Features

Supports the Onsemi ArrayJ-60035-4P-PCB
2x2 array of 6mm SiPMs

"HFC" variant: Horizontal coaxial connectors on the front (array) side of the board

- MCX, LEMO, SMA, and SMB supported

Individual transimpedance amplifier per SiPM

- Wideband DC-coupled signal path
- 500Ω transimpedance gain standard
- Other gains optional

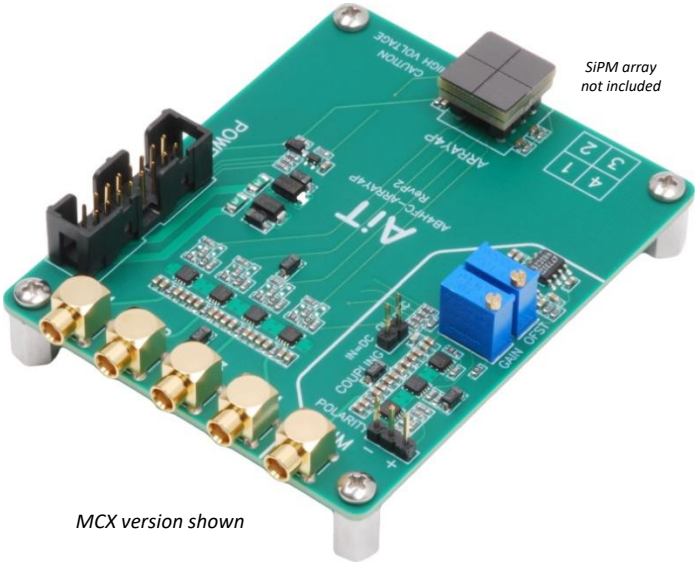
Sums four SiPM signals

- Gain adjustment potentiometer
- Offset adjustment potentiometer
- DC or AC coupling selection jumper
- Output polarity selection jumper

Connects to the optional AiT Amplifier Board Power Supply (model ABPS)

Pin receptacles for low-profile array attachment

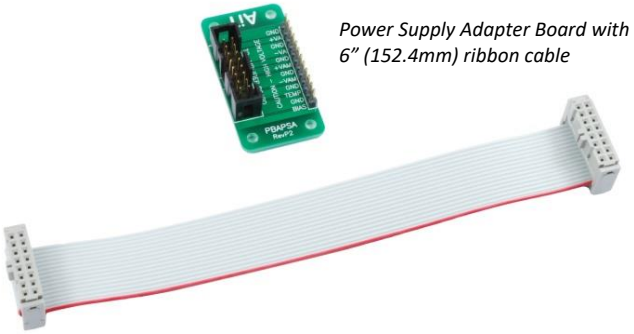
Four mounting holes for #4 or M3 hardware



MCX version shown

Accessories Included

- 16-conductor ribbon cable assembly, 6" (152mm) length
- Power supply adapter/breakout board
- Four threaded standoffs with #4-40 screws



Power Supply Adapter Board with 6" (152.4mm) ribbon cable

Part Number

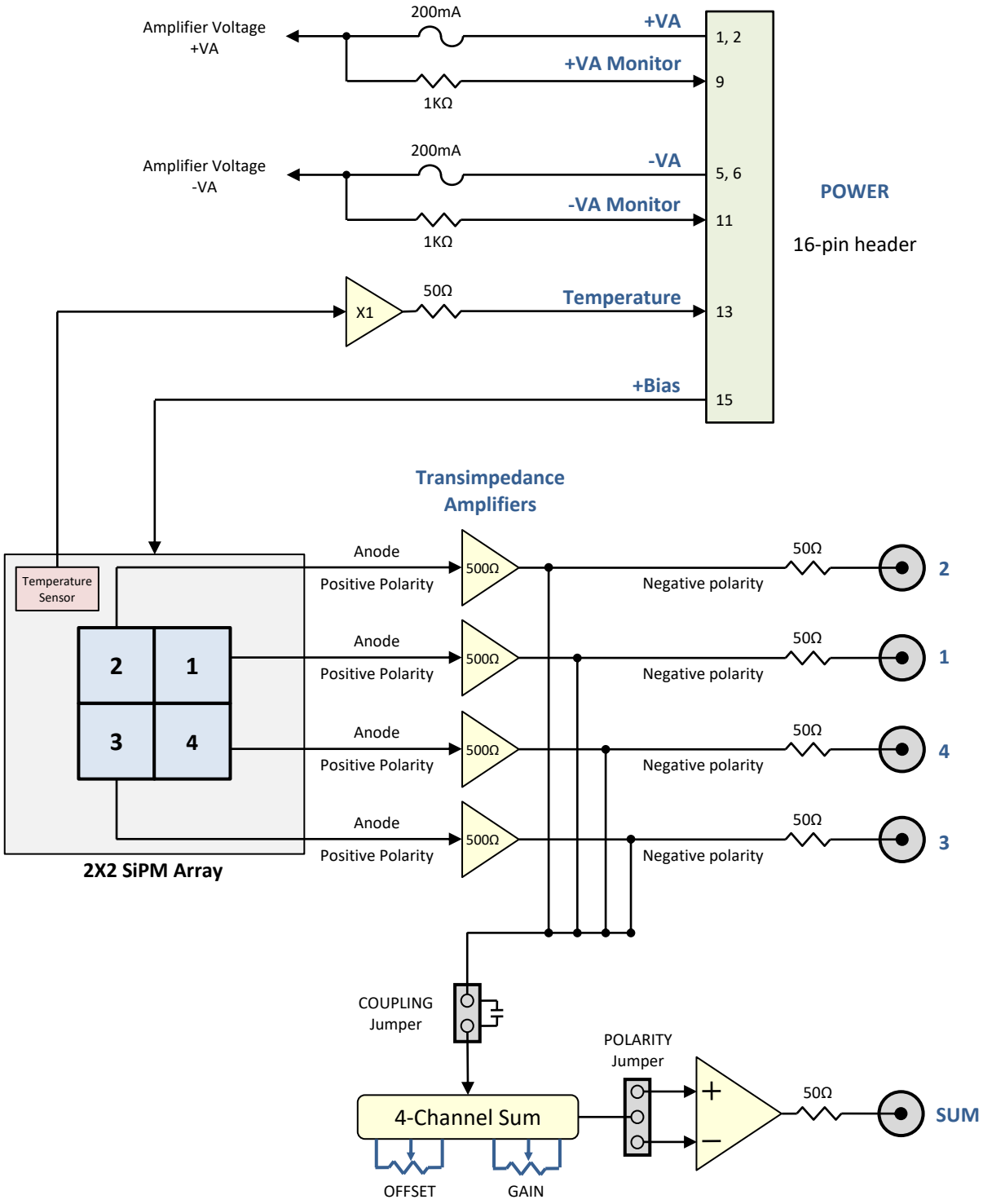
AB4HFC-ARRAY4P-Gxxx

AB4HFC: C = connector type
- M = MCX
- A = SMA
- B = SMB
- L = LEMO EPL.00.250.NTN

Gxxx: Transimpedance gain in ohms
- 500Ω standard if omitted

Example: AB4HFL-ARRAY4P
- LEMO connectors, 500Ω gain

Architecture



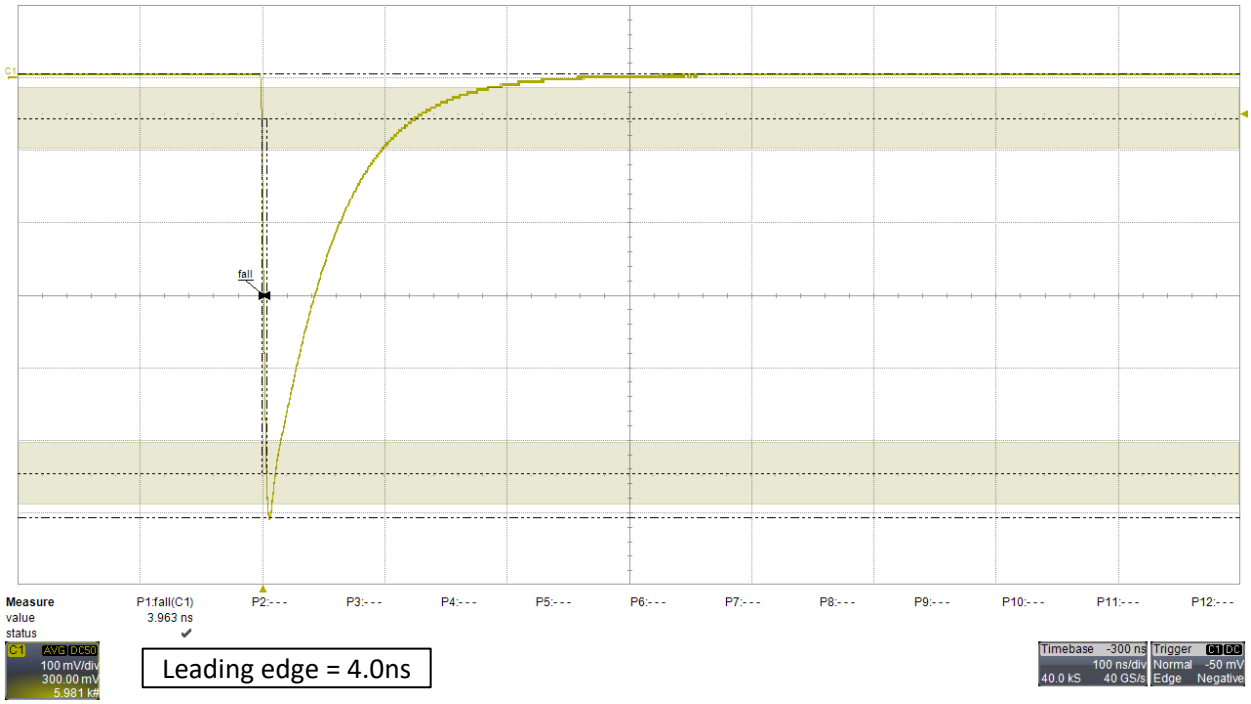
Specifications

Amplifier Voltage	±VA = ±2.5V → ±5.5V DC
Current	±100mA at ±5.0V (Iq, no load)
Current limit	200mA resettable fuses ±5.6V Zener diode clamp Reverse voltage protection
Bias Voltage	+29V typical (refer to SiPM data)
Voltage clamp	47V Zener diode 500mW maximum
Signal Amplifiers	
Gain	500Ω transimpedance gain
Output polarity	negative
Coupling	DC
Output impedance	50Ω
Output current	100mA maximum
Output voltage range	±3.4V maximum (±1.7V into 50Ω) with VA = ±5.0v
Signal Sum	
Gain adjustment	x0 → x2, referred to one output channel 25-turn potentiometer
Input offset adjustment	±250mV at sum gain = 1 25-turn potentiometer
Output polarity	Positive or negative, jumper selectable
Coupling	AC or DC, jumper selectable
AC coupling time constant	2.1 μs, ±5%
Output impedance	50Ω
Output current	100mA maximum
Output voltage range	±3.4V maximum (±1.7V into 50Ω) with VA = ±5.0v
Temperature Sensor	
Output voltage	500mV + 10mV per °C
Accuracy	±0.5°C
Output current	10mA
Output impedance	50Ω
Connectors	
POWER	16-pin shrouded vertical header, 0.100” pin pitch
Signal	MCX, SMA, SMB, LEMO options

Typical Signals

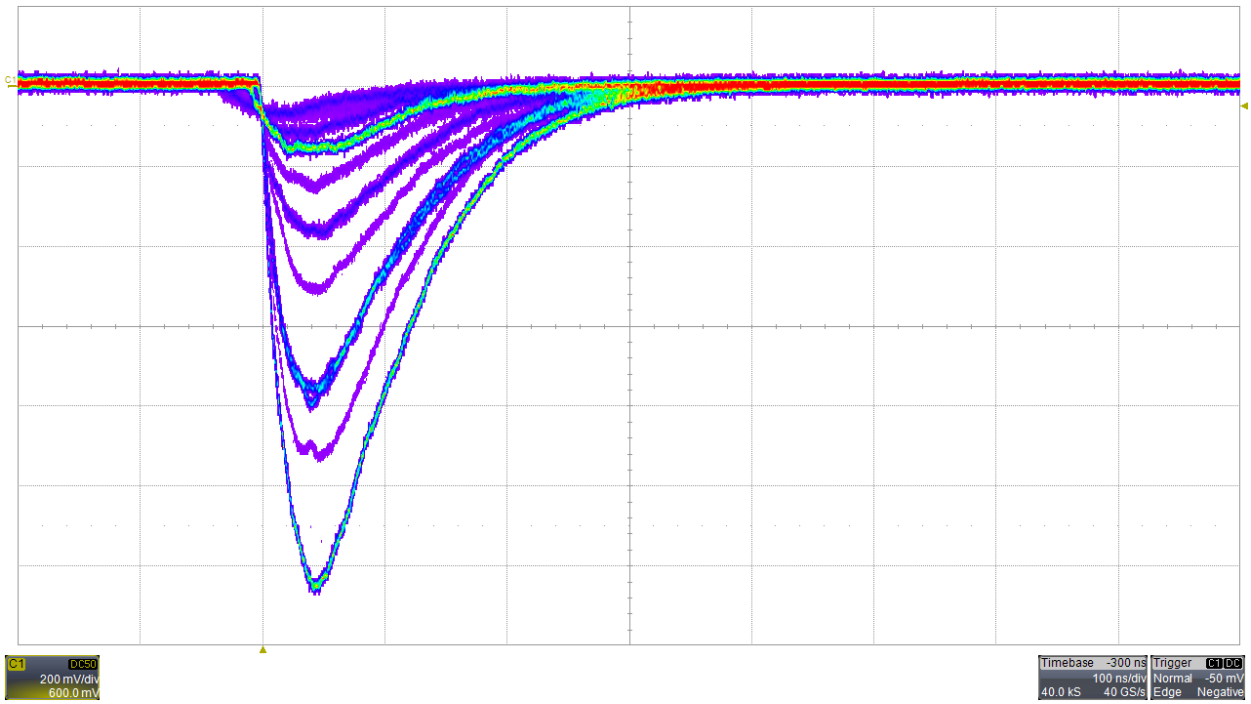
Array = ArrayJ-60035-4P-PCB

Source = Laser; Channel 3; Bias = +27V; averaged signal

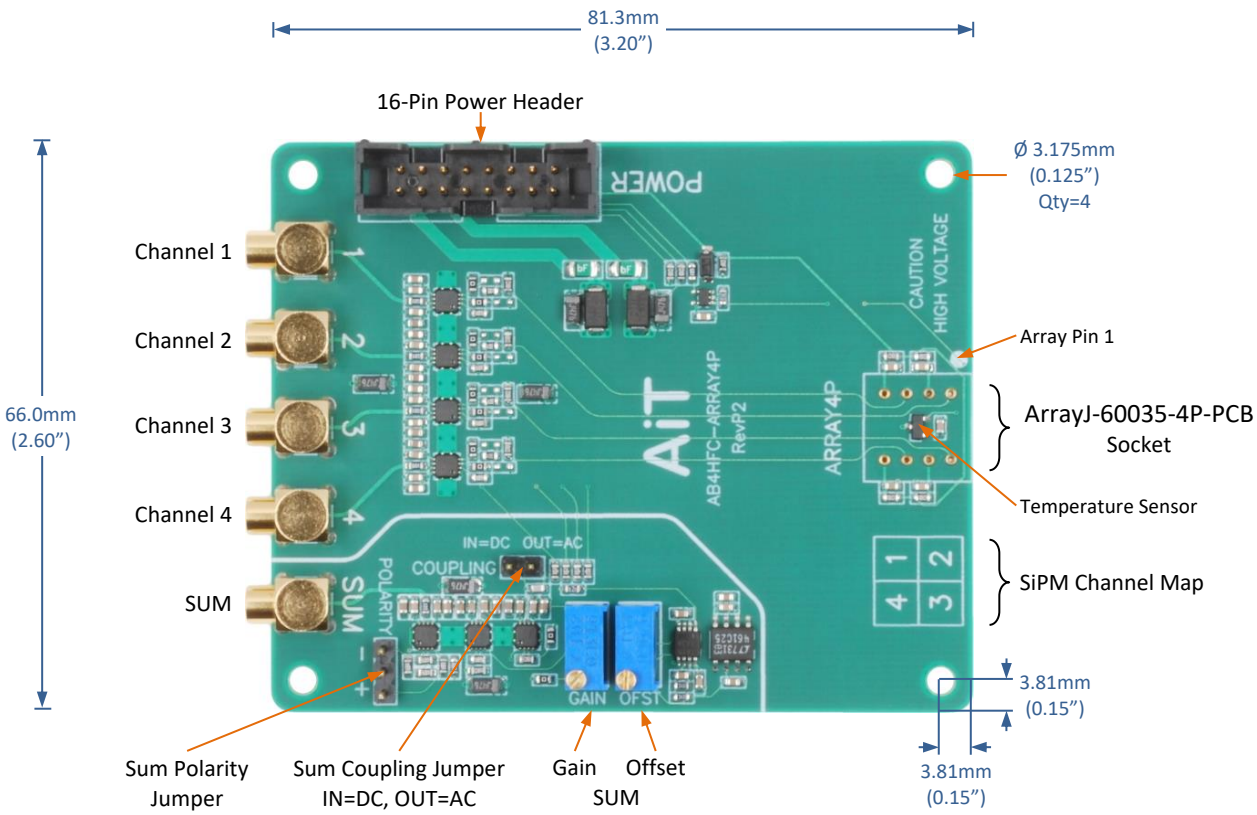


Leading edge = 4.0ns

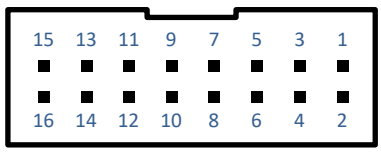
Source = LYSO Emission; Channel 3; Bias = +27V; persistence display



Mechanical



POWER Connector



Pin	Function	Pin	Function
1	+VA	2	+VA
3	Ground	4	Ground
5	-VA	6	-VA
7	Ground	8	Ground
9	+VA Monitor	10	Ground
11	-VA Monitor	12	Ground
13	Temperature	14	Ground
15	Bias	16	Ground

Operation

Typical Setup Procedure

1. Always handle the amplifier board with bias voltage off and amplifier voltage off
2. Configure the sum coupling jumper and sum polarity jumper

   DC coupling is recommended for most applications
3. Connect an oscilloscope to the SUM output and one or more SiPM output signals
4. Apply the amplifier voltage and bias voltage
   a. Adjust the bias voltage until SiPM signals are present
   b. SiPM signal polarity is negative

Sum Coupling Jumper

DC coupling is selected when the jumper is installed. AC coupling is selected when the jumper is removed. DC coupling is recommended for most applications.

Sum Polarity Jumper

Placing the jumper in the “- / center” (negative) position will select negative output signal polarity.
Placing the jumper in the “+ / center” (positive) position will select positive output signal polarity.

System Assembly Guidelines

High Voltage

This device must be used only by personnel trained and qualified in safe handling, installation, and operation of high voltage equipment. Any optional enclosure provided does not protect against high voltage exposure.

During operation, high voltage will normally be present in the following components:

- Amplifier board, especially the POWER connector
- SiPM array connector

Caution: This device does not limit bias current. Take precautions to limit bias current to prevent equipment damage and personnel injury.

Installation

This device is intended for benchtop usage or incorporated into another system or product. The circuit board may be installed using standard #4 or M3 hardware. Allow for adequate ventilation space around the board.

Safety Information

WARNING – High Voltage

- High voltage may be present during operation
- High voltage stored on capacitors may be present after power is removed
- Improper handling may result in personnel injury or equipment damage

This high-voltage device must be used only by personnel trained and qualified in safe handling, installation, and operation of high-voltage equipment.

CAUTION – Electrostatic Discharge (ESD) Sensitivity

The circuit board can be damaged by electrostatic discharge. Observe precautions for handling electrostatic sensitive devices. Handle only at static-safe workstations.

High-Gain Photodetectors

High-gain photodetectors such as silicon photomultipliers may conduct damaging currents if exposed to high optical signal levels while the bias voltage is applied, or if the bias voltage exceeds the recommended operating range. These devices must be operated only in low-light conditions, and only within the manufacturer's recommended bias voltage range.

Handling and Disassembly

This product may be provided with a protective enclosure. Disassembled enclosure components and circuit boards may contain sharp edges. Take appropriate safety precautions while assembling or disassembling the enclosure and handling disassembled components.

Indoor Use Only

Do not operate this product in a wet or damp environment. Do not operate in an explosive atmosphere.

Use of this product, and AiT Instruments' liability related to use of this product, is further governed by AiT Instruments' standard terms and conditions of sale, which were provided upon purchase of this product.