

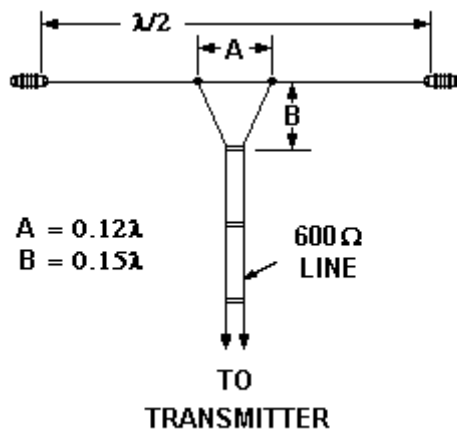
AERIAL MATCHING

An aerial may have an input impedance as low as 15 ohms or as high as 1000 ohms. However, most transmitters have an output impedance of 50 or 75 ohms and transmission lines are only available in a limited number of characteristic impedance so it is necessary to transform the aerial input impedance to the same value as the transmission line characteristic impedance. This process is called matching. There are a variety of matching techniques for aerials:

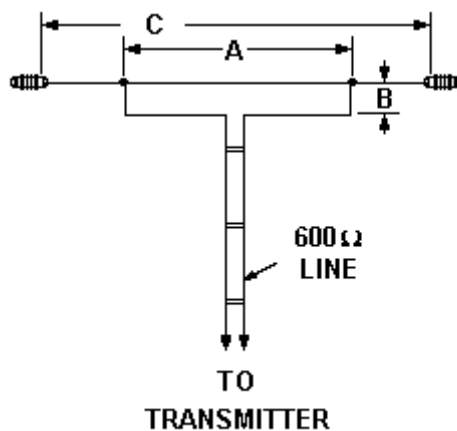
- Delta match
- Quarter-wave transformer
- LC network match
- Transformer match

DELTA MATCH

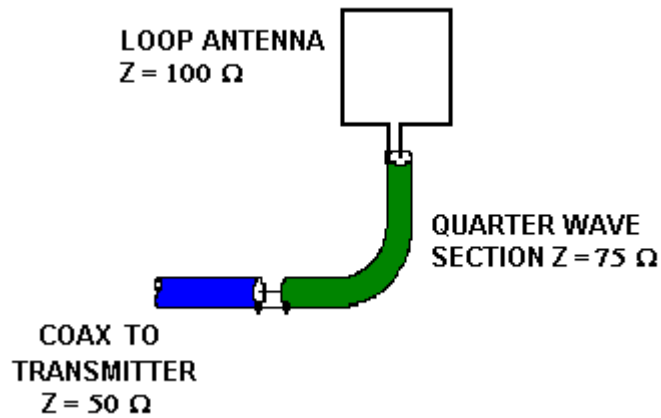
The delta match uses a section of 2-wire transmission line with gradually increasing separation to match a 2-wire line to an aerial. Two advantages of the delta match is the simplicity of its construction and its ability to match a wide range of impedances. Two major disadvantages are: generally, the length and amount of separation increase must be determined experimentally for a specific aerial and feed line, and the delta match section radiates some RF, changing the radiation pattern of the aerial.



A variation of the delta match that is widely used for VHF/UHF Yagi aerial is the T-match:



The T-match, unlike the delta match, does not radiate, but this advantage is offset by the need to adjust the overall length of the aerial slightly, as well as the T-match separation and length, to get a proper match. In general, lengths A, B and C must be determined by experiment.

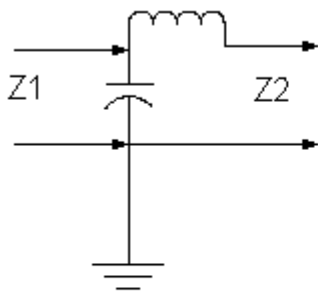


The advantages of the quarter wave transformer are that it is very easy to construct, and it can be used to transform a wide range of impedances. The disadvantages are that it is only useful over a narrow bandwidth and that a transmission line of proper characteristic impedance may not be available.

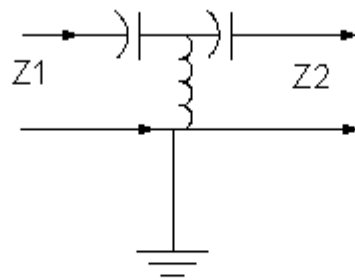
LC NETWORK MATCH

The LC network match consists of a network of capacitors and inductors that are used to transform the aerial impedance into the feed line impedance. There are three types of LC matching networks in wide use:

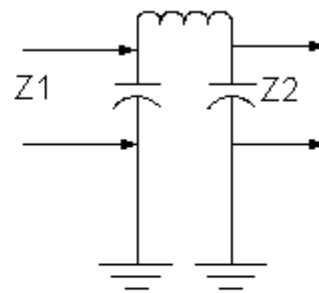
- L-network
- T-network
- π -network



L-Match



T-match



π -match

Because they work over a wide frequency range, RF transformers are often used for impedance matching. The turns may be wound over a hollow core or may be wound onto a toroid made from powdered iron or a ferrite.