

## Increasing the differential voltage range of TEGAM 4040A

**Problem** – How can I measure higher voltages with my PXI digitizer?

### Introduction

The TEGAM Model 4040A, a differential instrumentation amplifier, is becoming popular in the PXI industry not just because of its clean and flexible signal conditioning but also because of the differential input, wide bandwidth, selectable input impedance, gain and attenuation. It expands the measurement range of PXI digitizers and scopes from 2 mV to 100 V. Although this range appears fairly wide, there are some applications, which require a wider range. Such applications include: power line interference testing, DC power supply testing, hybrid-electrical vehicle battery testing and high-energy research with plasmas, ion beams and electron beams require high voltage, high frequency differential measurements.

### Solution

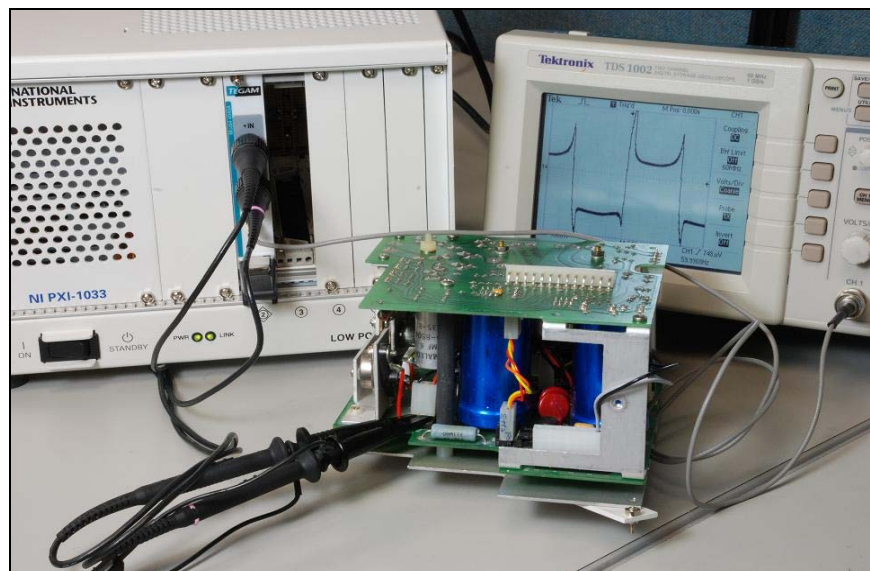
The measurement range of a PXI system can be expanded up to 1200  $V_{pk}$  by combining a TEGAM 4040A with x10 or x100 probes. There are some important factors to be considered while selecting the probe design. These factors are *Bandwidth*, *Voltage* and *Capacitance Loading*.

*Bandwidth* - The bandwidth of the selected probes should be greater than 50 MHz to get the full bandwidth out of the 4040A. Many probes in the market are rated at 200-300 MHz and are compatible with the 4040A. One example is the Probemaster [4906-1](#).

*Voltage* - The probe insulation decides the probe voltage rating. The probe voltage is normally specified in peak values and range from 300  $V_{pk}$  to 1200  $V_{pk}$ . Be sure to convert any RMS voltage values to peak voltages before selecting a probe.

*Capacitance Loading* - The 4040A's 15 pF input capacitance added with the probe's capacitance (typically 3-10 pF) should not adversely affect the signal source.

The following setup shows use of x10 probe in a DC power supply testing. The voltage tested from the power supply is 350  $V_{pk-pk}$ .



If you have any comments or would like to discuss your application, please email me at [asabnis@tegam.com](mailto:asabnis@tegam.com) or call at 440-466-6100.