

# 160 METERS

## END FED HALF WAVE ANTENNA

de Jimmy Capizzi, K3CHB

The popular **End-Fed Half-Wave (EFHW)** Antenna is an easily portable, high-impedance (2,000-4,000 ohm) wire antenna that resonates on its fundamental frequency and all harmonics above. Several ways exist to bring the wire's high impedance feed point closer to the desired 50 ohms, including use of a **49:1**, **64:1** or **75:1** unun, which eliminates the need for an antenna tuner in most instances. Such an antenna will **NOT NEED RADIALS** and in most cases **NO TUNER** at all.

Be a HAM and do some experiments!

The length of the wire is dependent upon your frequency of interest. You can calculate the necessary length through this simple equation:

$$L \text{ (foot)} = 468 / f \text{ (frequency in MHz)}$$

- **NO TUNER** needed!
- **NO** counterpoise needed! (*Grounding recommended*)
- Wire radiator of **~259 feet** makes this antenna resonant on **160/80/60/40m**.
- Wire radiator of **~133 feet** will give you low VSWR on **80/40/20/10m**.

Re: ARRL is Offering an EFHW Kit  
« Reply #5 on: June 09, 2021, 10:07:10 PM »

Quote from: W8SVLC on June 09, 2021, 08:16:02 PM

it's because the hams are using crappy poor efficiency antennas like this crap

I've been a ham for over 40 years and I kinda had the same opinion... until I tried one. Mind you, not any old end fed, but an End Fed HALF WAVE. It's a 49:1 transformer like they talk about here and 269 feet of wire, just under thirty feet high. (feedpoint is foot & a half off the ground, wire goes up & then horizontal) Shortly after putting it up I worked Asiatic Russia on 160m with ONE CALL. And before I could recover from the shock (been chasing UA0 for YEARS on 80m, much less on 160!) a station in Japan calls ME! I've worked JA on 160m all of once before and that was a sunrise spotlight, practically a fluke.

Bottom line... my opinion has changed. An EFHW is basically just a half wave dipole with the feedpoint moved... to near one end. It works. And I think pretty well, at that. As always, your mileage may vary... 😊

« Last Edit: June 09, 2021, 10:09:46 PM by N4UFO »

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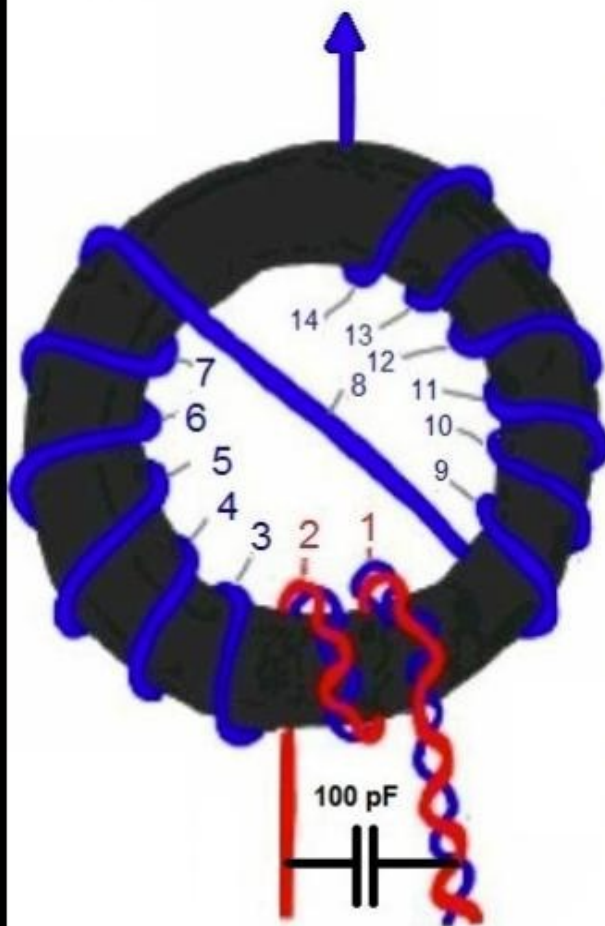
# 80 - 10M EFHW ANTENNA DESIGN

## 49:1 Transformer

Primary 2 Turns.

Secondary 14 turns (Total turns)

To End Fed Half Wave Antenna.



To TX

Gnd.

### Parts List

#### Toroid Core:

Mouser Part #623-5943003801  
240-43 Toroid 12.7mm x 61mm

*\*Use 1, 2 or 3 cores depending on transmitter output to be used.*

#### Capacitor:

Mouser Part #81-DHR4E4C221K2BB  
100 - 110 pF. You can use TWO  
220 pF @ 15 kV in series.

#### Antenna:

80m - 10m use a 134' wire.  
40m - 10m use a 67' wire, etc.

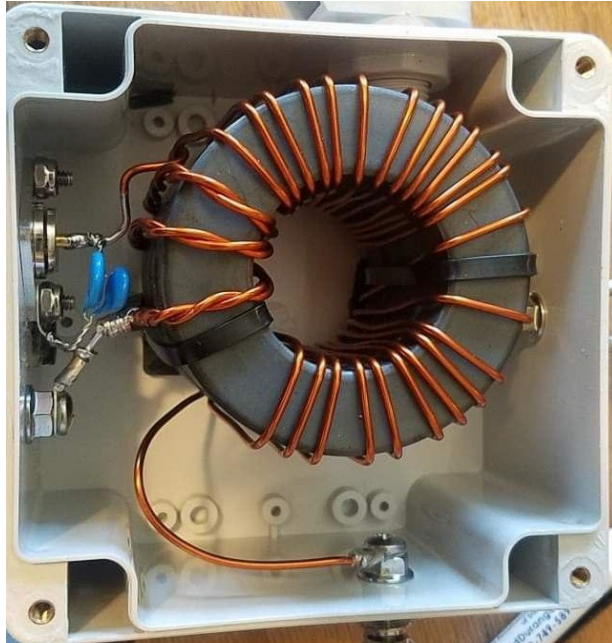
#### Wire:

14 gauge enameled wire. \*\*

*\*\* When using 3 toroid cores start with a Primary wire of ~13" and Secondary of ~80" long. 1 & 2 cores will use less wire.*

Revised: 07/14/2017 - K1TA

# 160 METER END FED HALF WAVE



- \* Make antenna 260 feet long for 1.8 Mhz. Trim off 1 ft. at a time until desired frequency is reached.
- \* No compensation coil
- \* Transformer should be a stack of three 290 - 43 cores
- \* Winding ratio should be 3 primary and 21 secondary turns. Up to 30 secondary turns may be needed.
- \* Do not "cross-over" the windings
- \* Use 14 ga enameled wire for the transformer
- \* Capacitor across primary should be 200 pf instead of 100 pf @ 6kv or higher voltage
- \* Power handling is way over 2 kw SSB easily.
- \* No you cannot use the 80 - 10 transformer. Not enough inductance. Will overheat.
- \* Antenna wire should be stronger since it is so long. 12 ga stranded CCS preferred
- \* This will work on 75 meters if cut for the low end of 160m. 40m will typically resonate too high >7.3 mHz.

*The higher impedance compensates for the relatively low height of the antenna on the 160m band. **Low height = high Z***

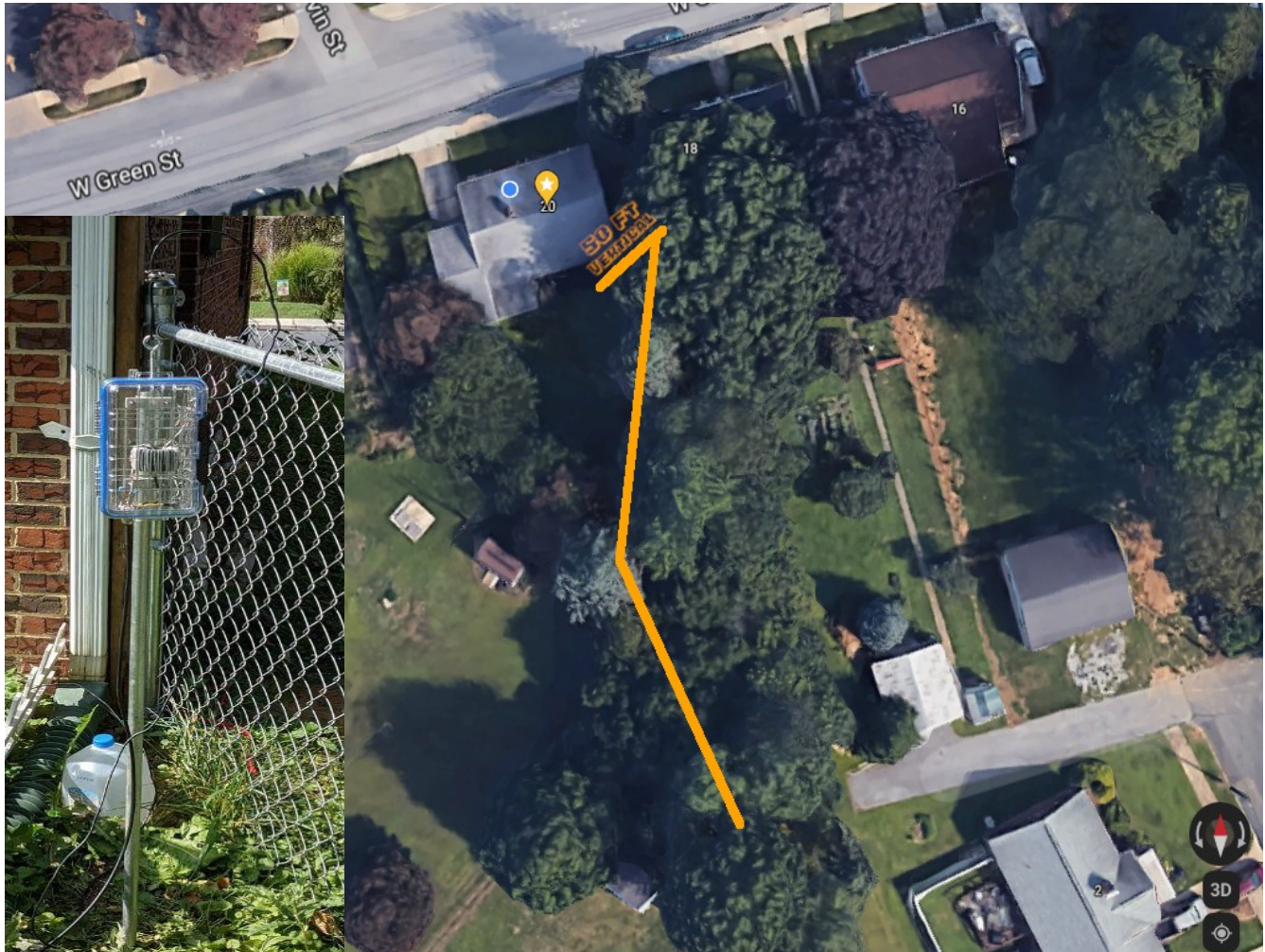
Depending on your station, I found that a **COMMON MODE CHOKE** was necessary where the coax comes into the shack.





# K3CWB QTH

## INVERTED "L"



Frequency: 1.93600 MHz

Impedance:  $56.6-j5.88 \Omega$

Series X: 13.983 nF

Series L: -483.3 nH

Series C: 13.983 nF

Parallel R:  $57.201 \Omega$

Parallel X: 149.31 pF

VSWR: 1.180

Return loss: -21.647 dB

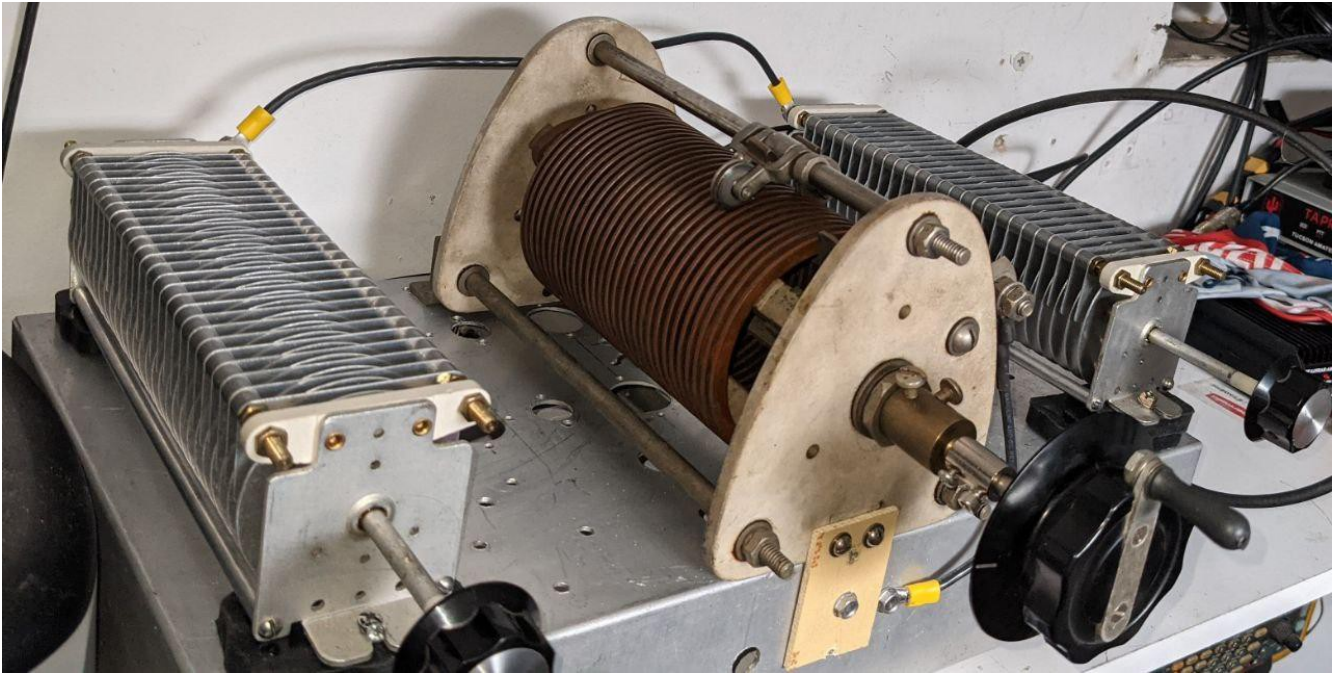
|S11|: 0.083

Quality factor: 0.104

S11 |Z|:  $56.894 \Omega$

S11 Phase:  $-38.58^\circ$

S11 Polar:  $0.08 \angle -38.58^\circ$



<https://myantennas.com/wp/product/mef-107-2k-plus-2/>

<http://www.aa5tb.com/efha.html>

<https://hamwaves.com/chokes/en/index.html>

<https://vu2nsb.com/antenna/wire-antennas/multiband-efhw-antenna/>

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