

Five Bands, No Tuner

Enjoy some of the advantages of a multiband, ladder-line-fed antenna without an antenna tuner.

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Reading "The Doctor is IN" (QST, January 1995) reminded me that the search continues for a simple backyard antenna. A wire *dipole* antenna fed at the center with 450- Ω ladder line is a good choice. The ladder line keeps your losses low—even at moderately high SWRs. All you need is an antenna tuner and you're in business. No coils or traps necessary.

But can you do away with the tuner and still keep the ladder line? That would certainly make life simpler. To achieve this, your transceiver needs to "see" an impedance that looks reasonably close to 50 Ω on as many bands as possible. Without an antenna tuner acting as the middleman between the 450- Ω ladder line and your 50- Ω radio, this could be a problem.

Can It Be Done?

A few years ago I attempted to design an antenna that would work on several HF bands from 80 to 10 meters. Full details were published in the spring 1992 edition of *SPRAT*, the journal of the G-QRP club.

My inspiration was the venerable G5RV. I took a 94-foot-long dipole and fed it with ladder line (see Figure 1). By cutting the ladder line to a specific length and using a 1:1 balun to make the transition to coaxial cable, I found that I could get close to 50- Ω (and thus achieve reasonably low SWRs) on at least five bands: 40, 20, 17, 12 and 10 meters (see Table 1).

The on-air results were better than I expected. My radio was happy and I didn't need to meddle constantly with an antenna tuner.

Of course, you'll need an antenna tuner to work the bands where the SWR exceeds 3:1. A simple tuner will do the job, though. Because you're using *unbalanced* coax ahead of the balun, you won't need one of the more expensive tuners designed for *balanced* feed lines.

For best results, put your antenna as high as possible. If the ends must bend downward to accommodate the size of your lot, don't worry. Run the ladder line to your balun and take your coax from there to your radio. Keep the coax portion as short as possible.

Conclusion

By eliminating the antenna tuner completely, you lose the flexibility of loading your ladder-line-fed antenna on virtually any band. In return, however, you gain the convenience of operating on several bands without making tuner adjustments each time you change frequency. Your losses are held to a minimum, which means that most of the power your radio generates is radiated by your antenna. Not a bad compromise! Of course, the results I achieved will vary when used at other locations. Still, it's a simple, fun project in the experimental spirit of Amateur Radio.

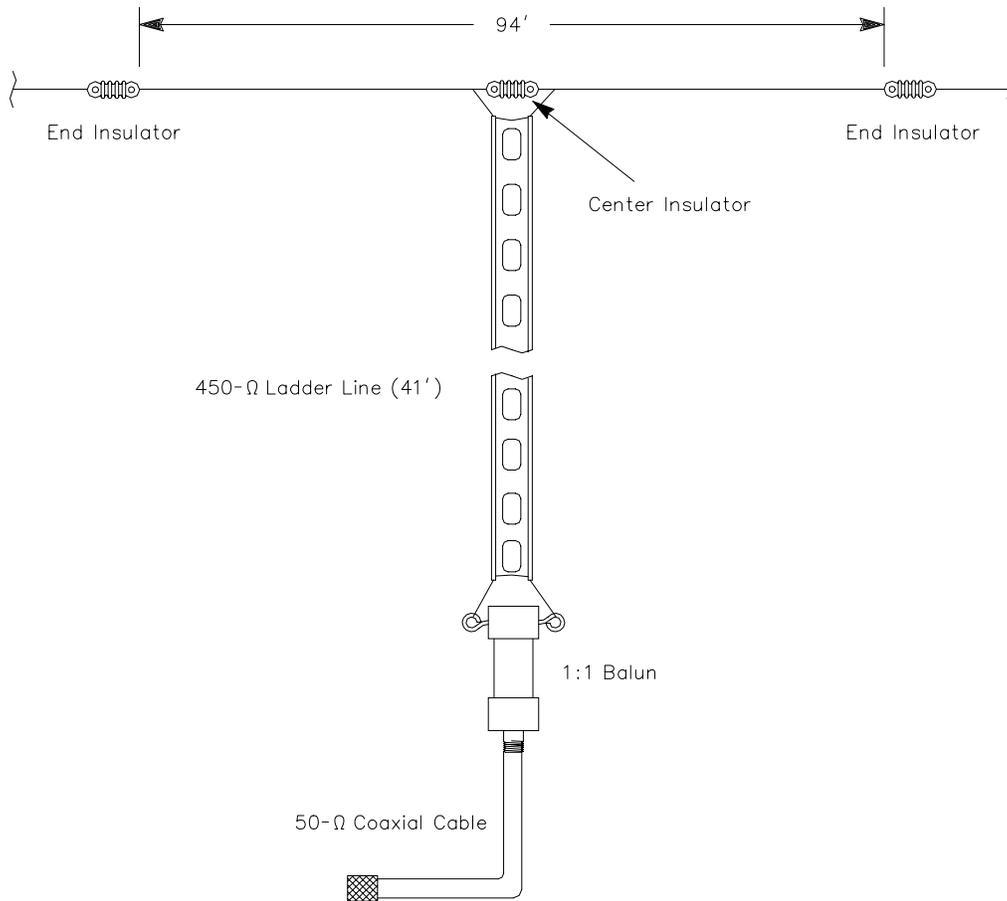


Figure 1—The wire dipole antenna is 94 feet in length. If you don't have 94 feet of open space, don't hesitate to droop the ends of the dipole to make it fit. Feed the antenna with 41 feet of 450-Ω ladder line that is connected to a 1:1 balun. From the balun to your radio, use 50-Ω coax.

Table 1

Calculated SWRs for a 94-foot Dipole Fed with 41 Feet of 450-Ω Ladder Line

Frequency	SWR
3.56	7.6:1
7.1	2.4:1
14.2	1.5:1
18.1	2:1
24.9	1.5:1
29	2.4:1

Note: Although the antenna is cut for the CW portions of the band, expect similar results at other frequencies.