QTC

WELCOME TO QTC..... THE OFFICIAL JOURNAL OF RASA

BEING HEARD IS IMPORTANT

Messages and News from RASA
The Radio Amateur Society of Australia

Special Winter 2020 Edition

The Origin and Attributes of Radioteletype

Spending time at the lower end of the spectrum

A simple 40M Vertical

Walkthrough QRM Guru

Review - KIO Hex Beam

Contents

BEING HEARD IS IMPORTANT
The Radio Amateur Society of Australia inc.
vkradioamateurs.org

Email us at info@vkradioamateurs.org

QTC from the Editorial Team

We've been overwhelmed with positive responses and feedback following our inaugural edition of QTC in June. QTC was downloaded over 2,000 times, and still counting.

As it is mid-Winter in Australia we thought we'd publish a special mid-year edition. We are also excited to move to a new publishing platform, FLIPHTML5. This new platform gives you, our readers, improved options in how you read QTC.

Aside from the improved user experience, enabling you to flip between pages, you can also download QTC and read it off-line on your tablet.

As you will experience, we can now embed YouTube videos.

And we are pleased to report and acknowledge some of the history associated with the use of QTC in Amateur Radio publishing.

Speaking of history, this edition we hark back to some earlier modes and reflections on a by-gone era. But there are lessons to be learnt from our past.

We are already planning the next edition, with a quantum leap to newer technologies.

One of our lead articles this edition covers Low Bands, the Medium Frequency (MF) bands which have been overlooked by many newer amateurs. Doc, VK5BUG is widely regarded as an expert in designing and deploying antenna that work effectively in suburban backyards.

Also, in this edition, we provide some follow-up articles on getting started in HF DX-ing. Bill VK1MCW has provided a good user-review of the Hexbeam antenna, and we have penned some notes on how you can construct a simple but effective 40m vertical antenna.

Ian VK3BUF has written an interesting article on the history of Radio Teletype (RTTY). Bob, VK6POP has provided a brief introduction on how you can get started in RTTY using a computer.

Chris VK3QB and Ian VK3BUF have co-authored an introductory article on using QRM Guru.

If this is the first time you have read our magazine, remember that it contains hotlinks. Hotlinks in text are highlighted in [blue](). Click on hotlinks to visit external web sites. Many pictures and images may also be linked to an external website. Hover your mouse over an image to see if it is a hotlink.

Embedded videos can be viewed right inside the e-magazine.

Let us know what you think of this new delivery platform. You can still download a PDF if that is more convenient. Just view the magazine and then "Print to PDF".

Again, thanks to our supporters and contributors. Please send us your feedback or requests, and if you would like to contribute, just send us an email.

73, QTC Editorial Team

editor@qtcmag.com

RASA News

As we indicated, 2020 would be a year for greater focus on supporting newcomers to our hobby.

QRM Guru

We have been providing email suport for amateurs dealing with QRM/RFI chalenges. QRM Guru continues to attract a lot of visitors and we'll provide an insight into the problems faced next month.

We continue to provide value for money kits to assist amateurs in identitfying and minimising QRM/RFI.

We've had some good constructive feedback on the DF Loop and we're reviewing that information.

Welcome to Amateur Radio

In April we released our free Welcome to Amateur Radio guide. This guide is aimed at the newcomer to our hobby. It bridges a gap for new licencees.

Representation & Regulation

We provide information on regulations and representation in easy to understand language. If you have any questions, please send us an email.

Club Visits on Hold

With the Covid-19 social distancing restrictions, our club visits are on hold. However, if your club would like a Zoom presentation, please let us know.

Support for Newcomers

A logical follow-on from QRM Guru is a broader Knowledge Base and support resource for newcomers.

Whilst Social Media can be a great forum to share news and ideas, unfortunately requests for technical support all too often descend into a slanging match.

RASA is launching a pilot support resource to assist newcomers with all the basic questions we face as we enter the hobby.

Stand-by for an announcement in the coming weeks.

RASA Annual General Meeting

It's that time of year again. The RASA end-of-financial year is 31 August. As we did last year, the AGM and all related processes will be held online.

RASA leverages the internet and all the benefits its delivers for us and our members. In spite of Covid-19, it is business as usual for the RASA AGM. We will update our members with details in the coming couple of months.

Our members and supporters enable us to provide these services. Our annual membership fee is just $8.

Please, send us your feedback, and we hope you enjoy this new e-magazine.

73, The RASA Team
mailto:info@vkradioamateurs.org

Looking for an simple up-to-date club contact list? Click here. Please send us corrections or updates.

RASA now produces a fortnightly Podcast. This technology allows us to get regular messages to you at a time and place that suits you.

You can download our Podcast by visiting this link – bookmark it!

Or, search on vkamateurradionews on Apple iTunes.

Our email Bulletin has been re-named *QTC-Lite* and will include a transcript of the Podcast. It will be published every two weeks.

Should there ever be any urgent news, we will use *QTC-Lite* to alert our readers.

Regs & Representation

This regular column will focus on keeping you up-to-date with Regulations and how they impact our hobby.

The ACMA has been improving communication with amateurs recently with an email subscription service for information relevant to Amateur Radio.

We'll sift through the anouncements as well as anything RASA is working on in this area and keep you updated. Of course, this means sometimes there may not be much to report!

A 70MHz amateur band for VK?

As we have discussed previously and ACMA confirmed, there are no 70MHz amateur allocations in ITU Region 3 (our area), and the band has never been used by amateurs in Australia.

An Amateur allocation at 70MHz is an ITU Region 1 (Europe) issue. It has no bearing on Australia, where the band is assigned to other services.

The background and policy settings in Australia are entirely different to those in Europe.

To quote ACMA from their Five-Year Spectrum Outlook:

> *"70–70.5 MHz—The ACMA considers that operating amateur services in this frequency range is not feasible as it would be inconsistent with ITU Radio*

> *Regulations and existing services already operating in the frequency range. This frequency range is used by a variety of fixed and land mobile services as supported under the VHF mid band (70–87.5 MHz). Class-licensed devices authorised under the LIPD Class Licence operate in the frequency range 70–70.24375 MHz."*

And in the ACMA "Response to Submissions":

> *"We note the continued interest in this band from the amateur community. The ACMA will not be further investigating this matter at this time. The ACMA considers that operating amateur services in this frequency range is not feasible as it would be inconsistent with ITU Radio Regulations and existing services are already operating in the frequency range. This frequency range is used by a variety of fixed and land mobile services as supported under the VHF mid band (70–87.5 MHz). Class-licensed devices authorised under the LIPD Class Licence operate in the frequency range 70–70.24375 MHz."*

Source: ACMA September 2019, https://www.acma.gov.au/sites/default/files/2019-09/Addendum%20to%20FYSO%202019-23%20-%20Response%20to%20submissions%20docx.pdf

You can read more about effective and realistic representation in our "***I've really been thinking***" column.

60M band

The ACMA call for consultations closed on 19th June. A response from ACMA should be forthcoming in the next month or so.

Syllabus review panel

ACMA are reviewing panel submissions. We will keep you posted as news comes to hand.

We aren't the first QTC Magazine

by Glenn Dunstan, VK4DU

Two of your editorial team are CW aficionados, and when we were searching for a title for the magazine, *QTC* immediately sprang to mind…

"I have a telegram/message for you"

QTC is not used on air these days. It harks back to the maritime Morse service (pre 1999), when it was extensively used by ships and coast stations to indicate that the sending station had a telegram for your station.

For example, the Sydney Radio Coast Radio Station (VIS) would call a ship on 500 kHz (the international distress frequency – monitored by all merchant ships at sea) with the message:

VLLB DE VIS QTC K. *(MV Lake Barrine, this is Sydney Radio, I have a telegram for you, go ahead)*

If the ship was in range, it would answer with:

VIS DE VLLB UP K *(Sydney Radio this is Lake Barrine, shift to your working channel, go ahead)*

Sydney would normally send:

R = *(roger, break sign, which means changing now).*

The ship would respond with:

= (*changing*)

Sydney Radio and the ship would then change to the working channels of 476/512 kHz and the message would be sent.

QTC the magazine is born

Back in the early days of Amateur Radio (AR), when CW was the main mode of communication, amateurs used many more Q codes than today, and there was more of a connection between professional and amateur radio – a blurring of the lines between the two, if you will. QTC was often used, and the meaning was well known in amateur ranks.

In April 1927, a group of amateurs formed the Queensland Radio Transmitters League. In July of that year, they published a newsletter called QTC – conceived and edited by Leo Feenaghty OA4LJ – in those days, Australia used the OA prefix ("Oceania, Australia").

"Radio Transmitters Leagues" were formed in other states. They amalgamated in 1928 to form a second national AR body – the Australian Radio Transmitters League (ARTL) – headquartered in Queensland.

The ARTL and the WIA eventually amalgamated, and QTC was the official journal of the WIA from 1929 until November 1931.

QTC logo, circa 1930

QTC was resurrected around 1955 as the newsletter of the Queensland Division of the WIA. It ran (in various formats) until the mid-2000s.

QTC lives again. History is indeed fascinating….

Sources:*"Halcyon Days – a history of AR in VK4" by Alan Shawsmith VK4SS*
Mike VK4QS

Onwards & upwards: Medium Frequency & Wireless Telegraphy (CW)

by 'Doc' Wescombe-Down VK5BUG & Chris Chapman VK3QB

Background

Life is dynamic, and change is inevitable. Ham radio has changed quite radically over the past couple of decades, largely due to altered societal priorities and attitudes framed by the digital era tsunami. In response to this dynamic, we explore our hobby's greatest strengths: its history and diversity.

Two of our lowest bands – 160 and 630m - provide a fascinating opportunity for technical experimentation.

Doc VK5BUG has had been working low bands as a professional and an amateur since1964. (Royal Australian Navy Training, 500kHz message handling, 44kHz broadcasting to submarines, NATO MF CW 'spook' including Polar maritime service).

Since 2010, Doc has established and maintained several variations of Low Band stations on an inner Adelaide suburban 1150m2 allotment. He has demonstrated that it is possible to design and operate an effective low band station on suburban blocks and he has written three books on this topic. These books can now be purchased from the ARRL Bookshop.

There will, of course, be physical limitations with many suburban blocks and environments, but Doc's work helps bust many modern urban myths that hitherto have professed there is no place for low bands in suburban Australia.

By contrast, Chris VK3QB is a relative Low Band 'newbie', first introduced to 160m on a DX-pedition to Vanuatu (YJ0VK) in 2010. Encouraged by Luke VK3HJ, Morse code

enthusiasts Chris VK3QB and Brenton VK3CBV (now VK5CBV) erected a low 160m Inverted L, fed against the chicken wire holding down the thatched roof of the house/shack we rented.

Over two evenings the team worked four dozen stations and 8 DXCC entities.

Subsequent DX-peditions by the team to Lord Howe Island and Norfolk Island always include a MW 160m station. In more recent years, the team have used beverage receiving antennas with success.

Commemorating 500 kHz & Morse code

In 1908, 500 kHz was established as the international maritime distress frequency and this allocation was maintained until 1999.

500 kHz was the frequency used by the RMS Titanic to send her plaintive cries (in Morse code) for help that April night in 1912.

It was the frequency used by thousands of merchant ships to signal their plight in times of peace and war. 500 kHz has been instrumental in saving tens of thousands of lives.

Many ship's Radio Officers died at their key sending a distress message on 500 kHz as their ship fell victim to enemy action or was overwhelmed by the forces of nature.

Morse Code at sea is no more, but amateurs can commemorate the vital role of 500 kHz by operating on our MF allocation of 472-479 kHz. This segment formed part of the marine MF CW band, which ran from 405-525 kHz.

The Sydney Coast Radio Station – Sydney Radio/VIS used 476 kHz as their MF working frequency – right in the middle of our MF amateur band.

Vail-Morse Code

Developed by two men but only one receives acknowledgement today (c.f. Mr Uda, co-developer of the Yagi-Uda beam antenna array). The Smithsonian Institute presents an interesting account of the code development and tribulations.

160m (1.8Mhz – 1.875Mhz)

160m provides a fascinating environment with quirky propagation conditions which absorb, frustrate, fascinate, and occupy enthusiastic hams looking for a new area of interest.

160m CW is therefore probably a logical first choice to embark upon the Low Band adventure, and it is quite adaptable for portable operation, SOTA, VKFF, contesting and Field Days.

Helically wound vertical with wire top loading

630m (472 - 479kHz)

As yet, 630m (472-479kHz), is a new band without a global 'plug-and-play' culture.

630m offers stable groundwave communication, often out to several hundred kilometres during daylight hours. Range increases significantly at night.

Doc, VK5BUG – "That's a coil!" for a duo-band 170ft Inverted-L 3-wire capacity hat & 60 dripper irrigated radials

The challenge

There being 'no free lunch', QRM and QRN are the downside of Low Band operation. Improving reception through better receiving antenna choices, and signal-to-noise enhancement are the defences. Noise suppression techniques can also make a huge difference, and QRM Guru offers practical guidance.

Low band operation does not require large antenna arrays or a multi-acre block of land. For example, Doc has achieved 160m QRP Worked all Continents and 55 DXCC countries using <20W from his suburban backyard. He has also reached over 3,000kms on 630m with the legal limit of 5W EIRP. All with analogue, hand sent CW.

Doc's three-volume series of 880 pages contain 'something about everything' to do with establishing, operating, and maintaining successful ham radio in Australia on 2200, 630 and 160m.

Over the course of future editions of QTC we will publish a series of articles explaining how you can get active on the MW Bands. We will start with 160 metres and then move to the greater challenge of 472-479 kHz (630 metres).

Watch for more details, practical hints and 'how to' notes in the next edition of QTC.

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The drawing below was found in an old 1951 PMG manual. It is the vertical antenna for the 3LO transmitter, now ABC Melbourne – originally on 770kHz, now 774kHz. We will do a bit more research and report back next edition. But, it is fair to say, this low band antenna will not fit in your suburban back yard.

.
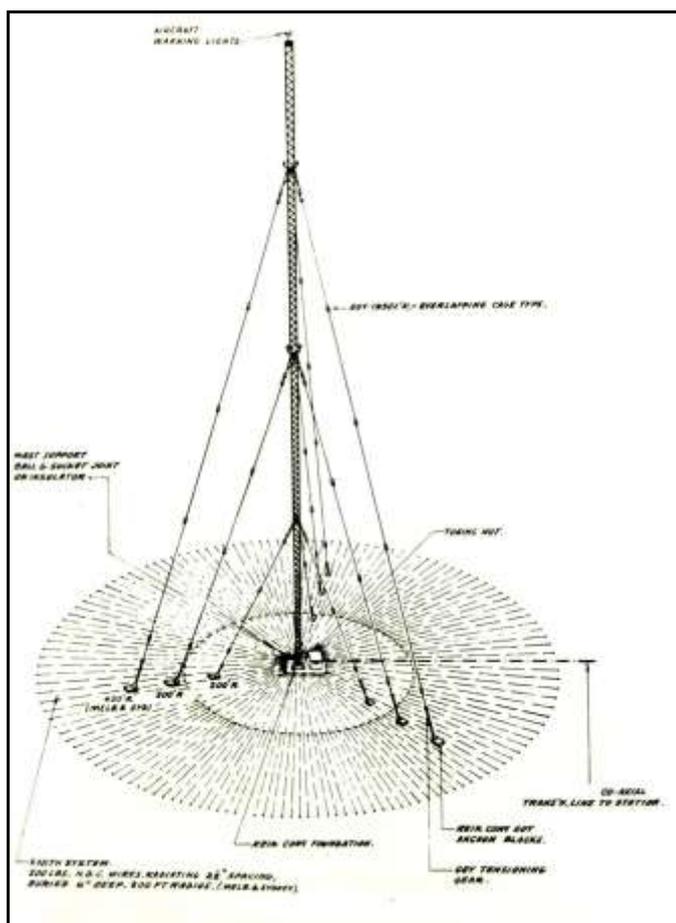
Technical Travesty

Is there something small that annoys your technical sensibilities? Want to get it off your chest?

Send us an email. Please just follow these simple rules:

- Must be technically correct
- No brand names
- No people's names
- 100-word limit

Here's our first email…

Dear Technical Travesty,

I get really annoyed when I see advertising in units that are being used incorrectly.

Like a lithium battery pack rated at 20,000 ma/h instead of just 20 amp/hour.

I mean, do we drive our cars at 100,000,000 mm per hour on the freeway?

(name and callsign withheld)

Killing that QRM

Welcome to our regular column of Kill that QRM. This column wil be a little more conversational than many of the articles you'll find on QRM Guru.

Getting started with QRM Guru

By Ian Jackson VK3BUF & Chris Chapman VK3QB

Do you suffer QRM/RFI? Are you uncertain how and where to start in resolving your issues? Are you looking for practical guidance, hints and tips and real-world examples of how to go about reducing noise and improving your enjoyment of the hobby?

QRM has become the bane of the modern radio amateur; especially those living in suburbia. Nearly every new gadget we buy contains a switch-mode power supply, and chances are these nifty gadgets will, at the very least, be contributing to the underlying increase in the noise floor.

To many hams, QRM/RFI has become the single largest inhibitor to their enjoyment of the hobby.

This article describes a resource developed by a group of VK radio amateurs for sharing practical solutions to help in the fight against QRM/RFI. Since launching this resource in March 2019, over 60 articles have been posted, 11 videos recorded and over 27 radio amateurs have contributed solutions, videos, and articles. Most of the contributions are from VK Hams.

We are fortunate to have material from the USA and UK as well, including articles from QST and RSGB RadCom (reproduced with permission). We have presented at 16 radio clubs across Australia and donated 11 **QRM Kill Kits**. More on these kits later.

Background

For the purposes of this article, we shall refer to RFI/EMI as QRM. The most common sources of QRM for most hams are (in no particular order): mains power line noise, LED lights, solar power inverters, switch-mode power supplies, electric garage door openers, plasma TVs, wall-wart power supplies, electric motors, electric fences and so on.
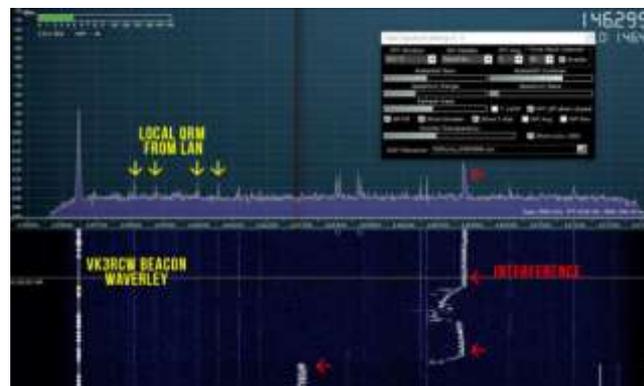
YouTube Video – that horrible noise

By contrast, QRN relates to noise generated by nature. We cannot do much about QRN, other than use features in our radios to reduce its impact (Noise Blanker, Noise Reduction, DSP etc).

The following image provides a simple overview of QRM and QRN. Of course, in

an electrical storm we would likely unplug our antennas anyway.

A simple comparison on QRN vs QRM

Compliance with national standards for Electrical Magnetic Compatibility (EMC) is varied at best. With easy access to internet shopping, relaxed import regulations, and very lax enforcement of compliance standards, our markets are flooded with sub-standard equipment. It seems that even basic RF filtering is non-existent in many of the cheap electrical products we see coming out of low cost countries.

Most of us, and our neighbours, have embraced these cheap, convenient products with great enthusiasm.

So, what of the national regulator I hear you say?

Our national regulator in Australia, the Australian Communications and Media Authority (ACMA) is simply unable to respond to every complaint. This is primarily due to resource constraints and the magnitude of the problem. RF Noise is ubiquitous. Informal feedback indicates that the Regulator may be able to assist, but only where the radio amateur has demonstrated adequate analysis of the noise source, attempted a resolution, and has documented evidence. This is where QRM Guru can help.

National solutions are few and far between. Anecdotal evidence suggests most other countries face similar challenges.

Nearly every ham we spoke to suffered QRM and wanted a solution. We spent a couple of months investigating options. We found books, YouTube videos, web articles and technical articles. Some national associations such as the RSGB, ARRL and RASA (The Radio Amateur Society of Australia) provide excellent technical articles and some even provide support to members.

However, we were unable to find a single freely available source with simple, practical solutions. This makes resolving such issues a major hurdle for many Hams, especially newcomers or the less technical in our ranks, who may not possess the technical or practical experience required.

We wanted a resource that would be a shared, free, dynamic, easily accessible, and practical. We also wanted a resource that clubs could use and would encourage experimentation. Our hobby is rich with experienced and highly qualified practitioners and professionals. We wanted a resource that could bring all this experience to a common platform. The solution must:

- be freely available on the internet;
- be dynamic;
- encourage engagement with local clubs;
- include practical tools & techniques;
- use real-world scenarios;
- link to useful references;
- be suitable for all levels of technical competence;
- be collaborative; and
- be user friendly.

QRM.Guru was born. The objectives of **QRM.guru** are to provide an integrated online educational resource to assist all radio amateurs in:

- better understanding RF noise sources that impact on their enjoyment of the hobby;

- providing a series of tools, techniques and guides to assist in locating and reducing or eliminating noise sources;
- providing guidance on how to select consumer devices that comply with regulations and do not emit unwanted RF noise;
- encouraging radio hams and clubs to collaborate in reducing noise and promoting the hobby; and
- developing and utilising our technical skills to resolve issues that impact on our enjoyment of the hobby, even when the interference is not our responsibility;

QRM.Guru provides ideal projects for clubs to undertake practical exercises to reduce or eliminate QRM.

Much of the content has been derived from various sources, including the ARRL, RSGB, the public domain, published works and project work by developers and individual radio amateurs. All references to published works and project work are acknowledged and attributed.

Using QRM.Guru

Start by visiting qrm.guru in your favourite browser.
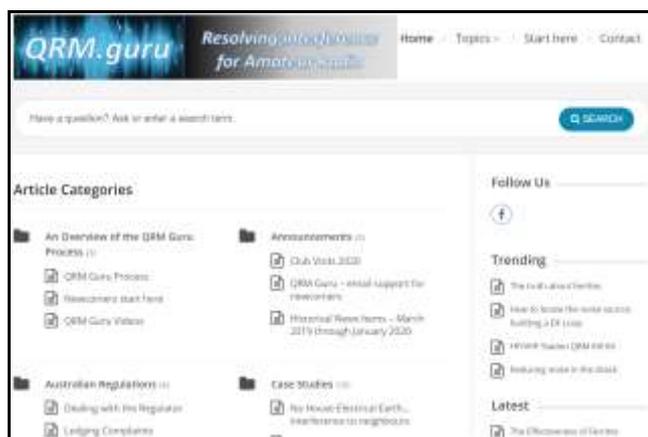
*YouTube video – Home page walk-through*

QRM.Guru has been built on a Word Press Knowledge Base platform. This allows articles, videos, templates, and data to be stored in an efficient and organised manner. Every article (or post), can be stored in one or more categories. The categories have been defined based what we felt most logical (categories can be changed or added).

Note that each category may contain more articles than appear on the home screen. The best way to see all articles for a given category is to click on the category name.

At the top of the screen you have the usual heading and pull-down menus. Clicking on the QRM Guru logo will take you back to the home screen, wherever you are. On the right-hand side of the screen you can click the Facebook logo to join our Social Media page. Beneath that are the most popular articles (referred to as *Trending*) and beneath that you can see the most recent (*Latest)* articles that have been posted.

What makes QRM.Guru different? Firstly, it is an open, dynamic resource, with regular updates from radio amateurs. Also, it resides on a Knowledge Base platform. This means you can enter search criteria and the Knowledge Base engine will locate articles that best meet your search criteria and overall popularity.
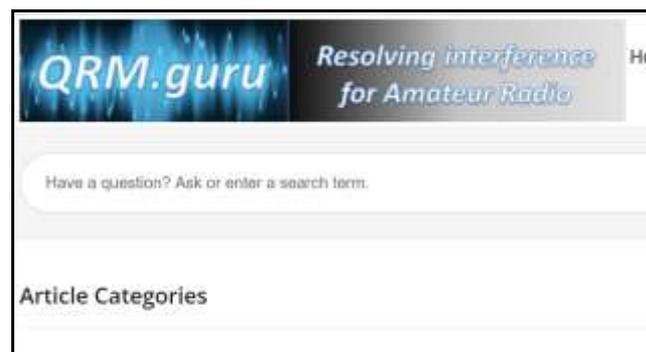
YouTube video – using the search bar

For example, my neighbour might have told me he is considering a PV Solar System. Typing "*Solar*" into the Search Bar will return articles that satisfy this search criteria. Those most popular, or those best meeting my search criteria are at the top of the list.

Give it a try. Enter a search word or phrase and see what you find. Typing "*chokes*" into the search bar gives a good mix of technical and practical posts from which to select.

QRM.Guru is a practical resource with real world examples of how the average ham can attack their local QRM issues. Whilst **QRM.guru** has been developed for VK Hams, it will be of use to hams worldwide. The collaborators are keen to see cooperation from all sources, be they individual hams, local clubs, or national associations.

We have also developed nine tutorial videos to walk users through the basics of identifying and resolving noise. Take some time to watch the videos and then check out some Case Studies to see how the tools and techniques have been applied in the real world.

QRM Kill Kits & Club Visits

Converting all these articles, templates, and videos into practical "how to" was our next challenge. Many people we spoke to did not know where to start. How do I build and use a simple Direction-Finding Loop? What sort of ferrite beads or cores are required to suppress noise? What templates will help me? Where should I start?

We decided the best way to break the impasse was to hit the road and visit clubs. We also put together a simple kit of equipment, incorporating some items that most clubs and shacks probably don't have to hand.

Since March 2019 we have visited 16 VK clubs and presented QRM Guru along with the QRM Kill Kit. We have donated 11 Kits to clubs and encouraged people to get active and solve their QRM/RFI problems. We have received case studies from local hams which is very encouraging. You can check these out by clicking on the Case

Studies category. These have also been a great feedback loop for the development team.

With the social restrictions of Covid-19 preventing club meetings, our road-trips are on hold. But if your club would like a Zoom presentation, just send us an email.

QRM Guru Test Lab

The most common problem reported was the QRM coming from consumer devices. Compliance labelling is very confusing in Australia. Type "*compliance*" into the QRM Guru Search Bar and follow the links.

Being regular amateurs, we do not have access to industry test labs, but we are able to perform some simple, effective tests. Ian, VK3BUF a QRM Guru collaborator, built a remarkably simple test lab with a discarded Mircowave Oven. You can read about this test lab by typing "product review" into the Search Bar.

Tests were performed on five common LED light brands here in Australia. You can see the results and read more here.

We have also conducted tests on ferrite cores and snap-ons. Again, visit QRM Guru and type "*ferrites*" into the search bar to learn more.

Conclusions and Next Steps

Where to next? Nearly all the material in **QRM.Guru** will be of use to amateurs everywhere. We all face the same challenges.

We encourage QTC readers whose stations suffer from QRM/RFI to take a more active role in resolving their own problems. We are asking clubs to get involved. Put together a QRM Kill Kit, build a simple DF Loop and provide some simple training or mentoring. Help fellow members in tracking down and eliminating local QRM.

We recognise that our hobby has people from all walks of life and skills, from professional engineers to entry level hobbyists. QRM Guru is a work-in-progress. It is intended to be a dynamic resource and we hope hams everywhere will benefit. The content is only limited by you and your contributions.

Please share your experiences with us.

Please surf the *QRM.guru* website. Check out the articles, templates, videos, and links. If you find an error, broken link, or something you think could be done better, please drop us an email. This, after all, this is a resource for hams, by hams.

Let us help each other to kill QRM. Share your stories with us at mailto:feedback@qrm.guru

YouTube Clip

Click this image to access the QRM Guru Process

QRM Kill Kits

Ferrite kits to suppress unwanted noise in your shack. Click the image to head to our online shop.

Build a simple DF Loop to help you localise and pinpoint the source of the noise. Click on the image to head to our online shop.

Seen around the internet

Have you seen something interesting around the internet that may be of interest to others? Welcome to our first regular column "*Seen around the interenet*".

We look forward to hearing from our readers and sharing your interesting internet news, web sites or YouTube links.

QSO Today Virtual Ham Expo

With all the Covid-19 social restrictions and cancelled Hamfest, conferences and gatherings, here is an interesting online expo scheduled for 8th and 9th August. It is worth checking out. Click the image below to visit their website.

The Uncertain Future of Ham Radio

None of us have a crystal ball… but, what do you think the future holds for our hobby?

This article came across our desk and we thought it worth sharing.

World Radio History

Can't sleep? Sent to us by Colin VK3NCC, it is quite easy to dive into a rabbit hole… and another, and another… loads of fascinating references and pictures into the past. Again, just click the image below. Thanks Colin!

HF DX Net

Do you remember the 7130 DX Net? It was around for years but folded earlier this year for want of someone to run it. So, from the ashes rises the Oz DX Net.

The OZ DX Net commenced on the 4th of May this year, to replace the 7130 DX Net. The OZ DX Net operates three nights a week: Monday, Wednesday, & Friday, and commences at 1000 UTC.

The OZ DX Net generally operates on 7.178 MHz, and the Net Control is Mal VK5MJ.

So, keep an ear out for the OZ DX Net. Start off on 7.178 MHz Lower Side Band, and if they aren't there, tune up and down the band to find them.

Getting started in – HF DX

Welcome to our regular column aimed at supporting newcomers to our hobby. We do not want to set an expectation that this is only for Foundation Licencees. Some newcomers may also be Standard or Advanced licencees, or may be old hands interested in trying new modes or facets of the hobby. We were all newcomers once and may have questions or need support.

As promised in our last edition, we'll now look at some antennas to help you get started.

Thanks to Bill, VK1MCW for this user experience of the popular Hexbeam antenna.

We followup with a simple project for a 40m vertical.

The KIO Hex Beam – A New Direction

by Bill Kirkwood, VK1MCW

It is over three years since I became an Amateur Radio operator. However, it has been some 45 years since I first touched a CW Key and began a career in radio and electronics (as an RAAF Air Electronics Officer (AEO).

As an amateur radio operator my focus has been CW portable operation – SOTA. At home I live on a small suburban block, and I have taken a liking to chasing CW DX contacts. However, getting the right antenna has always been a bit of a challenge. I started out with a little 40-20 trap dipole – and of course with a Foundation Call I could only use the 40m band! I soon added the popular G5RV – a simply brilliant wire antenna, but that is what it is, a simple antenna.

Any directional component was by chance in favour of Asia and Europe thanks to where the two trees are positioned on my block. North America was missing out. I had only worked the UK just once…

Upon upgrading my licence to the Standard class, I wanted to expand my RF horizons. 20m was like entering into a new world. But even then, I felt I was being held back by my RF noisy QTH and lack of a steerable antenna. High power? – forget it – you do not need much power.

As a Standard I am limited to 30 Watts (mean) for CW. Believe me you do not need any more. You simply don't. (Editor: on the lower bands and under difficult circumstances, higher power does get through, but Bill's point is valid. A better antenna adds far more than doubling your power.) I can't speak for SSB or digital modes… – Some sunspot activity would be nice though…

So, chatting with some fellow CW operators I was told about KIO Hex Beam. A bit of a search and research, I was soon placing an order for a four-band option: 6m, 10m, 15m and 20m. Shipping to Australia was not prohibitive and it arrived inside a couple of weeks. Note, that was before the COVID-19 restrictions! Expect to wait a little while in the current situation……

I have a small suburban block. The turning diameter of the KIO Hex Beam is approximately 22' (sorry being US designed and built the antenna comes with imperial measurements). My wife was intrigued when I spent a weekend with tape measure in hand trying to find the best position. On the roof was not an option. Yes, it would be ideal – but, I try to maintain a low neighbourly profile and that hex beam on my roof would just draw way too much attention. ACT Government building restrictions state that any mast cannot extend beyond 1.5m above the highest point of the roof.

So, I chose the spot and started to dig a (minimum) one metre deep hole for the Tilt Base I bought from Cushcraft.

The main mast is a 4m length of strong aluminium pipe (no, it's not about to bend in half). A one-man job to raise/lower the antenna (but I recommend asking a mate for an extra set of hands and extra grunt). I live on very rocky granite boulder-ridden land – so it was pure luck I was able to get the hole deep enough without the need of a jack hammer! All this going on as the antenna kit winged its way from the USA.

Assembly of the antenna is easy - but (and NO, I did not consider this), it is not something you can put together in the family room and carry it outside! The first thing to do was paint (with NON METALLIC paint) the fibreglass spreaders. The distant relative of the hex beam (the Hill's Hoist) came in handy for this task.. I chose matt black as it helps blend in with the background – yep the low profile approach!

Also – this is a job you should plan to start and finish in one day – or over a weekend. (or when your partner is visiting family interstate!) Domestic harmony is enhanced if the clothesline and entire back yard is not packed out by the project.

First the spreaders and then working from the inside out, each of the wires for the bands I chose. This was quite easy and went smoothly. The little portable workbench (very old) paid for itself!

I use guying ropes, not wires. So far it has survived the recent storms and fronts that caused havoc up and down the east coast. Delayed getting the antenna installed because of thick smoke from the January bushfires, not to mention temperatures over 40C, then followed by heavy rain and

gusting winds. I think it will do! I have lowered it once to adjust its North with actual North (doesn't need to be exact) and every couple of months to check all bolts and fittings.

The rotator is a Yaesu G-450A.

An antenna need not be at the "ideal" height or in the perfect position, and who is lucky enough to have the land area and absence of nearby neighbours for that luxury? Not me – and I am VERY happy with the results so far.

Results – AMAZING. It is resonant on all bands…though I do keep the built-in tuner of the IC-7300 in play! I have recently purchased a Rig Expert AA-55. Some measurements taken are displayed below.

The antenna would be even more efficient if it was up 10 to 15 metres and mounted on a stronger, more robust lattice tower, but space and cost rule that out, so you make do with what you've got and adapt. There is no such thing as the perfect match for the conditions 100% of the time. Besides, all my contacts to date have been CW (surprised?)

That I have worked multiple EU contacts and a 20m SOTA QSO with Adam K6ARK who was on W6/CT-016 speaks way better than any technical data. Ignore the 40m contact in this screen shot of my QRZ log - that was a visiting Pom activating a VK SOTA summit and I was using the G5RV for that.

This is as is, where is - no tuner required – Just as advertised.
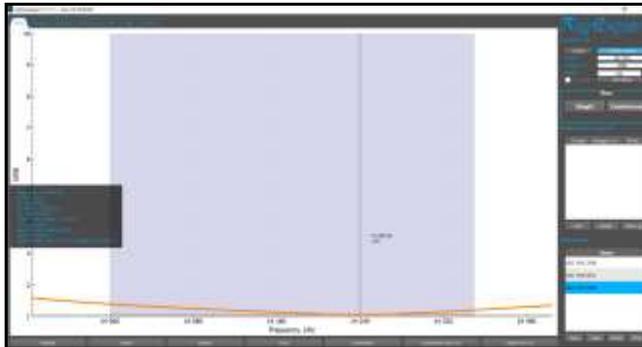
RigExpert 20m SWR Sweep
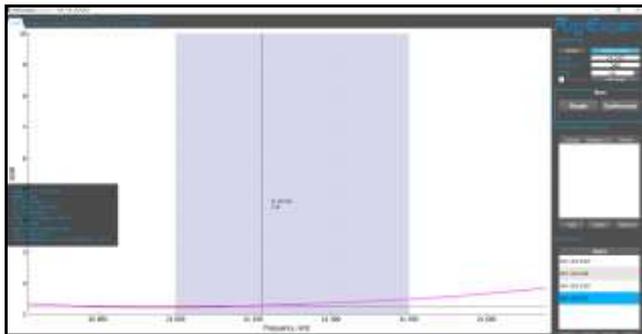
RigExpert 15m SWR Sweep
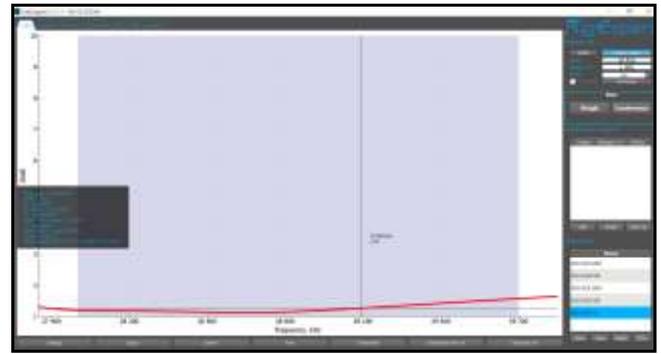
RigExpert 10m SWR Sweep

OK, so being limited to 52MHz a tuner is possibly needed here – but it is still pretty darn good... as a CW operator, if I upgrade or are otherwise granted access to 50MHz (we wish) that SWR in the CW region is still good.

So, are you wanting easier DX? Space limited? I do recommend getting yourself a Hex Beam. The KIO Hex Beam is quite easy to assemble and install… (If I can do it… anyone can!) and it does NOT need to be towering above the roof – but if I could, I would have mine a few metres higher. As is, it does the job and I consider it a worthwhile investment.

Good Luck – and happy DX-ing.

A simple 40 metre Vertical

Vertical antennas are well suited to DX-ing. They offer a low angle of radiation for transmit, which is where you want your signal to go. On the downside, they are may be susceptible to local noise.

Verticals also work well equally in all directions. This is also a downside if you are looking for directivity. However, as an all-rounder, you cannot go past a vertical as a good DX antenna for 40 metres.

Parts List

10 metre long Squid Pole
Mounting stake
10 metres of antenna wire
Radial wire ~ 10m per radial
Liquid tape
Radial Plate
Coax – RG58 spec fine
SO239 panel mount

Wavelength is 300/7.1Mhz.
Divide by four for a quarter wavelength

The Radiating element

Vertical element will be about 10.5m long. You will need to fine tune this once you finalise your installation and attach all the radial wires.

Use tape to lock the squid pole sections into place so they do not collapse. Attach the radiating wire to the squid pole with tape. Leave the top 50-100cm loosely attached. You may need to shorten to achieve resonance.

Radials

Each radial should be 10m long. If you are unable to get 10m in every direction, cut the radials to a length that fits.

You should aim to lay a minimum of eight radials. Sixteen would be better. General wisdom suggests 16-30 as being a balance between practicality and performance. Dedicated campaigners will lay 60 radials. More than this suggests OCD, a commercial installation, or a perfectionist!

Consider various alternatives for attaching your radials. You can look at commercial options (search google for "radial plates for vertical antennas"), or better yet, you can construct something in your workshop.

Connection plate for radial wires
Source: Internet Butternut HF6V

A simple 1:1 Choke Balun

You need a balun to keep RF off the feedline.

The simplest construction approach is to wind a length of coaxial cable into a coil, creating an inductor from the outer shield.

This method is cheap, simple and will suppress common mode currents. For 7MHz, wind about 6m of coax into a coil about 6-8 turns. Use some electrical tape to secure the coil in two or three places.

If you need 15m of coax to run from your shack to the antenna, then add about 6m to

allow for winding the choke balun. Attach PL259 connectors at each end.

Construction and Tuning

Once you have decided on how you want to attach your radials, run them out and ensure they are either buried or secured to minimise trip hazards and/or mishaps with the lawn mower!

These diagrams (courtesy: Hustler Antenna Manual) illustrate the "dos and don'ts" for laying your radials.
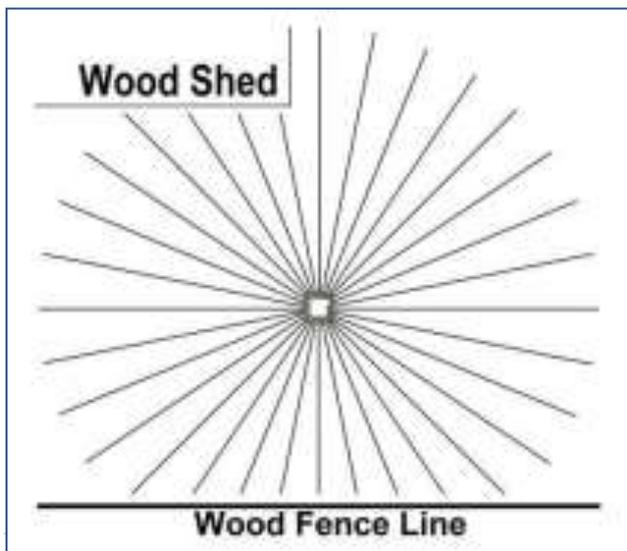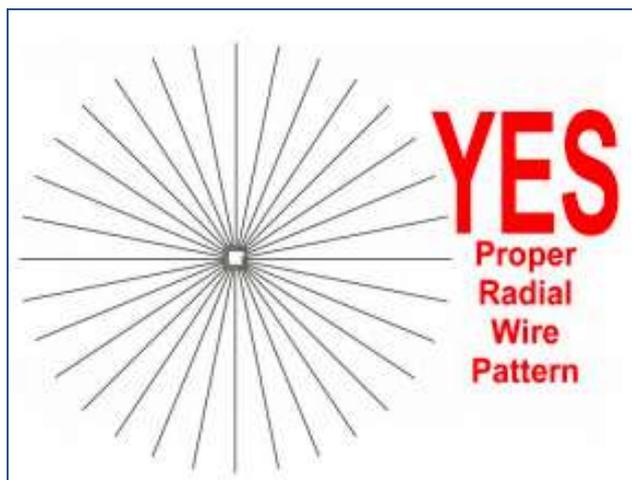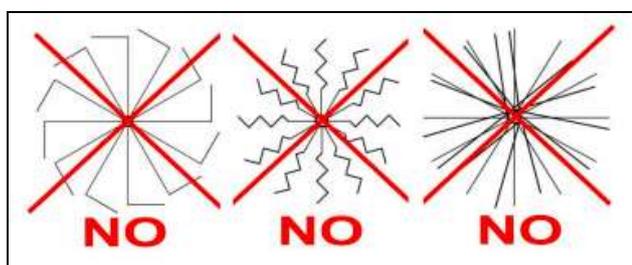
Erect the vertical and solder the radiating wire to the SO239 mount. Solder the radial common line to the mount.

If your installation is permanent, consider digging a shallow trench to run the coax from the shack to the base of your vertical. Run the coax through some conduit or similar, *under* the radials.

Attach the coax back to the shack and check for resonance.

The tools and meters you have in your shack will determine how you go about fine tuning your vertical.

As we (hopefully) made the vertical radiating wire too long to begin with, you will almost certainly need to shorten it. Do this carefully. It is far easier to keep trimming a little at a time than to add wire if you cut back too much.

You should be able to get the SWR under 1.5:1 and expect a reasonable bandwidth.

Commercial Alternatives

There are various commercial suppliers of vertical antennas. Do some research. Read online reviews and speak to other operators or friends at your local club.

eHam is a good site for product reviews.

We would suggest you exercise caution before buying "radial free" verticals.

The Origin and Attributes of Radioteletype

by Ian Jackson, VK3BUF

Amateur bands are a unique meeting place where operators may exercise an enormous range of technologies. Speech may be carried by AM, FM, SSB and now Digital audio. There is still plenty of Morse to be heard, from beginner to expert. Some very sophisticated data systems such as FT8 support solid contacts under poor conditions and have achieved great popularity.

But, in between all this rowdy clutter, we can still hear that distinctive two-tone rattle of classic Radioteletype.

Radioteletype, often referred to as '*RTTY*', has been with us for a long time. It is an automated digital mode, but it pre-dates the computer technology that drives today's communications. As far as radio amateurs are concerned, it is like text messaging a long, long time before mobile phones became a way of life. RTTY is a very conversational mode. You can use it to exchange callsigns and signal reports, but RTTY can also be used for unlimited casual chat. It is this simplicity which makes it a very attractive mode, even today.

To understand this medium, we must reach back well over a century and examine the very roots of binary encoding. This is important, as by gaining an understanding of RTTY fundamentals, we can observe the foundations of the many subsequent innovations in data transmission that followed.

The Baudot Code

RTTY uses a five-bit code. Put another way, if you had five cups and five stones, there would be thirty-two possible combinations of stones in cups ranging from no stones at all to five in a row.

This table shows every possible 5-bit combination presented as a 32-step binary sequence.
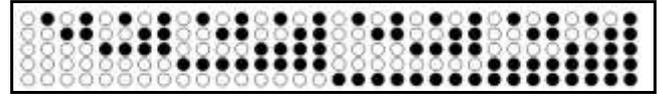
A 5-bit code is pretty basic and has some inherent limitations. Thirty-two combinations are enough to allocate one to each letter of the alphabet and still have six left over. This is fine until somebody wants to encode a message with numeric information: there is insufficient space for the numbers 0 to 9.

Rather than upgrading to a 6-bit code (with its 64 combinations to choose from) a compromise was adopted where *two* 5-bit code tables were used. One table set had letters (upper case only) and the other set had numbers and some punctuation characters, such as brackets, commas, and full stops. Two special shift-codes were used to select which of the two tables were presently 'active'. These are called Letters Shift and Figures Shift, which is somewhat resembles the 123 and ABC character set shift on small screen phones and Dymo label makers. Encoding messages is slower because the operator must remember to precede groups of letters and numbers by the correct shift code, or the message becomes garbled.

The original Baudot code was devised in the early 1870's by Emile Baudot. After a few revisions, the 5-bit Baudot character set looked like this:


As shown, the bit combinations are shared between the Letters and Figures groups of characters.

These dot combinations are straightforward, but there was a need for a reliable method of conveying those dot sequences over long distances. There is, and it is called the Teleprinter.

Introducing the Teleprinter

The teleprinter is a mechanical contrivance that converts letters and numbers into the Baudot code. It then sends this code down a wire where it can be converted back to plain text at the other end. This technology was a breakthrough. Large blocks of text could be sent and recorded without the need for specialist Morse Code skills. Indeed, the remote terminal could be completely unattended.

Although a 5-bit code is used, it is not practical to have five separate wires travelling long distances to convey the status of each bit. The logical alternative is for all the combinations to be sent serially. Five time slots were reserved within each character that forced bits into one of two states called Mark and Space.
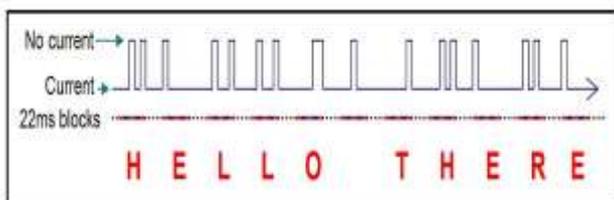
Eleven Baudot characters (including Space) transmitted serially

At the distant end, a receiving machine must perfectly synchronise with this code to make sense of these binary combinations. The rate that these combinations were sent is measured in Bits-per-second, or 'baud': a tribute to the aforementioned Emile Baudot. The term Baud is now part of our language.

Baudot code networks generally operated at 50 or 75 baud. Early American machines initially used 45.45 baud and it was this rate which was eventually adopted as the international standard for amateur radio. This transmission speed is still a little faster than most people can type.

The Creed Model 7 came out in 1931

Although 45.45 baud may seem like an odd value, there is an explanation for it. At this speed, the duration of each bit is 22 milliseconds. One second divided by 0.022 seconds = 45.45… This slower baud rate is quite effective at penetrating noise and static when signals are being transmitted by radio.

It is worthwhile noting that the Carriage Return function of the printer head and Line Feed of the paper are separate buttons on the keyboard. This means that the operator had to use both commands at the end of each line to prevent accidental over-typing of text.

Another important character is the '*Who Are You*' command, which is a figures-shifted letter 'D' in the Baudot code. Each teleprinter had a unique identity stored in a mechanical memory. When this character was sent to a distant machine it would trigger an automatic reply of that machines unique identity. It allowed operators to confirm that they were linked up to the correct target machine. For RTTY, these mechanical 'answerback' memories are great for storing an Amateur Radio callsign.

A teleprinter has two main parts The Printer and the Keyboard. These two mechanisms share a common electric motor, but they are separate devices.

The keyboard drives a single electrical contact that pulses rapidly to replicate each bit of data from the characters typed. The printer stage contains an electromagnetic coil which energises briefly with every bit of data. Effectively, this coil drives the printing mechanism which selects a matching character to print.

If the keyboard output contact is wired in series with the Reader coil and 40ma of current is permitted to flow through this circuit, then whatever is typed on the keyboard will also be printed to paper. When this DC loop is extended through another reader coil and keyboard contact of a second machine, then typed text will appear on both machines, even if they are 50km apart.
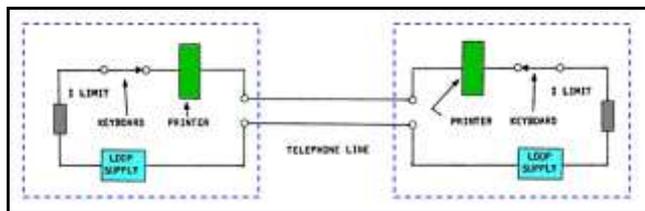
Block diagram of two teleprinters joined by a landline

Both machines must operate at the same speed. Motor calibration was not achieved with fancy rev counters and frequency meters. Service staff used low-cost tuning forks. The technician would thump the fork on a table, then look through the vibrating tines of the fork at the black and white strobe sections on the rear of the motor. When these calibration stripes appeared to be unmoving in the vibration field, the machine was deemed to be tuned to the correct speed.

If teleprinter field staff chose to dress well, they would wear bowties, as a conventional tie dangling inside one of these machines would be something of a health hazard.

My first Radioteletype experience

As a teenager back in 1978 I purchased a surplus Siemens 100 teleprinter from a scrap metal merchant in Melbourne and set about configuring it as a RTTY system for HF and 2 metres. It was a heavy beast of 30kg that tended to compress the spine and lengthen one's arms, but it was in good condition.

While my machine was German made, quite a few of these from the late 60's were assembled in Australia. I was fortunate that my unit featured the optional paper tape punch and reader, which allowed me to record segments of teletype conversations on paper tape and reproduce them later.

I gave the machine a respray in white over the original mouse-brown colour and slowed down the motor from the commercial 50 baud to the amateur band 45.45 baud. This was achieved with a screwdriver adjustment and a stopwatch, to count how many seconds the print head took to print a line of characters across a page. The block diagram below shows how the current loop of a teleprinter passed through a modem to extend the data into a transceiver as a series of alternating audio tones.
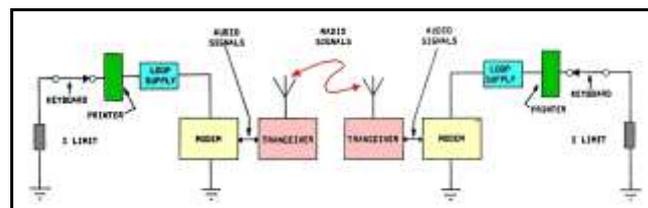
A suitable modem interrupted the current loop at the transmitter and receiver

To make the machine work on my Icom IC22s (an early 2M FM radio), I had to build a suitable AFSK modem. The abbreviation AFSK stands for Audio Frequency Shift Keying. On the Transmit side, the modem generated the conventional Mark and Space tones of 2125 Hz and 2295 Hz. These two tones are only 170 Hz apart.

These somewhat musical tones are easy to spot on the amateur bands and in full flight, have been compared with the sounds of a concrete mixer full of xylophones.

I designed a PCB with an LM566 audio oscillator chip that could switch between the tones in sync with the current loop of the teleprinter. It also required a switching transistor to key the Push-to-talk (PTT) control within the radio.

To receive radioteletype signals, I needed to carefully filter the 2125 and 2295 tones from the speaker output of the radio. For this I used a delightful chip called the XR2211. It has an internal PLL oscillator which was set midway between the high and low receive tones and provides logical outputs when an input tone is detected above or below this centre frequency.

The chip drove a nice big NPN transistor that could interrupt the 40ma current loop of the Siemens 100, allowing it to print incoming signals.

With teletype systems, the letters R and Y are mirror image data bits. Sending these two characters alternately exercises a RTTY system to its maximum. If your system can receive a few lines of RY's without errors, then the equipment is in good condition.

YouTube Clip – the noise & clatter

This machine worked very well, and I had a lot of fun sending pictures and text with other local operators for many years. My design incorporated a mains relay to apply 240V power to the Siemens 100 when a valid RTTY tone was detected. I could leave the machine unattended for extended periods and read a printout of on-air activity upon my return.

Back then the local radio club sometimes provided communications for horse endurance riding events. We used RTTY on 2M to send updates to the Siemens 100 placed in a remote barn. The enabled the

families of riders to track the event progress through the checkpoints.

To assist with these events, I purchased a second Siemens 100 machine.

Over forty years later both machines still work flawlessly, although they are pretty much retired from on-air action. Today such units have become quite rare. A Siemens 100 is on display at the *Victorian Telecommunications Museum* located in Melbourne. I once spotted another one of these at the extraordinary *Deutsches Museum* in Munich. It is likely that a few Amateurs still have one or two stashed in garages and garden sheds around the country. As the attached video segment shows, they are still a lot of fun to watch – as long as nobody is trying to sleep.

FSK versus AFSK

The differences between FSK (Frequency Shift Keying) and AFSK (Audio Frequency Shift Keying) can sometimes be confusing.

As used in the above teletype modem, AFSK transmissions are the result of two generated audio tones alternately selected by data pulses. These sounds may then be coupled to the microphone input of a transmitter, preferably via a small audio isolation transformer. This format is essential when transmitting on AM or FM. AFSK tones can also be recorded to tape and played back later to reproduce the same message.
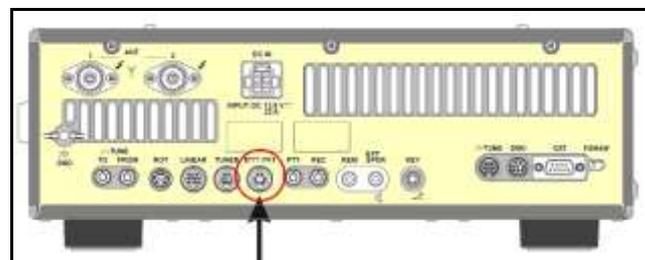
The rear of a Yaesu FT950 showing the FSK input for RTTY operation

FSK data may be transmitted without audio tones. Most modern HF radios have a special digital input reserved for FSK operation. When enabled, an FSK transmission produces a clean, soundless

carrier signal on a selected frequency. As data is applied to the FSK input of the radio, the RF carrier frequency will shift to a second frequency with each data element. In the case of RTTY this carrier shift is exactly 170 Hz..

At the receiver, the radio is switched to SSB, where the internal BFO reproduces the moving carrier frequency as two tones. This may then be decoded using two tight audio filters. True FSK transmissions will penetrate noisy atmospheric conditions quite well. As RTTY transmissions operate with a 100% duty cycle, transmitter power levels are usually reduced to avoid overheating PA stages.

RTTY and the Personal Computer

This brings us to the next phase of RTTY, where Amateurs started to see the introduction of home computers. In the mid 80's myself and a few other local Amateurs began to get into the Tandy Electronics (Radio Shack) Colour Computer 2 systems.

We learned basic, added home brew interfaces for floppy disk drives and wrestled with early word processors. We had a lot of fun with this stuff and it was only natural that we would try to apply this equipment to RTTY.

In the late 1980's some dedicated RTTY computers began to appear, such as the Drake Tono7000, but these were exceptionally expensive at the time.

In 1987 a joint project between Albert VK3BQO and myself saw the development of an EPROM cartridge that would fit into the side of the Tandy computer. On power up, the PC booted directly into the RTTY program that Albert had written in 6809 assembly language.

This system appears in the adjacent video clip. It was pretty advanced for its time, with transmit/receive buffers, CQ and RY test macros and dot-matrix printer support. A

Message Waiting feature would record RTTY transmissions to memory that matched our own callsign. The computer had a 4-pin serial port to control transmit, receive data and PTT commands at a 5V TTL level. This was an excellent project which encompassed several types of technology. We learned a lot about these early home computers along the way.

YouTube Clip – RTTY on the Tandy CoCo

One project leads to another

There is an interesting follow-up story to the development of this RTTY system. At that time, the national telex network was mostly defunct as fax machines had taken over, however Telecom Australia had their own internal telex network called SPAN that ran at 75 baud. It used Siemens teleprinters to distribute telephone orders, in triplicate, to all the maintenance and installation depots around Australia. Technicians would take a Siemens printed copy into the field to do the work. It was a busy network.

An in-house Telecom project had been launched to automate order processing in each depot using the latest '286 desktop PC's with an amazing new accessory called a 'hard drive'. It worked well as a system, except there was no way to transfer the Baudot data from their private telex network into these modern PC's, without complete manual re-entry of each order. This communications gap was frustrating the entire project. Albert and I had only just

completed our RTTY solution for the Tandy colour computer when we heard of this dilemma and thought "Hello…"

As a result, we created literally a black box with a colour computer pcb and current loop interface inside. It would read the 75 baud Baudot code, store it in battery backed RAM and dump it on demand in ASCII at 9600 baud. Problem solved. Within a year the teleprinters in the installation depots were removed and replaced with our black box. The moral here is that when you create a new Amateur Radio project 'just for fun', you never know where it is going to go next.

All this activity coincided with the arrival of two new kittens in the household which were dutifully named RTTY and ASCII. This created some colourful conversations with our local vet that wanted to enter them in their database as Ritty and Asky, but it was "*no..no..no.. you must spell them R-T-T-Y and A-S-C-I-I*"

Some people can be so difficult at times….

The transition of RTTY to modern computers
A unique aspect of RTTY is that it originated from an era that pre-dated software as we know it, but it revealed the incredible potential of automated data transmission. It was teletype functionality that set the scene for more contemporary systems of data packet transmission based upon 7- and 8-bit ASCII codes. These origins are one reason why RTTY occupies a special, widely supported, place in Amateur Radio.

It needs to be understood that RTTY is still a raw medium. Like CW, there is no automatic error checking or redundancy in any information sent. On-air static from a lightning crash will result in corrupted or missing data that cannot be recovered. More advanced protocols such as Packet Radio include error checking features, whereby a faulty block of data is detected at the receive end, which automatically requests a re-transmission of that corrupted block. This allows larger files of high

integrity to be assembled over time. RTTY does not support this. Part of the challenge of this mode is to make quality contacts under adverse conditions. In the case of contests and DX-peditions, that may entail the art of extracting of one valid callsign from the sounds of ten RTTY stations all calling simultaneously. Fortunately, we no longer must cart around heavy mechanical contrivances to get on the air. The availability of cheap, portable computer hardware and software has given fresh life to this mode.
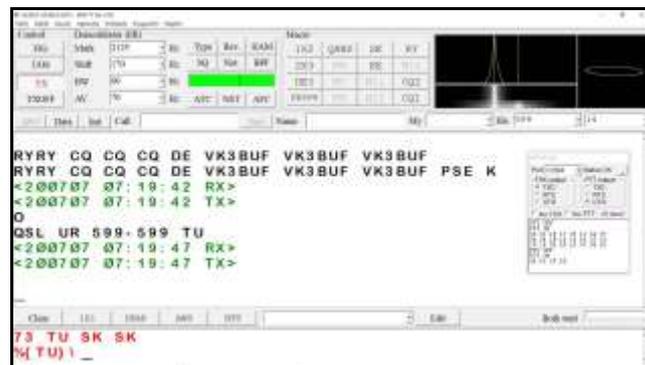
The MMTTY program has everything you need

MMTTY – PC based RTTY

These days, most operators use an excellent little program called MMTTY. It is an open-sourced application developed in 2000 by Makoto Mori JE3HHT of Osaka Japan. It attracted a huge following and many thousands of operators around the world have taken advantage of this free download.

Operators can take this anywhere on a PC laptop. It has several features such as programmable shortcut buttons for sending fixed messages and callsign recognition feature that can automatically create a contact record. This information can be stored in a log that may be ported into other contact databases such as N1MM.

MMTTY uses the inbuilt microphone and speaker of a PC to receive and send AFSK. A basic setup can be achieved by simply placing a laptop PC close to a transceiver where it can hear the tones coming from the speaker. RTTY can be sent by placing a transceiver microphone close to the speaker of the laptop while holding down a transmit button.

YouTube Clip – RTTY on a laptop

Of course, this arrangement is not ideal. Everyone in the house would have to endure the loud tones and any ambient sounds in the room would corrupt the data flow.

A better arrangement is to couple the radio directly to the PC mic input and speaker output via a pair of audio isolation transformers. This arrangement would also support Slow Scan TV imaging (SSTV).

The MMTTY main screen has a small waterfall display which shows the relationship of the two audio tones of 2125 and 2295 Hz. This simplifies the process of locking onto the two tones arriving at an SSB receiver.

USING MMTTY on FSK

If the operator wishes to send true FSK and not simply acoustically couple AFSK tones to a transmitter, the MMTTY program will support that need.

This IOCREST adapter is great for FSK compatibility on Windows 10 notebooks

This application can link with an RS232 Port on a PC and send RTTY data as a shifting voltage level to a TXD pin or a handshaking pin (CTS/DTR). The program can also use a handshaking pin within the same port to automatically place the radio into the Transmit mode when the operator commences a transmission. These RS232 outputs alternate between a positive and negative 9V potential. Depending upon the radio, some signal conversion may be necessary for compatibility, as the FSK inputs may be expecting a 0-5V potential.

Here the operator may strike a snag, as most PC's created in the last decade do not include RS232 ports. Only USB ports are available. USB to RS232 adapters are commonplace. Thousands of adapters were made using the 'Prolific' chipset, but none of these are Windows 10 compatible. They only work up to Windows 8, even though many are still being sold. If shopping for a USB to RS232 converter, stay with ones that use the 'FTDI' chipset inside, as these will work fine on Windows 10.

In the adjacent video clip one of these adapters can be seen in action, generating clean +/-9V Baudot waveform on the oscilloscope screen as a message is being transmitted

Why use RTTY?

Gaining a proficiency in this historic mode helps us to understand some of the

complexity behind modern on-air serial data transmissions. Establishing a RTTY station can also be a lot of fun. This capability is well within the scope of Foundation licensees, who are now permitted to access to digital modes in Australia. The aim here has been to de-mystify the mode for those who may not quite know where to begin.

I recommend teaming up with another local operator when starting out. It is easier to proceed if you can compare notes and do some local testing with a friendly station before logging contacts further afield.

Consider promoting some RTTY activity as a project within your local club.

This article does not go into specifics of program usage or on-air etiquette. That is a topic for another article. The aim here was to share the experience and origins of this intriguing mode. With luck, and we hope to soon hear a few more RTTY signals on the air.

QSL Card Nostalgia
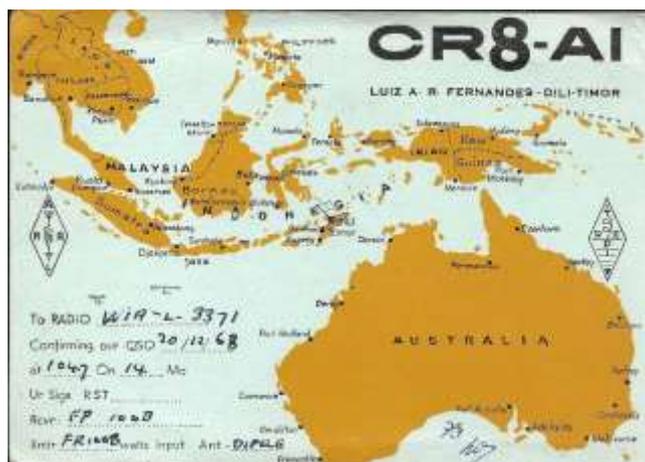
Courtesy of Colin VK3NCC

Q-Codes you may not have heard.

Code	Question
QNI	May I join the net?
QRH	Does my frequency vary?
QRU	Have you anything for me?
QRV	Are you ready?
QRW	Shall I inform ... that you are calling him on ... kHz (or MHz)?
QSD	Is my keying defective?
QSG	Shall I send ... telegrams (messages) at a time?
QSK	Can you hear me between your signals?
QSM	Shall I repeat the last telegram (message) which I sent you, or some previous telegram (message)?
QSN	Did you hear me (or ... (call sign)) on .. kHz (or MHz)?
QSR	Do you want me to repeat my call?
QSS	What working frequency will you use?
QST	Should I repeat the prior message to all amateurs I contact?
QSX	Will you listen to ... (call sign(s) on ... kHz (or MHz))?
QSZ	Shall I send each word or group more than once?
QTA	Shall I cancel telegram (message) No. ... as if it had not been sent?
QTC	How many telegrams (messages) have you to send?
QTU	At what times are you operating?
QTX	Will you keep your station open for further communication with me until further notice (or until ... hours)?
QUA	Have you news of ... (call sign)?
QUD	Have you received the urgency signal sent by ... (call sign of mobile station)?
QUE	Can you speak in ... (language), – with interpreter if necessary; if so, on what frequencies?
QUF	Have you received the distress signal sent by ... (call sign of mobile station)?

Getting Started in RTTY

by Bob Bristow, VK6POP

These days you can operate RTTY and other digital modes without using external hardware devices by connecting your transceiver to a computer via an audio interface that also operates the push to talk on the radio.

Interfaces can be bought off the shelf at Amateur Radio equipment stores, or you can home brew an interface. When purchasing a ready-made interface, you need to ensure that you specify the model of the radio you are connecting to.


YouTube video - Tutorial on interfaces

There is a multitude of design ideas available on the internet. Unless you're a home brew whiz, stick to the simple designs. If you're really lucky, and your transceiver is equipped with a USB port, the USB cable can usually perform all the functions of an interface. When you have successfully connected your radio to the computer, you' are ready to operate RTTY and other digital modes.

Whilst some of the material does not reference more recent developments in PCs and tablets, Don AA5AU has a website which is rich with useful information. It is well worth while visiting.

Next, you will need RTTY software. Probably the most widely used software apps are MTTY and WinWarbler, which have both been around for a while, and FLDigi, a more recent app, or rather a suite of apps combined that covers most of the popular digital modes. There are more, however I'll leave it to you to discover them.
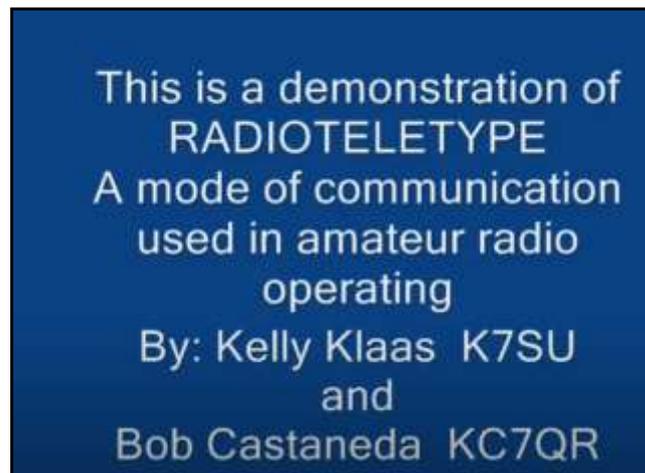
YouTube video - RTTY Demo

You do need to read the instructions to get the best out of the RTTY software, as audio levels and frequency adjustment are critical. But do not let that deter you.

There are now loads of YouTube videos and useful web sites to help you configure the software and your radio settings. Just use your preferred search engine.

Listen around the bands until you find RTTY signals and start tweaking. You will know you have got it right when your software starts decoding. Do not lose heart if you cannot decode - move on to another signal. You may have stumbled across someone using an odd mode. Also it is possible that your receiver missed a letters or figures shift when you first tuned in, causing your screen to show what looks like junk, but is really good decoding. This would resolve itself the next time the distant station changes between letters and numbers, such as when a callsign is sent.

When in doubt, get the station to send a few lines of RY characters, as it is easier to tune to a signal when you know what the text is supposed to look like.

It is a good idea to look out for RTTY contests so that you know there will be someone out there, and all using the standard Amateur Radio RTTY modes, so you can get the receive side tweaked, then the transmit side should follow on from there. The better way to get your RTTY up and running quickly is to team up with other interested people and get on air together. There's a RTTY Facebook group called "RTTY Operators" that is active and is a source of information and support.

Reach out to some like-minded locals and make it a joint project. That way you can help each other understand the mode, configure equipment and test your set-up on-air. It is always easier when you have a friend to work through a new mode for the first time.

RTTY is not as widely used as it once was in Australia, so when you get on-air, make sure you check our VK Band Plan and be careful not to transmit of some of the weak signal nominated frequencies (e.g. FT8, PSK31, WSPR etc).

Good luck with RTTY. It is a great keyboard chat mode, and like most digital modes it often gets through where voice won't. As a bonus, the learning experience sets you up for the more modern digital modes.

How did I get interested in AR ?

I had always been interested in electricity and certainly had a few "bites" along the way.

I was fortunate to spend some school holiday times in the local TV repair shop. The technicians were happy to teach me bits and pieces, so long as I responded to the call for "COFFEE", or " I need a 6BL8, NOW!".

My exposure to AR was through the TV – literally! I heard this strange voice coming through on channel 5 one day:

"*This is Victoria Kilowatt 3 America, London Zanzibar calling*"

Being quite shy, and reserved I decided to send him a report through the mail.. He was kind enough to send me a home-made QSL card. His kindness to accommodate me sparked my interest further and I started to use the old mantel radio that sat quietly in the corner.

By this time SSB was becoming more common and trying to understand "Donald Duck" talk was challenging.

Attached are a couple of my prized QSL cards from way back "when".

Each one that arrived was special, and all so inviting and encouraging.

I can share a few more another day.

Who else has QSL cards from their SWLing days?

Cheers, Colin, VK3NCC, ex-L3371

I've been really thinking… (yes, really)

By Staff Writer, David

How best *not* to engage with a regulator

There is an oft-repeated quote from Einstein that defines insanity as *"doing the same thing over and over again and expecting different results"*.

If the ACMA reject your proposal for a new amateur band at 70 MHz publicly, on two separate occasions, with increasingly forceful language, the message is plain:

Forget it.

Why then would you make the same proposal a *third time*?

70MHz has never been an amateur band in Australia, and the ACMA will not grant amateurs access. Period.

We have a great suite of bands, covering MF to microwaves. There is a good chance we will have access to 5 MHz in the foreseeable future.

Why fight a battle you can't win over a band that few would use? You just look, dare I say, amateurish…

Hardly "effective representation", is it?

How about some unity?

Firstly, some facts.

- Australian amateur examinations are provided via an outsourced arrangement with a commercial provider - AMC; and
- said provider has a 5-year contract.

Isn't it about time that the *entire* amateur sector accepted these arrangements?

We need universal support for the Government's contracted provider and the legitimate Australian amateur examination system.

If we are to grow our numbers and ensure our survival, we must put our differences aside and work for the good of the hobby….not push our own spiteful agendas.

Let's all work on promoting the hobby, encouraging growth and working **together** for everyone's benefit.

QRM Kill Kits

Ferrite kits to suppress unwanted noise in your shack. Click the image to head to our online shop.

National Special Interest Groups

Links to VK national groups with a brief explanation of their activites. Click on the image to visit their web site.

Morse code – VK/ZL site all about the code
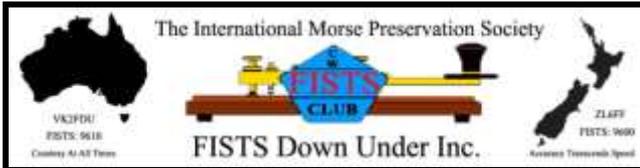
VK QRP Club – low power operation

Parks n Peaks – all about operating portable


VK Contest Club – VK Contesting

QRM Guru – resolving interference

VK Dmr Network – Digital Radio
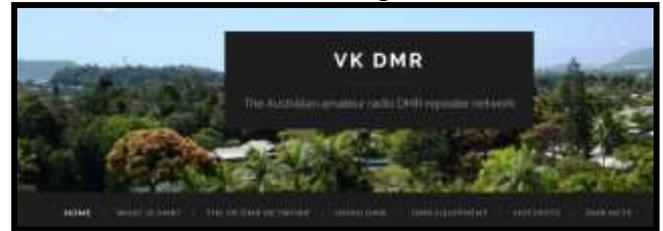
D-Star – Digital Radio
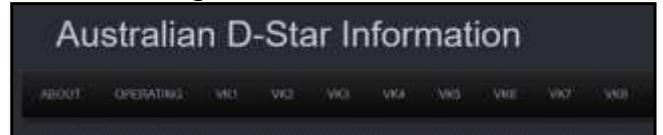
RAOTC – for amateurs licenced 25 years or more

ALARA – Ladies Amateur Radio Association

If you see we've overlooked something, please send us an email editor@qtcmag.com

Social Media Resources

VK Facebook Groups

Love it or hate it, here are some links to VK Facebook groups that may be of interest.

VK Home Brew
https://www.facebook.com/groups/16890373
84702683/
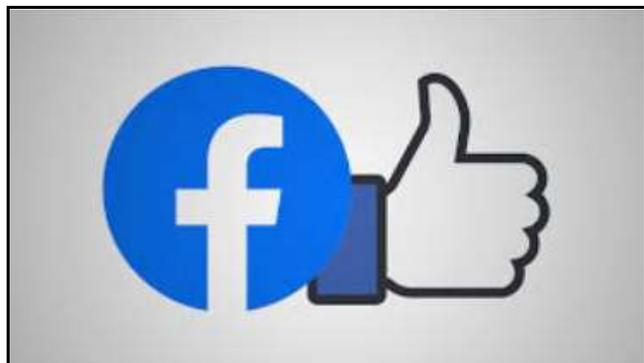
FISTS – Morse code Preservation Society
https://www.facebook.com/groups/17650585
20392148/

WWFF Australia – portable operating
https://www.facebook.com/groups/18057208
89702979/

SOTA – portable operating – Summits on the Air
https://www.facebook.com/SotaAustralia/

VK DMR Network
https://www.facebook.com/groups/74330087
9089972/

VK QRP Club
https://www.facebook.com/groups/VKQRPCl
ub/

80 metre FT8 DXing
https://www.facebook.com/groups/16098562
05711413/

QRM Guru – dealing with QRM/RFI
https://www.facebook.com/qrmguru/

Radio Amateurs Old Timers Club
https://www.facebook.com/groups/15454412
72389468/

Amateur Radio Sales Australia
https://www.facebook.com/groups/76828194
3267696/

VK Contests
https://www.facebook.com/groups/12394794
36169142/

28.490 VK/ZL Chat Group
https://www.facebook.com/groups/54684038
2880115/

If you see we've overlooked something, please send us an email
editor@qtcmag.com

VK Suppliers of AR Products