



KBARA GAZETTE



Summer, 2011 Kamiak Butte Amateur Repeater Association
KBARA, PO Box 30801, Spokane WA 99223-3013

KBARA 2011 HAM-O-RAMA All are welcome!!

WHAT: The Kamiak Butte Amateur Repeater Association's Annual Meeting and Camp Out

WHEN: July 22, 2011 Friday, 2:30PM through July 24, 2011 Sunday, 1PM

Pancake breakfast Saturday, 8AM.

Amateur Radio license testing hosted by W5YI Saturday, 12PM

J-Pole Antenna Making Workshop hosted by Guy, VA7GV, Saturday

KBARA Annual Meeting Saturday, 3PM

Potluck dinner Saturday, following annual meeting

WHERE: Riverside State Park - Bowl and Pitcher, 4427 N Aubrey L White Parkway, Spokane, WA 99205, phone 509-465-5064. For more information contact Mark, K7HPT at markvanwinkle@comcast.net or 509-993-1399.

HOW TO GET THERE: From Interstate 90, take the Maple Street Bridge exit #280. Travel north across the Maple Street Bridge. At the Maxwell St. traffic light, about one mile from the bridge, turn left (west). Follow Maxwell St. as it winds westward, and then northward as it becomes Pettit Drive. It later becomes the Abrey L. White Parkway. The Downriver Golf Course will be on the right, and Riverside State Park just beyond. The Bowl and Pitcher Campground is about two miles north of the park entrance. Signs inside the park will direct you to the KBARA campsites.



From John, KD7AAT

All Hams and their
friends/family are
invited to join in
on a motorcycle ride
when we can get one to-
gether.

Contact John, at
KD7AAT@comcast.net
and we'll hook up
and take a ride to where
the road goes.....

Jack Babbitt, WA5ZAY, Silent Key

On April 21, 2011, Jack Babbitt, WA5ZAY became a silent key. Jack had been an integral part of the ham radio community, not only here in the Walla Walla Valley, but in Texas where he began his amateur radio "career". Jack worked many public service events over the years, and provided emergency communications for numerous situations in Texas and Washington. He served in many roles, including several years as ARES Section Emergency Coordinator for Eastern Washington, President of the W7DP radio club, head of the local VE testing team, owner of the WA5ZAY Lewis Peak 2m and 440 repeaters, station trustee of the K7UH Lewis Peak Amateur Radio Repeater Association, as well as many other roles. Many new and long-term hams have received a wide variety of knowledge, advice, and hands-on training from Jack, and many individuals and groups have benefited from his direct and indirect assistance....Mable, WB5AVH, has asked that in lieu of flowers, those wishing to may make donations in honor of Jack's memory, to the K7UH Lewis Peak Amateur Repeater Association, P.O. Box 951, Walla Walla WA 99362. 73, Heidi KC7CCL

Jack was also an integral part of the KBARA club during the early years, and helped keep it going during that time.

The K4VX Linear-Loaded Dipole for 7 MHz

Here's a very simple and practical way to make a short but efficient 40-meter dipole.

One of the easiest antennas to build is the half-wavelength dipole fed with coax. Every *ARRL Handbook* since 1930 contains the information required for constructing one. The only limiting aspect to the antenna is the space, or span, required to support it. This becomes a particular concern at the frequencies 7 MHz and below. While in my own personal situation space is not a problem, I decided to design a shortened dipole for use where space is limited.

At 7 MHz a standard horizontal dipole requires approximately 66 feet of wire, and with center and end insulators, approaches 68 feet between rope supports. Obviously one must add several more feet to the total span for support. My concept was to design a dipole that is approximately 70% of the length of a standard dipole, yet be very inexpensive and simple to construct. It also had to perform nearly as efficiently as a full-sized antenna. Linear loading seemed to be the simple way to go.

Linear Loading

Linear loading has been around for many years in the design of 80 and 40-meter Yagis. One of the first antennas I can recall was the Hy-Gain 402BA, a 40-meter, 2-element design with 46-foot elements on a 16-foot boom. Other manufacturers copied the concept in their Yagi designs. The shortened dipole presented here is the result of using computer modeling initially to verify the concept, and actual construction to verify the modeling. Not surprisingly theory and reality are very close.

In order to keep the design of this antenna inexpensive I decided that I would try 450- Ω ladder line as the linear-loading mechanism. I pursued two methods of applying the loading:

1. Inserting the loading midway on

each side of the span, which requires two additional insulators.

2. Inserting the loading at the center, supported by the antenna wires.

After modeling with *NEC-2*, and later with *NEC-4*, I could see very little difference between these two methods. Since the first method requires two additional insulators, I chose the second

method. Both modeling programs provided encouraging results and I decided to construct the antenna.

My initial construction consisted of a 46-foot span of #12 Copperweld fed in the center, and linear loaded with two 12-foot sections of 450- Ω ladder line¹ on

¹Notes appear on page 42.

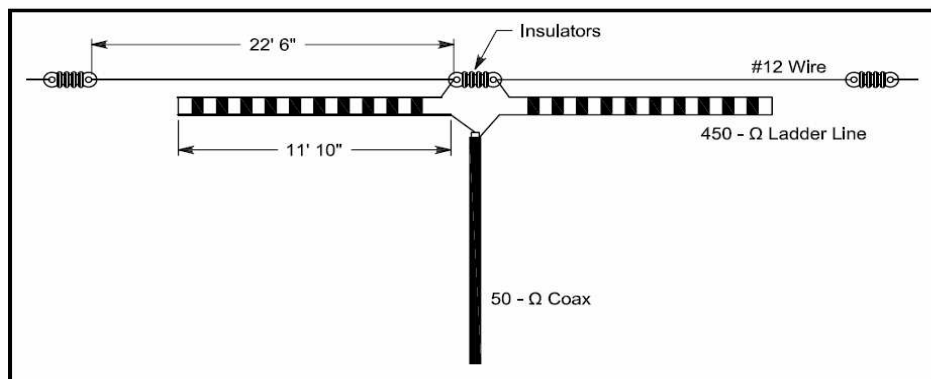


Figure 1—Layout of K4VX linear-loaded dipole. Although the #12 wire is threaded through the 450- Ω window line to support it, this is not shown in this drawing for clarity.

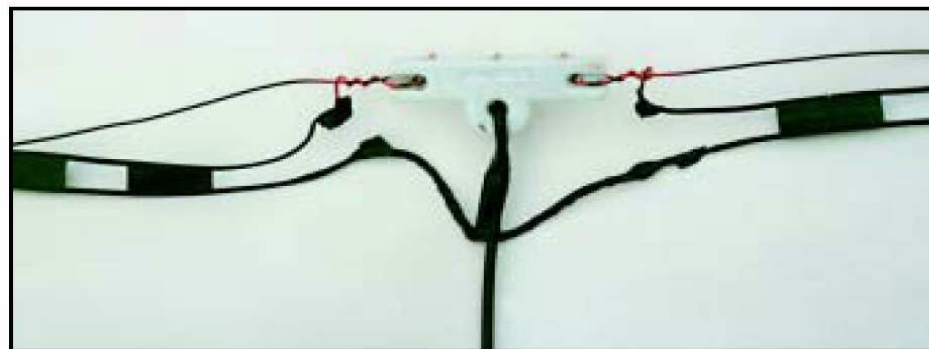


Figure 2—Details of feed point. Note that the feed coax loops through the center insulator for mechanical strain relief.

each side of the center insulator, and shorted at the end away from the center. Where this design differs from previous ones is that in mine the #12 wire is interlaced into the ladder line to provide physical support to the ladder line. See Figure 1, a schematic of the wiring arrangement. Figure 2 is a photo showing details of the feed point, and Figure 3 shows the final method I used for interlacing the #12 wire through the open windows of the ladder line. I'll discuss this in more detail later.

I can hear the purists now, "That contraption will never work. The wires are too close." Well, this is the proverbial bumblebee—it doesn't know it can't fly!

Construction

In actual construction I used approximately 54 feet of RG-8X Mini Foam from RadioShack² to provide a half-wavelength feed line at 7.025 MHz. Since I assumed I would encounter impedance that was different from 50 Ω , I wanted to make an exact half wavelength that would repeat the value at the center insulator.

I measured the electrical line length using a General Radio 916-A RF bridge, using a Measurements Corporation Model 65-B signal generator as the source, and an IC-740 transceiver as the null detector. For those readers who are not familiar with using a bridge to measure a half wavelength length of coax, the technique is to short one end and look for an impedance at the other end that is zero reactance and a very low resistive value. In this case after some pruning the resultant impedance was $3.1 + j0 \Omega$.

After the antenna was up in the air, I could then measure the impedance at the feed point and proceed with matching it. As a point of interest, RadioShack states that this coax has a velocity factor of 78%. My measurement was remarkably close, at 77%.

Installation

Once the antenna was constructed, I



Figure 3—Final assembly method using interlaced #12 Copperweld wire through holes punched in the windowed ladder line.

hoisted it up to about 40 feet. I then used the MFJ-247 bridge to measure SWR. To my shock, the SWR was perfectly flat at 7.025 MHz, the frequency for which I had designed the antenna! Having been a ham for almost 55 years, I can honestly say that the chances of this happening are almost nonexistent. Figure 4 shows the measured SWR for this initial antenna.

Obviously the design center at 7.025 MHz is too low to cover the entire 40-meter band. However, perusal of the data indicates that the 2:1 SWR bandwidth approaches 300 kHz, which is broad enough to cover the entire band with some scaling of the center frequency. In my own case I would probably have left the antenna as is, but since this is an article for the general amateur population, I proceeded to scale the design to 7.125 MHz.

Frequency Scaling

The first thing learned is that a 1.4% (7.125/7.025) proportional change of both wire length and 450- Ω ladder line length will not provide the correct frequency shift. Originally, I shortened each wire tip 4 inches and each linear loading line 2 inches. This moved the resonance to 7.200 MHz, rendering it less than useful at the bottom of the CW band.

Next, I decided to leave the linear loading alone and just lengthen the ends of the

#12 wire. After several attempts, resonance is now 7.125 MHz. Figure 5 shows the SWR of the completed antenna. The 2:1 SWR bandwidth is approximately 275 kHz, which covers practically the entire 40-meter band. The measured final dimensions of the antenna are 22.5 feet of #12 Copperweld, and 11 feet 10 inches of ladder line each side of center.

While conducting these tests, I discovered that raising and lowering the antenna alone could shift resonance as much as 20 kHz. This was with no length changes being made. I then decided to secure the #12 Copperweld as closely as possible to the center of the ladder line with electrical tape. It appears that as the secured Copperweld shifted, the coupling between the ladder line and the Copperweld changed—not much, but enough to be detected by the MFJ-247. Electrical tape alone is not the best final solution for this. A better solution is to punch holes in the center of the ladder line insulation and lace the wire through at about 6-inch intervals. This prevents any deviation in the spacing of the conductors. See Figure 3 again.

There are several ways to secure the end of the ladder line to the #12 wire. I chose electrical split-bolt connectors with nylon cord for mechanical strain relief. Care should be taken to insure that the shorted end of the ladder line does not come in

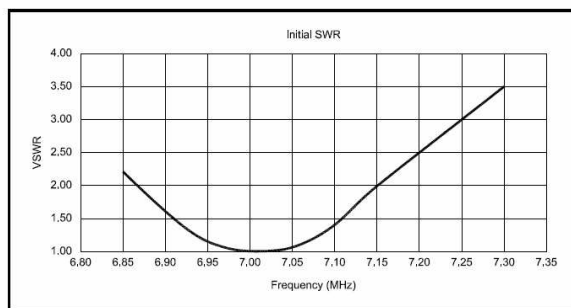


Figure 4—SWR curve for initial model built by K4VX.

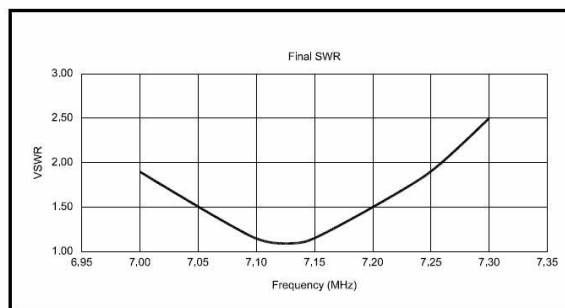


Figure 5—SWR curve for finalized model.

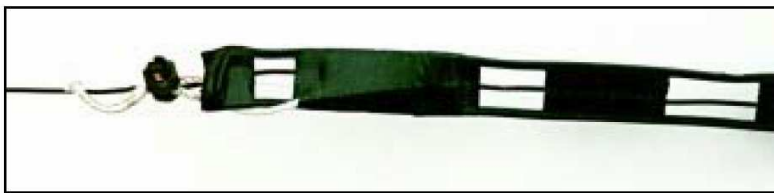


Figure 6— There are several ways to secure the end of the ladder line to the #12 wire. I chose electrical split-bolt connectors with nylon cord for mechanical strain relief. Care should be taken to insure that the shorted end of the ladder line does not come in contact with the wire.



Figure 7— The K4VX 40-meter linear-loaded dipole deployed at 40 feet.

contact with the wire. See Figure 6.

Performance

There appears to be little measurable on-the-air difference between this shortened dipole and a full-sized dipole. Computer modeling indicates less than 1 dB difference also. Figure 7 is a photo of the antenna at 40 feet.

The total cost of this antenna (minus coax) should be less than \$25 with all-new materials. The 450-Ω ladder line is available for approximately \$0.25/foot and Copperweld #12 wire for less. New insulators should be less than \$10, but junk boxes and flea markets can usually suffice.

Conclusion

This design provides a dipole that is 70% of the span of a full-size dipole with little observable difference in performance. On 40 meters this amounts to a reduction of over 20 feet. An 80-meter version requires only a 90-foot span. I can envision an 80-meter 4-square with a 45-

foot high linear-loaded vertical element and a single 45-foot linear-loaded radial supported by a 60 to 70-foot tower based upon the ON4UN design.³

Another application might be a linear-loaded quarter-wave 160-meter sloper supported from an 80-foot tower. As with most new concepts, experimenters will not necessarily get perfect matches on the first try as I did with this antenna, but for those willing to make adjustments and use some cut-and-try, the rewards will prove worth the effort.

Notes

¹Available from The WIREMAN, 261 Pittman Rd, Landrum, SC 29356, orders 800-727-WIRE; cahaba.net/~thewire/index.shtml. Part #CQ-552.

²RadioShack #278-1313.

³ON4UN's *Low-Band DXing* (Newington: ARRL, 1999) p 11-72, Section 5.3.

Photos by the author:

Lew Gordon has been licensed continuously since 1947, and earned his Extra Class

license in 1952. He has previously held the calls W9APY, WA4RPK and W4ZCY. He has held K4VX since 1973. Lew's wife holds NSOZ, and his daughter is NOHVY. Lew earned a BS degree in Physics from Purdue University and did graduate work at Georgetown University. Lew is a retired US Government systems engineer. He was elected ARRL Midwest Division Director in 1993 and retired in 2000. An active contester, Lew's main love in Amateur Radio is antenna design and construction. His antenna farm consists of 10 towers ranging from 50 to 170 feet with rotaries on 40, 20, 15 and 10 meters. He has written several human interest articles as well as articles on band-pass filters, antenna designs and other subjects. His freeware program YAGIMAX is in use all over the world. You can contact the author at PO Box 105, Hannibal, MO 63401; k4vx@arrl.net.

QST

STRAYS

LANDMARKS MAY BE COMING DOWN

◇ Anyone who's driven past the two impressive antenna structures just off I-71 in Oregonia, Ohio (between Wilmington and Rte 73), won't soon forget them. The two 80-foot homemade towers, one of which had a homemade sign with the owner's call sign, are about 150 feet apart—a comforting landmark to travelers to the Dayton Hamvention. The sign has come down, and the towers may soon follow, as Estle Hagemeyer, W8FMV, became a Silent Key last year and his farm is to be sold. —Charles J. Stinger, W8GFA



One of the towers, which have stood at the site in Warren County, Ohio, since 1950.

QST



35th Annual SPOKANE HAMFEST

and

American Radio Relay League

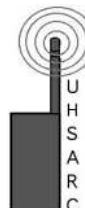
Washington State Convention

September 24th, 2011

University High School

12420 E 32nd Ave, Spokane Valley WA 99216

Hosted by 8 Amateur Radio Clubs:



Raffle prizes: 1st Prize: ICOM IC-7000 HF/VHF/UHF Transceiver; 2nd Prize: Kenwood TM-V71A Dual Band 144/430 FM Transceiver; 3rd Prize: Yaesu FT1900r Mobile 2 meter FM Transceiver

Many door prizes, seminars & displays: "Curacao Contesting" by Geoff, W0CG/PJ2T "Zimbabwe DX'ing" by Bob, Z2/AC7GP ~ "Junque" Auction by Wilse & Gimmie, WX7P & AL7LB ~ "Radio Test Gear" table with Jack, AD7FO ~ License Exam ~ ARRL NW Division Director Jim, K9JF ~ RTTY Demo by SDXA ~ WinLink demo by IEVHF Club ~ ARRL QSL Card Checker, Jay, WS7I ~ EmCom Vans ~ ARES/RACES Forum ~ Commercial & non-commercial vendors ~ Non-stop food ~ Hourly door prize drawings ~ and much, much more ~ See www.spokanehamfest.com for updates

Admission \$5

Age 18 and under FREE

Commercial tables \$15

\$12 if paid before September 2nd

Swap tables \$7.50

\$5.00 if paid before September 2nd

Admission not included in the price of table space

Friday, September 23rd

Vendor Setup: 7-9PM

Saturday, September 24th

Vendor Setup: 8 AM

Open to Public: 9AM – 5PM

License Exam: 11:00AM

"Junque" Auction: 3:00PM

Raffle: 4:30PM

No-host Post Hamfest Dinner: 5PM

Timber Creek Grill Buffet

9211 E Montgomery Dr.

Spokane Valley

Program advertising available: ¼ page for \$40 to full page ad for \$120

License exam info: Mary, AA7RT
at (509)991-2192 or aa7rt@arrl.net

Free off-street parking for cars & RV's

SPOKANE HAMFEST 2011 REGISTRATION

Name _____ Call Sign _____

Address _____

Phone number/E-mail address _____

Please make checks payable to & mail to: Spokane Hamfest
PO Box 2552
Spokane WA 99220-2552

_____ **Registrations @ \$5 each** \$ _____

Age 18 & under free

_____ **Commercial tables @ \$15.00 each** \$ _____

\$12 before 9/02/11

_____ **Swap tables @ \$7.50 each** \$ _____

\$5.00 before 9/02/11

Tables available while they last

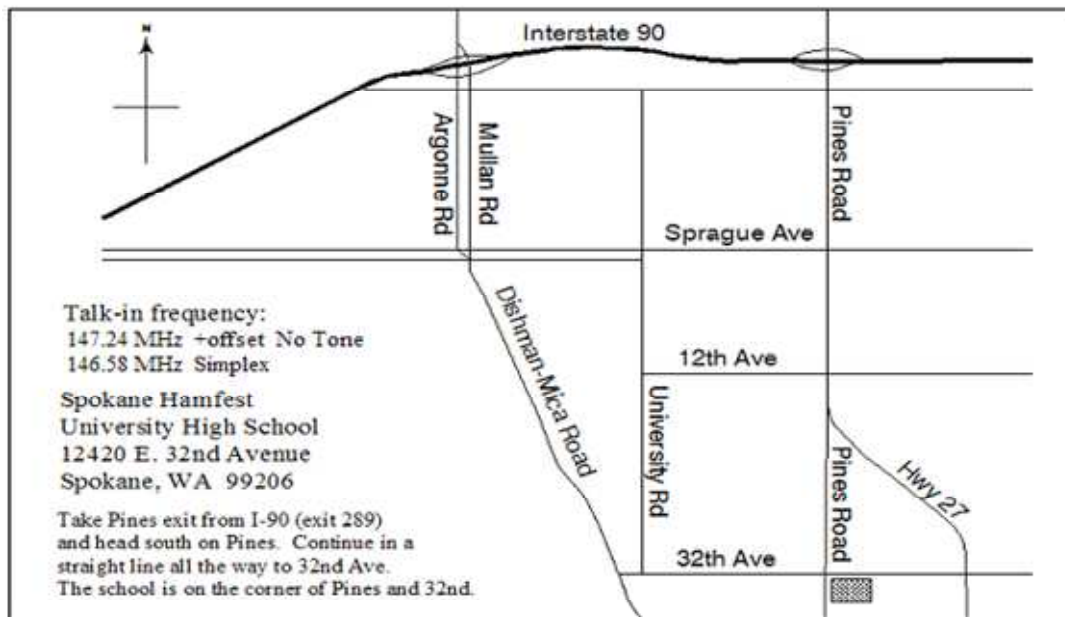
Total \$ _____

No admission charged for license exam only

Prepaid registrations will not be mailed, but will be held at the ticket table & available for pickup starting Friday, 9/23, 2011, 7 PM – 9PM

The SPOKANE HAMFEST is an annual event hosted by eight Amateur Radio clubs: The Inland Empire VHF Radio Amateurs, Kamiak Butte Amateur Repeater Association, Northwest Tri-State ARO, Spokane DX Association, Palouse Hills ARC, University High School ARC, Lilac City ARC, and Panoramaland ARC.

For additional information contact: Bob Meenach AC7GP
509-327-3188 ac7gp@hotmail.com
Web site: <http://spokanehamfest.com>



Pacific Northwest Hamfairs & Events

Source: PNW Hamfair webpage at <http://www.n7cfo.com/amradio/hf/hf.htm>

August 12-14, 2011. 56th Annual Pacific Northwest DX Convention. Holiday Inn, Everett, WA. *This is an ARRL sanctioned event.* <http://www.wwdxc.org/>.

August 13, 2011. Radio Club of Tacoma Hamfest. *This is an ARRL sanctioned event.* Bethel Jr. High in Spanaway WA. <http://www.w7dk.org/> [Flyer in PDF](#). (58K)

August 21, 2011. Antique Radio Swap Meet. Puget Sound Antique Radio Association. 9 AM to 1 PM. **New Location!** Shoreline Senior Activity Center, 18560 1st Northeast, Shoreline, WA 98155. Free admission. <http://www.eskimo.com/~hhagen/psara/swap.html> (Always the 3rd Sunday in August)

August 21, 2011. Surrey/Langley ARC Swap Meet. Surrey, BC. http://rac.eton.ca/events/detail.php?event_ID=1478

August 27, 2011. Highline ARC Swapmeet, Kent, WA. Gates & Controls, 6506 South 209th Street, #102, Kent, WA 98031 <http://highlinearc.webs.com/>. Talk in frequency: NC7G 146.660 (-) 103.5 Hz and 147.570 simplex. Open to sellers at 0800, open to buyers at 0900 and ends at 1300. Contact Dennis Reanier: w7uba@comcast.com, 206-241-6812.

August 28, 2011. Vancouver Island Ham Happenings 2011. Duncan, BC. http://rac.eton.ca/events/detail.php?event_ID=1472

September 9-11, 2011. Northwest Automatic Position Reporting System (NWAPRS) Summer Gathering. Valley camp, North Bend, WA. Contact Thom k7fzo@arrl.net <http://nwaprs.info/sq.htm>

September 24, 2011. The First Annual Clark County Amateur Radio Club Hamfair. Vancouver, WA. <http://www.w7aia.org/>

September 24, 2011. Spokane Hamfest. University High School, 12420 E 32nd Ave, Spokane Valley WA 99216. *This is an ARRL sanctioned event.* For information contact Bob, AC7GP ac7gp@hotmail.com.

September 24, 2011. Gallatin County Hamfest. Bozeman, Montana. *This is an ARRL sanctioned event.* Info, mail@gallatinhamradio.com. <http://www.gallatinhamradio.com/>

October 1, 2011. SARA Fall Fleamarket. Southern Alberta Repeater Association. Calgary, AB http://rac.eton.ca/events/detail.php?event_ID=1494

HAM Nation is the new TWIT show about ham radio. Bob Heil, with various co-hosts and guests will cover the excitement and importance of ham radio - from tossing an antenna wire in a tree allowing you to talk to the world, to the importance of ham radio operators in time of disasters. HAM Nation airs live each Tuesday at 6:00 PT/9:00ET on <http://live.twit.tv>.



KBARA Membership / Support Information The KBARA repeater system consists of several privately owned linked Amateur Radio repeaters. It covers an area from northeastern Washington to northeastern Oregon, and from western Montana to central Washington. The KBARA system is also part of the Evergreen Intertie, an interconnected group of repeaters located in western Washington and Oregon. The primary purpose of the KBARA repeaters is to provide a means for emergency communications within the above areas, and secondarily for routine radio traffic. It makes possible a single system of mobile communications coverage, extending the limited range provided by any single repeater operation. The KBARA FM repeaters operate in the VHF bands and are linked by UHF radios. The repeaters' frequencies, call signs, locations and owners are as follows:

KBARA REPEATERS

- 146.74 W7HFI** Kamiak Butte, near Pullman, WA, owned by Bob, W7HFI, John, W7OE, & Mark, K7HPT
- 147.02 K7HPT** Lookout Pass on I-90 on the Idaho-Montana border, owned by Mark, K7HPT, & John, W7OE
- 147.28 KD7DDQ** Pikes Peak in the Blue Mountains, SE of Walla Walla, WA, owned by Ken, KD7DDQ & Mark K7HTP
- 147.36 N1NG** Stensgar (Stranger) Mountain, near Chewelah, WA, owned by Mike, N1NG, & John, W7OE
- 147.38 W7OE** Mica Peak, east of Spokane, WA, owned by John, W7OE
- 223.90 AK2O** Stensgar (Stranger) Mountain, near Chewelah, WA, owned by Karl, AK2O
- 444.35 N1NG** Mica Peak, east of Spokane, WA, with a 192.8 Hz tone, owned by Mike, N1NG
- 53.750 N7ZUF** Kamiak Butte, near Pullman, WA, owned by Jay, N7ZUF
- IRLP Node #3957 N1NG** South Hill of Spokane, WA, owned by Mike, N1NG

All licensed Amateur Radio operators are welcome to use this open repeater system. Your support would also be greatly appreciated.

Please visit these websites for more information: <http://www.kbara.org> and visit <http://groups.yahoo.com/group/evergreenintertie>

To support KBARA, please send your contributions to:

KBARA, PO Box 30801
Spokane WA 99223-3013

Annual support is \$15 per calendar year for a single membership and \$20 for a family membership. Dues are due in January of each year and if paid between September 1 and December 31, they will be applied through the entire following year. Also, any contribution will be gladly accepted to the Repeater Fund.

KAMIAK BUTTE AMATEUR REPEATER ASSOCIATION

PO Box 30801

Spokane WA 99223-3013