisingly close and not be able to nominate a finishing time! Jeanne was aiming to be the oldest person male or female, (she is already the oldest female but a male, one year older than her at the time of her previous circumnavigation held that record) to sail solo, non-stop and unassisted, around the world. To take the record, she could not use her engine power (only her generator for electric power) so she had to rely on wind for navigating up the channel to the dock – a dangerous business in fickle light winds!

Photo 3: Jeanne and "Nerdia" under sail.

It was nail-biting stuff and Shirley VK5YL and I were fortunate to be able to follow her on various electronic modes as she finally passed the finish line. Thanks to expat Aussie Mike KH6GOZ who kept us posted and provided links so we could watch the actual photo-cam at the harbour itself, plus her AIS ship-reporting 'pings' as she moved along, Shirley and

I chatted on the phone whilst also zooming in on Google Maps to see where she was. It was a great moment when 77-year old Jeanne crossed the official finish line on Saturday Sept. 7 2019, to a crowd of cheering onlookers and a ceremonial archway spray of water from the fire-boat.

Once across the line, her engine was inspected and she was towed to her berth, accompanied by a flotilla of craft, all delighted to welcome her home safely. Jeanne started her journey from Victoria on Oct. 3, 2018. It was her third attempt after weather foiled two prior efforts in 2016. The media frenzy then began, but she took time to email ALARA thanks for our Congratulations on her outstanding achievement. She also got her wish for a nice wine, meal and comfy bed that did not roll! The luxurious Fairmont Empress Hotel donated her several nights' accommodation. She is now busy making repairs to her vessel 'Nereida' which took a battering on the round trip and is already out of the water having her "bottom cleaned"! Jeanne now starts a round of Talks and Presentations on her remarkable voyage, some time to visit friends and family back in the UK, then she is heading Down Under and hopefully we will have the opportunity to meet her for an "eyeball QSO" sometime next year! She is an inspiration to us all – showing us that YLs can achieve amazing things at any age. Taking on challenges with preparation, passion and having that 'Ham Spirit' to stay focused, troubleshoot and fix things when they break, took her right around the world so the same Ham Spirit can take our young girls and older YLs far in our own lives too.

"Life is precious," she says. *"You have one life and so many people lose it through cancer or whatever, early, and don't really have a chance to enjoy it, especially when they stop work and they thought they were going to get to do really nice things and suddenly it's taken away from them. So just make the most of your life whatever age you are and do the best you can with it."*

Lyn VK4SWE

From one of the eldest YLs, to one of the youngest

Photo 4: Elsa VK6FZEB.

I recently received an Email from Randall Wayth VK6WR telling me that his daughter Elsa VK6FZEB had recently passed her Foundation Licence at the age of 10, and he wondered if she was the youngest person in Australia to have achieved this honour. Unfortunately I had to tell him that she wasn't the youngest ever in VK. Janice Ampt VK3FIRE was 9 years old, when she and Nikolaas Dimitrijevic VK3FNIK (10 yrs) were featured on the front cover of Jan/Feb 2006 Amateur Radio magazine, and there may have been others.

It still doesn't take anything away from Elsa and her great achievement and welcome to amateur radio! I asked Randall if I could have a photo of Elsa and a few lines about how she got into amateur radio.

This was Randall's reply…

"The reason for her new interest in AR is simple: she got bitten by the JOTA bug. I have taken her along to a handful of meetings of the WA VHF Group over the last couple of years. For the 2019 JOTA weekend, the WA VHF Group again hosted groups and provided an on-air contact point for other groups. Elsa was keen to talk to the cubs and scouts to give the regular VHF Group members a break, and once she got the microphone in her hand there was no going back. Given she likes getting on air, I am hoping that she will be interested in joining me for contest weekends in the future."

Congratulations once again Elsa, and we hope that you have many happy years in amateur radio. We need new blood coming into the hobby, so that people like me who have been in it for over 40 years can hand over the reins!

As I mentioned in the last column, the ALARA Grants Scheme is now up and running and I was pleased to commend

Photo 5: Marilyn and Geoff with the ALARA members present. L to R. Meg VK5YG, Jean VK5TSX (back), Jen VK3WQ, Shirley VK5YL, Marilyn VK5DMS, Geoff VK5ACZ (back), Jenny VK5FJAY, Christine VK5CTY and Leslie VK5LOL.

it to Randall, who took it up on Elsa's behalf. Elsa will not only get half the costs for her study at Ham College reimbursed, plus her licence fee, but she will also receive a free subscription to ALARA for 12 months. Details of the Grants Scheme are available on the website *https://alara.org.au/*

60TH Wedding Anniversary for two VK5s

On the 9th of November, a group of family members and friends met at a hotel in North Adelaide to congratulate Marilyn VK5DMS (formerly VK3DMS) and OM Geoff VK5ACZ formerly VK3ACZ on their 60th Wedding Anniversary. Among the cards that they received were from The Queen, The Governor General, State Governor, and if I remember rightly, the Premier of South Australia. There were a fair number of ALARA members present. This is really not surprising as Marilyn has been an active ALARA member for over 40 years. She has held the positions of President, twice, Awards Custodian, Contest Manager, VK3 State Rep, Vice President, and coordinated two ALARAmeets in Mildura, amongst her many other achievements.

Congratulations Marilyn and Geoff, on reaching this wonderful milestone.

VK3 ALARA Christmas lunch at Sunbury

November 30th saw a group of 13 YLs and OMs enjoy the VK3 ALARA members' Christmas Lunch at Sunbury. Unfortunately, several of our regulars were unable to attend, some due to ill-health and we sincerely wish them all the best.

Before the lunch, the Bendigo ALARAmeet Committee, consisting of Heidi VK3FHID, Margaret VK3FMAB, Jean VK3VIP and Jen VK3WQ, held a meeting to which Neil VK3ZVX the President of the Bendigo Amateur Radio Club (BARC) had been invited. Neil suggested that, as the host club for the town in which we are holding the ALARAmeet, there could be some aspects in which the club could assist us. A useful discussion ensued, and I'm sure that the club's help will make the Meet even better, especially with public relations in the district.

Photo 6: VK3 ALARA ladies at their Christmas lunch in Sunbury. L to R. Jen VK3WQ, Pat VK3OZ, Jean VK3VIP, Heidi VK3FHID, Margaret VK3FMAB, Pam VK3NK and of course behind the banner is Jean's Mum, Elsie.

Expressions of interest in ALARAmeet Bendigo, October. 2 – 5 2020

In the next ALARA Newsletter there will be a form for members to fill in, with their Expressions of Interest to attend the ALARAmeet. There will also be an outline of the program. If you haven't already done so, please let us know if you are planning to come, as we need to have an idea of numbers, so that we can continue firming up our costs, etc. If you do not receive the Newsletter, please contact the Editor at... *editor@alara.com* I'm sure that Tina, our temporary Editor will be pleased to help you.

Wanted – ALARA Newsletter Editor

Our temporary editor for our quarterly newsletter, Tina, whilst happy to help out, is seeking to be replaced. We are looking for someone with computer skills and the time to be able to prepare, print and get the newsletter out to all our members. Access to group emailing would be of benefit as the majority of the newsletters are sent out in electronic form, however, the remaining number has to be printed and sent out by post. Further information and/or a copy of the Duty Statement for the position can be obtained from Linda VK7QP or Jean VK5TSX.

If you are interested in the position, please contact the President, Linda VK7QP, or Secretary, Jean VK5TSX via the ALARA website: *alara.org.au*

Australia wins Commonwealth Contest again

Allan Mason, VK2GR

The Australian teams in the 2019 RSGB Commonwealth Contest achieved first and third placings as they did in 2018. Team Canada gained 2nd place.

The Radio Society of Great Britain's Commonwealth Contest is one of the oldest radio contests in existence, having been first run back in 1931 when it was known as "British Empire Radio Week" and lasted for six days!

All those countries that were part of the British Empire – including Australia, of course – were invited to participate. While the sun set several decades ago on the empire, strong ties still exist between the countries that once were part of it and the contest still exists, but in a much shorter format.

British Empire Radio Week metamorphosed into the 24-hour British Empire Radio Union or BERU (pronounced 'berroo) contest in 1935, with the objective of linking all those having an interest in the amateur radio within the empire.

Then in 1976, BERU morphed into the Commonwealth Contest. This year the contest is 82 years. The team contest started in 2007, where the teams taking part reflecting those that took part in the 2007 Cricket World Cup.

The propagation conditions in during the contest on 9/10 March 2019 were depressed as expected at this time of the Solar Cycle, particularly on the high HF bands. Being a CW only contest, good global contacts were achieved and made many times over, particularly on the 40m band. The team scores are adjusted based on propagation conditions and geographic distance.

Table 1 and Table 2 show the QSOs, British Commonwealth Areas (BCA), scores and adjusted scores for Australia Team 1 and Australia Team 2 respectively.

The cumulative team scores are displayed graphically in Chart 1.

	QSOs	BCA	Score	Adjusted Score
VK6LW	437	115	5,620	9,442
VK4CT	361	104	4,950	8,316
VK2BJ	315	100	4,625	7,770
VK6VZ	295	92	4,075	6,846
VK2GR	243	84	3,600	6,048
Total	**1,651**	**495**	**22,870**	**38,422**

Table 1. Australia Team 1.

	QSOs	BCA	Score	Adjusted Score
VK4SN	270	84	3,930	6,602
VK3MI	196	76	3,575	6,006
VK7BO	220	76	3,555	5,972
VK3JA	232	74	3,480	5,846
VK2PN	217	76	3,450	5,796
Total	**1,135**	**386**	**17,990**	**30,222**

Table 2. Australia Team 2.

This year there was also an outstanding operating effort from Australian HQ stations by their operators and support teams. VK2WIA by Tommy VK2IR, VK3WIA by Lee VK3GK, VK4WIA by Keith VK4TT, VK5WIA led by Grant VK5GR, VK6WIA by Peter VK6RZ and VK7WIA by Martin VK7GN. Refer to Chart 2 and Table 3 for VK HQ station scores.

	QSOs	BCA	Score
VK7WIA	264	78	3,795
VK2WIA	173	65	3,115
VK5WIA	166	55	2,490
VK3WIA	106	36	1,640
VK6WIA	102	47	2,265
VK4WIA	60	30	1,280
Total	**871**	**311**	**14,585**

Table 3. VK HQ Stations.

Many thanks go to the HQ team operators for their operating skills and dedication this year.

In 2020 the 83rd contest will be held on 14th and 15th March. In addition to hopefully again having HQ stations in VK2, VK3, VK4, VK5, VK6 and VK7, it would be wonderful to have HQ stations activating VK1 and VK8 or for that matter VK9.

Anyone in any Australian state or territory who is interested in operating/assisting with the WIA HQ station operation during the 2020 contest, even if only for a few hours, please contact Steve VK6VZ (*vk6vz@arach.net.au*) or Allan VK2GR (*allan.vk2gr@gmail.com*).

References

1. Commonwealth Contest Web Site: *https://berucontest.wordpress.com/about/*
2. Full 2019 results: *https://www.rsgbcc.org/cgi-bin/hfresults.pl?Contest=Commonwealth%20Contest&year=2019*
3. Commonwealth Contest Rules: *https://www.rsgbcc.org/hf/rules/2019/rberu.shtml*

WIA Awards

Marc Hillman VK3OHM/VK3IP

2019 has been a busy year of innovation for the awards committee. Activities this year have included: Introduction of the "Islands of Australia" award; New Grid Square award certificate created, and award changed to include endorsements for achievement beyond 100; Start date for all awards changed to 1/1/1946; Past winners of DX Leaderboard listed at end of DX Leaderboard table; Grid Square category added to DX Leaderboard; Certificate for DXer of the Year award created. Certificates for all past winners loaded; You can now opt out of the DX Leader Board using an option in your profile; DX Leader Board display has changed so that when the results of a year are requested, and the result for that year has been declared, only the place-getters (1st, 2nd, 3rd) will be displayed; Clarified the rules around remote stations by adopting the ARRL rule - all station elements must be within a 500m circle.

Below are listed all New awards issued from 2019-10-15 to 2019-12-14, plus all updates to DXCC awards.

Go to *http://www.wia.org.au/members/wiadxawards/about/* to use the online award system.

New awards

Antarctic

#	Call	Name	Mode
114	VK5GR	Grant Willis	Open
115	VK5GR	Grant Willis	Digital

DXCC Multi-band (1)

#	Call	Name	Mode	Band	Count
230	VK3MH	Brendan Bryant	Phone	20m	102
231	VK3FN	Peter Dernikos	Phone	40m	119
232	VK3FN	Peter Dernikos	CW	40m	113
233	VK3FN	Peter Dernikos	Digital	40m	111
234	VK3KTT	Steven Barr	Digital	20m	104
235	VK2PW	Adam McCarthy	Open	40m	111

DXCC Multi-band (3)

#	Call	Name	Mode	Band	Count
146	VK6APK	Aleksandar Petkovic	CW	40-30-20m	476

DXCC Multi-band (5)

#	Call	Name	Mode	Band	Count
104	VK5GR	Grant Willis	Digital	40-30-20-17-15m	768
105	SV1RUX	David Vale	Open	40-30-20-17-15m	745
106	VK3GA	Graham Alston	CW	40-30-20-17-15m	684

DXCC Multi-band (9)

#	Call	Name	Mode	Band	Count
22	VK6IR	Stephen Chamberlain	Open	160-80-40-30-20-17-15-12-10m	2039

DXCC Multi-mode (CW)

#	Call	Name	Count
266	VK3FN	Peter Dernikos	130

DXCC Multi-mode (Digital)

#	Call	Name	Count
99	VK6APK	Aleksandar Petkovic	125
100	VK3DRH	David Heathcote	101

DXCC Multi-mode (Open)

#	Call	Name	Count
483	VK3DRH	David Heathcote	102

DXCC Multi-mode (Phone)

#	Call	Name	Count
630	VK3FN	Peter Dernikos	146
631	VK5GR	Grant Willis	125

Grid Square

#	Call	Name	Mode	Band	Count
409	VK2DX	Nikola Hacko	Open	HF	1774
410	VK2DX	Nikola Hacko	Digital	HF	1556
411	VK3VT	Greg Williams	Open	HF	1219
412	VK3VT	Greg Williams	CW	HF	539
413	VK3VT	Greg Williams	Digital	HF	954
414	VK3VT	Greg Williams	Phone	HF	470
415	VK3DRH	David Heathcote	Digital	HF	344
416	VK3FN	Peter Dernikos	Phone	HF	278
417	VK3FN	Peter Dernikos	CW	HF	180
418	VK3KJ	Scott Williams	Open	HF	876
419	VK3KJ	Scott Williams	Digital	HF	835
420	VK2KS	Martin Hutchings	Phone	HF	101
421	VK2KS	Martin Hutchings	Open	HF	102
422	VK2FBAG	Anthony Garton	Open	HF	165
423	VK2FBAG	Anthony Garton	Digital	HF	164
424	VK3TNL	Tony Linford	Open	HF	382
425	VK3TNL	Tony Linford	Digital	HF	357
426	VK4KEE	Robert Hollis	Open	6m	92
427	VK2PW	Adam McCarthy	Open	HF	754
428	VK2PW	Adam McCarthy	CW	HF	155
429	VK2PW	Adam McCarthy	Digital	HF	696
430	VK6APK	Aleksandar Petkovic	Open	HF	763
431	VK6APK	Aleksandar Petkovic	Phone	HF	232
432	VK6APK	Aleksandar Petkovic	CW	HF	254
433	VK6APK	Aleksandar Petkovic	Digital	HF	514
434	VK3VTH	Tony Hambling	Open	HF	791

Islands of Australia

#	Call	Name	Count
12	VK2DX	Nikola Hacko	20
13	VK5GR	Grant Willis	22

Worked All VK Call Areas HF

#	Call	Name	Mode
2395	JI1HNC	Akira Yamamoto	Open
2396	VK5GR	Grant Willis	Open
2397	VK6DW	Ian Cook	Digital
2398	VK5SA	Chris Levingston	Open

DXCC updates

DXCC Multi-band (1)

#	Call	Name	Mode	Band	Count
38	VK6IR	Stephen Chamberlain	CW	15m	209
43	VK7CW	Steven Salvia	CW	20m	284
97	VK6WX	Wesley Beck	CW	20m	157
148	VK3GA	Graham Alston	CW	20m	225
211	VK4CC	Colin Clark	CW	20m	109
214	VK5GR	Grant Willis	CW	20m	121
219	VK3KTT	Steven Barr	CW	20m	112
232	VK3FN	Peter Dernikos	CW	40m	113
54	VK3EW	David McAulay	Digital	20m	237
74	VK6IR	Stephen Chamberlain	Digital	20m	172
149	VK3GA	Graham Alston	Digital	20m	227
186	VK4CC	Colin Clark	Digital	20m	135
190	VK3BDX	David Burden	Digital	20m	224
198	VK2ZQ	Michael Ramsay	Digital	30m	120
221	VK3MH	Brendan Bryant	Digital	20m	154
222	VK2NN	Peter Garoufalis	Digital	20m	112
233	VK3FN	Peter Dernikos	Digital	40m	111
234	VK3KTT	Steven Barr	Digital	20m	104
1	VK3OHM	Marc Hillman	Open	20m	227
17	VK6WX	Wesley Beck	Open	20m	232
34	VK3KTT	Steven Barr	Open	20m	248
61	VK4CC	Colin Clark	Open	20m	251
72	VK6IR	Stephen Chamberlain	Open	20m	309
80	VK2NN	Peter Garoufalis	Open	20m	178
81	VK6APK	Aleksandar Petkovic	Open	20m	288
100	VK3GA	Graham Alston	Open	20m	301
111	VK3VTH	Tony Hambling	Open	20m	138
165	VK5GR	Grant Willis	Open	20m	222
166	VK3FZ	Roger Stafford	Open	20m	219
189	VK3BDX	David Burden	Open	40m	228
215	VK3MH	Brendan Bryant	Open	20m	176
223	VK3FN	Peter Dernikos	Open	40m	196
235	VK2PW	Adam McCarthy	Open	40m	111
35	VK3KTT	Steven Barr	Phone	20m	217
39	VK6WX	Wesley Beck	Phone	20m	178
73	VK6IR	Stephen Chamberlain	Phone	20m	280
112	VK3VTH	Tony Hambling	Phone	20m	138
114	VK2NN	Peter Garoufalis	Phone	20m	153
230	VK3MH	Brendan Bryant	Phone	20m	102

DXCC Multi-band (3)

#	Call	Name	Mode	Band	Count
24	VK3EW	David McAulay	CW	30-20-17m	908
35	VK6IR	Stephen Chamberlain	CW	40-20-15m	610
37	VK7CW	Steven Salvia	CW	30-20-17m	777
32	VK6IR	Stephen Chamberlain	Digital	40-20-15m	471
66	VK3EW	David McAulay	Digital	40-30-20m	644
132	VK3BDX	David Burden	Digital	40-30-20m	651
141	VK3OHM	Marc Hillman	Digital	40-30-20m	401
145	VK3MH	Brendan Bryant	Digital	40-30-20m	400
14	VK6IR	Stephen Chamberlain	Open	40-20-15m	883
59	VK6APK	Aleksandar Petkovic	Open	40-30-20m	721
63	VK2ZQ	Michael Ramsay	Open	40-20-10m	552
69	VK3KTT	Steven Barr	Open	20-15-10m	593
73	VK3GA	Graham Alston	Open	30-20-17m	753
95	VK3OHM	Marc Hillman	Open	40-20-15m	554
102	VK3FZ	Roger Stafford	Open	20-15-10m	610
112	VK6WX	Wesley Beck	Open	40-20-15m	549
122	VK4CC	Colin Clark	Open	20-17-15m	539
126	VK3AWG	Christopher Bellmont	Open	20-17-15m	550
131	VK3BDX	David Burden	Open	40-30-20m	671
143	VK3MH	Brendan Bryant	Open	40-30-20m	433
50	VK6IR	Stephen Chamberlain	Phone	40-20-15m	799
60	VK6APK	Aleksandar Petkovic	Phone	40-20-15m	502
68	VK3KTT	Steven Barr	Phone	20-15-10m	523
103	VK3FZ	Roger Stafford	Phone	20-15-10m	482

DXCC Multi-band (5)

#	Call	Name	Mode	Band	Count
21	VK3EW	David McAulay	CW	40-30-20-17-15m	1423
23	VK6IR	Stephen Chamberlain	CW	40-30-20-15-10m	961
35	VK7CW	Steven Salvia	CW	40-30-20-17-15m	1191
44	VK6IR	Stephen Chamberlain	Digital	80-40-20-15-10m	726
79	VK3EW	David McAulay	Digital	40-30-20-17-15m	987
96	VK3BDX	David Burden	Digital	80-40-30-20-17m	947
10	VK6IR	Stephen Chamberlain	Open	80-40-20-15-10m	1348
34	VK7CW	Steven Salvia	Open	40-30-20-17-15m	1252
43	VK6APK	Aleksandar Petkovic	Open	40-30-20-17-15m	1038
72	VK3FZ	Roger Stafford	Open	30-20-15-12-10m	911
87	VK2ZQ	Michael Ramsay	Open	40-30-20-15-10m	826
93	VK3AWG	Christopher Bellmont	Open	40-30-20-17-15m	800
94	VK3BDX	David Burden	Open	80-40-30-20-17m	976
98	VK6WX	Wesley Beck	Open	40-30-20-17-15m	799
30	VK6IR	Stephen Chamberlain	Phone	80-40-20-15-10m	1181

DXCC Multi-band (7)

#	Call	Name	Mode	Band	Count
10	VK3EW	David McAulay	CW	80-40-30-20-17-15-12m	1833
13	VK6IR	Stephen Chamberlain	CW	40-30-20-17-15-12-10m	1245
14	VK7CW	Steven Salvia	CW	40-30-20-17-15-12-10m	1551
32	VK6IR	Stephen Chamberlain	Digital	80-40-30-20-17-15-10m	957
5	VK6IR	Stephen Chamberlain	Open	80-40-30-20-15-12-10m	1744
15	VK7CW	Steven Salvia	Open	40-30-20-17-15-12-10m	1636
23	VK6APK	Aleksandar Petkovic	Open	80-40-30-20-17-15-10m	1266
35	VK3FZ	Roger Stafford	Open	40-30-20-17-15-12-10m	1184
25	VK6IR	Stephen Chamberlain	Phone	80-40-20-17-15-12-10m	1405

DXCC Multi-band (9)

#	Call	Name	Mode	Band	Count
12	VK3EW	David McAulay	CW	160-80-40-30-20-17-15-12-10m	2172
1	VK3EW	David McAulay	Open	160-80-40-30-20-17-15-12-10m	2817

DXCC Multi-mode (CW)

#	Call	Name	Count
211	VK7CW	Steven Salvia	308
223	VK6WX	Wesley Beck	229
225	VK4CC	Colin Clark	195
227	VK6APK	Aleksandar Petkovic	290
234	VK3KTT	Steven Barr	175
243	VK3WE	Rhett Donnan	132
257	VK3AWG	Christopher Bellmont	150
263	VK3BDX	David Burden	108
266	VK3FN	Peter Dernikos	130

DXCC Multi-mode (Digital)

#	Call	Name	Count
17	VK6IR	Stephen Chamberlain	252
20	VK3EW	David McAulay	304
25	VK3OHM	Marc Hillman	202
48	VK2ZQ	Michael Ramsay	182
50	VK2NN	Peter Garoufalis	128
61	VK4CC	Colin Clark	172
65	VK3FZ	Roger Stafford	161
67	VK4CAG	Graeme Dowse	225
71	VK3BDX	David Burden	252
79	VK3KTT	Steven Barr	176
82	VK6WX	Wesley Beck	134
85	VK3MH	Brendan Bryant	184
91	VK3FN	Peter Dernikos	125
98	VK2PW	Adam McCarthy	130
99	VK6APK	Aleksandar Petkovic	125

DXCC Multi-mode (Open)

#	Call	Name	Count
62	VK4CC	Colin Clark	288
363	VK3OHM	Marc Hillman	266
370	VK3KTT	Steven Barr	285
376	VK6WX	Wesley Beck	277
381	VK3VT	Greg Williams	321
393	VK7CW	Steven Salvia	320
409	VK2NN	Peter Garoufalis	211
419	VK3GA	Graham Alston	321
440	VK2BYI	Christopher Fredericks	200
458	VK3BDX	David Burden	261
466	DD0VU	Jens Knoepchen	202
470	VK3MH	Brendan Bryant	210
476	VK3FN	Peter Dernikos	212
482	VK2PW	Adam McCarthy	146

DXCC Multi-mode (Phone)

#	Call	Name	Count
569	VK3OHM	Marc Hillman	233
573	VK6WX	Wesley Beck	230
585	VK3VTH	Tony Hambling	143
591	VK4CC	Colin Clark	230
594	VK2NN	Peter Garoufalis	185
617	VK3FZ	Roger Stafford	272
626	VK3BDX	David Burden	134
628	VK3MH	Brendan Bryant	137
630	VK3FN	Peter Dernikos	146

Grid Square

#	Call	Name	Mode	Band	Count
120	VK4CC	Colin Clark	CW	HF	195
134	VK6IR	Stephen Chamberlain	CW	HF	904
281	VK3FZ	Roger Stafford	CW	HF	380
417	VK3FN	Peter Dernikos	CW	HF	180
51	VK5DG	David Giles	Digital	HF	1107
59	VK3OHM	Marc Hillman	Digital	HF	765
77	VK3EW	David McAulay	Digital	HF	1222
108	VK1DI	Ian Sinclair	Digital	HF	513
121	VK4CC	Colin Clark	Digital	HF	795
133	VK6IR	Stephen Chamberlain	Digital	HF	1292
146	VK2NN	Peter Garoufalis	Digital	HF	372
257	VK3GA	Graham Alston	Digital	HF	835
282	VK3FZ	Roger Stafford	Digital	HF	827
287	VK3JLS	John Seamons	Digital	HF	719
301	VK3BDX	David Burden	Digital	HF	1350
362	VK3ZZX	Oscar Reyes	Digital	HF	278
378	VK3MH	Brendan Bryant	Digital	HF	965
399	VK3FN	Peter Dernikos	Digital	HF	821
404	VK3MB	Philip White	Digital	HF	338
405	VK5NNN	Ivan VUJIC	Digital	HF	135
408	VK3GWS	Grant Smith	Digital	HF	618
410	VK2DX	Nikola Hacko	Digital	HF	1556
415	VK3DRH	David Heathcote	Digital	HF	344
50	VK3OHM	Marc Hillman	Open	HF	1000
74	VK3EW	David McAulay	Open	HF	1688
92	VK5DG	David Giles	Open	HF	1198
94	VK3JLS	John Seamons	Open	HF	885
107	VK1DI	Ian Sinclair	Open	HF	538
118	VK4CC	Colin Clark	Open	HF	1038
136	VK6IR	Stephen Chamberlain	Open	HF	1644
144	VK2NN	Peter Garoufalis	Open	HF	531
157	VK2BFC	Frank Scott	Open	HF	213
221	VK3GA	Graham Alston	Open	HF	1092
279	VK3FZ	Roger Stafford	Open	HF	1252
300	VK3BDX	David Burden	Open	HF	1410
332	VK3FZ	Roger Stafford	Open	6m	63
361	VK3ZZX	Oscar Reyes	Open	HF	278
377	VK3MH	Brendan Bryant	Open	HF	1002
387	VK5NNN	Ivan VUJIC	Open	HF	159

Grid Square

#	Call	Name	Mode	Band	Count
398	VK3FN	Peter Dernikos	Open	HF	994
403	VK3MB	Philip White	Open	HF	389
406	VK3GWS	Grant Smith	Open	HF	687
409	VK2DX	Nikola Hacko	Open	HF	1774
54	VK3VTH	Tony Hambling	Phone	HF	791
58	VK3OHM	Marc Hillman	Phone	HF	460
93	VK5DG	David Giles	Phone	HF	381
95	VK3JLS	John Seamons	Phone	HF	405
119	VK4CC	Colin Clark	Phone	HF	467
135	VK6IR	Stephen Chamberlain	Phone	HF	1229
145	VK2NN	Peter Garoufalis	Phone	HF	271
171	VK2BFC	Frank Scott	Phone	HF	185
222	VK3GA	Graham Alston	Phone	HF	427
280	VK3FZ	Roger Stafford	Phone	HF	717
363	VK3BDX	David Burden	Phone	HF	368
392	VK3MH	Brendan Bryant	Phone	HF	151
407	VK3GWS	Grant Smith	Phone	HF	135
416	VK3FN	Peter Dernikos	Phone	HF	278

Islands of Australia

#	Call	Name	Count
3	VK3EW	David McAulay	35
7	VK3KTT	Steven Barr	38
9	VK3AWG	Christopher Bellmont	22

Plan ahead

Wyong Field Day 2020
23 February

John Moyle Field Day
21-22 March

World Amateur Radio Day
18 April

AMSAT-VK

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Paul Paradigm VK2TXT
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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 Australian National Satellite Net is held on the second Tuesday of the month (except January) at 8.30 pm eastern, that's either 9.30 or 10.30Z depending on daylight saving. Please note we will be taking check-ins from 8.20pm-ish. 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. Operators may join the net via EchoLink by connecting to 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. 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
VK4RRC Redcliffe 146.925 MHz -ve offset IRLP node 6404 EchoLink 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 2 m. Repeater Stowport 146.775 MHz. IRLP 6616

In the Northern Territory
VK8MA, Katherine on 146.750, CTCSS 91.5, IRLP Node 6800

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.

Due dates for publication

Dates for submission can be found at the bottom of the page:
http://www.wia.org.au/members/armag/contributing/

All articles, columns, hamads and advertising booking for the next issue by **21 February 2020.**

VK3news Geelong Amateur Radio Club

Tony Collis VK3JGC

Photo 1: The Video Screen in the Foyer of the Club Rooms.

The City of Greater Geelong Seniors Week

Once again the Geelong Amateur Radio Club participated in the **Geelong Seniors Week** opening the club in Storrer Street from 9 a.m. to 4.0 p.m. to the public. On the day some 18 visitors were at the club house with tea, coffee and cold drinks refreshments available during their visit; of special interest being the Ken Jewel Radio Room. The screen below showed the start of a video of the Radio Club Activities, compiled by Mike VK3ASQ.

Three GARC Recent Initiatives

1. Competitions - Six of the Best

Dallas VK3DJ has initiated a bi monthly competition for club members to stimulate on air activity time for the members.

Labelled **Six of The Best** and geared to follow seasonal trends, with the winner determined by the total distances of the selected 6 longest contacts.

They are as follows:

December January The operator to make 6 contacts on 6 metres.

February March The operator to make 6 contacts to 6 different countries.

April May The operator to make 6 contacts on 6 Bands.

June July The operator to make 6 contacts on 6 modes, but not using IRLP.

August September The operator to make 6 contacts to 6 VK states or territories.

October November The operator to make a contact to 6 different VK post codes that have a 6 in it on any band.

To measure distances it is recommended to use either Google Earth or *https://www.distance.to*

The first winner of **Six of the Best** for the **October - November** Section,

Photo 2: Dallas VK3DJ presenting Ken VK3DQW with his certificate.

Photo 3: The Annual December "GARC in the Park" BBQ.

6 different VK post codes that have a 6 in it, was **Ken VK3DQW** with a cumulative score of 5,682.04 points.

2. GARC Net

Now each **Wednesday evening at 20.00 AEST** on the GARC ,VK3RGL 2 meter repeater on 147.00 Mhz, there is a net of GARC members for typically 30 minutes prior to the repeat broadcasts from the ARRL, RSGB, WIA etc.

3. Home brew Construction

Calvin VK3ZPK has proposed a DIY construction of "radio equipment" during the year, similar to the Crystal Set competition some years back, with a prize for the best construction determined by a select committee including Calvin who will present the award to the winner.

GARC In The Park

This annual event in the Rotunda in Eastern Gardens Geelong went well with a BBQ and soft drinks coupled with salads and desserts brought by the members and their partners. In spite of the cold and blustery wind the club members and their partners that managed to turn up had an enjoyable time.

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 Secretary: *armag@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.
- For commercial advertising on these pages Contact *admanager@wia.org.au*
- Copy must be received by the deadlines on page 1 of each issue of *Amateur Radio*.
- Use the separate forms for **For Sale** and **Wanted** items. Include name, address STD telephone number and WIA membership number.

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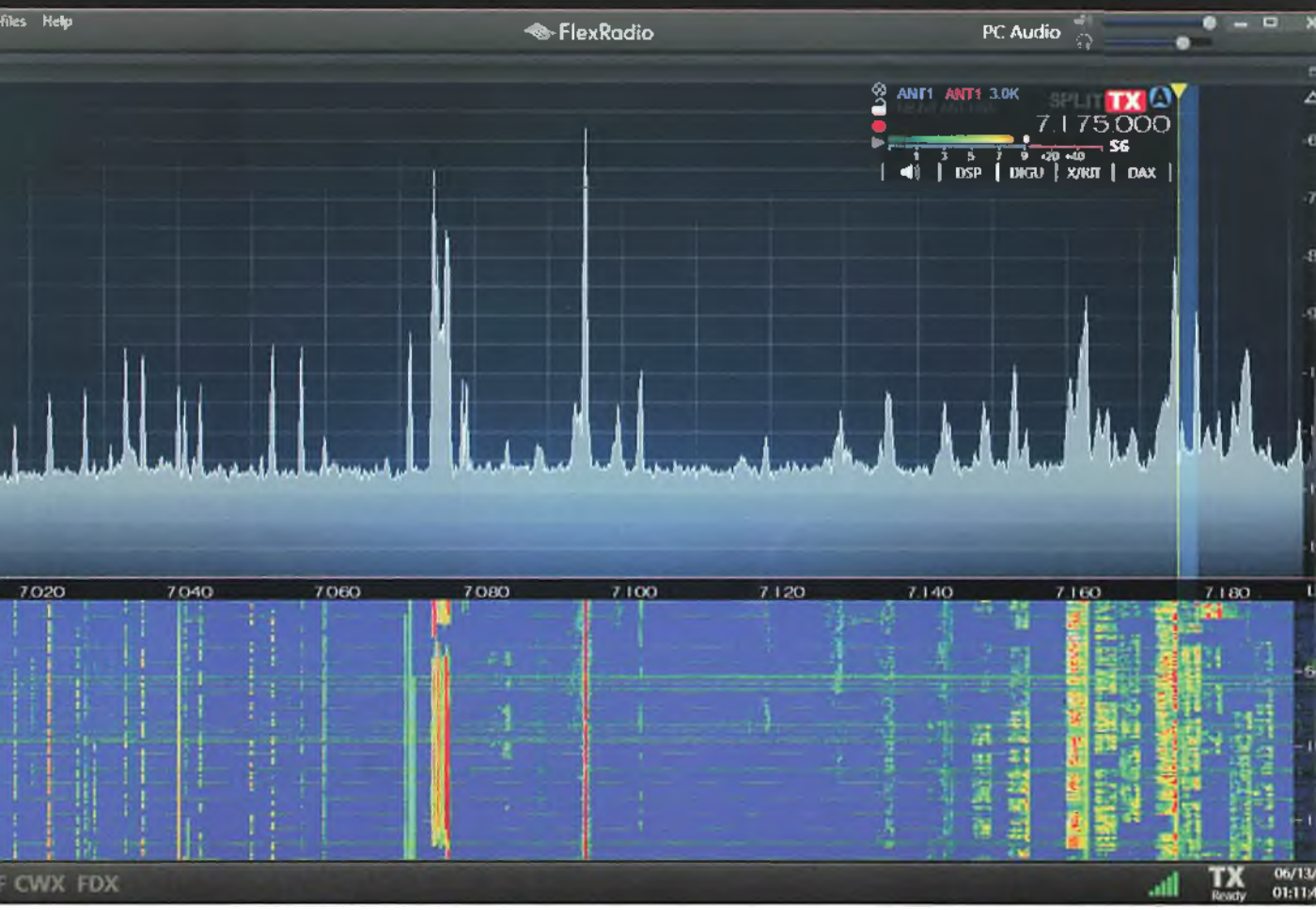

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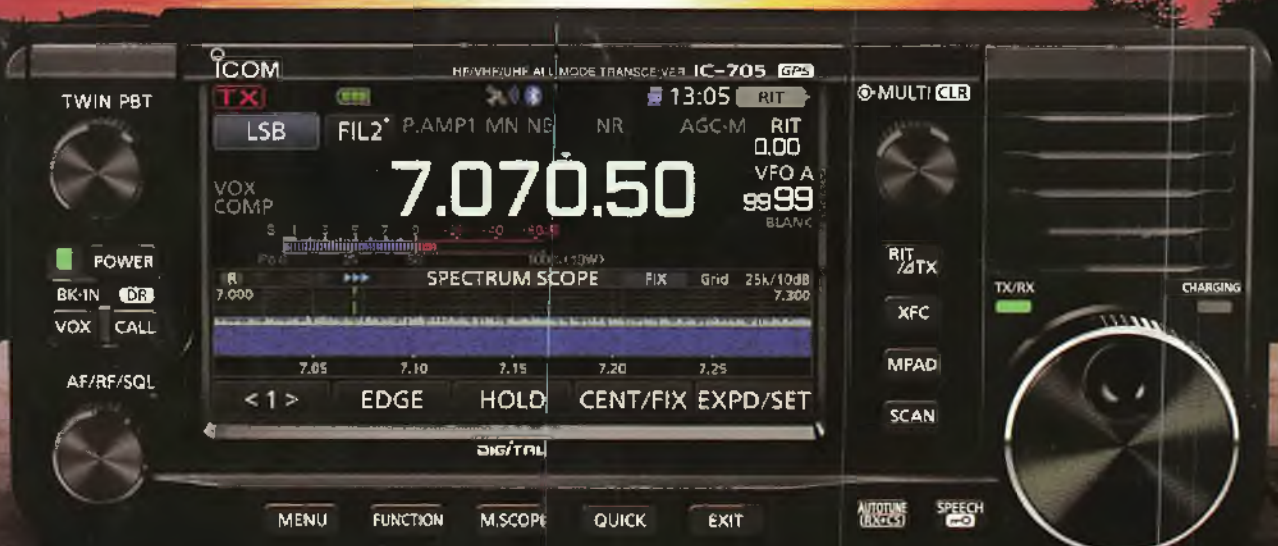

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