From the Help Desk – July 2026

Note – this is part of an ongoing series of related articles that will each take a look at some facet of radio selection, installation, or operation as suggested by actual questions received from Club members or other amateur operators.

Q: I have a couple of hundred linear feet of rain gutter on my house, and I would like to use some of the gutter length to make "stealth" antennas. How can I go about doing this?

A: The main thing that you will need to do in order to "carve" your rain gutter length up into proper antenna-length sections is to come up with a means of isolating each cut section from its neighboring section of gutter. Let's suppose that you want to make a gutter antenna for the 40-meter band. The job will involve cutting the overall gutter length into segments of the proper length, and then isolating those segments, sealing them to maintain gutter functionality, and then attaching the feedline to the segments. Finally, you will most likely end up needing a matching transformer as well. Let's look at the various steps required to do this job.

Before we begin, we must gather the requisite supplies and tools. For supplies, you will need your feedline, some RTV sealant, some flexible H-channel, some thin (1/64" to 1/16" thick) plastic sheets roughly 2" x 12" in size, #8 or #10 ring terminals, machine screws with KEPS nuts, some sandpaper, and some liquid electrical tape. For tools, you will need a tape measure, a saw (either a hacksaw or a reciprocating saw will do, though a Dremel rotary tool with a saw blade or cutoff wheel is actually the best option), a flexible putty knife, a portable drill motor, and a set of twist bits. Of course, you will need your ladder and a source of electrical power if you are using a corded saw and/or drill motor. Ultimately, you will also want an antenna analyzer and at some point, a matching transformer, which you may end up constructing later on.

Let's look more closely at the two "strange" bits of supply material that I itemized above – the H-channel and the plastic sheets. These only seem strange because you don't know where I am going with them yet. Both items are available online from Amazon. The flexible plastic sheets are 8" x 12" x 0.040" thick, and will need to be cut to size. These sheets, found on the Amazon website at https://www.amazon.com/Plastic-Flexible-Materials-Handicrafts-Decoration/dp/B0CCMNPWGW, are used to insulate the gutter from the drip-edge flashing that is often located above the gutter. The sheets will be slipped in between the existing drip-edge flashing and the upper edge of the gutter rear member, so as to prevent contact between the antenna segments of the gutter and the drip edge. Note that if the drip edge is vinyl, it is *not* necessary to insulate it from the rain gutter. The H-channel, which is not truly an H shape (see Figure 1), is meant to be cut to the proper lengths, as three pieces, so as to be slipped into the cuts between the gutter

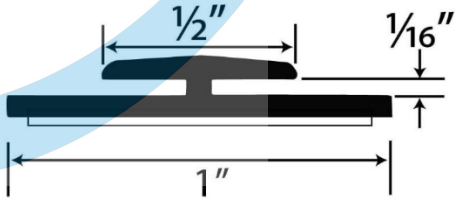

Figure 1 - H-channel cross-sectional view

segments. The channel is found at https://www.amazon.com/Outwater-Plastic-Material-Moulding-Adhesive/dp/B07N4B15M5. Both of these plastic items are black in color, but they can be painted to match the gutter afterwards if so desired, though care must be taken to avoid paints with any metallic compounds in their formulation. Now, on to the build details.

Suppose we are shooting for the center of the overall 40-meter band, or 7.150 MHz. The math, taken in feet, looks like this:

$$\lambda = \frac{984}{7.150} = 137.622\ feet$$

Thus, a half-wave *(λ/2)* antenna would need to be 68.811 feet, making each segment 34.4 feet long. This equates to 34 feet, 4-3/4 inches in length. This, in turn, should be derated by about 5% to account for the greater density of the metal than that of a vacuum or even of air. Ninety-five percent of the calculated segment length above brings us to a final adjusted segment length of 32 feet, 8-1/4 inches. OK – identify the center point, where the feedline will attach, and make sure that you have adequate gutter length on each side of that point for the antenna that you want to construct. If all is good, use your saw to make a cut completely through the gutter, from the front all the way through the back face and edge of the gutter. If there is drip-edge flashing overlapping the top of the gutter, it is best to avoid cutting that, but we will need to insulate the drip-edge flashing from the gutter later on, as discussed above regarding the plastic sheets. Now, measure and mark the gutter at the proper distance from the first cut to lay out the antenna segments, and then cut them in the same manner as the first cut. Next, we will need to isolate the segments from each other and from the rest of the gutter.

This is where the H-channel comes in. Measure as best you can the length of channel that is required to fill in between the gutter segments, at the back of the gutter, across the bottom of the gutter, and up the front of the gutter, cutting three sets of these pieces (one for each cut in the gutter). Slip the channel sections in between the gutter segments with the wide face to the outside. These strips will support the gutter segments as well as maintaining separation between them electrically. Use the sandpaper to clean the inside surfaces adjacent to the H-channel strips, scrubbing down to bright metal. This is necessary to make it more likely that the RTV sealant will bond to the metal. Clean the sanding dust out of the gutter, and apply sealant to the joints, spreading it evenly with the flexible putty knife. This will allow the gutter to continue to do its primary job of handling the rainwater runoff from the roof of the house without leaking at the cut locations.

Now it is time to isolate the rain gutter from any metallic drip-edge flashing that may be present. Do this by cutting the 8” x 12” plastic sheets into 2 x 12” strips. Then, slip a strip in between the top of the rain gutter and the bottom of the drip edge, push the strips in as far as you can. Ideally, the strips will fit under the drip-edge and be trapped in place

behind the vertical lip of the drip edge flashing. It may be necessary to cut a slot in the strip at the location of each nail that secures the drip-edge flashing to the roof in order to slide the plastic strip into place. Do this for the entire length of the antenna segments defined in your antenna design, thus ensuring that any metallic drip-edge flashing cannot come into contact with the metallic rain gutter within the length of the antenna.

OK – now comes the attachment of the feedline to the gutter. Prepare the end of the feedline by stripping the insulation from the wire as needed. If the feedline is coaxial cable, be sure to strip enough of the outer jacket to permit separation of the shield braid and the center conductor far enough to connect them to the two gutter segments. Using the sandpaper again, remove some paint from the gutter front or lower face in the locations where the feedline will be connected.

Install a ring terminal having a #8 or #10 ring onto each of the feedline wires. Then drill a hole in the sanded area of the gutter at each feedline attachment point. Finally, using a machine screw and KEPS nut for each terminal, secure the ring terminals to the gutter segments. Apply some liquid electrical tape compound to each of the screw attachment points and the feed line wires.

That brings us to the matching transformer. To accomplish this task, you will need to start out by measuring the impedance of the rain gutter antenna. Using that number and a targeted 50-ohm value, do some basic mathematics to determine the impedance ratio that is needed. For example, if the gutter antenna measures out to be 768 ohms of impedance, a 15:1 impedance matching transformer is required. Remember that the impedance and the turns ratio *are not the same!* Consider that a transformer with a 3:1 turns ratio provides a 9:1 impedance ratio. The impedance ratio is the square of the turns ratio, or, coming at it from the opposite direction, the turns ratio is the square root of the impedance ratio. Thus, the 15:1 impedance ratio of our example above ends up at a 3.87:1 turns ratio. Such a transformer would most likely need to be home-brewed, but that it not an insurmountable task.

I hope that this article helps to improve your understanding of rain gutter antenna construction. Hopefully, it will also encourage you to experiment a little bit with new and different ways of designing and building custom home-brewed antennas. Overall, it should help to remove some of the mystery, hesitation, and fear of the unknown when it comes to this type of stealth antenna.

