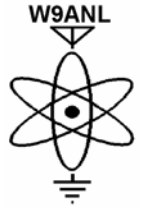


# RADIOACTIVITIES

## NEWSLETTER OF THE ARGONNE AMATEUR RADIO CLUB



Volume XLIX, Number 9

September 2008

### Club Meeting

Unless otherwise noted, AARC general meetings are the second Tuesday of the month at the Argonne cafeteria at a table on the north end of the room. Any club member is welcome. To arrange for a gate pass contact Bruce Epperson at [epperson@aps.anl.gov](mailto:epperson@aps.anl.gov) phone 630-252-3495 or Chuck Doose at [doose@aps.anl.gov](mailto:doose@aps.anl.gov) phone 630-252-6037.

### The Treasurer's Report

by Chuck KB9UMF

Nothing Received.

### REMINDERS

CLUB BREAKFAST: Always the 2<sup>nd</sup> Saturday of each month, 8:30 AM at:

***Old♦Country Buffet♦***

**59<sup>th</sup> Street and LaGrange Road in LaGrange**

CLUB NETS: Thru our Club Repeater 145.19.

SKYWARN NET: Mondays in season  
at 7 PM with Deni, W9DS.

THE CLUB'S 9PM NET: every Monday with  
Jack WA9FVP.

THE NIGHT PATROL: every night at 10:30 PM  
with Paul, W9FNM.

THE BREAKFAST CLUB: every morning at 8 AM.

THE NOONTIME NET: every weekday at noon.

### Mil's Corner for November

Nothing Received.

### Fitting PL259 to Coax

by Deni, W9DS

Every ham has to solder a connector to coax some time. We have different sizes of coax. The larger coax doesn't need an adapter, but RG58 and RG59U do. This calls for a different, longer process method. So, let's take RG8U and RG11 cable first. There are other cables, but these are the ones we use the most for attaching to our rigs and aerials.

Here could be the reason why your aerial won't radiate. Poor coax soldering. A minor short circuit or bad component can ruin your day. Dosing off in the installation can cause malfunctions in the transceiver. My FT101B final tubes pair RCA CJS6Cs would blush red and the final RF choke would smoke and snap shorting a few turns and become ruined. You will be seeking an RF doctor to fix your ailing rig. Like Dr. Jack, WA9FVP, P.O. Box 788, New Lenox, IL, [repair@wilcolele.com](mailto:repair@wilcolele.com).

Start by matching coax fitting along side coax line. A length of vinyl cover equal to the total length of the coax fitting is removed from the cable. This exposes braid which now is tinned as fast as possible using a hot iron 250 watts is used moving back and forth soldering the exposed shield, but do not damage the center insulation shorting the braid to the center connector. Now get a cup of coffee or a can of pop. Let the tinned braid cool. Then with coax fitting lying next to the braid scribe a line with sharp knife or cutting tool behind the second ring from the front of the connector. But, put the screw shield with the shank grip facing forward backwards onto coax cable out of your way. This will be brought back down the coaxial line later and screwed onto the sieve of the connector to finish the project.

But, now after cutting the scribed shield with 2 or 3 twists to the braid using pliers. It should break loose leaving a smooth edge. Now cut through the plastic cover of the center connector jacket with a knife, don't nick the copper strand in the process, leaving 1/16 inch of inner plastic as a shoulder. At this point be sure the outer sleeve is already on coax line facing screw head forward.

Now tin the center conductor carefully. Then slide coupling barrel as far as you can. Look at the 4 holes in the barrel. Solder center conductor first. Allow time to cool. Now solder the four holes on the barrel head. Sling ring screw onto barrel and the job is done. Check connections out using ohmmeter. No shorts, Ah! A sigh of relief.

Now, we have to solder RG58U smaller coax with an inner barrel connector, which slides (UG175 or UG176)

over the outside of the coax to provide strength to the coax connection which screws into the coax head.

What do we do now? Tin the very end of the UG175 or UG176 reducer (the thread less end) and slip reducer onto the cable. Strip the cable back as mentioned before; don't solder shield, but unbraid the shield with a tool so that the shield fans out like radials from the center conductor. Now tin the fanned out braid from center conductor for  $\frac{1}{4}$  inch. Using a cutter, trim the tinned braid to about  $\frac{1}{8}$  inch of the cable jacket. Slide reducer up to the tinned braid. Using head, solder braid to the tinned end of the reducer.

Next, strip the tinned cable center conductor as done for the PL259 assembly method. Here comes the hard part. Using 2 sets of pliers, one for reducer collar and the other on PL259 body, turn reducer assembly into PL259. Get it as tight as possible. Now solder the cable center conductor to PL259 pin. Viola! It is simple and works, no other soldering is necessary since you turned reducer very hard into PL259 body.

An advantage is that reducer unscrewed can be reused by disassembly simply again. Here is a problem some PL259 connectors are nickel plated and hard to solder even with a 200 watt gun on a calm day. The female connector end is impossible to bond a wire to. This is the problem with my quad 60' up the tower. Tape and tape using plastic over your connections out doors to keep moisture out. Use silver connectors when available; they stay soldered.

Salvaging coax connectors especially silver PL259 is worthwhile in my consideration. Prices are the cost of a couple gallons of milk these days. So, lets use them over and over again! These plugs can be easily removed. Start by unsoldering center conductor. Cut coax line 2 inches from the connector. Remove the threaded outside ring off the connector and coax.

Next cut back jacket, slide braid toward connector. Use knife to cut through insulation all the way around, & take it off. Heat conductor tip & use pliers to pull centerpiece of insulation material out. If not, then vise connector but don't deform it. Pick up your drill with  $\frac{1}{8}$  inch bit and drill through 4 holes in the body if found. Drill straight through so  $\frac{1}{8}$  inch bit will come out the opposite hole. Drill other set of holes in the same fashion. Try to pull stub braid out. If not, well then dig it out using pick out enough to get to solder holes. Use  $\frac{1}{4}$  inch drill bit and variable speed drill. Axially drill to the connector tip through insulation. Now pick out braid with small screwdriver or your favorite tool.

As a last resort, use 11/32 inch drill bit. Hold connector in vise grip, ream solder flux debre and run this into connector insulation lightly scrape clean.

Connector is ready for reuse. Now connector with adapter if not removeable drill through solder ports. Adapter is ruined but they are cheaper than a new PL259. So, get drilling.

Thanks to Rudy, W9ZEW, and Wally, WA9CJZ, for their advice.

## The Wide Band Helix

by Deni, W9DS

Since we are facing the loss of narrow band TV and switching over to high definition TV, and other formats to come, Blue Ray surpasses HDTV. Developed by Sony, Bluera y will eclipse HDTV once it gets into production and debugged. Bluera y is 3 times sharper than HDTV. People will want this instead of HDTV. It is very pricy, but now a days, so is everything else. [Bluera y is a DVD format. ed.]

I think Helix is a good choice for wide band reception of the VHF and UHF bands. Satellites require dishes, which have very high gain to receive signals with the best definition on your screen. After all TV stations have switched over to circular polarization.

K3WBH built a two bay helix and presented it to the public in November 1980 CQ Magazine. Wound for right hand circularity using fiberglass quad spreaders as supports helix covers 1.8 times its base design frequency. Designed for 432MHz, it will perform up to 750MHz. A pair of 7 turner helixes will come in at 16db if receiving right hand circular radiation. 13db on either vertical or horizontal signals. It will support fading and faraday rotation effects. Follow this pitch (distance between turns) =  $\frac{1}{4}$  wave. Coil diameter =  $\frac{1}{3}$   $\lambda$ , sides of screen =  $\frac{4}{5}$   $\lambda$ , screen to turn zero =  $\frac{1}{8}$   $\lambda$ , and stacking, coil center to center = 1  $\lambda$  at lowest desired frequency. Coil is #12 copper no copper weld. Screen is 1 inch mesh hardware cloth. Structural pieces must be non-metallic pieces within aerial area even the mast. Helix is held parallel to ground. For low angle type work leave it this way.

An elevation mount with settings of 10, 20, and 30 degrees must be mounted on flat surface. Great height is not needed, but a clear take off field out in front of array many wavelengths in desired direction no foliage.



The vertical element, while transmitting, and the horizontal element in receiving mode are the results of wave tilt caused by finite conductivity of the earth.

These elements due to wave tilt are greater over poor earth than over good earth and very poor over sea water. Because of the high impedance, the aerial is very efficient as matched against an inverted vee or short vertical. Beverages make good receiving aerials 400 to 1000 feet long, 3' to 10' high off the ground. Some are as high as 20' using two wires. One wire terminated to ground through a 600 ohm resistor and the other not terminated for bi-directional receiving or transmitting.

An effective beverage must be 2 waves long on lowest band to be used, 1100 feet at 1.8MHz and 600 feet on 3.5MHz. This aerial reduces atmospheric noise, drops it about 5 S-units. Signals coming in from the sides drop 40db to 25db and rear of beverage. In twilight hours, aerial seems dead. The tilting ionosphere layers tend to make right angle signals without any low angle signals.

How this works out. The long wire has high degree exposure to horizontal wave component that induces series of voltages being sent along our aerial from one end to receiver. Now, energy collected from radio wave going in opposite direction is heated up in end resistor and washed out so won't get into receiver.

So, you need up to 1000' of #18 wire installed 3' to 12' up from ground for receiving only. Bending wire off 10 to 20 degrees from being straight is allowed. Resistor, if used, 1 or 2 watt carbon, 200 to 600 ohms. Experimentation is allowed and recommended. You need to improve end ground conductivity. Ten foot copper rod 9.9' in earth. 66' radials running every which way connected to rod that is connected to resistor end that's soldered to long wire that goes to receiver.

You can run more wires spread out 45 degrees from the receiver position for coverage to other places.

Our wave aerial being broad banded a periodic can be further used over frequency range 1.8 to 30 MHz. Our lossy transmission line use the ground acting as poor conductor. We can transmit over it using matching transformer with one side grounded. It matches feed impedance to 50 ohm coax cable. Lot size 360' up 6'. Supported by ground screen of 16 radials 60' long staked at ends by 2' long rods. Imagine this; when multi-beverage elements are used, there will be enough gain at HF to be efficient in receiving and transmitting. Thus, directivity calls for bi-directional operation.

Jan 1983 QST covers work details done by VE2CV and VE3YO in conjunction with Communications Research Center, Ottawa Ontario, Canada. They considered effects of length, height, frequency, and ground conductivity on these arrays. So, wavelength must be longer than one wavelength on frequencies 1.8 to 30 MHz. At 1.8MHz, an aerial 656' gives satisfactory performance.

Theory says wave aerials respond to the vertically polarized waves in that it responds to the horizontal part of the vertically polarized ground wave via the tilt of the wave front and to sky wave because of down coming wave front. A vertical polarized ground wave at surface of the earth will have forward tilt, magnitude depends on conductivity and permittivity of earth. So our slight forward tilt is cause for a small vertical downward component big enough to make power dissipate in earth over the wave that is passing it's a horizontal component parallel to the beverage wire that juices a current on it. This current rushes into our receiver and shocks it into life through speaker to ear. Now for sky waves it is the arrival angle that makes our wave tilt angle down-coming plane wave and the power of the induced voltage depends on a parallel part of the vertical polarized electric field. So voltage causes a current wave to carry on the wire to get to our receiver.

These aerials are a bear to build if you don't have the land, and arrays of elements are inexpensive for transmission and reception on long range, point to point hamming circuits. Only ham disappointing view is that gain comes in only one or two back and forth directions on these wires and with eating up large chunks of 'wireland' at lower HF bands.

*Thanks to Deni, W9DS, for all of his articles. I have now used all that he has sent.*



N40° 18.807' W88° 58.623'

<p><b>ARGONNE AMATEUR RADIO CLUB</b>  P.O. Box 741  Lemont, IL 60439</p> <p>————— <b>Officers</b> —————</p> <p><b>PRESIDENT</b> Bruce Epperson KA9H  <b>VICE PRESIDENT</b>  <b>SECRETARY</b> Kurt Boerste KB9ZFR  <b>TREASURER</b> Charles Doose KB9UMF  <b>DIRECTOR</b> Dick Konecny K9IB  <b>DIRECTOR</b> Torben Lauritsen KF9MI  <b>DIRECTOR</b> Charles Doose KB9UMF  <b>DIRECTOR</b> Tim Smith N9UEB  <b>DIRECTOR</b> Dale Travis AG9H</p> <p>e-mail: w9anl@bigfoot.com  www.bigfoot.com/~w9anl</p>	<p>MEMBERSHIP is open to all who are interested in amateur radio. This club is sponsored by Argonne National Laboratory. Employees of ANL or DOE-Chicago are eligible for full membership. Auxiliary membership is available to non-employees.</p> <p>W9ANL/R is an open repeater, coordinated on 145.19 MHz (-600 input). The AARC repeater has been in operation on this frequency pair continuously since February 5, 1982.</p> <p>CLUB NETS: 2 meter fm 1) Regular, every Monday evening at 9:00 and 2) the Night Patrol every night at 10:30, both on W9ANL/R. The Peanut Whistle Net (PWN) every Sunday at 1:30 p.m., and many evenings at 8:30 p.m. on 1932 kHz (cw/am/ssb), QRP.</p>	<p>RADIOACTIVITIES is published monthly by the Argonne Amateur Radio Club as a nonprofit newsletter intended only for the use of its membership. Material appearing here does not represent the official position of Argonne National Laboratory or the U. S. Department of Energy. Please give credit to the author and to Radioactivities or the Argonne Amateur Radio Club, when using original material published here. Deadline for submissions normally is the 20<sup>th</sup> of the preceding month.</p> <p>EDITOR Dale Travis AG9H  EVENTS  SKYWARN ACTIVITIES Deni Lamoreaux W9DS</p> <p>Please send club and editorial correspondence to the club address, or to travisdj@bigfoot.com Please include "AARC" in the subject.</p>
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