

A13-5-1
A 13-1 of 5

THE WEDGE

The Wedge is a broadcast band loop antenna which began life as an experiment in loop shape. It has proven to be a very useable antenna for beb DXing. In addition, the tall, thin shape of the Wedge makes it a valuable development for apartment dwellers or other DXers with limited space.

These plans describe the construction of my own 4 1/2' Wedge. You may wish to change certain phases of the construction. However, these plans are intended to give you a working, sturdy loop.

1. The Materials List

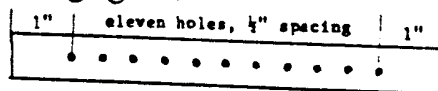
| | | |
|---------------------------------------|------------------------------------|----------------------|
| 125' of #14 or #16 insulated wire | 6' of 1x3 pine | 1" dowel, |
| 2 tuning capacitors: variable, 365 pf | 8' of 1x1 pine | 2' long |
| wing nut w/bolt | 6' of 1x2 pine | nails, solder, tools |
| 6' insulated one-conductor coax cable | two plastic knobs (for capacitors) | |

2. Cutting the Wood

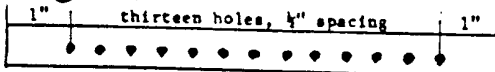
| | | | | | | | | | |
|----------|--|-------|----------|-------|-------|-------|-------|--|--|
| 1x1 pine | These three pieces will be cut further during construction | | | | | | | | |
| 7" a | 7" b | 8" c | 8" d | 8" e | 12" f | 12" g | 10" h | | |
| 1x2 pine | 1 1/2' i | | 4 1/2' j | | | | | | |
| 1x3 pine | 18" k | 18" l | 12" m | 12" n | 12" o | | | | |

3. Drilling Holes

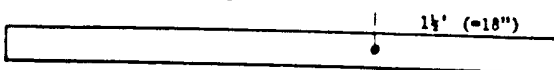
parts a & b, 1x1, 7"



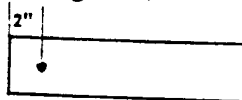
part c, 1x1, 8"



part j, 1x2, 4 1/2' long



part o, 1x3, 12"

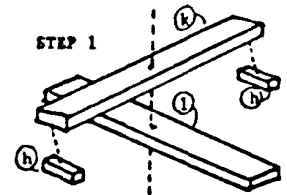


HOLES in parts a, b, and c should be drilled so wire can pass through them. HOLES in parts i and o should be large enough for wing nut/bolt assembly

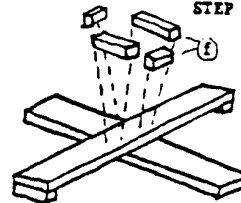
4. Construction of the Antenna Stand

Materials Needed: wood parts f, g, h, i, j, k, l, m, n, o
dowel, 1", 2' long
wing nut
nails, tools

STEP 1: Cut part h into sections as long as the width of one of the 18" 1x3's. Attach pieces k and l at right angles at their centers, and mount the pieces of h to create a flat base.

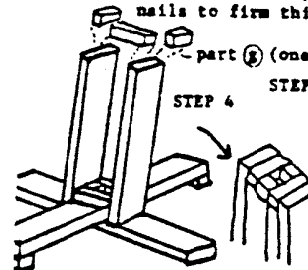
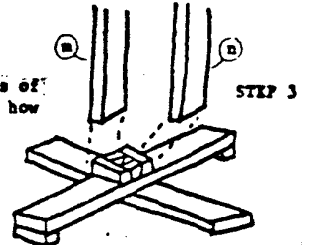


STEP 2



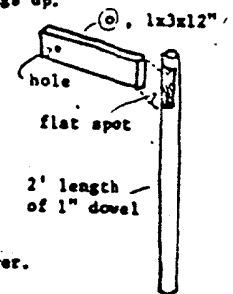
STEP 2: Take part f and cut it up to build a square which will hold the 1" dowel snugly in place, and mount to the base.

STEP 3: Attach parts m and n, the 12" sections of 1x3 pine, vertically to the base. To see how these parts hook on, see the drawing for STEP 4. Just use one or two nails for each of the vertical supports at this point; after completing STEP 4, add extra nails to firm things up.



STEP 4: Hopefully, your stand will come out a little straighter than this drawing... anyway, the next step is to take part o, a 12" section of 1x3 and use the pieces to create a square to hold the 1" dowel like you did at STEP 2; this time, it's mounted at the top of the vertical supports. After adding the square at the top, you should add extra nails to the vertical supports where they join the base of the stand, to firm things up.

STEP 5: Attach part o, a 12" long 1x3 with a hole drilled in it, to the 2' length of 1" dowel. HINT: At the point where the board mounts to the dowel, it makes things a lot easier to file a flat spot on the dowel at the junction point, as in the drawing. This makes for a firmer stand, and also makes it easier to drive nails into the dowel. These two parts need to be very strongly attached; my suggestion is to use 2" or 2 1/2" nails, pound them all the way through the dowel, and bend them over. Slightly ugly, but good and strong.

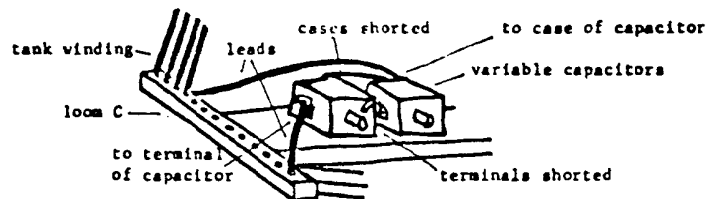


FINALLY, insert the dowel through the two supports. It should rotate freely, without being sloppy. If it's too tight, use a file on the 1x1's to open the hole a little more. If it's too loose, try shimming things up with a couple sections of popsicle stick or something similar.

Insert the wingnut in the hole for safe keeping.

A13-5-3
A13-30F5

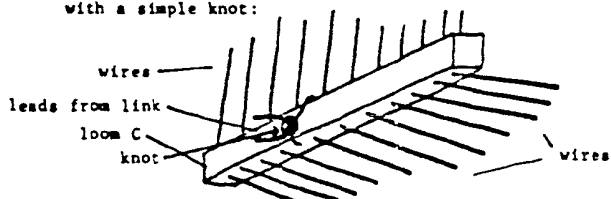
DIAGRAM: Correct Wiring of Variable Capacitors



STEP 9: Take the remaining 11 or so feet of wire. This wire is used to make a one-turn link winding, using the open holes in the looms. If you wound the tank winding clockwise, do the link winding clockwise. If you did the tank winding counterclockwise, do the link winding counterclockwise. The way to make sure you did this correctly is that the tank winding and the link winding should not cross at any point.

Attach the wire the same way you attached the tank winding - leave leads of about 4" at each end, and tie knots in the wire to keep it from pulling out. Not much can be done to tighten up this one-turn winding, but try to keep it as tight as possible.

STEP 10: Take the two leads from the link winding and tie them together with a simple knot:

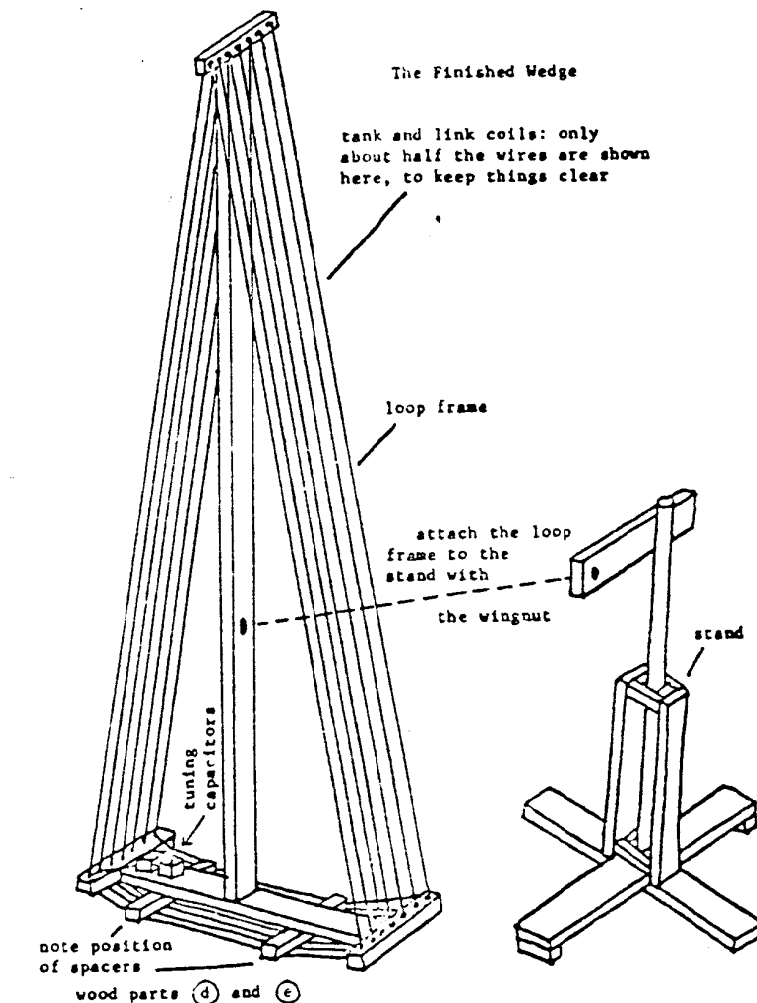


STEP 11: Attach your coax lead to the link winding at the point where the wires are tied together. One wire goes to the shield of the coax (which hooks to the ground terminal on your receiver); the other wire goes to the inner conductor of the coax, (which hooks to the antenna terminal on your receiver). Mount the plastic knobs on the capacitors.

7. Putting the whole thing together....

....is fairly simple. The first thing to do is to put the spacers in place. The spacers are meant to tighten up the windings a little more. The drawing on the last page should show where to put the spacers, between the wires on the bottom side of the Wedge and the horizontal frame member. Insert them near the center and slide them toward the edges, until things seem tight.

Finally, attach the loop frame and windings to the stand by means of the wingnut; again, see the last page for details. Attach the coax to your receiver (see step 11 - if you have A1, A2, and Ground - terminals, attach the center wire to A1, and the shield to Ground, which is then shorted with A2).



OPERATING THE WEDGE: To null a station, turn the loop around until the signal "dips". By centering in on the place where the dip is the deepest, and experimenting with various degrees of tilting the loop, you should be able to knock out a noticeable amount of signal from any station. The tuning capacitors are meant to peak the antenna to certain frequencies. The further clockwise you turn the capacitors, the higher the frequency you'll tune. The "amount" of capacitance from the two caps adds, so, if you can't get high enough on the band by using only one, tune one all the way clockwise and start turning the other one. This isn't exactly how things work, but it will get you started, anyway.

A13-5-2
A13-20F5

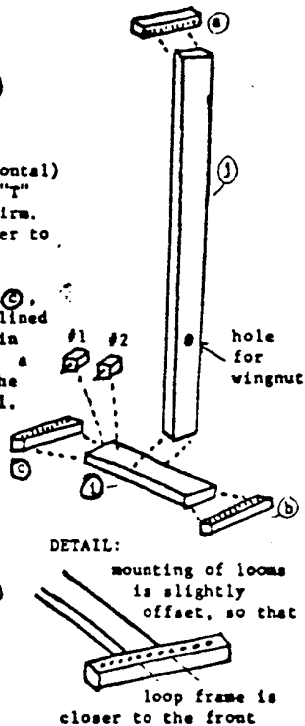
5. Construction of Antenna Frame

Materials Needed: wood parts ①, ②, ③, ④, ⑤
nails, tools
tuning capacitors

STEP 1: Attach part ① (vertical) to part ② (horizontal) at the center of ②, to make an inverted "T" shape. Use three or four nails, make it firm. Be careful that the hole in part ① is closer to the bottom of the loop.

STEP 2: Mount the wire "looms," parts ③, ④, and ⑤, as indicated. Be careful to get the holes lined up the way they are in the drawing; holes in ③ and ⑤ should face up and down, holes in ④ should be parallel to the ground. Mount the looms about 1/3 of the way back; see detail.

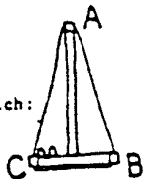
STEP 3: Mount the tuning capacitors, shown in the drawing as small boxes #1 and #2. The shafts should extend towards the front of the loop. Many tuning capacitors are difficult to mount; contact cement will work, if you follow directions closely and give it plenty of time to work. Mount the capacitors as close as possible to part ③ the 13-hole loom, on part ①, so as to get the shortest possible leads from the tank winding to the capacitors.



6. Winding the Loop Antenna

Materials Needed: 125' of #14 or #16 insulated wire
loop frame (completed)
wood parts ④ and ⑤

To begin, let's review which corner of the loop is which: All the windings begin and end at ③. The coax lead to the receiver will also attach at this point.



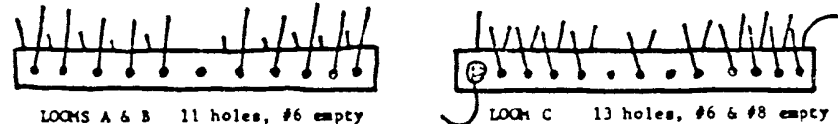
STEP 1: Take one end of the wire and pull it through the hole at the front of C. Pull through about six inches (enough to reach one of the tuning capacitors) and tie a knot to hold the wire in place. The knot is tied in the six-inch section, right where it comes through the loom (part ③).

STEP 2: Take the other end of the wire and begin going around the loop, pulling the wire through the holes in the looms. It doesn't matter whether you go clockwise or counter-clockwise, as long as you do all the winding in the same direction. Continue around the loop until you have wound five complete turns. The end of the wire from the end of the fifth turn goes through the seventh hole in loom C; hole #6 is left open.

STEP 3: Continue around the loop, skipping the sixth hole in looms A and B, and the eighth hole in loom C. After passing the wire through hole #9 in loom C, you should have four open holes in each loom. If not, you've done something wrong, and you might as well go back and try again.

STEP 4: After checking that you're ok so far, continue around the loop and finish the winding. The very last open hole you come to should be in loom C. As you did at the start, tie a knot in the loose end of the wire. However, do not cut off the extra wire at this point.

If you have correctly wound the loop to this point, your three looms should look like this:



Either end of the loom may be considered "hole #1"; you will get the same results counting either way.

STEP 5: **TIGHTENING THE LOOP** Even if you had a friend help you with the winding of the loop, the wires are probably still rather slack, and they must be tightened. Begin with the end of the wire you began the winding with, and go around, ride by side, and pull the loop tight; each time you pull a side tight (by pulling it out away from the frame of the loop), pull through all the accumulated slack. By the time you've worked your way around ten turns of the loop, you should have five or six inches of extra wire, or more, depending on how tightly it was originally wound. Tie a new knot in the end of the wire, to keep the slack from pulling back through the loom. It's usually worth going through this whole process two or three times, so that the loop is fairly tight before inserting the spacers.

STEP 6: After you have the loop tightened up, cut off the excess wire from the end of the ten-turn "tank" winding. This extra wire should be enough to make one more full turn around the loop - about eleven feet long - with a little extra at each end. Be sure, however, that you leave enough of a lead on the end of the tank winding to reach the capacitors.

STEP 7: Take the lead from one end of the tank winding and attach it to the case of one of the variable capacitors. Take the lead from the other end of the tank winding and attach it to the terminal (either terminal) of the other variable capacitor. For some reason I have not been able to figure out this is important. I don't know why, it just has to be done to make both capacitors work in the circuit.

STEP 8: Short the terminals of the two capacitors together, and short the cases of the two capacitors together. This should give you a setup that looks like the diagram on the next page.

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A13-5-4

The PVC Loop Frame

by Dennis Kibbe

Even the newcomer to MW DXing knows that a loop antenna offers advantages over a long wire and is a valuable addition to any receiver. But maybe like I have, you've been turned off building one by the thought of some complicated woodwork or the high cost of a commercial unit. Well, take heart! Your local hardware store has everything you need to construct a really first rate box loop right in their plumbing department!

PVC plastic pipe and fittings are easy to work with (just cut and glue) and the threaded parts available allow easy construction of a moveable joint for tilting. Here is my shopping list for a wedge loop (IRCA reprint #A13): 3/4 inch thick wall pipe, 2-joints to support wire, threaded elbows between antenna frame and base upright to allow tilting, flat threaded metal flange to screw to plywood base, threaded adapter between flange and upright. 1/2 inch pipe might work in lengths under two feet, but will not stay straight in longer lengths.

If I may be permitted to boast, the wedge loop I constructed turned out great! With its white frame wound with red wire and a yellow pinstripe for the coupling turn, even my wife has accepted it. See, do you think there is a market for designer antennas?

Hi!

My name is Phil Bytheway, and I'm the Publisher of "DX Monitor", the bulletin that you have received with your "Wedge Loop Antenna Plans". I assume that you may have some questions about the "Wedge" and its connection with your receiver (radio). Basically, if you have a communications-type receiver, or one with antenna and ground screws, you can just connect the pick-up turn to the antenna and ground of the receiver. However, you may ask, what do you do if you do not have any external connections on the radio?

There are two recommended ways to use your antenna without having to open up the radio and mess with the electronics. First, just place the receiver inside the turns of the loop or as close as possible to it, tuning the loop for a peak in signal, and then rotating the radio and loop for best or loudest signal. Just the action of the loop will bring in enough signal to inductively couple with the antenna inside your radio. If that technique doesn't work too well, or you find it hard to move your radio around at will, try a few turns of extra wire around your receiver, connecting both ends to the pick-up turn of the loop. This will improve reception greatly without having to move the radio around. This method can be taken one step further if you feel like opening up your radio. Take the back off, or whatever, and wrap the few turns of wire around the radio's antenna (usually a 3 to 6 inch Ferrite bar) before connecting it to the pick-up turn.

These techniques will help you improve radio reception with your "Wedge" antenna once you have it constructed.

HOW TO USE THE WEDGE ONCE YOU HAVE IT CONNECTED

The Wedge antenna is just a big tuned circuit, the same kind of circuit that your receiver uses to tune the stations in. Thus, for best results, the antenna must be tuned to the frequency you are listening to. Connect your receiver as described on the previous page, and adjust the capacitor until the signal peaks (i.e. gets louder). The "Wedge" is also very directional. Turn the antenna around slowly until the signal peaks. You are now "pointing" the antenna at the station you are trying to receive. It receives radio waves perpendicular to the plane of the windings. If you turn the antenna 90 degrees in one direction, the signal will become weaker. This is the "null" of your antenna, and there are two of them 180 degrees apart. More often than not one of these nulls is deeper, (i.e. the signal is weaker in one of the nulls). This nulling capability of your "Wedge" can be used to eliminate interference from stations that are slopping on the one you are trying to hear (say slop from a station on 790 while trying to hear one on 810).

You have built the "Wedge", and now you know how to use it! Enjoy! Broadcast band listening has provided many people with countless hours of entertainment.

If you have any further questions about the antenna, our radio club, the IRCA, or whatever, please feel free to write either me or the IRCA Technical advisor Nick Hall-Patch.

Nick Hall-Patch

^{73s}
Phil and best of listening,
 Phil Bytheway
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