The REPEATER

The OFFICIAL newsletter of the Rogue Valley Amateur Radio Club

W7OEK

Volume 2009, Issue 11 **November 2009**

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Next Club Meeting

Thursday, November 5, 2009. 7:00 PM
Red Cross Building, 60 Hawthorne St., Medford, OR
Across from Hawthorne Park
Program: Moonbounce (EME), Steve Chastain, N7SC

President's Letter

The November 5 meeting program will feature Steve Chastain, N7SC, telling us about his moonbounce (EME) activity on UHF. Steve has extensive experience and success using this mode.

A big thanks to two outstanding engineers in our midst for their presentations at the October meeting. They exemplify two of the justifications for the amateur radio service we enjoy (the FCC calls them PICON; Public Interest, Convenience or Necessity) i.e.(1) technical expertise by Tom N5EG, and (2) emergency communications preparedness by Don, WB7Q.

Again, be receptive to accepting a leadership position for 2010. Bud, W7LNG, is heading up the nominating committee, assisted by Tom, N5EG. Nominations also can

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Secretary's Report

RVARC 1 OCT 09 MINUTES

1. Herb Grey, W7MMI called the meeting to order in the Red Cross building at 1900L

   One guest was present, Vick Seeburger, W7VSE.

2. Herb immediately started the evening's programs with Tom McDermott, N5EG giving us a very good Power Point presentation of computer sound cards.

3. At 2015 Herb adjourned the meeting for coffee, donuts and visiting.

4. At 2035 Herb called the meeting back into session for a short business meeting.

5. Herb then turned the meeting over to Don

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President's Letter, Continued

be made from the floor at the November meeting, with prior agreement from the nominee. Elections will follow.

I'll open discussion on changing the Club station call, as mentioned in previous newsletters. This was planned for last month but had to be shelved because of time constraints. I'll also ask for a volunteer to arrange for the December Christmas party meeting.

73, Herb W7MMI

Two Meter Repeater Frequency

In order to provide a common place to find fellow RVARC club members on two meters, we recommend using the K7RPT 147.62 / 02 repeater as a calling and monitoring frequency. This is an open repeater (no tone or PL access required). The repeater listens on 147.62 MHz and transmits on 147.02 MHz.

Secretary's Report, Continued

Montgomery, WB7Q who gave us a complete update on ARES.

6. The minutes where not read because they are in the newsletter.

7. Lud Sibley, KB2EVN informed the group that the treasury has $1961.05 in it.

8. Old business: Herb told us to get our Field Day expense bills in to the treasurer.

9. New Business: Herb solicited for people to serve on the nominating committee. The only person to volunteer was Tom McDermott. Herb got Bud Larson, W7LNG to help Tom.

10. Other business: Vick Seeburger wants volunteers to help send CW at the railroad park on the 2nd and 4 Sundays.

11. Herb adjourned the meeting at 2045.

Submitted by Jacob O. (Jack) Schock
WA7IHU Secretary

Feeding Top Band Receive Antennas

In the previous newsletter, the importance of a directional receive antenna on top band (160 meters) was discussed. Because of practical real estate limitations, directional antennas on top band are usually physically small, and in terms of wavelengths, they are close to ground.

One important limitation of a physically small antenna for receive is that it will have poor efficiency (that's the reason we can't use them effectively for transmitting—most of our transmit power would turn into heat). However, signals and noise tend to be pretty strong on 160 meters, and the loss of the antenna may not be important because we have more than enough receive sensitivity so that receiver noise is many times not a problem. Some 160 meter receive antennas can be so lossy that it sometimes helps to have a preamplifier. Fortunately, receive preamplifiers don't require much power (unlike transmit power amplifiers!). These receive preamplifiers however have to put up with strong AM broadcast stations, so their design is non-trivial if you want to avoid overload. Fortunately most times they are not necessary.

One easily overlooked problem however is feeding a small receive antenna. We normally assume that coaxial cable is well shielded and at 160 meters, certainly does not have much loss. Thus the temptation is to simply connect up our coax to the small beverage or loop antenna and start listening.

This is usually the start of our problems.

Because the output of the small antenna is quite low, we have to be concerned about our feedline actually acting as an antenna itself! The feedline-acting-as-antenna is not too efficient, but because it is summing with the miniscule receive antenna signal, the net result is that we can easily lose all the directivity of the receive antenna.

How can this happen?

The feedline is typically grounded at the receiver end, and the braid is grounded out near the antenna. If we ignore the center conductor for a moment, we see that the braid forms a wire antenna the looks pretty much like a terminated beverage antenna itself, although the height above ground is close to zero.

Figure 1 shows a typical beverage antenna setup along with the feedline connecting back to the shack. A beverage requires a ground connection, which provides the return path to the far end of the beverage. Typically, it's difficult to get less than about 10-25 ohms of ground resistance when putting in a ground rod, and this resistance in fact is common between the beverage antenna and the feedline.

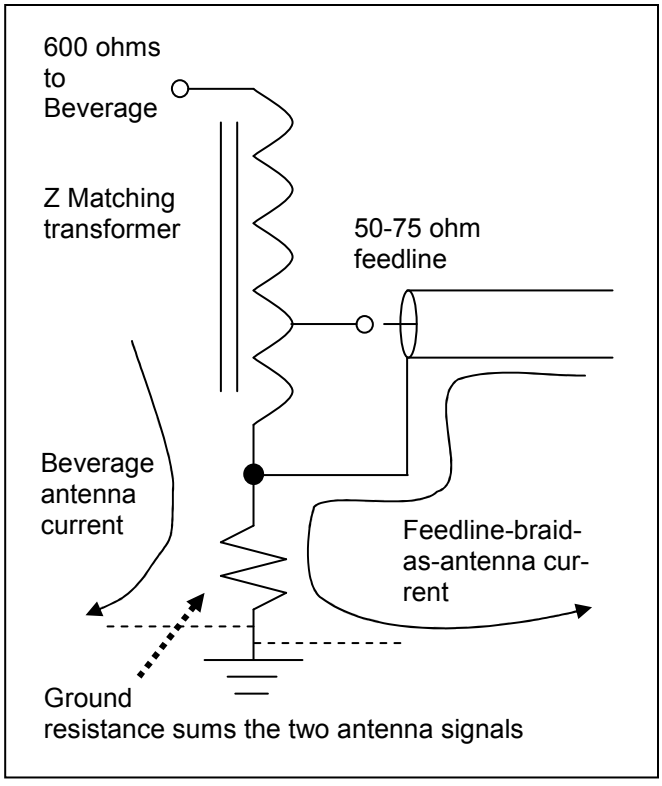

Figure 1—Poor approach to connecting feedline to antenna.

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The beverage antenna current and the feedline-as-antenna current both travel through the ground resistance, and thus resistively sum up at the input to the feedline. At that point nothing can distinguish between the desired antenna signal and the undesired feedline-as-antenna signal. We've destroyed the nice pattern of our receive antenna because the two antenna patterns overlap, and the front-to-back of the desired antenna is swamped with undesired signals.

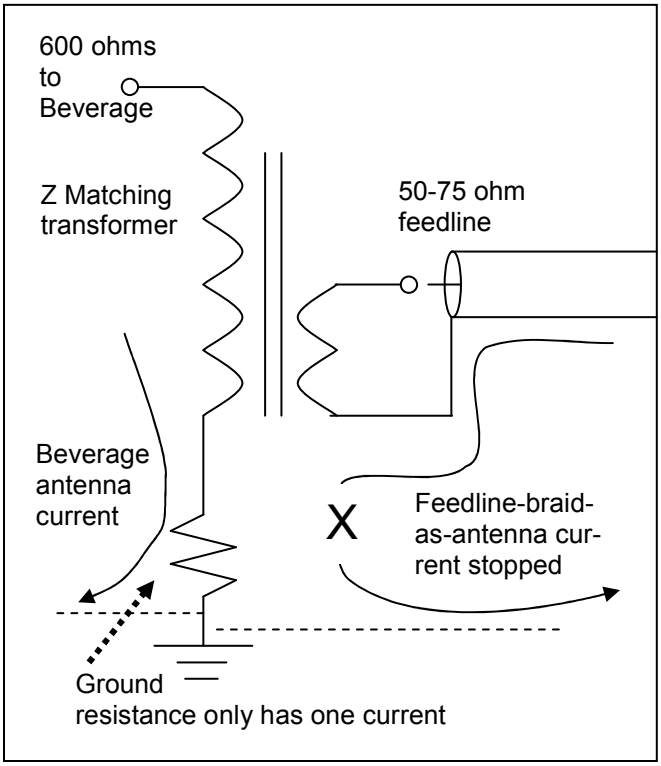

Figure 2—Better method to connect feedline to transformer.

We need to prevent the feedline from acting like an antenna. There are a couple of ways to do this, they rely on isolating the antenna ground current from the feedline ground current. One good approach is to use an isolation transformer to float the end of the feedline up from ground out at the beverage antenna. This same approach works for a K9AY antenna, which is also a ground-referenced antenna. Figure 2 shows the transformer connections that reduce common ground currents.

In figure 2, the transformer is wound as an isolation transformer rather than as an autotransformer. This means that the connection between the feedline braid and ground at the antenna can be cut loose, resulting in stopping the flow of feedline braid current through the common ground resistance of the ground rod earth.

While the design of the transformer is not too critical, there are some common misconceptions about preferred winding methods for isolation transformers, and one of the common techniques turn out to somewhat poorly suited for use on top-band.

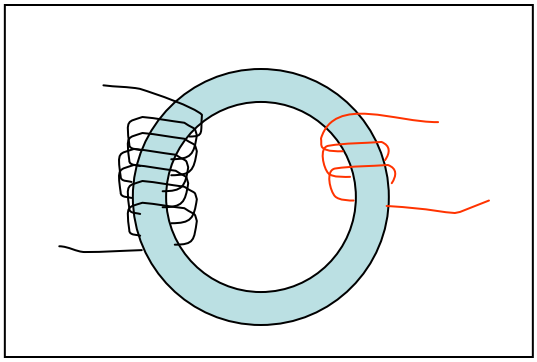

Figure 3—Lossy transformer winding.

Figure 3 shows a transformer wound with the primary on one side of the core, and the secondary on the other side of the core. The idea here is that the stray capacitance between the two windings is reduced thus reducing undesired coupling. However in this type of transformer the magnetic flux couples poorly between the two windings, and thus a lot of leakage inductance is introduced into the circuit.

The leakage inductance acts as a series inductance and this forms an attenuator with

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Feeding Top Band Receive Antennas

the load impedance. The net result is that the loss through the transformer is very high—sometimes as much as 10-20 dB of loss at low frequencies. If the received signal is strong enough, this loss may not be noticed; sometimes it can be a problem.

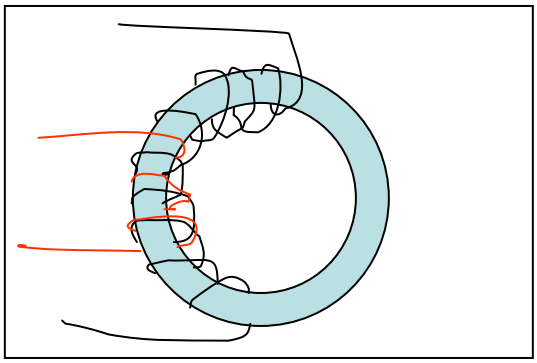

Figure 4—Less lossy transformer winding.

Figure 4 shows a less lossy method to wind the transformer. The overlapping windings reduce the leakage flux substantially thus reducing the loss of the transformer due to leakage inductance. The inter-winding capacitance is slightly increased, but at 160 meters, it does not have too much impact (1 pF is about –j88,000 ohms which causes minimal leakage).

For the transformer to work well, the core losses should be low and the permeability of the material should be relatively high in order to minimize the number of turns needed on the transformer core. If more than about 15-20 turns are used in an RF transformer the performance often suffers.

Type 61 or type K ferrite material would be a good choice for this application due to the low losses and the high permeability of the core. Type 31 ferrite material might not be as good a choice since it is intended primarily for EMI suppression applications and thus has a high resistive loss component in this frequency range.

Eagle Cap Sled Dog Race

The Eagle Cap Extreme Sled Dog Race would like to invite Amateur Radio Operators to join us for the 13–16 Jan., 2010 Sled Dog Race.

During January… Volunteers and spectators gather in Joseph, Enterprise and Halfway Oregon to support the running of the Eagle Cap Extreme Sled Dog Race. This Race brings Mushers and their Teams from across the country to run through the Wallowa-Whitman National Forest, which contains the Eagle Cap Wilderness, for both a 100 and 200 mile event. The Race is a Qualifier for the legendary Races in Alaska and Canada, the Iditarod and Yukon Quest respectively.

For safety and logistic support… Checkpoints are established across the Trail with the 2010 proposed Checkpoints being Salt Creek Summit, Ollokot Campground, Fish Lake, Trinity, Cornucopia and Halfway. Headquarters for the Race are located in Joseph at two diverse locations. These Checkpoints will be staffed with Volunteers to provide Shelter, Food, Veterinarian care, Logistic support, snow-machiner transportation and of course a multi-layered Communications Network. Again this year the Checkpoint Communication modes available will be Land-line, Internet, Satellite Tracking devices (SPOT), Satellite Phone and Ham Radio at Checkpoints. We are excited to invite Amateur Radio Operators back to the event. We utilized over 40 amateurs in the 2009 race Comms in our VHF/UHF network. This was accomplished with the support of the Central Idaho Amateur Club personnel and repeater. Since the 2009 event, Scott Hampton KB7DZR, has built and installed a local VHF repeater that will have another layer of reliability to our network.

Amateur Radio at ECX…We are in the process of creating our special event Ham club and Web page for the 2010 Eagle Cap

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Eagle Cap Sled dog Race, Cont'd.

Extreme. Please follow our progress on http://www.eaglecapextreme.com under COMMUNITY then AMATEUR RADIO TAB.

This year… we are inviting interested Amateur Radio Operators to exercise their Net skills in an exciting winter community service setting. The Communications Volunteer will be vital to passing 3rd party traffic as well as providing support of critical situations and SAR efforts. Law Enforcement from Wallowa and Baker County, SAR Teams and US Forest Service personnel regularly participate as Volunteers and in a professional role during the Race. The Communication Volunteers are vital to providing real time information and coordination for general messaging, Logistics and in support of critical situations through various and appropriate Communication modes. To learn more, or if you would like to be part of our Amateur radio committee Project Management Team, email: KL0CW, Clyde Raymer, Jr., president@eaglecapextreme.com (Condensed & Reprinted from ARRL Oregon Section Website).

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