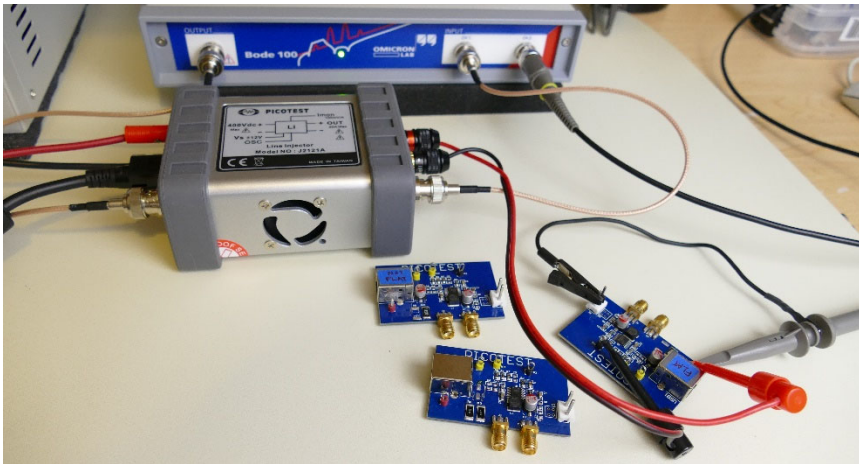


# DC-DC Converter Input Impedance Testing

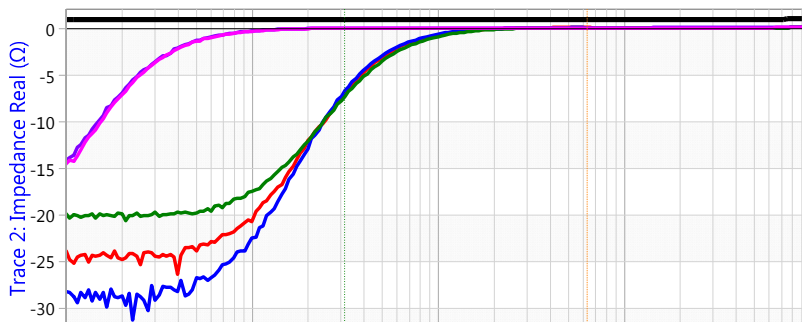
## Picotest PSRR Injector

### Now you can measure switching converter input impedance with ease

Characterizing the input impedance of a DC/DC converter is a necessary step in designing a stable input filter to counter-balance the converter's negative input resistance. The J2121A High Power Line Injector makes this challenging measurement easy. The J2121A uses the vector network analyzer's (VNA) oscillator signal to modulate the input voltage (output of the J2121A) while accommodating a wide range of voltage and current conditions. The input voltage at the converter and the input current taken from the J2121A's current sense monitor are divided in the VNA displaying input impedance. A simple through calibration corrects for the scaling of the current monitor and the probe connections.



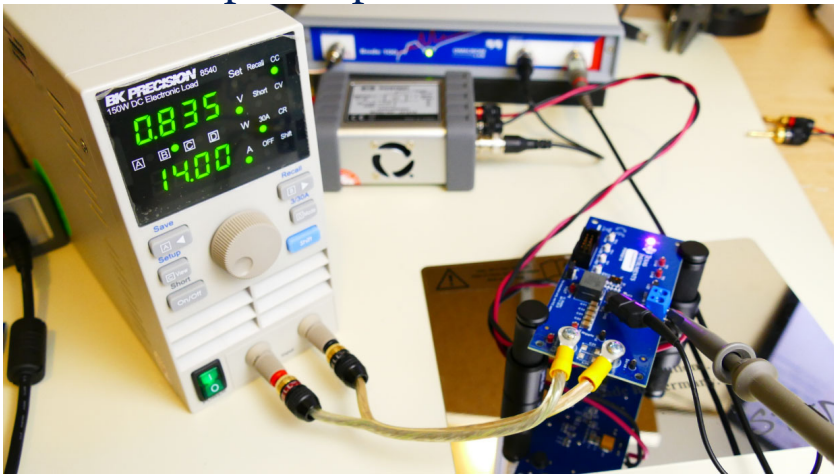
J2121A DC-DC Converter Input Impedance Test (LM20143, 3A Synchronous Buck) - The J2121A output is connected to the converter's input; a scope probe is connected to CH2 of the VNA. The J2121A current monitor connects to CH1. The VNA reports impedance or the negative resistance as shown below (Blue/Red/Green =  $V_{in}$  4.5V, 5.0V and 5.5V no input cap, Purple with an input capacitor, Black - 1ohm calibration).



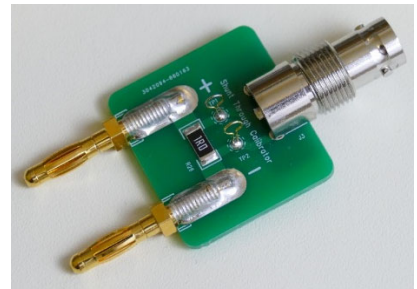
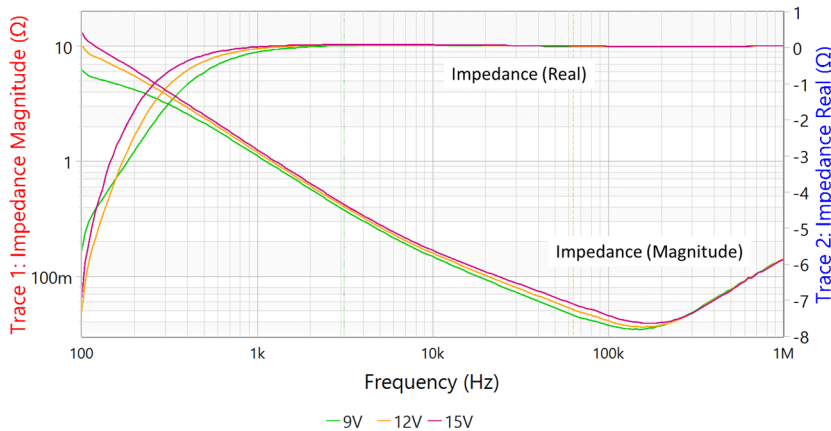
- The J2121A is especially suited to high power applications:
  - PSRR
  - Input Impedance
  - Inductor DC bias testing
- Bus voltages up to 400V, 20A output current, 100-1MHz bandwidth
- Includes Isolated Current Sense Monitor output (100mV/A) eliminating the need for a current probe (for use with VNAs)
- Uses VNA source for modulation
- Supports military and satellite buss applications
- Fan cooled, includes low-noise power supply
- Supports higher voltage/current applications compared to the low noise PSMR Injector, J2120A



# Converter Input Impedance Measurement



Test setup for the TPS544B25 SWIFT™ Synchronous Buck Converter with 0.9V at 14A output. The results of the input impedance measurement, magnitude and real, at 9, 12, and 15V input are shown below.



The J2121A includes a 10ohm shunt calibrator.

## Converter input impedance testing products

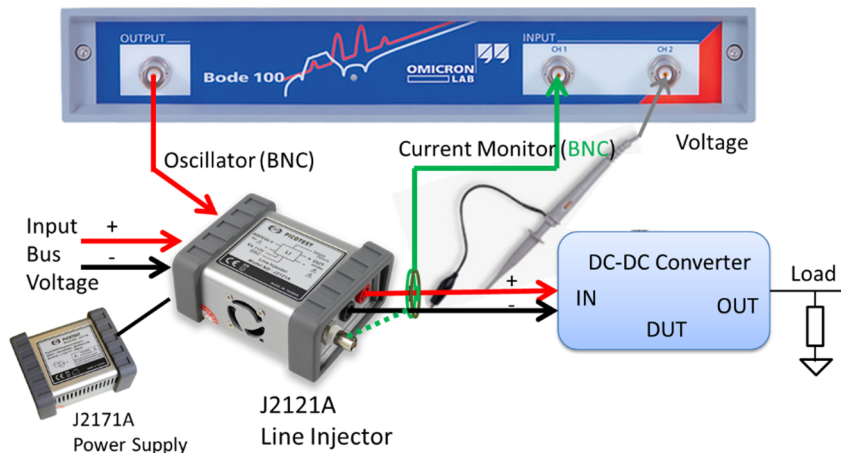
**J2121A Line Injector** J2121A + J2171A - 200mA Low Noise Power Supply  
1-ohm Calibration Fixture

**Bode 100** Vector Network Analyzer (VNA) + Frequency Response Analyzer (FRA)

Also works with Keysight, Rohde & Schwarz, Copper Mountain, and other VNAs and FRAs

Picotest provides products that are designed to simplify measurements while providing the ultimate resolution and fidelity.

This information is subject to change without notice.  
© Picotest, 2019 www.picotest.com



The input impedance test setup diagram using a VNA and the J2121A line injector. The input bus voltage to the line injector is fed into the J2121A. The included J2171A power supply powers the J2121A. The DUT is connected to the output of the J2121A. The current monitor output of the J2121A is connected to CH1 of the VNA. The VNA oscillator output that is connected modulates the J2121A produced output voltage driving the converter.