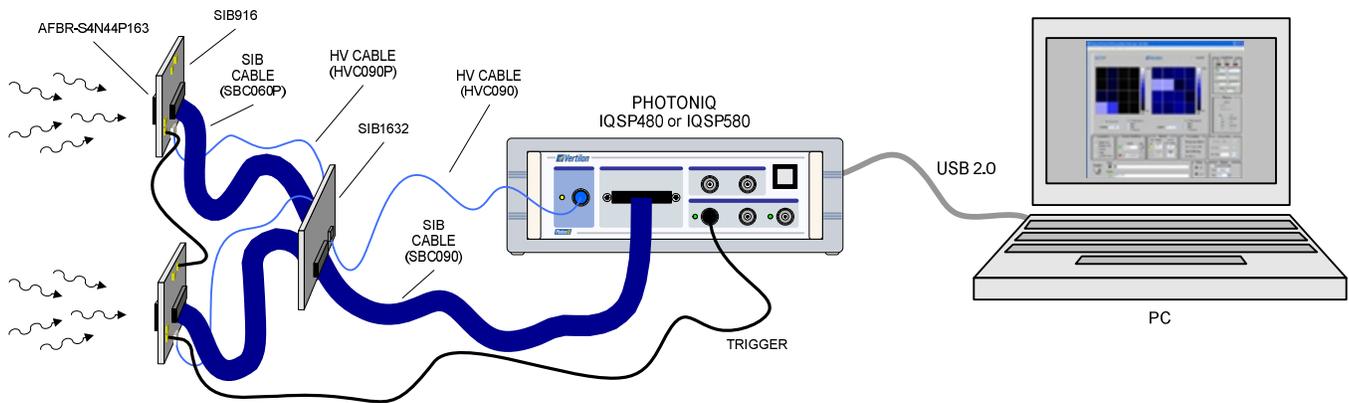


Description

The SIB916 sensor interface board allows for the Broadcom AFBR-S4N44P163 4 x 4 silicon photomultiplier (SiPM) array to easily interface to a Vertilon PhotoniQ multichannel data acquisition system. The SiPM array is attached to the bottom side of the printed circuit board where its cathode output signals are routed directly to a sensor interface board (SIB) connector. The SIB connector mates to a micro-coaxial cable assembly that connects the 16 device outputs to the PhotoniQ. Bias to SiPM array is provided on a high voltage cable by the PhotoniQ where it can be enabled and configured through the PhotoniQ graphical user interface. A special current-sense tap from the bias interface circuitry is sent to a variable gain preamplifier that outputs the total charge signal measured simultaneously on all 16 elements in the SiPM array. This signal is fed to a user-programmable leading edge discriminator that generates a trigger signal when an event exceeding a preset energy threshold is detected on any element of the AFBR-S4N44P163 device. The trigger output is typically connected to the trigger input on the PhotoniQ data acquisition system where it is used to initiate the collection of the energy signals from the SiPM array connected to the DAQ system's inputs. Alternatively, the discriminator signal can be fed to the on-board coincidence detector and used with a second SIB916 to generate triggers only when two near-simultaneous events are detected.

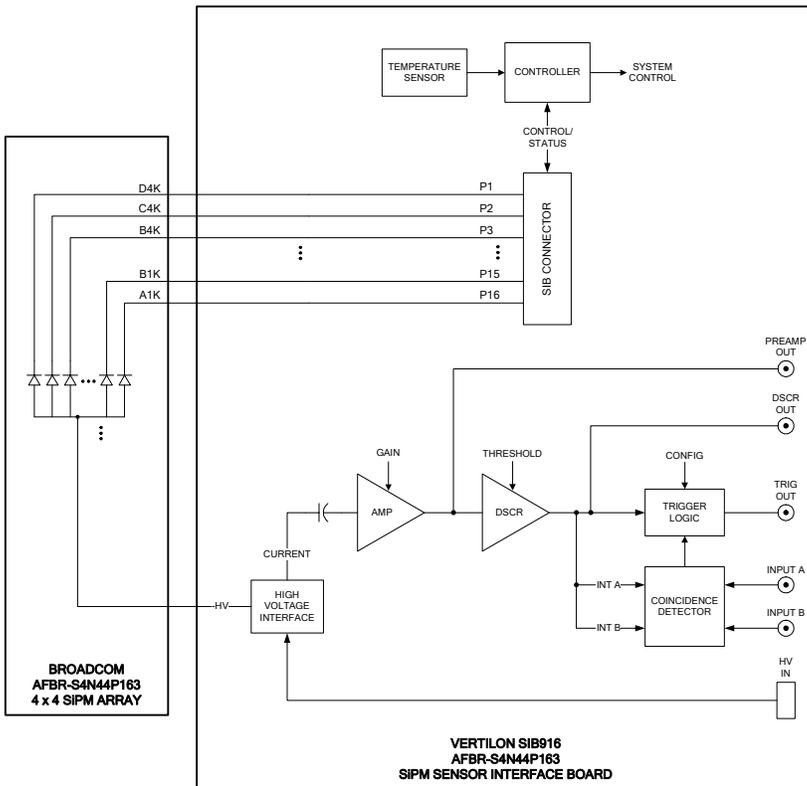


Typical Dual Sensor Setup

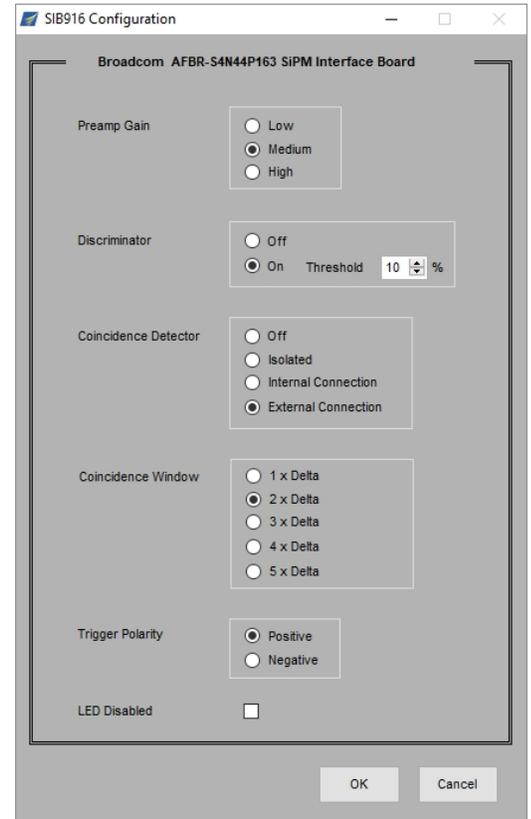


The Broadcom AFBR-S4N44P163 4 x 4 SiPM arrays are mounted to the SIB916s which are positioned in an optical assembly to detect incoming radiation. The SIB cables from each SIB916 connect to a Vertilon SIB1632 where the 16 outputs from each SiPM array are combined into one SIB cable (SBC090) that connects to a PhotoniQ IQSP480 or IQSP580 multichannel data acquisition system. The discriminator output from one SIB916 is fed to the coincidence detector input on the other SIB916 so that a trigger to the PhotoniQ is produced whenever a near-simultaneous radiation event is detected on both SiPM arrays. The energy level threshold for the radiation event is set by the user through the PhotoniQ graphical user interface. Charge signals from the 32 cathodes from the two AFBR-S4N44P163 devices are acquired by the PhotoniQ for each coincidence trigger produced by the SIB916. Digitized output data from the PhotoniQ is sent through a USB 2.0 connection to a PC for display, logging, or real time processing. In the figure above, the PhotoniQ GUI is set to display a dual 4 x 4 image of the energy levels for each event captured.

Functional Block Diagram



Configuration Dialog Box



Ordering Information

SIB916 is directly compatible with Vertilon PhotonIQ IQSP480 / IQSP580 32 channel data acquisition systems. PhotonIQ systems sold separately. See User Manual for performance specifications.

SIB916 includes three SMB120 coaxial cables, SMB plug to BNC plug, 120 cm.

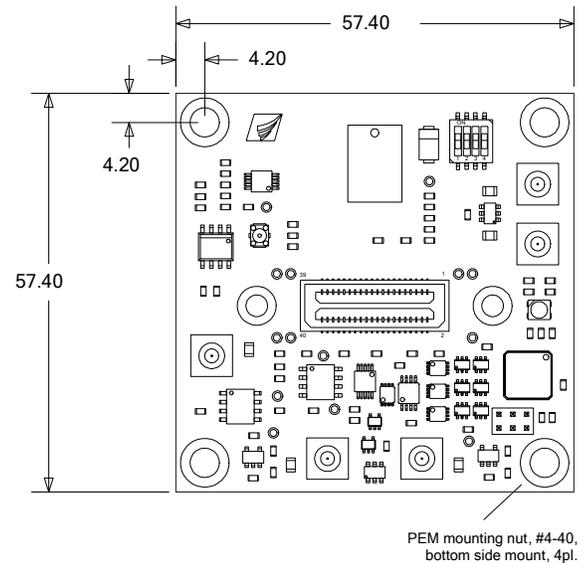
When using the coincidence detector with two SIB916, a coaxial cable consisting of an SMB plug on each end is required.

Sensor interface board (SIB) cables ordered separately. Specify part number SBCxxx, where "xxx" equals length in centimeter.

See SIB916 User Guide for complete specification.

See Broadcom AFBR-S4N44P163 datasheet for specific device information

Mechanical Data



ALL DIMENSIONS IN MILLIMETER



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Vertilon Corporation, 66 Tadmuck Road, Westford, MA 01886 / Tel: (978) 692-7070

info@vertilon.com

www.vertilon.com