## Antenna Tuners

AKA

- Matching Network
- Impedance Matching Unit
- Matchbox
- Transmatch
- Antenna Coupler
- Feedline Coupler

#### What do you mean they don't tune the antenna?

- An antenna tuner is a device that is inserted between a radio transmitter and its antenna; when properly adjusted (tuned) it improves power transfer by matching the impedance of the radio to the impedance of the antenna, as it appears at the end of the feedline connected to the antenna tuner, with the other end connecting to the antenna.
- Transmitters are typically designed to feed power into a reactancefree, resistive load of a specific value: 50 Ohms, by modern convention. However the antenna and feedline impedance can vary depending on frequency and other factors resulting in a high standing wave ratio (SWR) at the transmitter output.

#### Common Types of ATU

- T-Match
  - Very common in commercial manual tuner designs (MFJ, etc.)
  - Capable of matching a large impedance range
  - High-pass filter by design will not attenuate spurious radiation above the cutoff frequency
  - Multiple settings will match the same impedance
  - Most efficient match uses the most capacitance & the least inductance



#### Common Types of ATU

- L-Match
  - Simplest impedance matching circuit
  - For any one given antenna and frequency, only one set of component values will match the input impedance to the output impedance
  - Automatic antenna tuners most often are 'L'networks, since they involve the fewest parts and have a unique setting for the adjustment circuitry to seek out
  - Typically the low-pass design is used (as shown)



#### Common Types of ATU

- Z-Match
  - Three tuning capacitors, two of which are ganged with separate connections to the primary transformer coil, produce two distinct resonant frequencies allowing it to cover a wide frequency range without switching the inductor
  - Can be used with either balanced or unbalanced transmission lines, without any modification to the tuner circuit
  - All of the capacitors must be isolated from ground
  - Design is limited in its power output by the core used for the output transformer.



## **T-Match**







## L-Match (Automatic)







#### SWITCHED INDUCTOR L MATCH TUNER







#### Z-Match



## Z-Match

