

Surface Mount Balun Transformer General Information

What is Balun Transformer?

Balun is name of device that can be like a **common mode choke**, unbalance to balance transformer, or a step up or down transformer.

Balun is an acronym of **BAL**anced **UN**balanced, it's used to convert an unbalanced signal to a balanced one or vice versa. A balun transformer is a device that:

- joins a balanced line (one that has two conductors, with equal currents in opposite directions, such as a twisted pair cable).
- to an unbalanced line (one that has just one conductor and a ground, such as a coaxial cable).

Baluns isolate a transmission line and provide a balanced output. A typical use for a balun is in a television antenna.

Balanced: A method of transmitting signals using two signal lines. One line carries the source signal; the other carries a signal of opposite phase (antiphase).

Unbalanced: A method of transmitting signals using one signal line, with a ground line providing a reference potential.

Why Use a Balun?

Baluns are used for two primary reasons:

- One : Eliminate “common mode current” on the transmission line.
- Two : Matching antenna impedance to the transmission line.

Insertion Loss (dB)

Loss due to transmission from primary dot port to secondary dot port and secondary port. Most balun transformers are symmetrical through their central horizontal axis, therefore, an input can be applied at the primary dot port or the primary port with differential outputs at the secondary dot and secondary ports.

Basics of Broadband Transformers

There are two kinds of broadband transformers. One is known as a conventional type, which has separate primary and secondary windings, as do power and audio transformers. The other type is called a transmission-line transformer. It is believed that the latter variety is the most efficient of the two. Transmission-line transformers are wound with twisted or parallel windings and produce specific integers of impedance transformation, such as 4:1, 9:1, and 16:1. Conventional transformers permit you to obtain any transformation ratio you need.

Applications of Balun Transformers

In a **balun transformer**, one pair of terminals is balanced, that is, the currents are equal in magnitude and opposite in phase. The other pair of terminals is unbalanced; one side is connected to electrical ground and the other carries the signal. Balun transformers can be used between various parts of a wireless or cable communications system. Some common applications denotes as following:

- Television receiver (Balanced) - coaxial cable network or Coaxial antenna system (Unbalanced)
- FM broadcast receiver (Balanced) - Coaxial antenna system (Unbalanced)
- Dipole antenna (Balanced) - Coaxial transmission line (Unbalanced)
- Parallel-wire transmission line (Balanced) - Coaxial transmitter output, or Coaxial receiver input (Unbalanced)

Token's baluns provide impedance transformation in addition to conversion between balanced and unbalanced signal modes. Most television and FM broadcast receivers are designed for 300-ohm balanced systems, while coaxial cables have characteristic impedances of 50 or 75 ohms. Impedance-transformer baluns with larger ratios are available and used to match high-impedance balanced antennas to low-impedance unbalanced wireless receivers, transmitters, or transceivers.