

20m Half-Wave End Fed - Stub Matched



A Half wave antenna has a high impedance feed point. This can be matched using a 1/4 wave stub matching section and converts the 40m vertical into an "L"-shaped 20m J-Pole antenna. The 300 ohm feeder used for this purpose must be kept away from the ground.

Vertical antenna wire behaves as
1/4 wave wire @ 40m & 1/2 wave wire @ 20m

Based on *OE3MZC's 20 Metre 1/2 wave end fed antenna article*, that uses 50 ohm coax for his quarter wave matching section, but to further reduce loses this design uses 300 ohm twin feeder with lower loses.

Formulae :

Antenna wire length

Quarter wave = $234/\text{FMHz Feet}$

Transmission line length

$1/4 \text{ wave length} \times \text{VF for line}$

Where VF = velocity factor of the transmission line

Note To Convert feet to metres x 0.3048)

Theory :

$1/4\lambda$ end fed $Z_0 = 37 - 50$ ohms, but $1/2 \lambda$ end fed $Z_0 > 2000$ ohms

The transmission line is a matching transformer, where sections $A+B = 1/4 \lambda$ and at point "C" the $Z_{in} = 50$ ohms

Stub Construction :

Section A = 3.54m & Section B = 0.75m but this is cut to 1m initially.

Reduce SWR below 1.3:1 by trimming the shorted section 2.5 cm at a time.

NOTE:

This technique is not restricted to the 20m band, e.g it can be used for other band's $1/2 \lambda$ end fed antennas

IMPORTANT :

The matching transmission line must be kept at least 30cm above the ground.

