

Official Bulletin



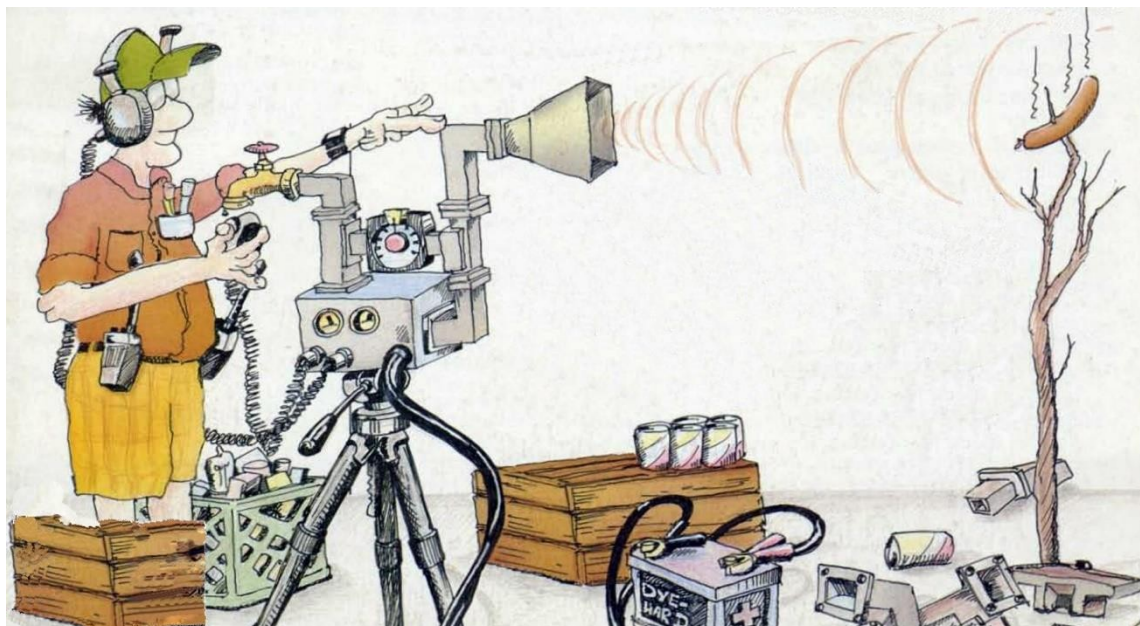
MHz to GHz

The West Australian VHF Group Bulletin

NOVEMBER 2016

THE WEST AUSTRALIAN VHF GROUP (INC)

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1. **Editor's Comments**

As most amateur radio operators know that the progress in electronics is amazing and the digital communications is expanding at a very fast rate. Typically the increase in digital voice, digital weak signal comms is a reality. Behind most of these systems is either a trustee PC or a microprocessor. Small powerful microprocessors such Raspberry Pie or Arduino units are readily available from electronic stockists. Check out the websites listed in **section 5**. There are wide range tools & accessories combined with the intellect and know how the amount of AR community is ever increasing. In the coming months a number of microprocessor projects is be considered for members. As a reader do you have suggestions or a project that club members would appreciate building?

More submissions from members would be appreciated. There is only 4 months to go before next edition of the magazine.

2. **From the President's Desk Terry VK6ZLT**

Would members consider submitting proposals as to what they consider would be a suitable activity for the benefit of all members? Having been an activity officer for the club since 2003 (I think) there are times when ideas of mine are not exactly what members are looking for, so come on how about some suggestions that would be appropriate for members to engage in or even demonstrate yourself some equipment you have. With 2017 looming on the horizon how about a concerted effort be made to expand each members to expand their knowledge, equipment and frequency use into the microwave regions.

Another facet which has been slowly deteriorating is that of radio propagation beacons run by the club.

Esperance VK6REP site loss

Bunbury VK6RBU Site loss

Augusta VK6RSW site loss

Mt Barker VK6RST pending GPS upgrade

Perth Wireless Hill VK6RSP Operational

Dampier VK6RSX operational

Perth VK6RPH operational (in doubt)

3. Report by Denis VK6AKR Vice President WA VHF GROUP.

On 5th November a club Saturday's Activity Day at Wireless Hill. The main feature of that session was a demonstration and explanation of DMR – Digital Mobile Radio. A good turn-out, thanks, with around 20 members / visitors able to come along. A good networking session was had prior to “the main event...”

Allan VK6MST presented a comprehensive PowerPoint show, whiteboard illustrations and demonstrations of some practical features of DMR such as radio wake-up, background messaging and on-screen callsign identification. In addition to that and because the infrastructure is internet / server based, his iPad device showed statistics of the calls he had made and received, as well as traffic throughout the world of DMR. He explained the topic of talk groups and other jargon associated with DMR in an approachable manner – knowledge that would have been very helpful during Jota, where Steve VK6VHZ had kindly loaned us a DMR radio. An amazing thing (to me at least) is that Allan claims relatively short experience with DMR but has obviously climbed a steep learning curve in style. Thanks to for the comments by Alastair VK6KIF during Allan's presentation.

There is a growing community of Amateurs in Western Australia involved in DMR. A standard or advanced call is necessary for operation. Following Allan's part of the presentation, and intermission, Steve VK6VHZ then gave us a walk-through of his DMR collection and explained the mix-and-match approach that could be used to achieve interoperability between units, with attendant economies of scale. A common battery charger, or microphone, or mounting bracket for

example could be used across a range of devices. Steve has clearly spent a considerable amount of time carefully researching the devices on the market and would be our go-to person for advice on DMR acquisition and use, I suggest. Other Group member such as Peter VK6FROG / VK6PCC is a keen user of DMR with a hand-held. Steve mentioned software that can be used in conjunction with a radio and sound card to decode the DMR streams but there is no comparable codec to use for transmission.

Thanks to Allan VK6MST and Steve VK6VHZ for a job well done. We are grateful to Steve for his kind donation of a DMR radio - used already at JOTA – and with the added knowledge will be used in other events and contests. Museums on the Air for instance, if the organizers agree to that modality.

During the intermission for refreshments, Steve VK6BBM and others attempted to use Roger VK6FRAN's QHA antenna for a satellite QSO. Unfortunately conditions prevented that but it gave us a chance to practice efficient set-up and tear-down of the antenna and TS-2000 interconnections. Perhaps we should invest in a couple of decent (30+ M) lengths of RG__ and connectors to make this setup even more time efficient until we can settle on operating parameters and have it permanently mounted on the shack roof or tower.

On behalf of the Group a big thankyou to all members for participating in Activity Days – they have proven a great networking medium and long may they continue to be a well-supported part of our organization.

4 DMR Radio Source

[http://www.dmr-marc.net/media/Amateur Radio Guide to DMR Rev I 20150510.pdf](http://www.dmr-marc.net/media/Amateur_Radio_Guide_to_DMR_Rev_I_20150510.pdf)

What is DMR

<http://www.taitradioacademy.com/topic/what-is-dmr/>

Australian DMR

<http://www.vkdmr.info/>

5. Web sites for Digital DIY Education for Amateur.

DDS sig gen 1 Hz to 60MHz.

<http://www.vk5tm.com/homebrew/dds/dds.php>

VHF/UHF Sig Generator

http://www.dxzone.com/catalog/Technical_Reference/Test_Equipment/Signal_Generator/

Arduino based Antenna analyser

http://www.dxzone.com/catalog/Technical_Reference/Vector_Network_Analyzer/

http://www.dxzone.com/catalog/Technical_Reference/Arduino/

Selection

6. *The Fusion Radio Repeater System by Will VK6UU*

Yaesu introduced Fusion about 3 years ago, a digital mode that offers a lot of flexibility in its various functions. There are two digital bandwidths available, wide and narrow. The occupied RF bandwidth is the same in digital narrow and digital wide, and is the same as 5Hz deviation FM, 16 KHz. In digital narrow the audio occupies half the bandwidth, the other half contains other information, such as distance between operating stations. This is printed on the screen along with the station you are in contact with. Users often configure their radio to show their callsign and name. This is most useful when mobile, a glance at the screen reminds you of the identity of stations, you don't have to rely on memory. Digital wide occupies most of the RF bandwidth and distance information is not available, but callsigns are. There is also forward error correction improving dropout when the signal becomes weaker.

The digital information is modulated onto 4 FM carriers. Fusion is actually FM but with 4 carriers, the digital information distributed across the 4 carriers. It has the designation of C4FM. Carriers 4, FM modulation.

The Fusion system also has a built in *GPS receiver and this* allows for the distance between stations to be displayed. When working through a Fusion repeater the distance is between the stations in QSO and not the distance to the repeater. If you use the radio inside and don't have GPS satellite access then the radio can be manually configured to the radios location.

Fusion repeaters are very flexible. They can be fixed FM only, fixed digital only or automatic mode selection (AMS) where the repeater switch automatically to whatever mode it is receiving and transmits that mode. Along with this the repeater can be configured to cross mode, for example, an incoming digital signal can be converted to FM and visa versa. C4FM when heard on an FM only receiver sounds like noise and does open the squelch. If the Fusion repeater is encoded with a CTCSS tone then FM only users can set their receiver on CTCSS decode and the C4FM transmission is not heard.

There are many features with Fusion, such as the ability to send digital files, photographs and APRS. The receiver displays a variety of direction information, including height.

Also there is the WIRES system that allows Fusion systems to interconnect Worldwide. Users can select rooms which are different areas of activity. For example there is one called AUS-REPEATER-NET which anyone can join and monitor activity in that room. By its name it indicates there is likely to be mainly Australian amateurs logged into that room. You can see how many are logged in as a number is displayed. You don't have to log in to a room, you can just monitor by being on the repeater's frequency. However, if you are logged in, call signs can be searched for of the amateurs logged in. There is way too much to describe in a short article like this in regards to WIRES.

So how is Yaesu Fusion in practice? Better than D-Star, in voice quality and drop out when you are mobile. C4FM recovers far quicker in a mobile situation than D-Star and with less R2D2 digital artefacts. It compares well in weak mobile signal areas and can outperform FM while

mobile. Cannot comment how it compares to DMR.

A personal observation. With so many emerging new technologies and so many options for amateurs today it could result in less activity! The reason, many of these new modes are locked to that mode, and as such can only talk to amateurs with that mode. If we all used SSB only then everyone could talk to everyone and as a result more activity.....?

Will - VK6UU

7. Fusion Data Reference

https://www.yaesu.com/pdf/System_Fusion_Text.pdf

<https://www.youtube.com/watch?v=upHvshoVvyE>

<http://www.trinityos.com/HAM/Yaesu-System-Fusion/Yaesu-fusion-and-c4fm-v7.pdf>

<http://www.mikemyers.me/blog/2016/2/19/d-star-dmr-fusion-which-is-right-for-you>

<https://systemfusion.yaesu.com/what-is-system-fusion/>

8. For those interested in using those Off Set Feed satellite dishes check out the following:.....

Off set dish calculator-1

<http://www.satellite-calculations.com/Satellite/Offsetreflector.htm>

Off set dish calculator-2

<http://www.electroniccircuits.com/electronic-software/parabola-calculator-for-satellite-dish-antenna-design>

Beam Width calculator

<http://www.tracking-antenna.de/antennas/beam-width-calculator/>

Parabolic calculator

<http://www.rfwireless-world.com/calculators/parabolic-dish-antenna-calculator.html>

On line calculator

<http://educyclopedia.karadimov.info/electronics/electroniccalculatorsatellite.htm>

Super 3G antenna

http://whirlpool.net.au/wiki/nextg_3g_satellite_dish_antenna

General antenna formula

<http://user.engineering.uiowa.edu/~ece195/2006/docs/AntennaFormulas.pdf>

Off set & asymmetrical antenna

<https://www.youtube.com/watch?v=pNg82yZZjqw>

W1GHZ Microwave Antenna Handbook

<http://www.w1ghz.org/>

I suppose you didn't think there was so much out there

New or Intending members

Why not checkout the following

<http://www.wavhfgroup.org.au/history>

<http://www.wavhfgroup.org.au/subscriptions>