

## Hertz Antenna (Multi-band)

A Multi-band Dipole antenna is cut for a specific frequency, but plans call for it to be used on any of the frequencies above that.

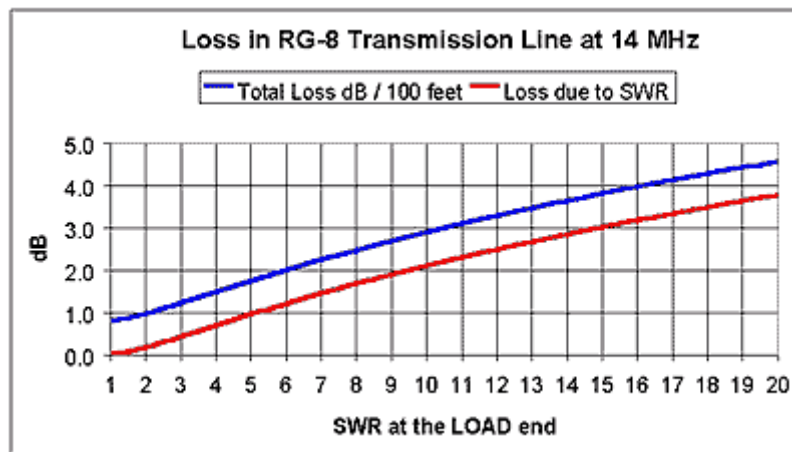
This is a popular antenna and many have been built with DX Engineering Baluns.

The correct construction technique is based on making the antenna element a half-wavelength on the lowest frequency on which the antenna will be used based on the  $468/F$  formula.

The parallel conductor, air-dielectric feedline is led away from the antenna at right angles.

Lower impedance feedlines result in less extreme impedance changes from band-to-band. For instance, 600-ohm feedlines tend to present wider load impedance excursions to the tuner in multi-band applications than 300-ohm feedlines.

Yes, coax has still lower impedance, but the non-air dielectric causes great loss within the feedline with high SWR. For instance, at 10:1 SWR you lose half of your power for each 100 feet of coax. Parallel feedlines with air dielectric would have much less loss at the same SWR.



**Why you don't want to use coax when the SWR is high.** For each 100 feet of coax, you lose half your power at an SWR of 10:1. At frequencies higher than 14MHz, it's worse. For higher loss coax like RG-58 or RG-8X it is even more worse. Plus, the SWR shown here is measured at the antenna, not at the radio where it would measure significantly lower but still would eat up just as much power.

**Additional Info on Feedline Length with Multi-band Dipoles:** Feedline length is critical to antenna performance. Always choose a feedline (connects the antenna to the balun, in this instance) that is 1/8th wavelength or some odd-multiple of 1/8th wavelength long on the lowest band. The table below shows

the correct dimensions for the antenna and feedline for your Multi-band Dipole Antenna when using DX Engineering Ladder Line. Make the feedline any ODD multiple of the lengths shown. Make sure that you pick the correct column for 300-ohm or 450-ohm.

Lowest Frequency on which the antenna will be used (MHz)	Half-Wave Dipole (ft)	Make Feedline an ODD Multiple of This Length in Feet	
		Select Column Corresponding to Correct Velocity Factor of Your Feedline. Velocity Factors shown are for DX Engineering Ladder Line	
		0.91 (450 Ohm)	0.88 (300 Ohm)
1.8	260	62.2	60.1
3.5	134	32.0	30.9
7	67	16.0	15.5
10.1	46	11.1	10.7
14	33	8.0	7.7
18	26	6.2	6.0
21	22	5.3	5.2
24.9	19	4.5	4.3
28	17	4.0	3.9

Table 1 - Length of Feedlines for Multi-band Dipoles

**The best balun for this application is a 1:1 ratio current balun.**

A 1:1 balun has the widest operating frequency range, lowest core stress, and provides the best overall balance of any balun for given cost, size, and weight.

