TIS-B1

100 Ohm Balanced RJ45 to 50 Ohm SMA BALUN

Table of Contents

Overview

The TIS-B1 uses a simple 2:1 transformer to convert a 100 Ohm balanced twisted pair impedance to an unbalanced 50 Ohm SMA connection.

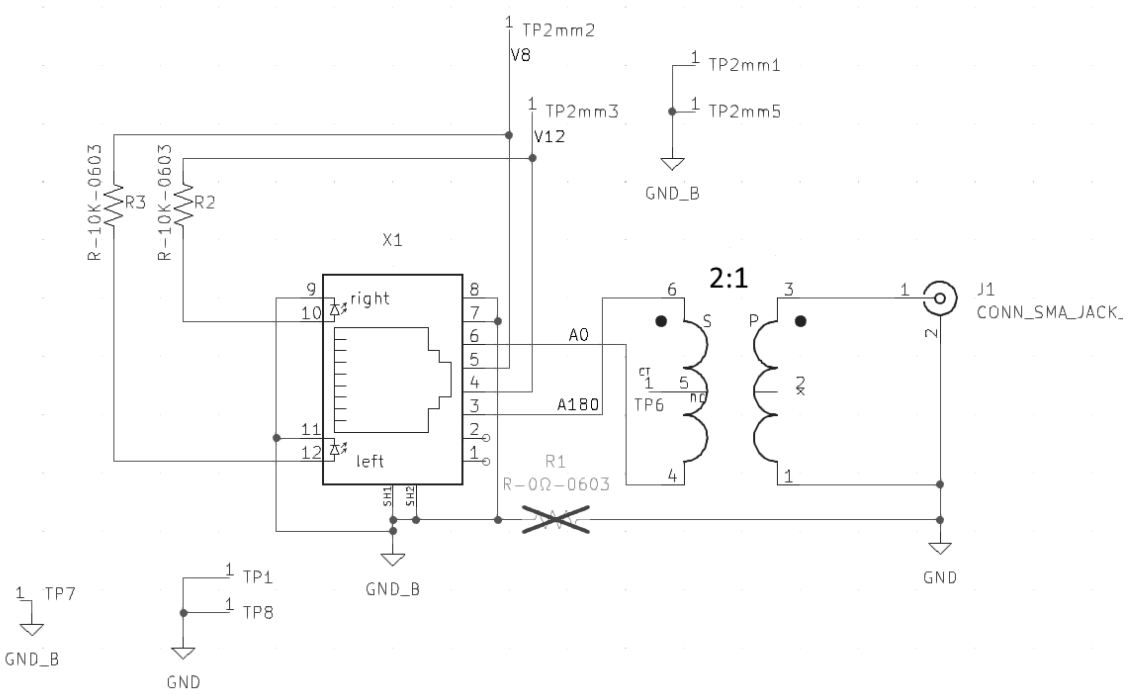

Illustration 1: TIS-B1 Schematic

The RJ45 connector pins 4 and 5 can be used to carry DC voltage, with pins 7 and 8 connected together as a common ground / DC return. Indicator LEDS built into the RJ45 connector show when voltage is present on pins 7 and 8.

The SMA connection is isolated from the RJ45 connector. A non-installed resistor (0603 footprint) or through-hole testpoints are available if a common ground connection is desired.

Performance

Return Loss, 100 Ohm load:

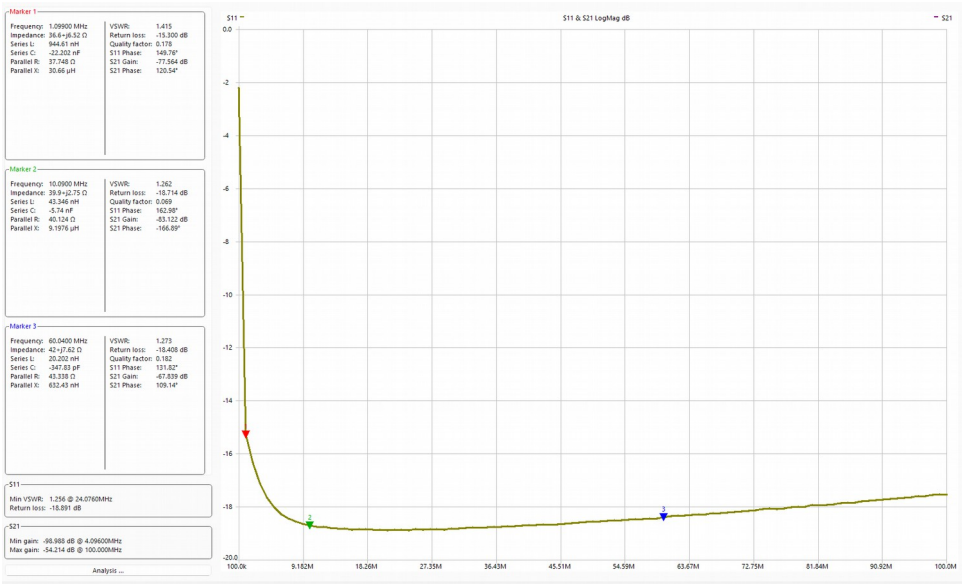

Illustration 2: Return Loss

Back to Back Frequency Response

The transformer used in the TIS-B1 has a specified maximum loss of 1 dB from 1 to 200 MHz, and a typical insertion loss of 1.2 dB from 0.4 to 500 MHz.

Since these baluns will typically be used in pairs, the measurements below are for a pair of baluns connected back to back.

CAT 6 cable, 4 inches:

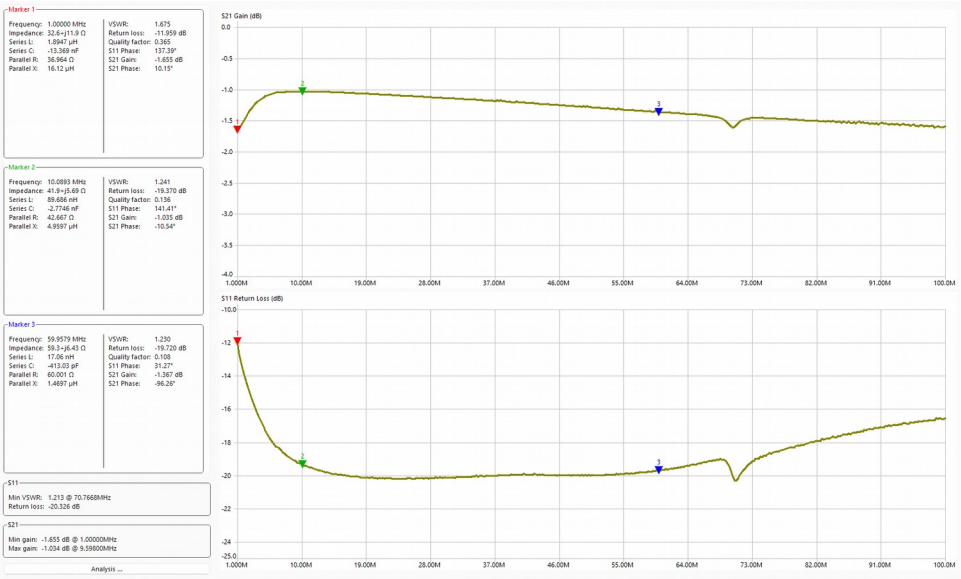

Illustration 3: 1-100 MHz

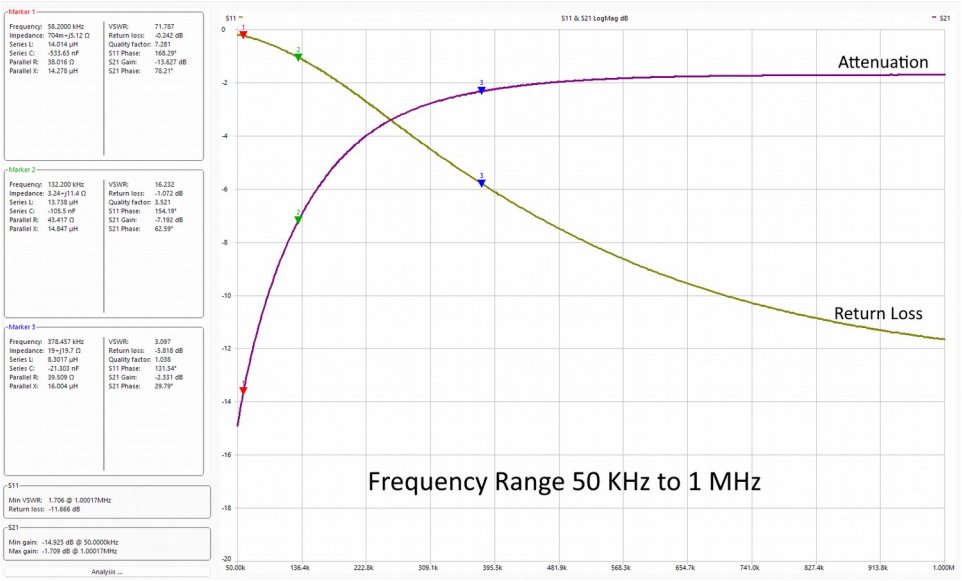

Illustration 4: 50 kHz - 1 MHz

CAT 5e, CAT 6 Cable, 100 ft

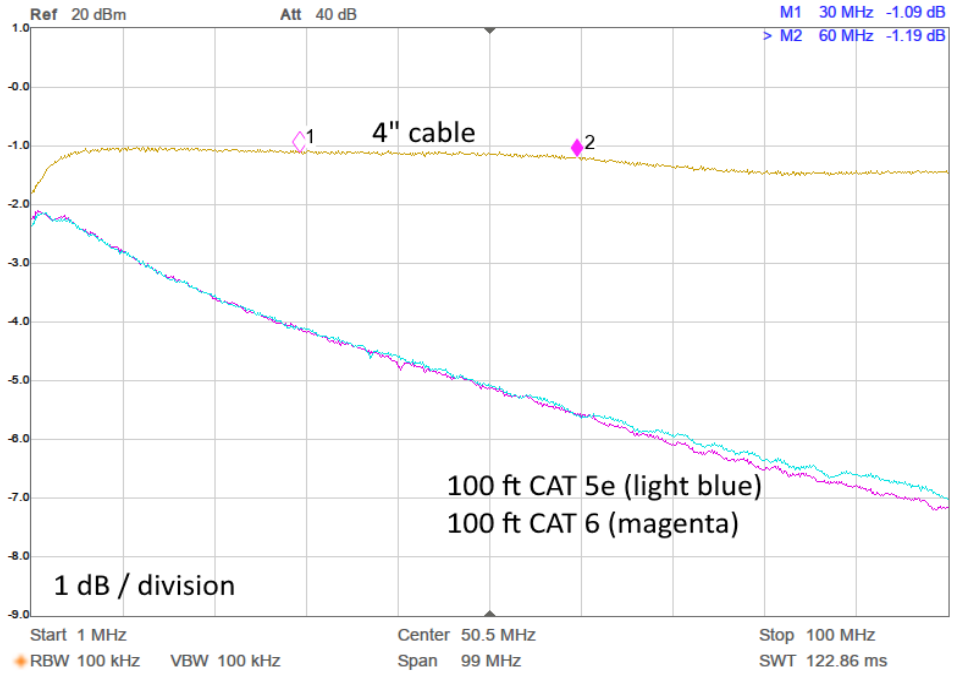

Illustration 5: 1 - 100 MHz, 100 ft CAT 5e, CAT 6

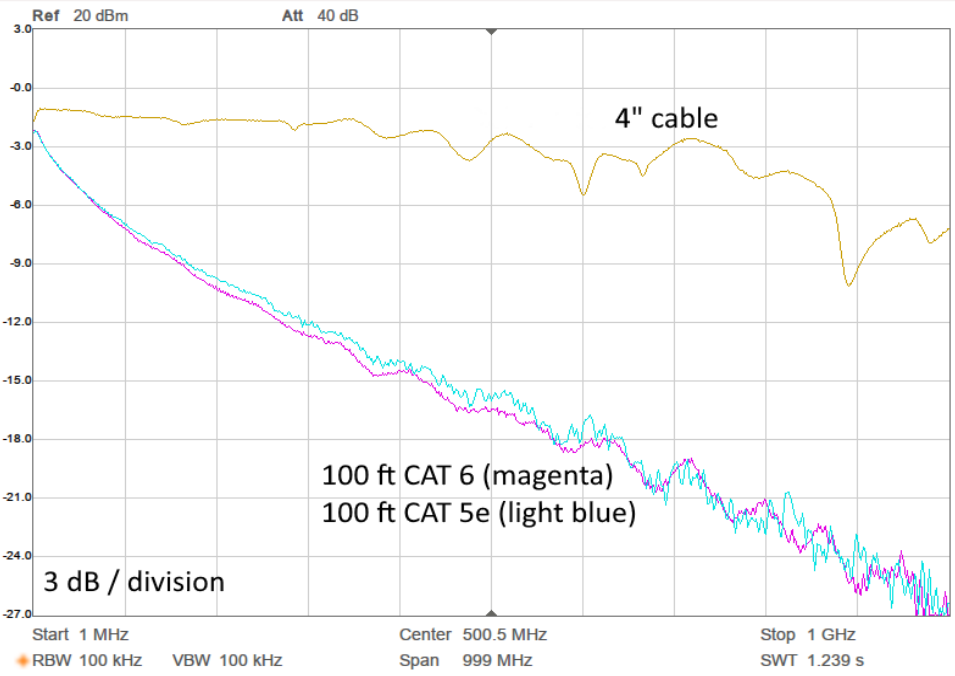

Illustration 6: 1 - 1000 MHz, 100 ft CAT 5e, CAT 6

Common Mode Rejection

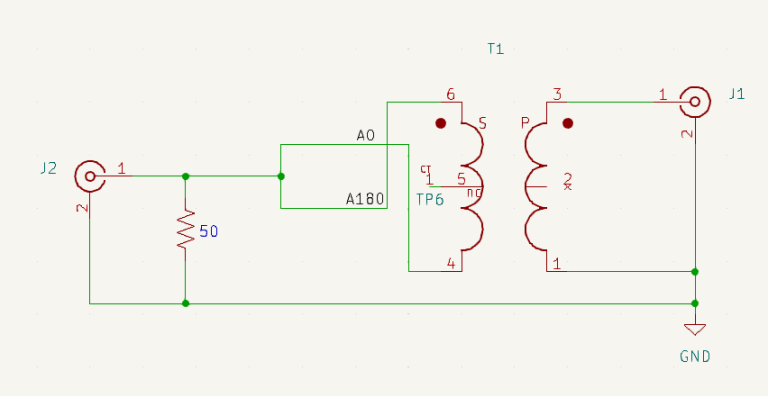

Illustration 7: Test Fixture Schematic

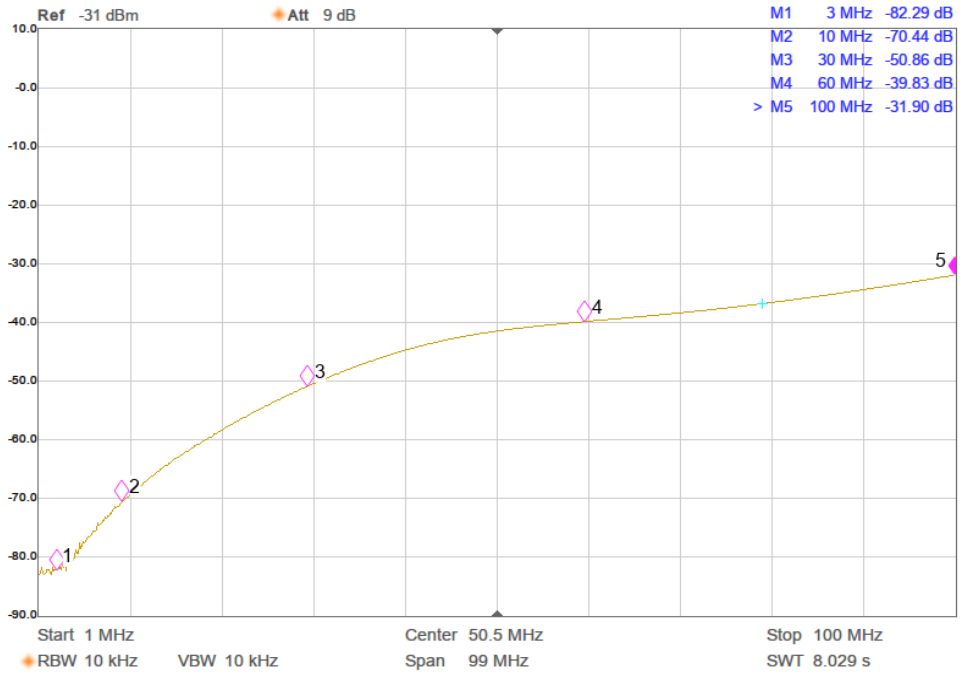

Illustration 8: Common-Mode Rejection

Here is a 10 MHz square wave, as launched (blue) and as seen at the end of 100 ft of CAT 5e cable (magenta). Note the approximately 38 ns of cable delay: