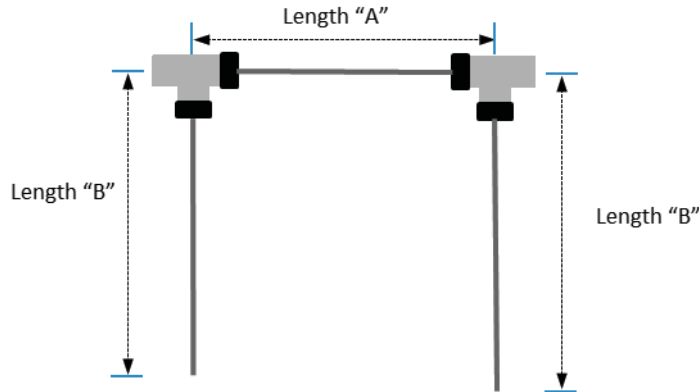


## Tuning a Type N double-stub tuner

### NOTE

Double-stub tuner results are best achieved with the help of a network analyzer, displaying results in either polar or Smith chart mode.



Cable ends are left open circuit for trimming to length on site

Length "A" is 1/8th wavelength at the transmit frequency adjusted for all losses.

$A, \text{ in inches} = [0.125 * (11803 / \text{frequency in MHz}) * \text{Velocity coefficient of line}] - 2$   
 (e.g.: at 98.9 MHz, using UMR-400 line,  $A = [0.125 * (11803 / 98.9) * 0.85] - 2 = 10.68''$ )

Length "B" is 1/2 wavelength at the transmit frequency, adjusted for all losses.

$B, \text{ in inches} = [1.05 * ((11803 / \text{frequency in MHz}) / 2) * \text{velocity coefficient}] + 2$   
 (e.g. at 98.9 MHz, using UMR-400 line,  $B = [1.05 * ((11803 / 98.9) / 2) * 0.85] + 2 = 52.26''$ )

### Round one:

- Start with the stub closest to the antenna, cut it back\* by ~1" and note any VSWR change.
- Next, repeat the process on the other stub. Whichever stub showed the most improvement from the cut is the primary stub. If no VSWR improvement is evident from either cut, repeat process.

### Round two:

- Continue with cuts (no more than 1") on the primary stub, until the VSWR ceases to improve.
- Move to the secondary stub, and repeat the procedure, making small cuts on the second stub as long as the VSWR improves.
- The first time the VSWR degrades from a cut, switch to "Subsequent Rounds," below.

### Subsequent rounds:

- Repeat steps a and b above, but using cuts of only ~1/4" at a time.
- Continue this procedure until no further improvement is noted.

### CAUTION

Ensure every cut is clean and proper, and does not pinch, deform, or fray the cable end.

### Document No. ts-double-stub\_tuner (150727)

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