

# WANSARC NEWS



Wansarc is an affiliated club of the Wireless Institute of Australia

Volume 40 Issue 5— June 2009



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

## WHAT CAN YOU GET FOR A "FIVER" ???



Well, why not find out by coming to the next club meeting on **JUNE 5, 2009**?

That's when the WANSARC clubrooms become buzzing with the wheeling and dealing of items for sale less than or equal to \$5!!

Members will have their "pre-loved" bits and pieces available for you to purchase for ridiculous prices and one can only imagine the quantity of odds and ends available on the night.

So fill your pockets with gold coins and \$5 notes, bring your carry bags and boxes ready for collecting those prized items you have been looking for.

And don't forget that Don VK3HDX has donated a very nice piece of equipment as a door prize on the night! But you must be on the premises to have your chance of taking home this "up to date", new fangled radio item!!

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### Calendar for JUNE 2009

- **Friday June 5 2009** — The WANSARC "FIVER" night—come down and buy and sell your odds and bods for no more than \$5 a bundle.
- **Tuesday June 2, 9,16,23,30** - CLUB VHF NET 146.450MHz 1930 hours local time call Club station VK3AWS
- **Sunday June 14**— WANSARC "FOXHUNTING" day— let's have as many members and families along.

## WANSARC COMING ATTRACTIONS

**FRIDAY JUNE 5, 2009** — Come down to the club-rooms with all of your preloved gear for a **“FIVER NIGHT”**. What is this you say? Members are invited to bring down equipment for disposal, however nothing for sale is over \$5! It’s amazing how much you can enjoy picking up some real bargains with a handful of **“FIVERS”** in the pocket.

So start saving your small change and FIVER notes, or get that shack cleared of your little nick knacks and bring them down to the club for a great night. And you never know, an auction or two of some other items may provide a pleasant surprise!!

Meeting starts at 1930 hours with the formal **“stuff”** followed by the wheeling and dealing.

**SUNDAY JUNE 14, 2009**— Following on from the very successful foxhunting presentation at the May 1 meeting, and the foxhunting construction activities on May 17, 2009, now is the time to put all of this into action. So test your new foxhunting gear and come along to the **WANSARC “FOXHUNTING”** day. Members and their families are welcome to attend. Great prizes, great company, and RSVP by .....

**FRIDAY JULY 3, 2009**— **“CHRISTMAS IN JULY”** family night. Yes, it’s that time of the year where the days are short, the temperatures low and a need exists to get together in a warm location and drink and be merry. So pack up your car and family and head for the old **“Tina’s”** haunt. You know where it is—just north of the corner of Plenty Road and Murray Road, Preston. (near Beauchamp Street).



## MORE ON THE FOXHUNTING—JUNE 14 2009

Many thanks to Don, VK3HDX for being the prime catalyst for the foxhunting day and for arranging catering and prizes for the day!!

The plan for the foxhunt day is as follows,

- 10:00** Meet at the clubrooms
- 10:30** Brief on the foxhunt, discuss any weather issue’s
- 11:00** Practice Fox Hunt, Hunt will be a single transmitter on 2 metres constant carrier with tone.
- 1200** Meet back at clubroom for a debrief on foxhunt
- 12:30** Lunch
- 13:30** Second Hunt, Hunt will be a multi transmitter hunt on 2 metres alternating on & off with tone, you must find both transmitters.
- FINALLY** Back at the rooms to award placings & prizes.



Rules will be explained on the day, but will be very simple & weather dependant.

All hunts’ will be confined to the Edwardes Park area and will be conducted on foot.

The recent construction day was a great success, with 20 or more members busy on the day playing **“construction”**!

Top right John VK3FMPB measuring up his antenna and left a trio of builders, left to right Victor VK3DKM, Trevor VK3FTDX and Jess VK3FJPM.

**FINALLY PLEASE PROVIDE DON VK3HDX with NUMBERS FOR CATERING on the day!!**

## TAPE MEASURE BEAM OPTIMIZED FOR RADIO DIRECTION FINDING

by Joe Leggio WB2HOL

### Description

This antenna evolved during my search for a beam with a really great front-to-back ratio to use in hidden transmitter hunts. This design exhibits a very clean pattern and is perfect for RDF use. It trades a bit of forward gain in exchange for a very deep notch in the pattern toward the rear. (You could optimize the design for more forward gain, but at the expense of a really good notch in the pattern toward the rear.) It is a design that can be constructed using only simple hand tools (no machine shop needed) and still perform well. It has been duplicated several dozen times by other local hams and has been successfully used as a club construction project.



When I designed this antenna I had one basic idea in mind. It had to be easy to get in and out of the car when hunting for a hidden transmitter. This would be accomplished by the use of steel "tape measure" elements. These elements could fold easily when fitting the antenna into my car and yet still be self supporting. I decided to use three elements to keep the boom from getting too long.

Another of my design goals was to use materials that were easy to obtain. I chose to use Schedule-40 PVC pipe and fittings available at my local hardware store for the boom and element supports. These kept the cost for the antenna very low. The element supports consist of PVC crosses and tees.

### **Performance Predicted by YAGI-CAD**

GAIN 7.3 dBd

Front-to-Back Ratio >50 db

3 db BeamwidthE = 67.5 degrees

3 db BeamwidthH = 110 degrees

When I first built this beam I found it needed a matching network of some kind to have a low SWR. My first attempt was a Gamma match. This was unwieldy. The driven element could barely handle the weight and the Gamma match itself was not very flexible. The best matching network turned out to be a "hairpin match." This is simply a 5 inch length of wire that is connected across the feed points of the driven element. The antenna has some capacitive reactance without the matching network. The 5 inch length of wire has just enough inductance to cancel the capacitive reactance. This resulted in a better match than anything else I had tried.

The wire I used for the hairpin match was enamel insulated 18 gauge solid. Other hams who have duplicated this beam have used just about anything they had on hand. 14 gauge house wire works well, so does a length of 22 gauge hookup wire. It does not seem to matter if it is stranded or solid, use whatever you have available. This results in a very good match across the two meter band once you have adjusted the distance between the halves of the driven element for minimum SWR. (1 inch apart on my prototype).

I used a pair of shears to cut the tape measure elements to length. An old pair of scissors will probably do as well. No matter how you cut the elements be very careful. Those edges are very sharp and will inflict a nasty cut if you are careless. Use some sandpaper to remove the really sharp edges and burrs resulting from cutting the elements to size. I put some vinyl electrical tape on the ends of the elements to protect myself from getting cut. I encourage you to do the same. It will probably be best if you round the corners of the elements once you cut them. Wear safety glasses while cutting the elements. Those bits of tape measure can be hazardous.

The RG58 coax feedline is connected directly to the driven element. No matter what method you use to attach the feedline, make sure you scrape or sand the paint off the tape measure element where the feedline is attached.

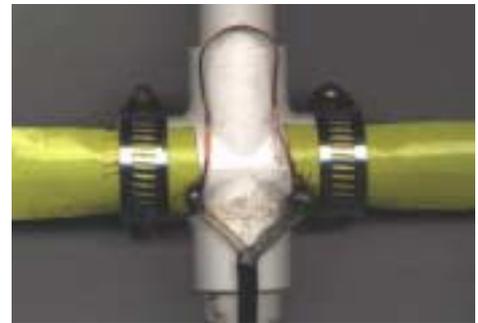
## TAPE MEASURE BEAM OPTIMIZATION Page 2 of 3

Most tape measures have a very durable paint finish designed to stand up to heavy use. You do not want the paint to insulate your feedline connection.

If you are careful, it is possible to solder the feedline to the element halves. Care must be taken since the steel tape measure does not solder easily and since the PVC supports are easily melted. You might want to tin the tape measure elements before mounting them to the PVC cross.

If you decide not to solder to the tape measure elements, there are two other methods that have been used to attach the feedline. One method employs ring terminals on the end of the feedline. The ring terminals are then secured under self tapping screws which hold the driven element halves. This method does not allow you to tune the antenna by moving the halves of the driven element. 6-32 bolts and nuts could be used if holes are drilled in the elements near the ends. If the bolt heads are placed nearest the PVC fitting, you could secure ring-terminals with nuts and lock washers. Another possibility is to simply slide the ends of the feedline under the driven element hose clamps and tighten the clamps to hold the ends of the coax. I know this is low-tech, but it works just fine.

Stainless steel hose clamps are used to attach the driven element halves to the PVC cross which acts as its support. This has the added benefit of allowing you to fine tune your antenna for lowest SWR simply by loosening the hose clamps and sliding the halves of the driven element either closer or further apart. By using the dimensions specified, I found that the SWR was 1:1 at 146.565 Mhz (our Fox-Hunt frequency) when the two elements were spaced approximately 1 inch apart. Figure 1 shows the method used to attach the driven element to the PVC cross.



I used 1 1/2 inch hose clamps to attach all the elements on my prototype beam. Others who have duplicated my design have used self tapping screws to attach the elements to the PVC crosses and tees. Performance is the same using either method. The screws are much less expensive but they do not hold the elements as securely. If you do not use 1/2 inch PVC fittings but instead use 3/4 inch, make sure the hose clamps you buy are large enough to fit.

If you wish a slightly neater looking beam, use the self tapping screws. If you do not mind spending a few more dollars for the hose clamps, use them instead. If I were to build another beam I would use screws for the director and reflector, and hose clamps for the driven element. That would give me the best of both methods.

Rubber faucet washers have been used by some builders between the tape measure element and the PVC fittings on the director and reflector. These allow for the tape to fit the contour of the PVC fitting and will make the antenna look better. Now you know what to do with those washers left over from the assortment you once purchased; You know the ones I mean, the washers that do not fit the faucets you have in your house. If you are an apartment dweller, ask around, these things are stashed in almost every homeowners basement or garage.

### Construction:

Cut a length of tape measure to 41 3/8 inches. It will be the Reflector element. Cut two lengths of tape measure to 17 3/4 inches. These will be used for the Driven element. Cut one length of tape measure to 35 1/8 inches. It will be used for the Director. Once you have cut the tape measure to length, put vinyl tape on the cut ends to protect yourself from the sharp edges. You will want to scrape or sand off the paint from one end of each of the driven element halves so you can make a good electrical connection to the feedline.

If you are planning to solder the feedline to the driven elements it is best to tin the elements first before attaching them to the PVC cross. If you don't, the PVC will melt as you apply heat to the element. It would be a good idea to also take the time to form the wire used for the hairpin match into a "U" shape with the two legs of the "U" about 3/4 inch apart. Tin the ends of the hairpin if you plan on soldering it to the driven element. If you tin 1/4 inch of each end of the hairpin it will leave 4 1/2 inches to shape into the "U".

You will need to cut two lengths of PVC pipe to use as the boom. One should be cut to 11 1/2 inches. It is used to form the boom between the Director and the driven element. The other piece of PVC should be cut to 7 inches. It will be used between the Reflector and the Driven element. Just about any saw will cut through the soft PVC pipe. I used a hacksaw. When we mass produced this antenna as a club project, we marked the pipe and used a portable jig saw to cut the lengths in assembly line fashion. It took longer to measure the pipe than to actually make the cuts. Since the pipe is available in ten foot lengths, you can

### TAPE MEASURE BEAM OPTIMIZATION (Page 3 of 3)

Since the pipe is available in ten foot lengths, you can make a few beams from a single 10 foot length. In any case, you might want to cut a few extras lengths for your friends. They will want to duplicate this once they see your completed antenna

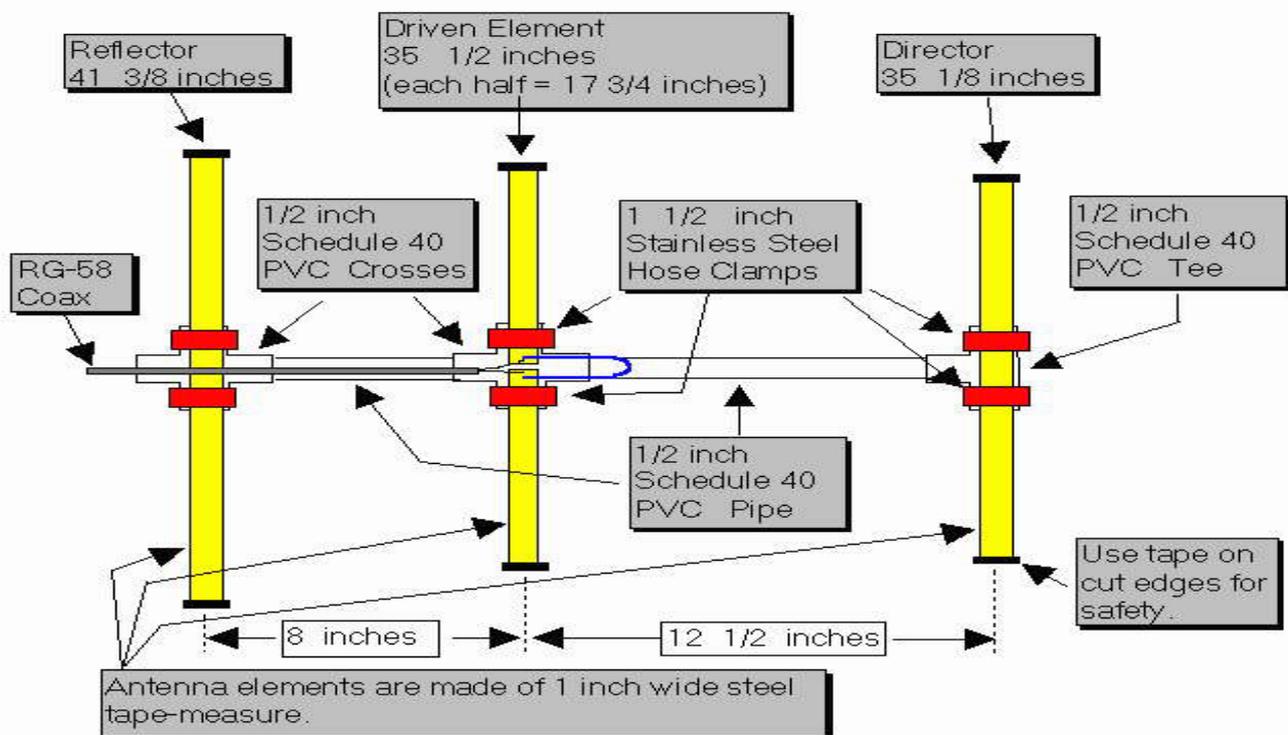
At this time you can pre-assemble the PVC boom, crosses and tee which will support the tape measure elements. I did not use any cement or glue when I assembled mine. The PVC pipe is secured in the fittings with a friction fit.

The hose clamps I used are stainless steel and have a worm-drive screw which is used to tighten them. They are about 1/2 inch wide and are adjustable from 11/16 inch to 1 1/2 inch diameter. Attach the tape measure elements to the PVC fittings as shown in the accompanying drawing. It is normal for the Reflector and Director elements to buckle a bit as it is tightened to the PVC Tee and Cross. You can eliminate this buckle if you use the washers and self tapping screws to attach these elements instead of the hose clamps. I do not think the beam will withstand as rough a treatment as when hose clamps are used.

#### How does it perform?

Once you have completed your beam you probably will be interested to see if it performs as well as the computer predicted. The SWR should be less than 2:1 across the entire two meter band. The front-to-back ratio is predicted to be very good with the antenna exhibiting a very deep notch in its pattern towards the rear. The [YagiCad 4.1](#) program produced these antenna pattern graphs showing the pattern you should expect. If you would like to experiment a bit with this program, the yagi specification file for this tape measure beam is available for download [here](#). Simply download the YAGI-CAD program and put the tape measure beam design file in the same directory. You will then be able to experiment with the design.

Note: under Windows95, only the first .yag file will show in the OPEN-FILE menu. You can either move all the other .yag files to a sub-directory or re-start the computer in MS-DOS mode. It works fine there. (I really do not know why this occurs but will blame Microsoft)



#### Summary

This beam has been used on Fox-Hunts, on mountain tops, at local public service events, outdoors, indoors in attics, just about everywhere. The SWR is typically very close to 1:1 once adjusted. Front to back performance is exactly as predicted. The null in the rear of the pattern is perfect for transmitter hunts. When tested using a sensitive field strength meter and a low powered fox transmitter, full scale readings were seen from a distance of ten feet. With the same field strength meter I was able to point the antenna away from the transmitter and move the reflector element to within a few inches of the transmitter antenna and still not see a reading. I don't have the facilities to verify a 50 db notch as predicted by the Yagi-Cad software but it sure



### **BITS and PI-eces**

Well what a month it has been, with more excitement to come.

The club net continues to attract many stations and thanks to Don, VK3HDX, the net is being re-broadcast on 10 metres on 28.470MHz USB. Don is taking a call back and many stations are calling in. Thanks Don.

40 metres has been excellent in the late afternoon, with many European and USA stations with big signals. Even a wire antenna and 100 watts will score a contact.

Great to hear Reg VK3KK on the club net recently. Reg has had some fine tuning on his ticker and is doing well!

73 de Mark  
VK3PI

### **RAFFLE BOOKS DUE FOR RETURN, PLEASE**

Thanks to those members of the club who have returned sold raffle tickets with money.

WANSARC appreciates members support in assisting the club and Reservoir Rotary in this mutually beneficial fund raising event.

Remember \$1.45 of every \$2 ticket sold is returned to the club.

The raffle will be drawn in the second week of June and as such members have until the **June 5 meeting** as the **final date** for the return of tickets.

**Please bring your ticket stubs and money to this meeting.**



### **LOOKING FOR A PIC PROGRAMMER ?**

Chris VK3KQU is offering you, the discerning reader, a DIY PIC programmer K149.

Can program all 12X, 16X and 18X series PIC's.

One problem is that the socket it has wears out the pins on the PIC if programmed often. If to be used for serious programming then the socket should be replaced with a



ZIF socket however these are too expensive for me so I am giving it away. The programming mode is either USB or RS-232 (Serial). The software is provided and can be used with Microsoft Windows Vista. MPLAB (programming environment) can also be provided or downloaded if required. Would prefer it to go to someone who would get good use of it. I am happy to assist anyone who may be interested in learning about PIC's however I can only advise on the two "real" languages ☺ assembly and C. Get in touch with **Chris VK3KQU** for further details.

### **AUSTRALIAN SHIRES CONTEST** from WIA

The aim of this contest, organised by the Oceania DX Group, is to work as many shires as possible - they call them 'shires' for this event but it means all local government areas, as well as working DX stations.

The contest is being held this coming weekend - **0600 UTC Saturday 6 June to 0600 UTC Sunday 7 June** and **only SSB and CW modes** can be used on **80m (3.500-3.700), 40m (7.000-7.250 MHz), 20m (all), 15m (all), 10m (28.000-28.600).**

Contest rules and information - <http://www.vkshires.info>

### **A SOCIETY COMMENT—IRONY AT ITS BEST** from Rod VK3MRT

**90 People get the Swine Flu and everybody wants to wear a mask.  
200 Million people have AIDS and no one wants to wear a condom.**

*NEVER..... from Martin VK3FMJP*



*LEFT Never make a man with a backhoe angry!!*

*And below, one of the contestants for contractor of the year award—you can imagine the fantastic security pictures!!*



*I will never complain about my job again— from Geoff VK3AVJ*



This is a timely reminder that it is essential to follow a strict OH&S practice in the workplace. In this case, you will note the following defective work methods:-

- the work platform is too low
- there is no guard rail
- the workers) should be suitably qualified for working confined spaces.

In any case it certainly makes me appreciate that I will never complain about my job again.

73 de Geoff VK3AVJ

*Military manual wisdom— from Graeme VK3PGK*

- Any ship can be a minesweeper—ONCE.
- The only time you have too much fuel is when you're on fire!
- Never trade luck for skill
- If the enemy is in range, so are you!



**SQUID POLES, brand new, 6 metres long** \$18 for club members, \$22 for non-club members, some still left, see the **Treasurer Gordon VK3YOD** or mail [vk3pi@optusnet.com.au](mailto:vk3pi@optusnet.com.au) to order

## 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.

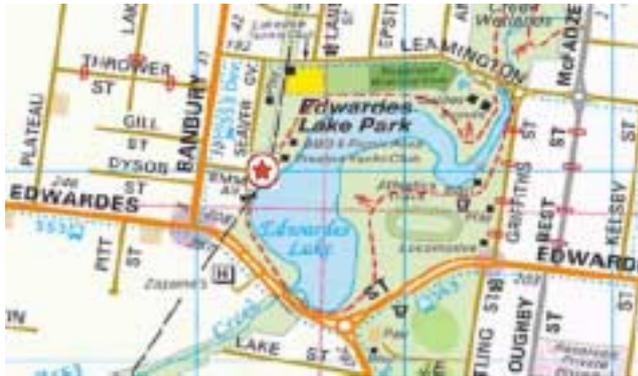
### Meetings

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](http://www.wansarc.org.au)

Email: [wansarc@wia.org.au](mailto:wansarc@wia.org.au)



**Don't forget the "club" meets on air regularly on 146.450MHz FM. And now rebroadcast on 28.470MHz USB.**

**Next meeting 7.30pm local Friday June 5 , 2009**

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

**Australia Post stamp here**