

(HORIZONTAL CONFIGURATION) 1/2 λ MONO BAND HERTZ ("DIPOLE") CENTER FED [MBHCF] AND MULTIPLE MONO BAND HERTZ ("DIPOLE") CENTER FED PARALLEL CONNECTED [MMBHCFPC] USING # 12 AWG THHN INSULATED WIRE.

PHYSICAL WAVELENGTH DIMENSIONS BASED ON CENTER FREQUENCY (fc) OF THE AMATEUR RADIO BAND AS RESONANT FREQUENCY

| FREQUENCY SPECTRUM | U.S. AMATEUR RADIO SERVICE BAND | U.S. AMATEUR RADIO SERVICE BAND - AUTHORIZED RADIO FREQUENCIES | BAND CENTER FREQUENCY (fc) IN MEGAHERTZ (MHz) USED FOR RESONANT FREQUENCY | 1/2 λ TOTAL LENGTH OF "HORIZONTAL" CONFIGURATION (180 DEGREE) LENGTH IN FEET $L(ft) = 468 / fc(MHz)$ | 1/4 λ EACH LEG OF "HORIZONTAL" CONFIGURATION (180 DEGREE) LENGTH IN FEET $L(ft) = 234 / fc(MHz)$ |
|--------------------|---------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| MF | 160 Meters | 1.800 - 2.000 MHz | 1.900 MHz | 246.32 Feet | 123.16 Feet |
| HF | 80 Meters | 3.500 - 3.600 MHz | 3.550 MHz | 131.83 Feet | 65.92 Feet |
| | 75 Meters | 3.600 - 4.000 MHz | 3.800 MHz | 123.16 Feet | 61.58 Feet |
| | 60 Meters | 5.3305 - 5.4035 MHz | 5.367 MHz | 87.20 Feet | 43.60 Feet |
| | 40 Meters | 7.000 - 7.300 MHz | 7.150 MHz | 65.45 Feet | 32.73 Feet |
| | 30 Meters | 10.100 - 10.150 MHz | 10.125 MHz | 46.22 Feet | 23.11 Feet |
| | 20 Meters | 14.000 - 14.350 MHz | 14.175 MHz | 33.02 Feet | 16.51 Feet |
| | 17 Meters | 18.068 - 18.168 MHz | 18.118 MHz | 25.83 Feet | 12.92 Feet |
| | 15 Meters | 21.000 - 21.450 MHz | 21.225 MHz | 22.05 Feet | 11.02 Feet |
| | 12 Meters | 24.890 - 24.990 MHz | 24.940 MHz | 18.77 Feet | 9.38 Feet |
| | 10 Meters | 28.000 - 29.700 MHz | 28.850 MHz | 16.22 Feet | 8.11 Feet |
| VHF | 6 Meters | 50.000 - 54.000 MHz | 52.000 MHz | 9.00 Feet | 4.50 Feet |
| | 2 Meters | 144.000 - 148.000 MHz | 146.000 MHz | 3.21 Feet | 1.60 Feet |
| | 1.25 Meters | 222.000 - 250.000 MHz | 236.000 MHz | 1.98 Feet | 0.99 Feet |

| CONVERSION: DECIMAL FEET TO INCHES | | | | | | | | | | |
|-------------------------------------------|----------|----------|---------|---------|---------|---------|---------|---------|---------|----------|
| | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
| 0.00 | 0 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 13/16 | 15/16 | 1 1/16 |
| 0.10 | 1 13/16 | 1 5/16 | 1 7/16 | 1 9/16 | 1 11/16 | 1 13/16 | 1 15/16 | 2 1/16 | 2 3/16 | 2 1/4 |
| 0.20 | 2 3/8 | 2 1/2 | 2 5/8 | 2 3/4 | 2 7/8 | 3 | 3 1/8 | 3 1/4 | 3 3/8 | 3 1/2 |
| 0.30 | 3 5/8 | 3 3/4 | 3 13/16 | 3 15/16 | 4 1/16 | 4 3/16 | 4 5/16 | 4 7/16 | 4 9/16 | 4 11/16 |
| 0.40 | 4 13/16 | 4 15/16 | 5 1/16 | 5 3/16 | 5 1/4 | 5 3/8 | 5 1/2 | 5 5/8 | 5 3/4 | 5 7/8 |
| 0.50 | 6 | 6 1/8 | 6 1/4 | 6 3/8 | 6 1/2 | 6 5/8 | 6 3/4 | 6 13/16 | 6 15/16 | 7 1/16 |
| 0.60 | 7 2/8 | 7 5/16 | 7 7/16 | 7 9/16 | 7 11/16 | 7 13/16 | 7 15/16 | 8 1/16 | 8 3/16 | 8 1/4 |
| 0.70 | 8 3/8 | 8 1/2 | 8 5/8 | 8 3/4 | 8 7/8 | 9 | 9 1/8 | 9 1/4 | 9 3/8 | 9 1/2 |
| 0.80 | 9 5/8 | 9 3/4 | 9 13/16 | 9 15/16 | 10 1/16 | 10 3/16 | 10 5/16 | 10 7/16 | 10 9/16 | 10 11/16 |
| 0.90 | 10 13/16 | 10 15/16 | 11 1/16 | 11 3/16 | 11 1/4 | 11 3/8 | 11 1/2 | 11 5/8 | 11 3/4 | 11 7/8 |

EXAMPLE: 11.63 FEET CONVERTED IS "0.60" ROW + "0.03" COLUMN = 11 FEET 7 9/16 INCHES

| CONVERSION: INCHES AND FRACTIONS TO DECIMAL FEET | | | | | | | | | | |
|---------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| | 0 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 7/16 | 9/16 |
| 0 | 0.000 | 0.010 | 0.021 | 0.031 | 0.042 | 0.052 | 0.063 | 0.073 | | |
| 1 | 0.083 | 0.094 | 0.104 | 0.115 | 0.125 | 0.135 | 0.146 | 0.156 | | 0.130 |
| 2 | 0.167 | 0.177 | 0.188 | 0.198 | 0.208 | 0.219 | 0.229 | 0.240 | | |
| 3 | 0.250 | 0.260 | 0.271 | 0.281 | 0.292 | 0.302 | 0.313 | 0.323 | | |
| 4 | 0.333 | 0.344 | 0.354 | 0.365 | 0.375 | 0.385 | 0.396 | 0.406 | | 0.375 |
| 5 | 0.417 | 0.427 | 0.438 | 0.448 | 0.458 | 0.469 | 0.479 | 0.490 | | |
| 6 | 0.500 | 0.510 | 0.521 | 0.531 | 0.542 | 0.552 | 0.563 | 0.573 | | |
| 7 | 0.583 | 0.594 | 0.604 | 0.615 | 0.625 | 0.635 | 0.646 | 0.656 | | |
| 8 | 0.667 | 0.677 | 0.688 | 0.698 | 0.708 | 0.719 | 0.729 | 0.740 | | |
| 9 | 0.750 | 0.760 | 0.771 | 0.781 | 0.792 | 0.802 | 0.813 | 0.823 | | |
| 10 | 0.833 | 0.844 | 0.854 | 0.865 | 0.875 | 0.885 | 0.896 | 0.906 | | |
| 11 | 0.917 | 0.927 | 0.938 | 0.948 | 0.958 | 0.969 | 0.979 | 0.990 | | |

EXAMPLE: 19 FEET 7 3/4 INCHES CONVERTED IS "7" ROW + "3/4" COLUMN = 19.65 FEET

Metric and SAE Equivalents

millimeters = inches (") x 25.4

inches (") = millimeters / 25.4

miles = kilometers / 1.609

kilometers = miles x 1.609

miles = feet (') x 0.3048

feet (') = miles / 0.3048

GAIN REFERENCE

Isotropic (Theoretical Radiator) = 0.0 dBd

Hertz (Dipole) = 2.14 dBi

When a Dipole is installed as a "Inverted-V" or "Flat Top Horizontal"

1. The WIRE LENGTH can be **SHORTENED** to **RAISE** the fundamental Frequency of the pair.
2. The WIRE LENGTH can be **LENGTHENED** to **LOWER** the fundamental Frequency for the pair.

When a Dipole is installed as a "Inverted-V" Dipole

3. The APEX ANGLE can be **WIDENED** to **RAISE** the fundamental Frequency of the pair.
4. The APEX ANGLE can be **NARROWED** to **LOWER** the fundamental Frequency of the pair.

$$\text{FEEDPOINT (FP) "Z" = COAX (Z}_0\text{) x VSWR}$$

PRUNING INSTRUCTIONS

Most Dipoles require a little pruning to reach the desired resonant frequency. Here's a technique to speed the adjustment of how much to prune: *When assembling the antenna, cut the wire 2 to 3% longer than the calculated length and record the length. When the antenna is complete, raise it to the working height and check the SWR at several frequencies. Multiply the frequency of the SWR minimum by the recorded antenna length and divide the result by the desired resonant frequency. The result is the correct finished length. Subtract the lower number (either original or corrected) from the highest length number (either original or corrected) and add or trim both legs equally to reach that length and you're done. If the original length is longer than the corrected length, trim equal amounts from both legs. If the original length is shorter than the corrected length add equal amounts to both legs.*

Example:

Original total length of wire was 65.45' (32.73' for each leg) for a resonant frequency of 7.150.

The lowest SWR was 1.5:1 at a frequency of 7.100 MHz.

$$7.100 \text{ MHz} \times 65.45' = 464.69 / 7.150 \text{ MHz} = 64.99'$$

$$65.54' - 64.99' = .46' / 2 = .23' = 2 \frac{3}{4}" \text{ to long on each side and needs to be trimmed off or folded back.}$$