# The Short-Vee Antenna

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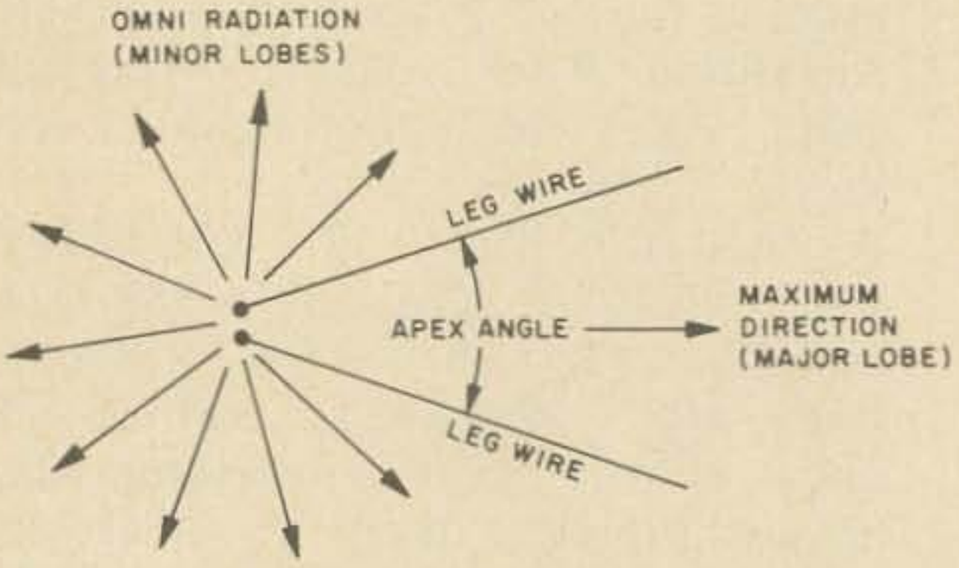


Fig. 1. The Short-Vee Antenna.

The short-vee antenna is an effective fixed-position antenna because of its reasonably omnidirectional pattern plus a broad directional characteristic in one direction. A simple definition for a short-vee antenna would be a vee antenna with a leg length of no greater than 100 feet or no greater than 2½ wavelengths, whichever is the shorter. Angle between the two leg wires would fall between 60 and 100 degrees, **Fig. 1**. If the legs are dimensioned and trimmed carefully, such an antenna requires no tuner and permits direct feed to the coaxial line between antenna and transmitter.

The short horizontal vee antenna should be made resonant on the desired bands. Do so by making certain the legs are an *odd multiple of an electrical quarter wavelength.* Equations for determining odd quarter wavelengths are:

$$1/4 \text{ Wavelength} = 246/f_{mc}$$
$$3/4 \text{ Wavelength} = 738/f_{mc}$$
$$5/4 \text{ Wavelength} = 1230/f_{mc}$$
$$7/4 \text{ Wavelength} = 1722/f_{mc}$$
$$9/4 \text{ Wavelength} = 2214/f_{mc}$$

The practical electrical quarter wavelength of the leg is somewhat shorter than the above formula values. In most instances for a short horizontal vee mounted at least 30 feet above ground, the shortening is approximately 6%. It is advisable to cut the legs long and then cut back slowly to the desired frequency using an antenna noise bridge or swr meter. When using an swr meter it is essential that the meter be placed a *whole multiple of an electrical half wavelength* from the point where the transmission line is connected to the antenna.

**Multi-Band Relations**

An interesting relationship exists among the odd quarter-wavelength dimensions for various amateur bands. For example the leg length for 5/4 wavelength operation on 15 and 7/4 wavelength operation on 10 is approximately the same. Thus a compromise leg length can be determined that permits optimum operation on both bands, **Fig. 2**. Furthermore an additional leg can be added in conical fashion to obtain an odd quarter wavelength operation on still another band.

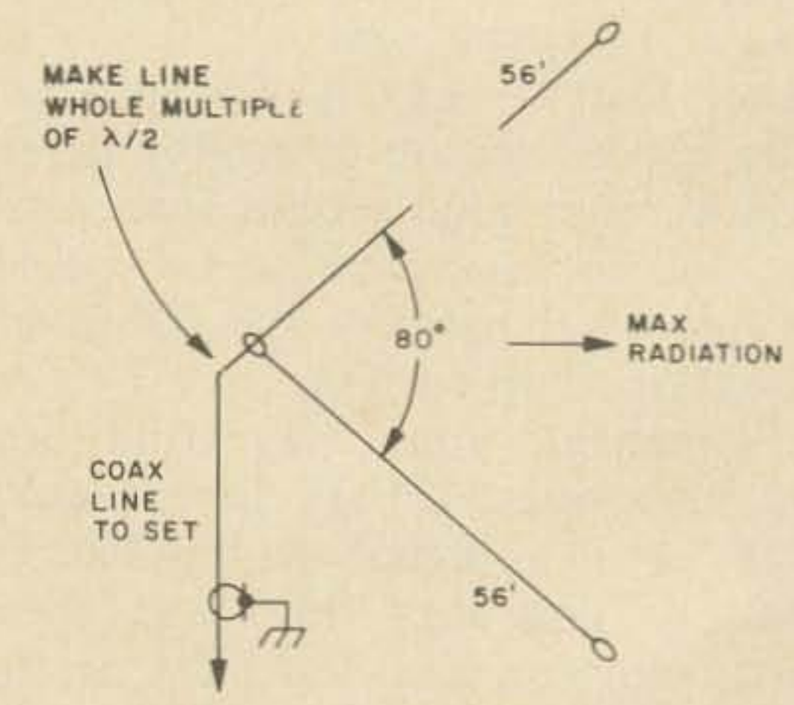


Fig. 2. The 10-15 Short-Vee.

Matching is helped by using a compromise length of transmission line which is a whole multiple of an electrical half wavelength on each band. In so doing the antenna resistance is reflected to the transmitter with little or no reactance. Thus the SWR ratio can be kept below 1.8 to 1 without any tuner at antenna or transmitter. This expedient permits fast band changes.

**10-15-20 Short Horizontal Vee**

Still another advantage of the short vee antenna is its limited space requirement. A practical version of this antenna style is

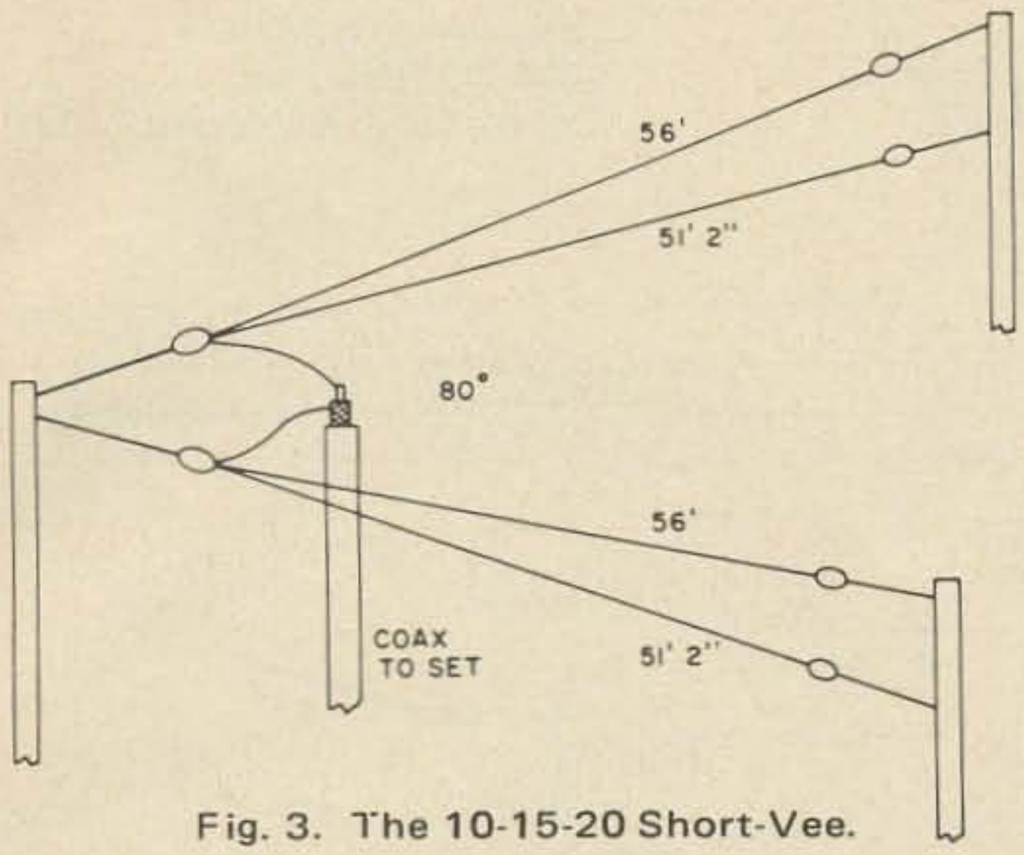


Fig. 3. The 10-15-20 Short-Vee.

given in **Fig. 3**. It serves as a fine antenna on 10-15-20 meter sideband. One pair of legs is cut to 56'. In so doing resonance is established on both the 10 and 15 meter bands. The second pair of legs is cut somewhat shorter to 51'2", operating as a 3/4 wavelength resonant leg on 20 meters.

The two pairs of legs are brought together at the apex and connect to the coaxial transmission line. The legs fan out from this point in conical fashion, **Fig. 3**, and have a separation of approximately 10 feet at the far end.

The apex angle was made 80°. The total length of transmission line from antenna to transmitter can be made any whole multiple of 45 feet. (The 45-foot figure takes into consideration optimum operation on the three bands and the velocity factor of 0.66.)

A line that bisects the small angle of the vee is the direction of maximum radiation. For the short vee antenna it is quite a broad beam. At the same time there are additional lobes that provide omnidirectional radiation as well. Thus the antenna support positions can be selected to obtain maximum radiation in some preferred direction at the same time you can obtain acceptable all-direction radiation as well. It is not a high gain antenna but does give you that extra boost in some preferred direction.

Along the east coast such an antenna could be erected with its maximum direction south toward South America. At the same time it would provide good omnidirectional stateside coverage. If you have a WAS need, the maximum direction can be toward the west. At the same time you would have good north and south coverage. You may wish to beam it toward Europe, always ready for good openings. At the same time you have good stateside coverage.

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