



Founded 1979 Incorporation No A6677 P.O. Box 692, Shepparton 3632
March 2022

VK3RGV repeaters and transmitter operating frequencies Mt Wombat

53.725MHz (-1 MHz), **In Service** 146.65MHz (-600 kHz), **In Service**
438.2MHz (-7 MHz -D-Star), **In Service** 438.650MHz (-7 MHz 91.5 Hz tone), **In Service**
438.9MHz (-7 MHz - DMR), **In Service** 439.775MHz (-5 MHz), **In Service**, IRLP (node #6990)
476.475 MHz (+750 kHz) CB Repeater WBT03 Channels 3- 33, **In Service**
VK3RDS, 438.7625 MHz (-7 MHz DMR) **Shepparton on test @ VK3YNV QTH**

The three following repeaters are not the clubs but are allied to the club in one way or another.

Mt Major VK3RDU, 146.850 MHz, 439.875MHz. Mt Bruno VK3RWC 147.325 MHz **(-1.6 MHz 123Hz)**

Access to most analogue repeaters is by sub-audible 123 Hz tone or noise/carrier mute (less sensitive).

Your TX offset shown in brackets

Club informal on air get togethers, all welcome. Club call sign VK3SOL:-

Wednesday- 2mx repeater 146.65 MHz 8.00pm,

3.63 MHz SSB ± interference 8.30pm,

Sunday - 2 mx repeater 146.65 MHz 8 pm,

& The Vintage Radio Club - 2 mx repeater 11 am

Meetings the first Saturday of the month from 10 am for informal chats and technical talks. A BBQ follows (a gold coin donation). Business meeting 1 pm (except January when no meeting occurs) at Flexible Learning Centre, 18 Channel Road (250 metres from Archer Street), Shepparton.

Variations in these times, days and location are normally notified in the preceding newsletter.

Remember Covid rules and check the website for any changes re the meeting

Website – www.sadarc.org or www.sadarc.org.au Face book Page - Shepparton and District Amateur Radio Club Direct Link: <https://www.facebook.com/groups/481867453084459>

Note: Want to get your licence? SADARC has examination assessors, contact the secretary for details.

DISCLAIMER: - No guarantee is given as to the accuracy of information in this newsletter. E. & O.E.

Warning: - There is a danger of electrocution or injury when working on electrical/radio gear or working at heights doing antenna work. You do so at your own risk. 27/03/2022

President:- Rob Hose

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VK3YNV

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Facebook coordinator:- Rob Campiciano

VK2RK

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Communications Managers (External Events):- Bruce (VK3PNG) & Darren (VK3HEN) Glasson
Tech. Committee: Geoff VK3ZNA, Ray VK3YNV, Josh Gardiner & Rodney VK3UG – with power to co-opt.
Newsletter: - Rodney VK3UG (Editor) rodlynn6@bigpond.com , (Distribution) ?

President's Report (March 2022)

We had a good meeting this month with a good turn out and very interesting input from several members. It is great to see we still have members working on projects and experimenting. This is what our hobby is all about.

Sadly, we have been the target of a Scam which I hope all members are now aware of. It is always a worry when things like this spoil our interactions within the Club.

We are having a great time RF wise with many members able to make DX contacts. It reminds me of my early days as a Ham and all the stations I was able to work during the high sunspot period.

At our last meeting we discussed a trip up to Mt. Wombat to see the installation. I am sure it will be a worthwhile experience for all. In preparation of our excursion, I have asked Ray and Josh to give a short presentation about our installation on the hill.

Our next meeting will be on 2nd April commencing at 11:00 A.M. I will not be at the meeting due to medical reasons but I hope it will be of great interest to all our members.

Cheers and 73 Rob (VK3BLD)

SADARC MARCH. 2022 Meeting Minutes.

Club Rooms, Shepparton

In Attendance: VK3BLD Bob, VK3ZYZ Denys, VK2RK Robert, VK3BPH Kevin, VK3YNV Ray, VK3AXI Peter, VK3YYY Ian, VK3UG Rodney, VK3BF Alan, Josh, VK3AFD Arthur, VK3OV Pat, VK3ASK Peter, Bill C., VK3EB Dallas, VK3TJS Jacek, VK3ZE Huntly , VK3 ZNA Geoff, Stevo. Visitor James.

Apologies: Les VK3TEX, Andy VK3 AJA, Jim VK2JKN, Allan VK3FALN. Geoff VK3GSR.

Minutes of last Meeting: Read by Arthur VK3 AFD Moved By Rob. VK2RK Seconded by Denys VK3ZYZ With correction of "all-star" corrected to "IRLP" all In Favor.

Inward: Renewal notice PO Box \$139 , Licence renewal notice VK3SOL \$55, Mt. Wombat Internet \$142.80 (Ray VK3YNV).

Outwards: Nil.

Moved by Rob 2RK Seconded by Vk3 Ask all in favor.

Financial: No Report

Moved by VK3YYY Seconded by VK3ZYZ all in favor.

Technical:

2 Meter Repeater –Crackling on windy days. Due for a trip up the hill . Paul to be in attendance to sweep antennas.

If repair is needed to Co-linear antenna, getting it down and up again will not be easy. Swapping of antennas will be undertaken as an initial test.

IRLP linking – Rob VK2RK has proposal with minimal cost in setting up.

Rod VK3UG - 6 meters has a noise problem on receive, anticipate going up and trying some antenna swapping. – not wind problem.

Moved by Kevin VK3BPH, seconded by Jacek VK3TJS, all in favor.

General Business:

Ray VK3YNV -- Reported that Bill C. and the Vintage Club have acquired from the deceased estate of Bob Maggs some Parts including some LDF 450 which is available.

Bill C. Reported on the dismantling of Bob Maggs' 3 masts. And was impressed that Bob would climb an 80 Ft. tower and work on his antenna.

Rod VK3UG. Advised that we could be losing a member soon as he is relocating to Melbourne, Dallas VK3EB. Dallas said he would remain a member, and he is not far away.

Josh. In the future there will be changes to our email arrangements OK for 6 months

Rob.VK3BLD. Our Sunday night net is not well patronized should we continue? – A change of time was discussed. It was decided to leave as is for now.

Rod.VK3UG Moved that the commencement time of our monthly meeting be changed from 10.00 am to 11.00 am. Seconded by VK3YNV, all in favor.

Rob. VK3BLD. Asked, As Andy will not be providing the BBQ, who will be responsible? Should we have BBQ or Pizza? Will contact Andy.

A welcome was given to Visitor James who is working with security. Has questions on radios and antennas. Could be interested in gaining a license in the future.

Meeting Closed. 1.40 pm.

DC Voltage conditioner

One of the problems when a two-way radio is powered by an external power supply is the voltage drop at the radio due to the resistance in the power cable used.

Using my ICOM IC7610 with the factory supplied DC cable, in RX mode the DC voltage at the radio input terminal was 13.5 Volts, when in TX mode with maximum power (110 Watts) the current draw was 16 Amps, the voltage dropped to 12.9 Volts, calculating the combined positive and negative wire resistance of the cable results in 0.0375 Ohms

$$R = (13.5-12.9)/16 = 0.0375 \text{ Ohms}$$

This resistance does not seem to be a lot, however in TX mode the voltage drop is 600 mV dropping the input power from 216 Watts to 206.4 Watts a loss of approximately 10 Watts.

Input Power of $13.5 \times 16 = 216.0$ Watts

Input Power of $12.9 \times 16 = 206.4$ Watts

In a simplistic explanation, the action of the ALC that controls the RF output power will accommodate this power loss, however it decreases the efficiency of the Power Amplifier, further the SSB RF peaks will be reduced even when the ALC compensates for the lower power, Note that ALC response has hysteresis such that the power peak maximum value has to occur before it's controlled, therefore having the lowest possible voltage drop at the radio DC input improves the SSB peak response along with the efficiency of the RF finals that will reduce the current draw from the power supply.

Another way to look at this is to say that the power supply has to offer the lowest possible impedance to the radio, delivering peak currents without a voltage loss, The lower the impedance the less voltage loss, the cable connecting the power supply to the radio is part of the delivery impedance, this is often ignored.

In a base station installation the effect can mostly be eliminated by having the power supply located as close as possible to the radio making the DC cable short, not possible in a mobile installation.

The rule is basically this, keep the resistance of the DC source to the load as low as possible either by increasing the diameter of the cable or by reducing the length of the cable.

There is another way, that of using a super capacitor placed as close as possible to the radio DC input, such that the DC source impedance is so low that can supply very large peak currents and minimal voltage drop, I say minimal as there always will be some resistance be it in a fuse or length of wire a switch contacts or a solid state device, but if very small it can be ignored.

Using a super capacitor presents some problems.

- a) Initial inrush current is very high only limited by the charging source.
- b) The stored charge is very high requiring proper safe handling (Will melt wire)

It's not as simple as it may appear to just add a super capacitor, the inrush current must be limited allowing the capacitor to charge to a voltage value such that the charging current is within the range of the power supply capacity, as the capacitor voltage raises, inversely the required current reduces.

When dealing with capacitance values of over a Farad the time to charge the device is considerably long largely controlled by the available current from the power source.

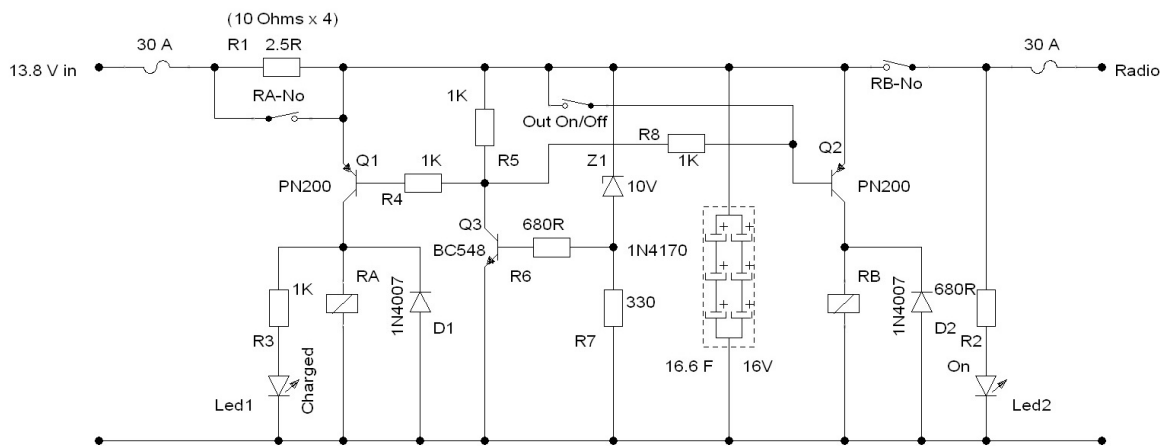
Understanding that the initial charge of the capacitor must be controlled with safety in mind, and that we are dealing with metal melting currents, ignoring these conditions can result in damage to the power supply or worst. To give some prospective the stored energy is calculated $E = CxV^2/2$

Thus $16.6 \times 13.8^2 = 3161.304$ Joules This is a huge number that needs to be respected, converting to Coulombs (1 Joule = 1 Coulomb) The definition of a coulomb is 1 Amp per second so having 3161.304 Joules stored can deliver in an instance almost infinite current only limited by the resistance in the circuit.

Handle super capacitors as you would a fully charged car battery.

Having provided the required protections, the device can be placed as close as possible to the radio the cable voltage drop due to the I^2R losses are largely cancelled out by the action of the capacitor.

Circuit Operation



The Choice to use automotive relays:

This was largely in consideration of the voltage drop across the switching devices, further requiring no heat sink to dissipate any heat caused by the voltage drop.

I considered a MOSFET but the voltage drop across Drain and Source is high, typically greater than 1 Volt, thus this drop would defeat the concept of a low impedance voltage source.

Fully discharged condition:

1/ When power is applied DC current flow from the power supply and charge the super capacitor via R1 limiting the inrush current. At this time RB is Normally Open providing no power to the radio.

2/ The Zener Z1 and R7 form the voltage sensing circuit. When the voltage at the super capacitor reaches 11 Volts Q3 transistor is driven into saturation this in turn drops the voltage at the junction of R4 and R5 to 9.6 Volts forward biasing Q1 to saturation energising RA whose contacts bypass the current limiting resistor R1, at the same time the unlimited charge tops up the supercapacitor to the power supply DC value, if the on/off switch is open contact RB will be closed and voltage is applied to the radio.

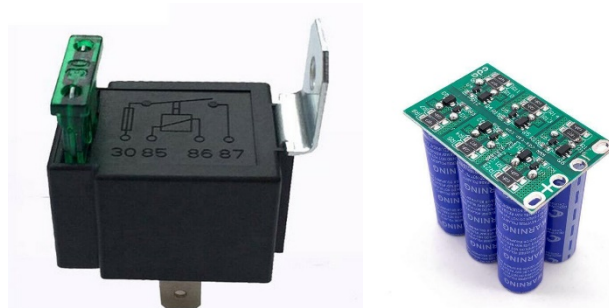
The initial charge time is 1 minute, LD1 indicates the readiness of the unit in that the Super capacitor is fully charged. Note that power is applied to the radio, only when the super capacitor is fully charged.

Partially Charged condition:

When the unit is disconnected from the power supply with the radio turned off the circuit will discharge the super capacitor to approximately 10 volts, this residual voltage is retained for several days, the leakage currents involved are very low in both the super capacitor and the control circuit around it, thus when the device is powered by the power supply, the charge time to top up is very short almost instantly reaching the working voltage of the power supply. If the device remains attached across the power supply and the radio there is no charging time to consider.

Chosen relay and Super Capacitor

Obtained from eBay, Relay and super capacitor, relay with built in fuse making construction simpler not having to have separate fuse holders.



Note the above is a theoretical design not yet prototyped.

The concept is to have an extremely low power supply source impedance that offers peak currents as required by the transmitter with no or very small limitations, efficiency of both power supply and radio are increased.

Robert Campiciano VK2RK

Some extra thoughts on Robert's DC conditioner.

Having read Robert's article on the DC conditioner I find it to be a very effective way to overcome power lead voltage drop when using CW or SSB transmit modes, in fact any mode that is not constant carrier. I have not built it but see no reason why it would not work as stated. Read Robert's comments that heavy leads are desirable from any high current low voltage supply to minimize voltage drop. Think of the voltage drop when we had cars with 6-volt batteries.

Robert said that the output of transmitters dropped by 10% if the voltage to them dropped this amount. This may be true of some later rigs, but older rigs on 12 VDC however will not just drop 10% in output power with a drop in voltage drop of 10% in fact they will drop to around 81% of output due to the inverse power law. Some drop even more. Hence this conditioner is even more important for older rigs. AC operated rigs also have the same problems and many USA rigs designed for 115 volt and 230 volts (sometimes switchable), the mains voltage on 115 volts was found to sag too much for proper operation on this voltage. They recommended that the transmitters be run on 230 volts. Most USA premises had or have a centre tapped 230-volt supply and it is intended that light duty items work off 115 volts (centre tap to one end of the winding) whilst heavy current drain items ran across the whole winding.

Robert's design is a belts and braces design and if you don't require some facilities, it can be slightly simplified. Keep in mind with a 13.8-volt supply that R1 will dissipate around 76 watts at turn on with a current drain from the supply of 5.5 amps. This power dissipation will drop fairly quickly as the 16.6 Farad capacitor charges. The resistor(s) can be overloaded for a short period but Robert suggests that four 10-watt ceramic resistors will survive this treatment as it is not as if 76 watts is being dissipated for long or often. The decision will be yours. I'd give it a go at that.

Rodney (Editor)

For Sale

Yaesu FT101E, complete with AC & DC leads, desk and hand microphones, user and service manuals.
\$300 Contact Huntly VK3ZE 0428 311 630. (Located in Shepparton)

Editor's Ramblings

- Adds for members are free. Just contact the editor with the details of what you want to **sell, buy or exchange**. **Or for that matter help you would appreciate on a project.**
- Things are starting to settle down with the introduction of our new president, secretary and treasurer. This follows on from the significant easing of COVID restrictions, so we should get back to near normal soon. It behoves all members to assist the new hierarchy of the club to maintain the high standard of co-operation enjoyed over the last decade.
- The sun spot cycle is coming out of its trough so improved radio conditions can be expected over the next few years.
- The Australian Antarctic Division will have completed its summer supply to the bases at Mawson, Davis, Casey and Macquarie Island by the time you get this newsletter. It is interesting (particularly for me) to follow the movements of the ships, the extremely rough seas they experience, high winds and the difficulties getting personnel, goods of various sorts and fuel ashore. A total of four polar ships were involved this season, the smallest being around 2,000 tons and the largest the Nuyina at 22,000 tons.
- As many would know, with assistance from several others I compiled and wrote a short history of Radio Australia at Shepparton. I am contemplating reproducing the extremely long article with photos into the newsletter. It covers pre-Shepparton site information from 1928 to 2020 when in 2020 we were given the opportunity to use the antennas at Radio Australia for amateur radio use for a period of 48 hours over the 14/15th March 2020. The history is extremely lengthy; therefore, it will not fit into a single short newsletter article. If there is sufficient interest, I would be prepared to include it in the newsletter in around 15 segments over as many months. The segment lengths would vary from around 3 pages to much larger. I could run the introductory segment so you could see what it would be like. If implemented, it would take second fiddle to more time important articles in any particular newsletter. Let's know whether this is suitable for the newsletter.

Rodney VK3UG (editor)