

WANSARC NEWS



Wansarc is an affiliated club of the Wireless Institute of Australia

Volume 40 Issue 11—December 2009



Western and Northern Suburbs Amateur Radio Club VK3AWS
Incorporated in Victoria A7611S



Here's something to "crow" about! The PI tower is starting to sprout antenna seedlings however it has been a struggle to keep our feathered friends from "splattering" all over the place. Very bad cases of QRM! Enter a local group of crows and the problem has been solved—most of the other local birds are now a little wary of propping on the tower for a bit of pooping.....and who said crows don't like ham{s)! MERRY CHRISTMAS ALL!!

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Calendar for DECEMBER 2009

- **Friday December 4 2009—It's the CLUB DINNER at the NMIT Restaurant. 1900 for 1930 start. Haven't booked yet? See details in this newsletter.**
- **Tuesday December 1,8,15,22,29 - CLUB VHF NET** Come on and join in and catch up with the latest member projects and news. 146.450MHz is the club net frequency on FM and we look forward to hearing from members and visitors.

NEXT MEETING—CLUB DINNER

FRIDAY DECEMBER 4, 2009 — A reminder to club members that the final club meeting of the year will be the Annual Dinner, to be held on **FRIDAY DECEMBER 4, 2009**. The venue will again be the NMIT Restaurant in St. Georges Road, Preston.

Gordon, VK3YOD, has advised that the cost of the dinner will this year be \$30. A menu has not been available from Gordon and NMIT however if past performance is anything to go by the meal will again be scrumptious.

If you have not already put your hand up to attend the dinner, no problems. Please contact Gordon VK3YOD to advise of your intentions and number of persons attending.

Gordon can be contacted on 0425 738 181, via email at ghall@nmit.vic.edu.au or vk3yod@optusnet.com.au or at the clubrooms in person.

Look forward to seeing you all at our final club meeting for the year.

EXTENDING MY SQUID POLE by Martin VK3FMJP



Well after some more tinkering, I thought I could bore you some more information and help populating the club news letter.

I wanted to try using the 3mtr squid pole that I bought from the club with a balun/trap set-up for 40-15-10.

I didn't want to buy another 9mtr squid pole so thought I could extend the 6mtr unit. I had a hunt around my favourite hardware chain and found some PVC high-pressure pipe that fits the bottom of the squid pole nicely (about 40mm) The 40-20mm reducer slips over the pole nicely too.

The reducer has an internal lip that I filed out so it doesn't damage the pole. The PVC is glued except for the top reducer that is a friction fit at the top. (This pole has some copper pipe that is slotted so that I don't damage it when using the the 'python' clamp on the dipole unit that you might have read about previously. No point in removing it each time.)

In short, have a play.

The extension can be made as long as I need within reason.

I can add extra lengths of pipe and insert a length of wood dowel inside the 'Plasson' plastic pipe to add some rigidity. The plastic pipe comes in differing lengths and is threaded each end.

In order to resist slipping, I put a bolt into a plug that can be swapped around as needed.

I plan to fasten it to any hand post or I could also use this on the tri-pod unit I converted from an ex-army 'dumpy level' and of

And another idea- Attached is a photograph (right) of a groundscrew, available from your local hardware giant starting with B Could be useful for setting up a portable light weight mast as there is a reasonable depth inside.

There is a rebar inside to screw it in plus some collets to allow for differing diameter of mast/umbrella etc.

They could also make a sturdy tie-down on a corner of a large tarp/tent annex or portable tower as they are easy to get out of the ground too- sometime an issue with stakes. 73s Martin VK3FMJP



Z MATCH ATU by Peter VK6YSF

The Z-Match Antenna Matching Unit was constructed and refined for use with my all-band HF dipole at my previous residence in Melbourne, Victoria from 2004 - 2007

The ATU, *sorry Graham*, AMU (Aerial Matching Unit) is an integral component of my all band HF dipole. After talking to a number of hams and having an exploration of the internet, I finally made the decision to construct Lloyd Butler VK5BR's version of the Z-Match. Lloyd's web site describes a version of the Z Match designed for High RF Power, which is suitable for the maximum 400 watt Australian amateur power limit; this design also featured the ability of 160metre band operation which appealed to me as my HF transceiver was capable of working this band and of cause it's another band to explore!



There is a lot of debate amongst amateurs when it comes to antenna systems and there appears to be two strict camps when it comes to the use of AMUs or antenna matching units. The table below displays the key arguments for and against.

For	Against
Operational over the entire HF band.	Difficult to operate
Suppressers transmitter harmonic radiation.	Introduces some additional losses
Acts as receiver band pass filter, attenuating strong signals on adjacent bands.	

I'm sure that there are many more additions to the above list that could be made. My opinion is that there is little against the use of AMUs. While it is not a simple flick of switch to change bands it is still very straight forward and will require less that a minute to change bands and retune once practiced.

While there can be some additional losses within the AMU, this is negated in most cases as the use of open wire feed line is much lower loss than coax particularly when high SWR are present on the system. Also the transceiver will in most cases see a perfect 50ohm load and be a lot happier.

The main factor that determines the final power rating is spacing of the variable capacitor plates, and as I only intended to run around 100 watts I selected two broadcast type variable capacitors with little concern for the plate space. This was a big mistake as there appears to be always one or two bands that generate voltages up towards the kilovolt across the capacitors. The result was sporadic arcing on the both variable capacitors.

The project was redesigned with the largest broadcast type variable capacitors that I could locate and the transformer coil was redesigned with the ability to switch in more turns to the secondary winding.

Performance

The performance has been almost faultless despite both variable capacitors experience some arcing at 100 watts on two bands. However with the ability to switch in alternate tap positions this problem is over come and operations on all bands is achieved.

An interesting operational note is that tapping in more secondary turns is not always the solution. In some cases the arcing is over come by tapping less turns. Treating the coil as a simple transformer is not as straight forward in a resonant situation I guess.

The 160metre band has been trialed and despite the successful performance of the Z-Match the short dipole is very inefficient at this frequency resulting in a limited number of contacts.

Z MATCH ATU by Peter VK6YSF (continued)

Operating Limitations

For operations below 10 MHz particular care is needed in relation to the power handling capabilities that is manifested as arcing across the capacitor plates. The solution to the capacitor arcing may be resolved by selecting the ideal tap position.

A related issue on the lower frequency bands and in particular the 80 and 160metre band is the very high Q that the matcher exhibits. This allows the matcher to operate over a very narrow range of frequency before require further retuning. Again the 80 metre band requires retuning after a frequency shift of less than 20 kHz. The chart at right (Figure 1) illustrates this effect. At least the occasional knob twiddle makes you feel like you drive the station!

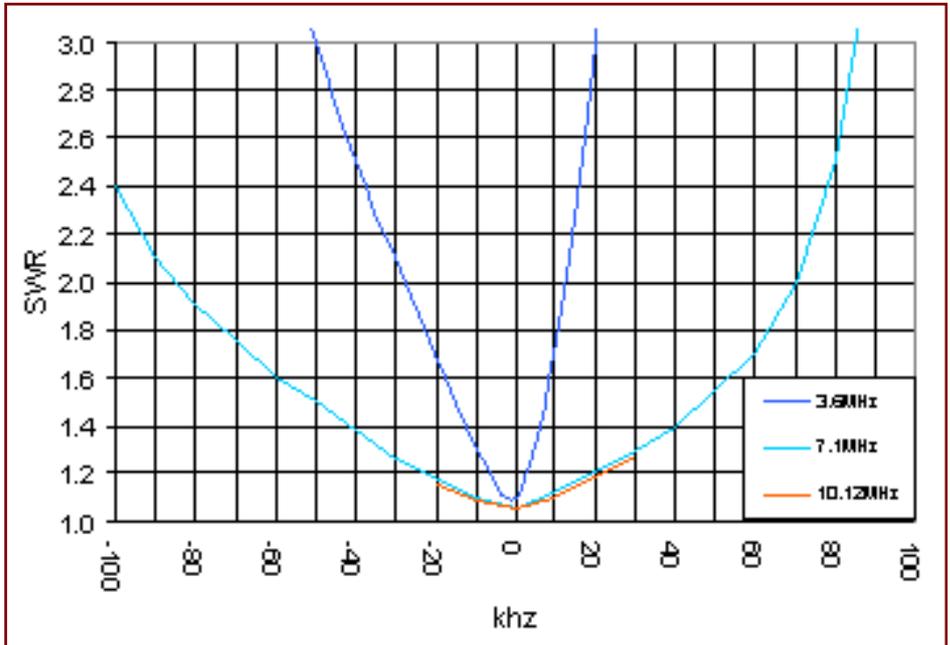


Figure 1

The chart below (Table 1) is used to guide the operation of the Z-Match but of course will be unfortunately different for every antenna system including the feed line that it is connected too. But it serves to indicate that once the operational experience is recorded in a convenient form it is not too onerous a task to hop from band to band.

FREQUENCY	SHUNT	SERIES	BAND	TAP	SWR
1.84	27	54	C	1	1.1
1.85	29	54	C	1	1.1
3.60	44	56	B	1	1.1
7.10	75	74	A	1	1.1
10.13	23	74	B	2	1.1
10.13	23	74	B	2	1.1
14.20	37	28	A	2	1.1
18.10	51	28	A	2	1.1
21.20	61	45	A	2	1.1
24.95	74	14	A	2	1.1
28.50	82	58	A	2	1.1
29.50	84	55	A	2	1.1

Table 1

Practical construction issues.

L1 and L2 Perspex Support Former.

Coils L1 and L2 are wound with around 1.5mm diameter bare copper wire. The coil former is made from 3mm perspex sheet and drilled as per diagram to support the turns of the L1 and L2 coils. Note the diagram is displayed upside down.

The wire size is not critical, but heavier is better. Bare copper wire was used as it was what was available.

Drill holes are all 2mm.

The coil support former is mounted with two right angle aluminium brackets attached to either side coil support former.

L1 = 14 Turns, Tap at 7 and 10 Turns from cold end.

L2 = 6 Turns Tap at 4 Turns from cold end

Z Match ATU by Peter VK6YSF (continued)

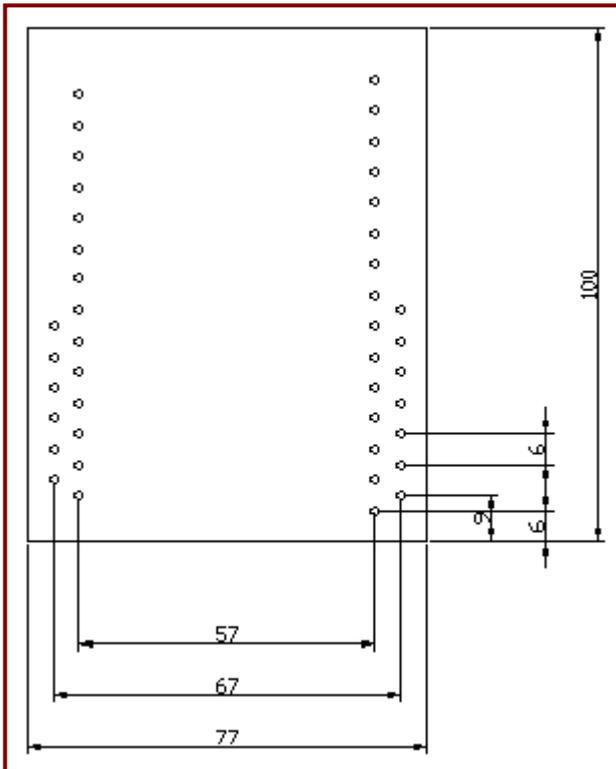


Figure 2 (above) —L1 and L2 Perspex support former

Other component mounting considerations.

The both sides of the C2 variable capacitor are above ground and therefore C2 must be mounted so that it is insulated from the grounded chassis. I chose to mount C2 on a small sheet of Perspex mounted about 2cm above the chassis. The C2 spindle is also connected by a short section of 6mm fibreglass rod to the control knob. Both variable capacitors have been mounted using the same technique for consistency, but with the frame of C4 being grounded to the chassis. See photos.

Both variable capacitors are controlled with a 6:1 planetary reduction mechanism as operationally it would otherwise be impossible to set the correct amount C for many frequency settings.

Balance Capacitor

The Z-Match antenna matching unit while not exclusively designed for a balanced antenna system is particularly well suited to this configuration. A balanced antenna system requires that each half of the dipole as well as each side of the transmission line be a near mirror image and should also avoid nearby trees and structures in particular metallic structures. When the system is balanced the transmission line will have equal, but opposite current flowing in each line. This will cancel out any radiation or reception on the transmission line.

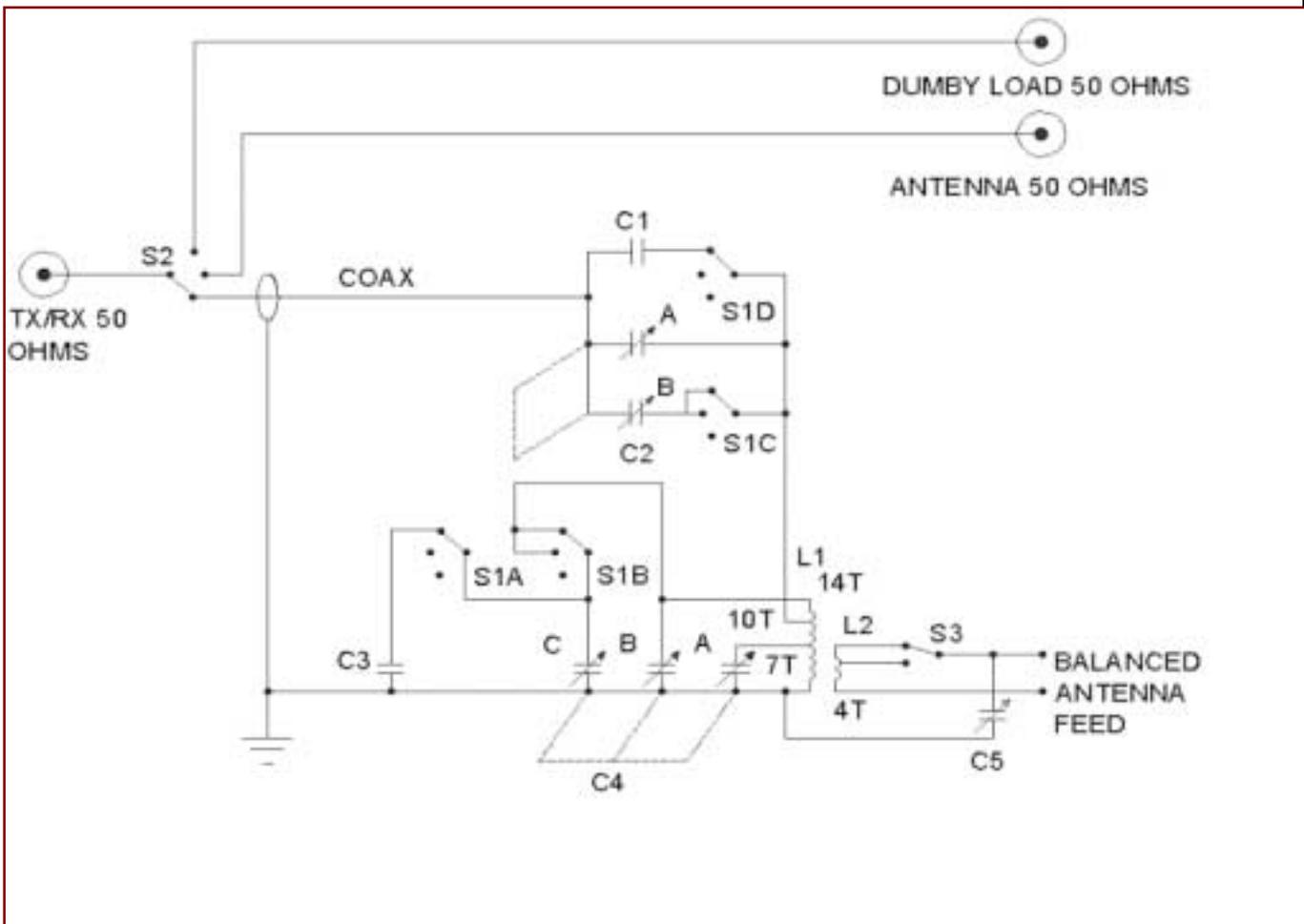
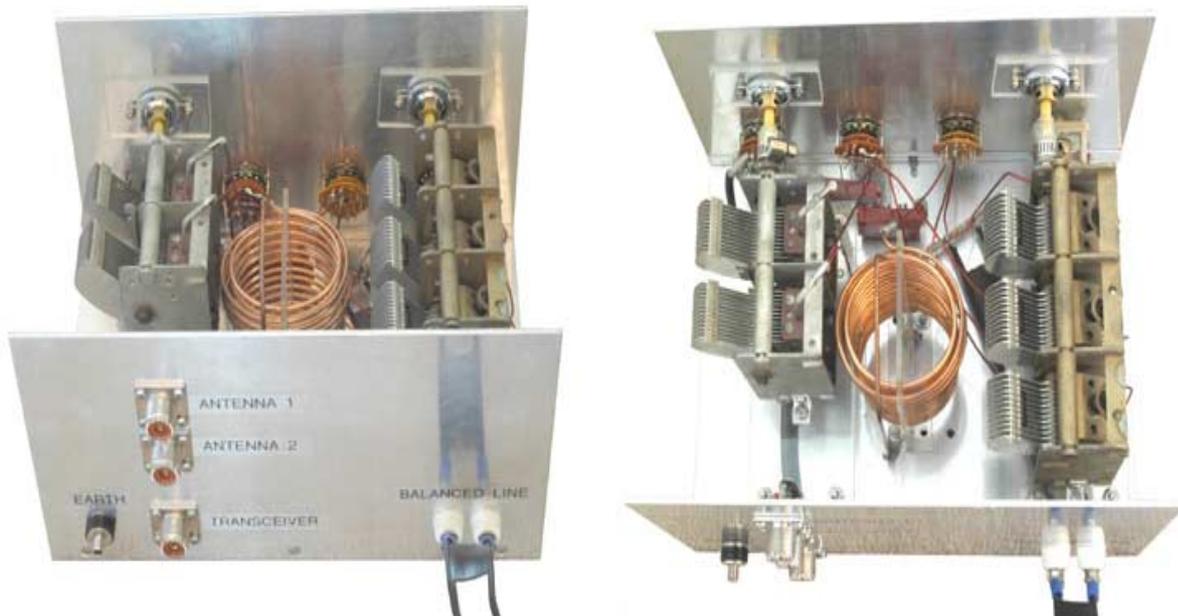


Figure 3—circuit diagram of the Z Match ATU

Z Match by Peter VK6YSF (continued)

C1	500pF 2000V Mica	S1	4 Pol, 3 Position Rotary Switch
C2	2 Gang Capacitor 415pF (Load)	S2	Single Pol, 3 Position Rotary Switch
C3	500pF 2000V Mica	S3	Single Pol, 2 Position Rotary Switch
C4	3 Gang Capacitor 350pF (Series)	L1	14 Turns, Tap at 7 and 10 Turns from cold end
C5	25pF Variable Capacitor (Balance)	L2	6 Turns Tap at 4 Turns from cold end

Table 2— Z Match components



Two views of the completed Z Match— ready for operation

The transmission line is the main reason for maintaining a well balanced system as it will be prone to radiating and receiving signals as it enters the radio room. Devices such as computers radiate noise which may find its way into the sensitive radio receiver and strong fields around un-balanced transmission feed may interfere with other sensitive equipment.

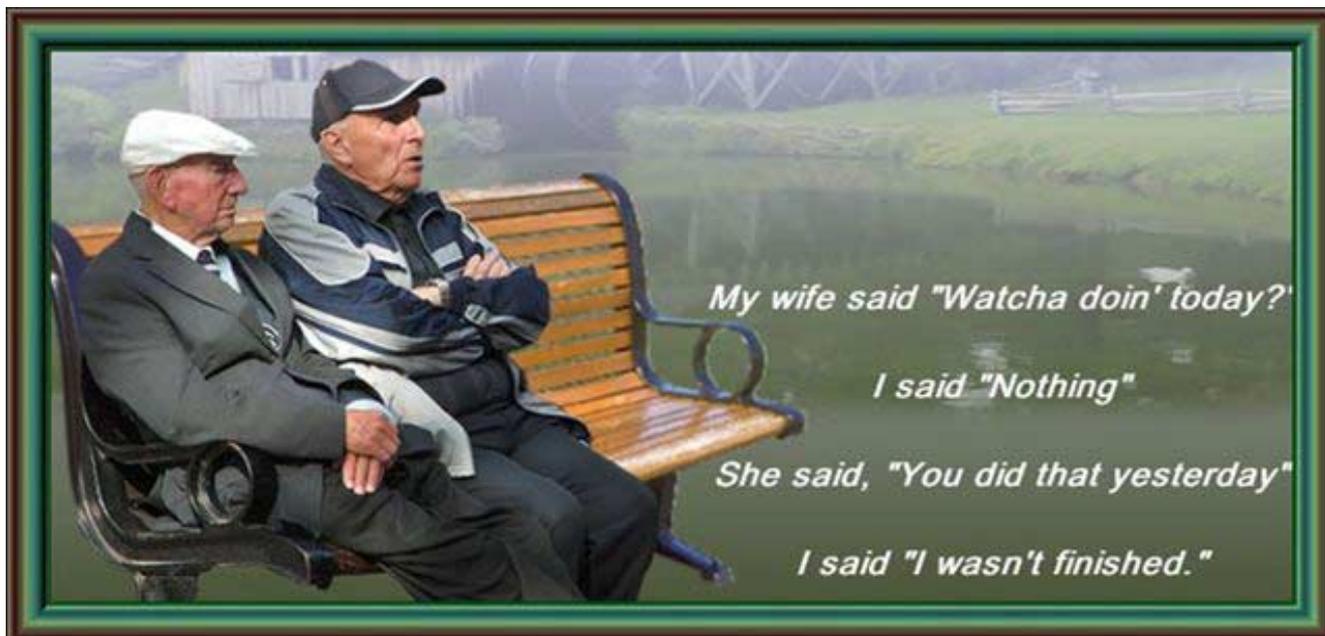
A real world issue for many if not most balanced antenna systems is achieving this more or less perfect balance. Imbalance is primarily caused by more capacitive coupling to one side of the system than the other. This coupling often occurs within the matching unit itself. Lloyd Butler suggests a method to counter this effect by simply adding additional capacitance to the opposite side the system. There for I have added this feature to my version of the Z-Match. Which side requires the additional capacitance is a bit of trial and error, but a method to test for balance is to measure the current in each leg simultaneously and observe if they are equal or to simply adjust until locally generated noise reduces. The further the problem noise source is from the antenna system the more likely it will be the antenna and not the transmission line that is receiving it and the less effective the balance capacitor will be.

For more information on the Z-Match Antenna Match. See Lloyd Butler VK5BR web site:

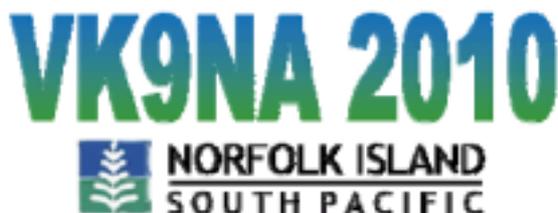
<http://users.tpg.com.au/users/ldbutler/SingleCoilZMatch.htm>

Cheers Peter VK6YSF

AMATEUR REFLECTIONS from Graeme VK3PGK



VHF/UHF Microwave DXpedition from Mike VK3KH



A team of experienced VK amateurs is heading to Norfolk Island this January to operate bands from 6 metres to 10GHz. The DXpedition will operate from **3rd January – 14th January 2010 from Norfolk Island (OC-005) (RG30XX)**

The team from the **VK uWave Group**, will be **Alan VK3XPD, Kevin VK4UH and Michael VK3KH**. Preparation and preplanning is progressing well with accommodation and airfares already booked. As with most

remote operations the airfare cost and arrangement are the most difficult part, particularly as the group plans to take a 1.2 metre dish for all bands from 1296MHz through to 10GHz.

A group of VK5 and VK3 operators has organised to travel to Port Macquarie on the NSW coast, with full Microwave gear, to take advantage of the opportunity. A number of ZL operators have also indicated their interest in setting up at favourable locations on the NZ North Island.

It is hoped to use 2 metres as the main propagation indicator, and then move up the bands as propagation/conditions permit. The group will have internet access, and will use the **VKlogger** (www.vklogger.com) as the main method of liaison. Operation will be SSB, CW and where possible Digital modes for Meteor Scatter and Tropo paths.

6 Metres will be part of the operation, and we are hoping for opportunities on the "magic band" in all directions. As this is the main Sporadic E season, anything is possible. We will have HF capabilities, but these will be limited as VHF,UHF and Microwaves are our prime focus.

THANKS from Mark VK3PI

To all contributors to our humble WANSARC newsletter, my thanks for your efforts in making my production job easier each month. We have been able to share in some wonderful articles in 2009 and I trust we are fortunate to have such contributions in 2010. Our next newsletter will be produced in late January 2010 prior to our next club meeting in February 2010, so in the meantime very best wishes for a safe and Happy Christmas/NEW YEAR and we look forward to your continued contributions to the newsletter in 2010.

WANSARC CLUB PROFILE

History

The Western and Northern Suburbs Amateur Radio Club (WANSARC) was first formed in 1969 and since then has served the needs and interests of amateur radio operators, short wave listeners and those interested in hobby radio and electronics. The club is not gender specific, having both female and male members. Members come from all walks of life with a mix of experience, young and mature, novice and technical. The most important aspect of the club is the willingness of all members to share their knowledge for the benefit of others. Members mainly reside in the west and north of Melbourne; however membership is encouraged from all interested.

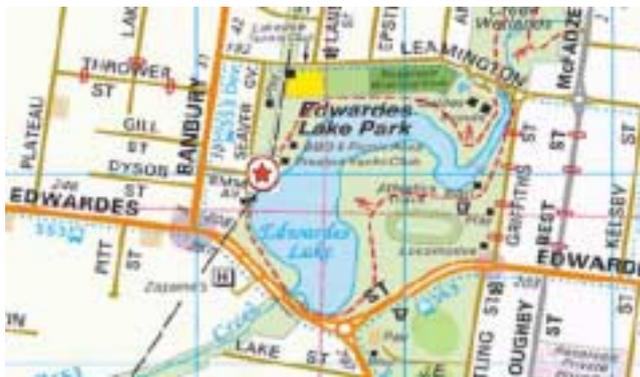
Meetings

FIRST Friday of each month except January at the Ern Rose Memorial Pavilion, SEAVER GROVE, RESERVOIR. See map). 7.30pm local time start.

Talk in on 146.450MHz FM—call club station VK3AWS.

Benefits

Free technology and related presentations, sponsored construction activities, discounted (and sometimes free) equipment, network of like



minded radio and electronics enthusiasts, excellent club facilities and environment plus an informative monthly newsletter for members to post articles, news, classifieds for all radio, test equipment, etc, featuring Amateur Radio news from WANSARC, WIA, ACMA, Melbourne Clubs, VK and Worldwide.

Club Nets

146.450MHz FM each Tuesday evening commencing 7.30pm local time. Also monitor 28.470MHz on 10 metres USB.

More Information: Website: www.wansarc.org.au

Email: wansarc@wia.org.au



Don't forget the "club" meets on air regularly on 146.450MHz FM.

Next meeting Friday December 4, 2009 AT NMIT restaurant, 1900 for 1930 start time. Bookings essential.

If not delivered within 7 days, please return to WANSARC, PO Box 336, Reservoir, 3073

Australia Post stamp here