



No. 2: Invisible and Hidden Antennas



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If you live in an apartment, condo, or development with antenna restrictions, you may need to hide or disguise your antenna. Here are some ideas to get you started. First, some general principles, then some basic antenna types.

Principles: The principles are few: 1. Safety: keep the antenna as far away from people as possible for their safety. 2. Propagation: put the antenna as high and in the clear as possible for maximum efficiency within the limits of needing to keep it out of sight. 3. Antenna tuner: with few exceptions, the hidden or invisible antenna will become a random length end-fed wire. Any of the T-matches (for example, MFJ's tuners) will do a good job matching the antenna to your rig. 4. Expectations: do not expect the performance of a long Yagi. Instead, expect to make a lot of great contacts.

Antenna Types: The basic hidden antenna types are four: 1. disguised verticals, 2. thin wires, 3. attic antennas, and 4. loading existing metal. There are dozens of variations on each theme. But, forget loading the bedsprings.

1. Disguised verticals: You can encase almost any type of vertical antenna in PVC, and call the outdoor structure a flag pole. For working dx from a development with restrictive covenants, this route is often useful, especially if you use a multiband vertical. Construction varies with the circumstances.

2. Thin wires: Wire as small as #28 enamel makes a good antenna for 100- watt transceiver use. It is often invisible enough to leave running from a second-story apartment window to a tree. Or, you can put it on a reel and wind it out and in as necessary. Alternatively, you can string it in the attic, turning corners wherever necessary. I have used it with success taped to the edges of a second story ceiling. How much wire? How much have you got? Just do not end up with tight coils; try for maximum length in each direction used.

Thin wire antennas, indoors or out, are random length wires fed at the end and need a transmatch. If possible, locate the transmatch where the wire leaves the building. Otherwise, try a piece of RG-213 from the tuner to the antenna wire. Ignore the coax losses. Try a sleeve balun (such as those sold by Radio Works) where the coax leaves the building. Ground the coax shield where the antenna begins and the tuner and every piece of equipment in the shack well--very well! The object is to do everything possible to keep the RF outside or away from the rig. Some combination of sleeve balun, ferrite cores, and the like will likely solve any RF-in-the-shack problems. Keep experimenting. And be willing to spend a few dollars on wide braid to use as grounding strap; it works well, as does a good, long ground rod (replaced every few years).

3. Attic antennas: Way up and away from everything is best, but attics are not usually as bad as you might think. The frame and roof shingles do not absorb too much RF, and the braces can help support an antenna. In the attic, you can usually find room for dipoles for many bands, even if you have to bend the ends down or to the side. Mount the dipole as high in the structure as you can, and away from any metal duct work, metallic duct insulation, or house and phone wiring. Feed an attic dipole just as you would an outdoor antenna (coax and 1:1 choke balun). Trim it to resonance or minimum SWR.

The attic may also hold a 2- or 3-element Yagi fixed on your favorite target. You can adjust element lengths for thinner wire elements and do away with the boom. If you use tubing, getting it into the attic may be a problem if the opening is small. First, build and test the antenna, then cut it into pieces that will fit the

opening, developing couplings to reconstruct it on site. (Back before cable, I put a 12'-long TV log periodic in the attic just that way: I used wire on a wood frame, cut the wood into entry size pieces, and used linking pieces to reassemble the frame before restringing the wire. Great reception from Atlanta about 70 miles away.)

4. Loading existing structures: Perhaps the most obvious aluminum structure to load is the gutter and down spout. Treat the system like a thin wire antenna and use a tuner, driving a ground rod near the feed point. Be sure to securely bond the joints, since painted aluminum joints with pop rivets make a shaky electrical system. Expect changes in pattern and antenna tuner settings with water, snow, or leaves in the gutter.

You can also load patio umbrellas, existing aluminum flag poles, and other metal structures. You can shunt feed a grounded flag pole. Avoid iron and steel structures if an alternative is possible, since their losses are fairly high, but use them in a pinch. Even the frame of a sliding patio door will radiate and receive.

Anticipated results: Compared to a high and free outdoor antenna, these substitutes will likely disappoint you for local area point-to-point work on 10 meters. However, do not sell them short with skip. Their low height will give high take-off angles, but still produce very solid contacts, even in 10-10 contests. The idea is NOT to try to compete with the 1.5 kW linears feeding 7-element quads at 105' altitudes. Instead, find modes of operation to which the antenna is better suited: rag chewing, nets, and even informal contesting. Most of these hidden or invisible antennas will usually outperform loops and other tiny antennas (but they will also work in making contacts).

If your situation calls for these measures, develop an attitude: be on the lookout for better places (higher and bigger) for the next design. Most of these antennas are cheap, but do not skimp on quality coax, connectors, ground rods, baluns, and filtration. Use the same high quality components you would put into an outdoor tower and beam. Part of your attitude adjustment should be forgetting ultimate antenna efficiency, except when comparing two of your own models to see which one to keep.

Last, be careful and considerate: keep RF out of the power lines and phone lines. It is often easier to try a different kind of hidden antenna than to filter or revise parts of the phone wiring.

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