

Specifications for Required Hardware – PXI Express Based, High-Speed Data Acquisition System

We require a PXI-Express based, high-speed data acquisition system for the measurement of high-bandwidth unsteady transducer signals during wind tunnel tests in the 2'x3' Low-Speed Wind Tunnel. There are several required components and specifications for this system to ensure compatibility with existing tunnel instrumentation:

- 1) Line item 1 - We require an 8-Slot PXI Express chassis for PXI and PXI-Express modules. The chassis shall accept 3U PXI-Express modules in every slot. The chassis shall also accept 3U PXI modules in 4 or more hybrid slots that accept either PXI or PXI-Express modules. Each chassis slot shall have up to 1 GB/s (or better) dedicated bandwidth and a total system bandwidth of 4 GB/s (or better). The chassis shall also have 1 PXI Express system slot for a controller card that is connected to a PC.
- 2) Line item 4 - We require a PCI-Express card that connects to the PXI-Express chassis via a fiber-optic cable and a PXI Express module to ensure electrical isolation. The PCI Express card shall be compatible with a Dell desktop computer. The fiber-optic cable shall be 10 meters or greater. The sustained data throughput of the connection between the PC and the PXI chassis shall be 800 MB/s or greater.
- 3) Line item 5 - We require a 16 channel, 16-bit analog-to-digital converter (ADC) with simultaneous sampling at 1.25 MS/s/ch or greater. This data acquisition card shall have a PXI form factor and a PXI Express bus type. The input coupling shall be DC and the input range shall be programmable from $\pm 1V$ to $\pm 10V$ full scale. The bandwidth of the data acquisition card shall be 1 MHz or greater. The crosstalk between adjacent channels shall be -80dB or less and between non-adjacent channels shall be -100 dB or less. The random noise on a 1V full-scale range shall be less than 65 μV_{rms} , and on a 10 V full-scale range shall be less than 260 μV_{rms} . The data acquisition card shall also allow for different trigger types: free running, level triggering, and external TTL triggering. Software configuration of the data acquisition card shall be fully compatible with National Instruments LabVIEW programming environment.
- 4) Line items 6 and 7 - We require two 19-inch rack mountable BNC breakouts to access the input channels to the data acquisition card. This shall be compatible with the data acquisition card and shall be connected to the data acquisition card via a shielded cable.