SHACKNEWS

HIGHVELD AMATEUR RADIO CLUB

APRIL 2009

COMMUNICATION IS THE NAME OF THE GAME

Meeting Not a large turnout at the meeting and the guest speaker did not arrive. A lot of discussion was about the **WORLD AMATEUR RADIO DAY PROMOTION** to be held on **18 APRIL 2009** at the TAC. The educational licence for ZS6HVB has been approved. The idea is to get the station up and running by 09:00 when the doors are opened and the first visitors arrive. See you all there. Next meeting will be held on the **16 May 2009**. There is nobody to open the venue on the usual date and on the 2nd Saturday the venue is being used for another event. Also on the 9th May the Radio Technology in Action is being held at the NARC. Frank ZS6TMV will give a talk and demo on a computer interface for use with digital modes that he has designed and built.

SSC Meeting Was held at the home of Rex and Ingrid and took the form of a bring and braai. Not a good turnout. Being the Easter weekend might of had something to do with the small attendance. Those that were there had a most enjoyable time.

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At a naval barracks the enlisted men were being given their shots prior to going overseas. One lad, having received his series of injections, asked for a glass of water.

"What's the matter, Mate?" asked the sick bay attendant. "Do you feel pain?"

"No, just checking to see if I'm still watertight."

Being a Grandparent...

After putting her grandchildren to bed, a grandmother changed into old slacks and a droopy blouse and proceeded to wash her hair. As she heard the children getting more and more rambunctious, her patience grew thin. Finally, she threw a towel around her head and stormed into their room, putting them back to bed with stern warnings. As she left the room, she heard the three-year-old say with a trembling voice, 'Who was THAT?'

A grandmother was telling her little granddaughter what her own childhood was like: 'We used to skate outside on a pond. I had a swing made from a tire; it hung from a tree in our front yard. We rode our pony. We picked wild raspberries in the woods.' The little girl was wide-eyed, taking this all in. At last she said, 'I sure wish I'd gotten to know you sooner!'

A little girl was diligently pounding away on her grandfather's word processor. She told him she was writing a story. 'What's it about?' he asked. 'I don't know,' she replied. 'I can't read.

I didn't know if my granddaughter had learned her colours yet, so I decided to test her. I would point out something and ask what colour it was. She would tell me and was always correct. It was fun for me, so I continued. At last she headed for the door, saying, 'Grandma, I think you should try to figure out some of these yourself!'

Build a 2 Meter, 5/4 Wave (Sorry all dimensions are Imperial) From the WWW

This antenna is unique in that it is enclosed entirely in 3/4" PVC which makes the design a little more complicated. The primary problem is that PVC tubing has a significant velocity factor which causes RF to slow down. This means that an antenna encased in PVC will normally need to have it's physical length reduced by about 19%. To further complicate the design, a 5/4 wave antenna's impedance has a highly inductive component which must be tuned out to get a good match. Fortunately, the design in Figure 1 solves all of these problems.

This antenna is made with the following components:

About 2 feet of outdoor type 300 ohm TV twin lead (Used for matching system.)
About 5 feet of #18 stranded insulated wire (Used for radiating element.)
About 5 feet of RG58/U coax
One PL259 Connector
One PL259 female to female coupler
About 8 feet of 3/4" PVC tubing. (normally sold in 10 foot lengths)
Two 3/4" PVC end caps
About 8 feet of 1/4" hardwood dowel (normally sold in 4 or 5 foot lengths)
About 25 small tie wraps
Miscellaneous PVC cement, solder, small piece of tubing, etc.

The twin lead was originally cut for 20 inches with 4 7/8 inches cut back on the braid or ground side. The #18 insulated wire was cut to exactly 57 3/4 inches. The overall length of the antenna assembly is 77 3/4 inches. This indicates a velocity factor of about .81 compared to a normal 5/4 wave 145 Mhz antenna. See calculation below:

234 * 5 / 146 X .81 = 6.49 feet or about 77.88 inches

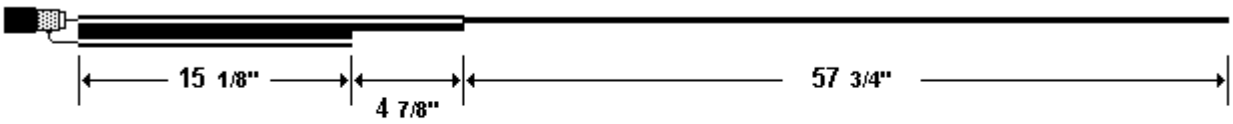


Figure 1

Now that we have all our parts, lets begin assembly by cutting back the insulation of the coax and the TV twin lead. We will need to cut back the coax to expose the centre conductor as well as part of the braid. It is a good idea to lightly thin the braid with solder to prevent any strands from shorting out to the centre conductor. Solder the centre conductor to one end of the twin lead and solder the braid to the other end off the twin lead as in Figure 1. Notice the braid of the coax is soldered to the shorter part of the twin lead which is left open. This serves as our matching system which adds capacitance to our antenna to offset the inductive component of the antenna. Trim the twin lead to 20 inches and solder about 60 inches of #18 stranded wire to the twin lead as in Figure 1. The insulation should not be removed except as necessary for soldering.

Prepare the 1/4" hardwood dowel by joining two 4 or 5 foot lengths together. The ends can be joined by crimping a 1 inch length of 5/16" aluminium tubing or using a good quality wood glue. Now attach the coax, twin lead and wire assembly to the 1/4" dowel using tie wraps about every 3 inches. Pull the twin lead and wire to keep it as straight as possible. Before attaching the PL259 connector to the coax, drill a hole in one of the PVC end caps and slide it over the coax to prepare for permanent mounting in the PVC. Now attach the PL259 connector as well as any other connectors needed to check SWR. Cut back the open end of the twin lead to about 16 inches as in Figure 1.

Now we are ready for final tuning. Slide the antenna, dowel assembly inside the 3/4" PVC first. All SWR readings must be taken with the antenna, dowel assembly inside the PVC tubing or the antenna will appear electrically shorter than necessary. Check SWR on both the top and bottom edge of the band. If the SWR is higher at 147.995 Mhz than at 144.005 Mhz then the antenna is too long and should be shortened. Cut off no more than a 1/4" at a time of the #18 wire. Also, trim the open end of the twin lead by no more than 1/8" at a time to further lower SWR. Remember the twin lead is simply a matching system which changes impedance and has no real effect on the electrical lengh of the antenna. The final lenghs of the #18 wire and twin lead should very closely resemble those listed in Figure 1. The prototype antenna achieved SWR readings of less then 1.2 to 1 across the entire 2 meter band. Remember to keep the antenna away from metal objects when checking SWR.

After the antenna is properly tuned, trim the antenna dowel assembly to about 7 feet. Leave a few inches of coax attached to the bottom of the dowel so that the mast will be away from the twin lead portion of the antenna when mounted. Trim the PVC tubing to about 7' 2" and cement the top end cap. Double check SWR before cementing the bottom end cap. After SWR has been doubled checked, slide the antenna, dowel assembly into the PVC and cement the bottom end cap. If desired, styrofoam spacers may be used to get a very snug fit. Waterproof the bottom end

cap where the coax leaves the antenna. When completed, the antenna should resemble Figure 2.

When mounting the antenna, use a PL259 female to female coupler. Do not use RG58/U for the entire feed line because it is too lossy. Use good quality RG8/U or similar coax for the feedline. Of course, do not forget to waterproof the female to female coupler. Mount to any mast using standard TV antenna clamps at the bottom of the antenna and keep it high and away from other metal objects for best performance and lowest SWR.

Completed 5/4 Wave Antenna

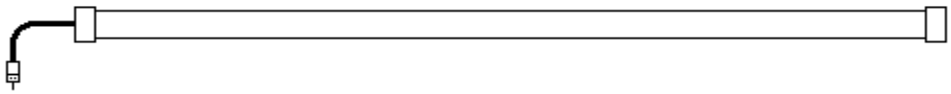


Figure 2

Although not actually measured, this antenna should give at least 6 dB gain if mounted high enough. Remember, the small diameter of the radiating element has no effect on the radiation resistance. The only real benefit with using a large diameter radiating element is durability and slightly improved bandwidth. This antenna should give many years of reliable performance for a fraction of the cost of a commercial antenna.

The Adjustable Voltage Regulator

Many amateurs have stopped by their local Radio Shack store and have noticed the famous LM317T adjustable voltage regulator. But, did you know that all voltage regulators are adjustable? Yes, any IC voltage regulator can be adjusted to a higher voltage than its fixed voltage by just adding a couple of resistors.

As an example, lets consider using the popular 7805 (5 volt) voltage regulator as a 12 volt regulator. In figure 1, lets assume 470 for R1 which means that a constant current of 10.6 mA will be seen between terminals 2 and 3. This constant current plus a regulator standby current of about 2.5mA will flow through R2 to ground regardless of its value. Because of this constant 13.1 mA, R2 can now be set to a value which will give us a constant 7 volts across this resistor. A resistor value of 533 ohms or 510 (standard value) will give us the necessary 7 volts. With 5 volts across R1 and 7 volts across R2, a total regulated value of about 12 volts will appear across terminal 2 and ground. If a variable resistor is used for R2, then the output voltage can be easily fine tuned to any value greater than 5 volts. The regulator standby current will vary slightly in the 7805 but 2.5mA will yield good results in the calculations. If an exact voltage (within .3 volts) is needed then R2 must be a variable resistor.

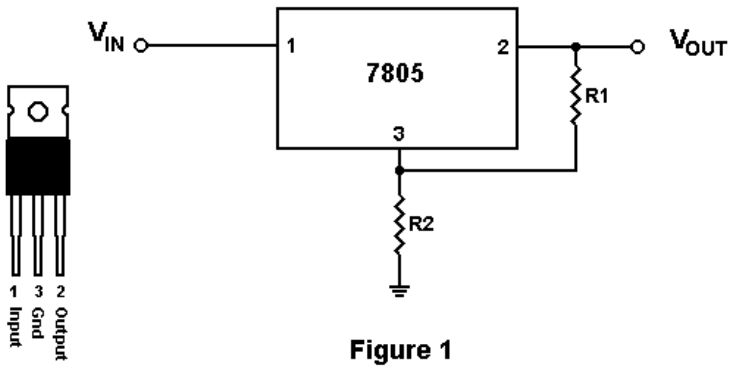


Figure 1

Vout (Approx.)	R1	R2
6 Volts	470	100
8 Volts	470	220
9 Volts	470	330
12 Volts	470	510

To make any fixed regulator adjustable, use the following formula:

Vout = Vfixed + R2(Vfixed/R1 + Istndby)
Vout = Desired output voltage

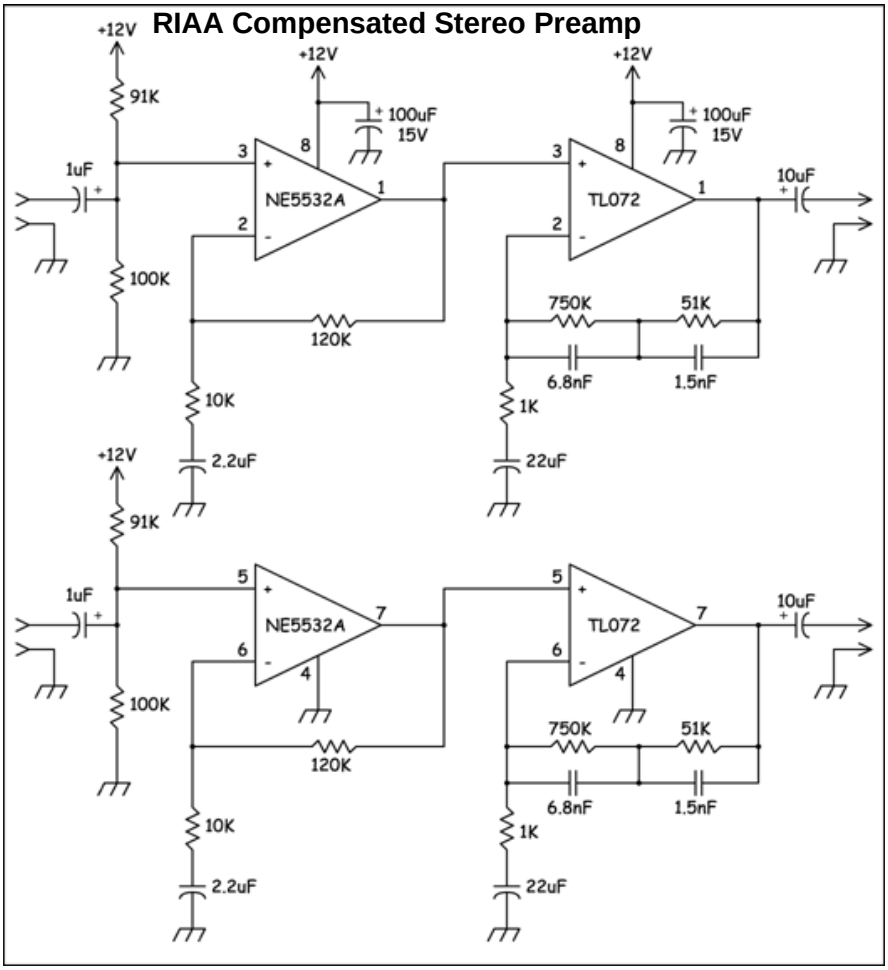
Vfixed = Fixed voltage of IC regulator (5 volts for 7805 or 1.25 volts for LM317T)

R1 = Assume any value from about 470 to 1K for best results

Istndby = Standby current of regulator (use 2.5MA for 7805 or zero for LM317T)

Common Resistor Combinations for the 7805 regulator:

Incidentally, the famous LM317T adjustable regulator is really nothing more than a fixed regulator with an output voltage of 1.25 volts. Amateurs seldom need voltages below 5 volts so the 7805 regulator is a good choice and it even costs a little bit less than the LM317T.



If your stereo amplifier does not have an input for a record player, you should use this circuit between your turntable and your amplifier. The output of your turntable follows a gain-bandwidth curve called the RIAA compensation curve. The standard AUX input on your stereo does not. Records will sound very strange without an RIAA preamp.

The RIAA compensation curve was adopted in the mid 1950s, as a way of dramatically improving the fidelity of playback. This curve takes into account the limitations of the mechanical recording system on the record surface. At low frequencies, this amplifier provides 20dB of gain. At medium frequencies it provides no gain, and at high frequencies it provides 20dB of attenuation.

Note that only two Opamp packages are used. Each type is actually a dual Opamp. The left and right amps share one amp of each type from each dual package.

CLUB INFORMATION

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Repeater 145.1875 MHz input - 145.7875 MHZ output
Linked to 70 cm - 438.850 MHz

Bulletins Sunday morning - 145.7875 MHz & 7062 KHz @ 08h45.
Relay - 80M - 3662KHz

Monthly meeting venue

Witwatersrand Rifles HQ
Cnr Barlow and Cavaleros Str
Industries West
Germiston

First Saturday of the month at 14:30

Committee

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