

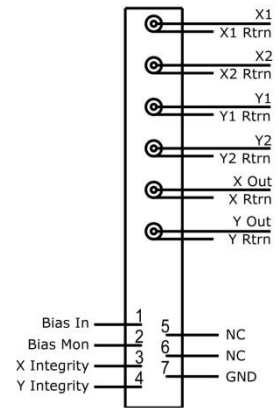
**BiRIO AFE cRIO module**  
Model: 3443

**Introduction**

The BiRIO Systems Model 3443 “AFE” (Analog Front-end Electronics) was developed for particle accelerators in the National Laboratories; design specifications came from Los Alamos National Laboratory . The BiRIO Model 3443 AFE is designed to accommodate the wide range of energies in the accelerator without gain switching and has full EEPROM implementation per National Instruments MDK (Module Develop Kit). Dual Channel Transimpedance amplifiers with dual summed inputs and true DC coupling are utilized to collect the charge signals from the sense wires. A single BiRIO Model 3443 AFE cRIO module provides interface to both horizontal (X) and vertical (Y) wire sensors and features a CONEC Combination D-Sub connector that provides all analog signal inputs and outputs on the AFE module front panel.



The new BiRIO Model 3443 AFE is implemented in a Single National Instruments cRIO module and is compatible with the 4U BiRIO Model 9024-WS-A cRIO enclosure specifically designed to accommodate the cRIO crate and all the interface electronics. The input circuitry is completely DC isolated from the equipment ground with signal guarding from the beam line to the AFE module to minimize encroachment of noise. Wire bias of 0V to +/-50V is applied directly to the sense wires to maximize charge-collection efficiency and minimize shadowing. The integrity of each wire can be verified independently real time using the normal signal path and data acquisitions system. The BiRIO Model 3443 AFE module is designed to accommodate comparatively long macropulses (>1ms) with high PRF (>120Hz) without the need to provide integrator reset signals. The basic AFE bandwidth is flat from true DC to 35 kHz with a well-defined first-order pole at 35 kHz. Numeric integration is utilized in the cRIO FPGA to provide pulse-to-pulse numeric integration of the AFE signal to compute the total charge collected in each macropulse. This method of charge collection provides the capability to accurately collect the charge in long macropulses at high PRF without the need to provide integrator-reset signals to the BiRIO Model 3443 AFE.



**Accessories:**

Mating Cable: BiRIO 3443 – Cable (Please contact BiRIO Systems if individual components or tools are required).