

W6LVP Amplified Receive-Only Magnetic Loop Antenna
Setup and Operation Guide
Portable Version

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By
Larry Plummer
805-328-4178
lplummer@vcnet.com

Setup and Operation Instructions

I use and recommend a Blackmore Model BJST-60KG DJ speaker support tripod that will raise the base of the antenna to a bit over 6 feet. The speaker tripod is sturdy, collapsible for portability, and with a 1" PVC compression coupler is compatible with the antenna 1" PVC lower tube section (see details later). The tripod can be purchased from a variety of sources including Amazon for \$25. It is best to stake or weight the center of the tripod to prevent it from tipping over from a wind gust.

For about \$10, an H-stand can be built from standard 1" PVC parts available from most hardware stores, Lowes, and Home Depot. The stand is built from three 1" tees, seven pieces of 1" PVC pipe that are 7 inches long, four 1" caps, and one 1" PVC compression coupler. The compression coupler mates the bottom black PVC section of the antenna to the vertical section of the H-frame. Since the coupling does not need to be water tight, cutting the compression gaskets makes sliding them over the pipe sections easier. (See the photo on the right below.)

The antenna could also be hung from a tree branch with nylon cord or mounted on a stake driven into the ground.



Blackmore Speaker Tripod
(Not fully extended)



DIY PVC H-frame

The receive loop should be located as far as possible from noise generating sources and as far as practical from a transmitting antenna.

Assembly of the antenna is extremely straightforward. Insert the upper $\frac{3}{4}$ " PVC tube with coaxial cable loop attached into the top of the 1" PVC lower tube section. Connect the two BNC connectors on the ends of the coaxial cable loop to the BNC connectors on each side of the loop preamplifier. Insert the lower 1" PVC tube into its mount as described above. The coaxial cable loop can be adjusted to a round shape which has only cosmetic benefit. Slight deformation of the coaxial cable loop will not affect loop performance.

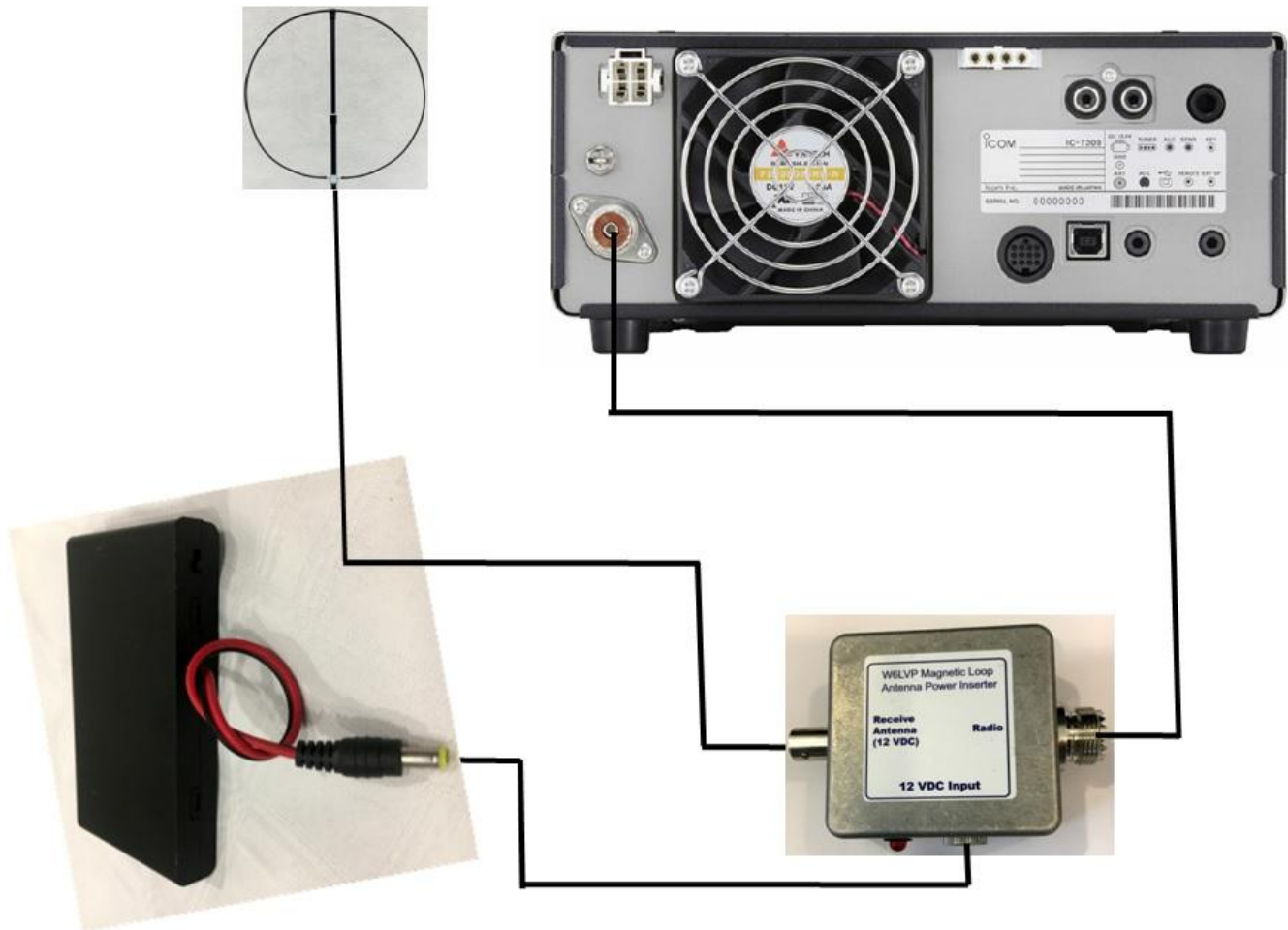
A loop has a figure-8 pattern a bit like a dipole with broad front and back lobes but with narrow and deep side nulls. If you think of the loop as a wheel, the main lobes are in the directions that the wheel could roll forward or backwards. The nulls are perpendicular to the plane of the loop and extend in both directions like the axles of the wheel. It is the nulls that are a loop's greatest asset. Rather than pointing the lobes at signals, it is better to point the nulls at noise by rotating the loop for minimum received noise or other RFI.

Mounting a loop higher is not necessarily better. Getting the loop high enough to have a view of the horizon clear of RF obstructions is all that is necessary.

Coaxial 50-ohm cable with either BNC connectors or other connectors and BNC adapters can be used to connect the antenna to its power inserter. However, 75-ohm quad-shield RG-6 is also an excellent cable and has high common mode rejection to prevent the cable shield from picking up stray noise or RFI.

Using the W6LVP mag loop portable version with a transceiver with separate receive antenna input or with a receiver.

When using the W6LVP magnetic loop portable version with a transceiver having a separate receive antenna input or with a receiver, connect it as follows:



- Connect a short 50-ohm cable with a PL-259 connector on one end to the power inserter RADIO connector. Use an appropriate connector or adapter on the opposite end of the cable for the radio receive antenna connector.
- Using a 50-ohm coaxial cable with BNC connectors or other connectors and BNC adapters, connect the power inserter RECEIVE ANTENNA input to the loop amplifier output. Although the loop preamp and the input to most radios are 50 ohms, experiments indicate that quad shield RG-6 cable with F to BNC adapters is not only inexpensive but has good common mode rejection.
- Remove the battery pack battery door. Install eight AA alkaline or rechargeable batteries into the battery pack being careful to observe the correct battery polarity. Replace the battery pack battery door.

- Connect the 8 pack AA battery power source to the power inserter, turn on the battery pack, and the LED will illuminate indicating power is applied. Good quality new AA alkaline batteries should power the antenna for about 24 hours of use. Be sure to turn off the battery pack when not in use to obtain maximum battery life.

TIPS

A 1" PVC compression coupler available from hardware stores for about \$5 is a great aid to either extend the lower section of the loop PVC tube or to attach the loop directly to the top of a speaker tripod. If using the coupler to extend the lower PVC tube, use an appropriate length of 1" PVC pipe and the coupler will fit perfectly on both the bottom



section of the antenna support tube and the top of the PVC extension. If using the coupler to attach the antenna to a speaker tripod stand, one end of the coupler will fit directly to the bottom of the loop PVC 1" pipe. However, the diameter of the top tube of the speaker stand is slightly too large to fit the coupler compression nut. In order to make it fit properly, remove the compression nut and slightly enlarge the hole in the compression nut to fit the top of the speaker tube. The hole can be enlarged using a half-round file, a rat-tail file, or a short piece of 3/4" PVC pipe with fairly coarse sandpaper wrapped around it to form a round file.



If a permanent extension to the lower 1" PVC pipe is necessary, a 1" to 1" PVC slip coupler can be used between the lower section of the antenna structure and the top of an appropriate length of 1" PVC pipe with both glued into the coupler.

Either with the antenna located close by or with a helper, the loop antenna can be rotated either for optimum desired signal reception or minimum noise. Testing has indicated that rotation for minimum noise has the greatest benefit. With an SDR receiver, rotate the loop for minimum baseline noise. With a conventional receiver, tune to an unused frequency near where you plan to listen, turn the receiver volume up, and rotate the loop for minimum noise sound. There may be cases where the loop can be rotated to separate two stations operating on the same frequency – optimize one and minimize the other.



An auto cigarette lighter plug to 5.5 x 2.1 mm power cable can be used to power the antenna from a car battery which will enable extended operation. Available from Amazon for under \$5.

Using a 5.5 x 2.1 mm barrel power plug, the antenna through its power inserter can be powered from any clean 12 to 14 volt DC source. That could be a larger battery for portable operation of a line voltage AC to 12 volt DC power supply (wall wart). It is recommended that only battery or linear power supplies but used for a power source due to potential radio interference noise generation from switching mode power supplies.

Use only the supplied 8 pack AA battery pack or a 12 volt DC linear power adapter. Do not use a switching 12 VDC power adapter as it will inject noise into the received signals.

NEVER CONNECT THE POWER INSERTER RECEIVE ANTENNA CONNECTOR (BNC) TO THE TRANSCEIVER ANTENNA OR RECEIVE ANTENNA CONNECTOR. THE CABLE FROM THE POWER INSERTER TO THE LOOP IS USED FOR BOTH THE RECEIVED RF SIGNAL FROM THE LOOP AMPLIFIER AND 12 VOLTS DC POWER FOR THE LOOP AMPLIFIER. THAT 12 VOLTS DC COULD DAMAGE THE INPUT TO A TRANSCEIVER OR RECEIVER.

NEVER CONNECT THE OUTPUT OF A TRANSCEIVER OR POWER AMPLIFIER TO THE MAGNETIC LOOP AMPLIFIER. THIS ANTENNA IS FOR RECEIVE ONLY.

Warranty

All products manufactured by W6LVP are warranted to be free from defects in material and workmanship for a period of one (1) year from date of shipment. W6LVP's sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by W6LVP. If W6LVP's products are claimed to be defective in material or workmanship, W6LVP shall, upon prompt notice thereof, issue shipping instructions for return to W6LVP (transportation-charges prepaid by Buyer). Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing. The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation, damaged from severe weather including floods, or abnormal environmental conditions such as prolonged exposure to corrosives or power surges, or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer's specifications. In addition, W6LVP's warranties do not extend to other equipment and parts manufactured by others. The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages.

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