Summary

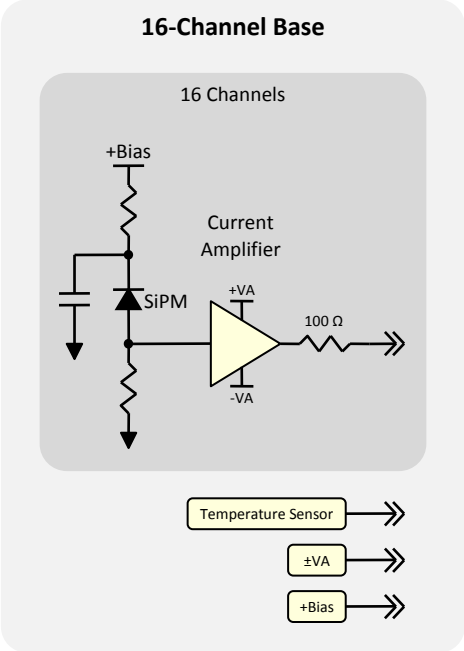
Features

- Supports the Hamamatsu S12642-0404PB 4x4 array of 3mm MPPCs
- Wideband amplifier per SiPM, 16 total
- DC-coupled signal path
- Low power consumption
- Precision temperature sensor

SiPM array
not included

Mechanical

- Mounting/alignment hole for #2 hardware
- 0.050” signal connector uses low-profile micro IDC cable assemblies for versatile placement



Specifications

SiPM Signal Amplifiers

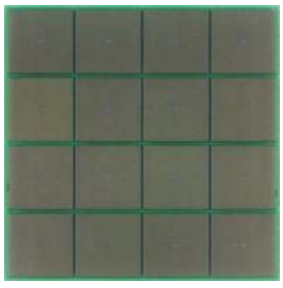
Channels	16
Type	Transimpedance
Gain	750Ω
Rise time	< 10ns
Output voltage	0 → -1V (100Ω load)
Output impedance	100Ω
Output current	50mA max.

Temperature Sensor

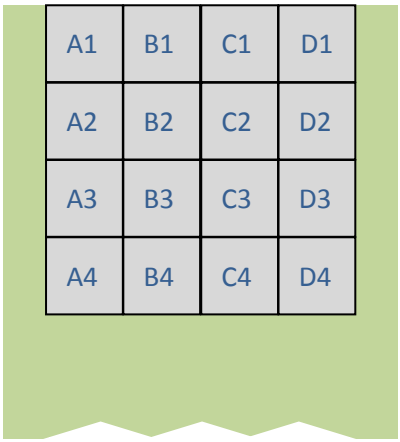
Output voltage	500mV + 10mV per °C
Output current	10mA
Output impedance	100Ω
Accuracy	±0.5°C

Bias Voltage	+67.4V typ. (refer to manufacturer's data)
Over-voltage clamp	82V Zener diode
Amplifier Power (±VA)	±2.8V typ.; ±5V max.
Current	±30mA typ. (Iq, no signal, no load)
Signal Connector	Right angle 26-pin 2-row header 0.050" pin pitch
Mating assembly	Samtec FFSD-13-D-XX.XX-01-N (XX.XX = length in inches)

S12642-0404PB

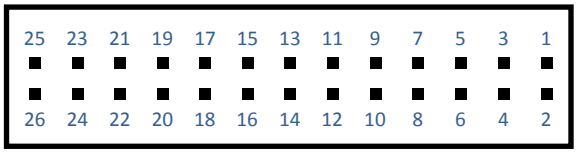


Array Channel Map



PCB Top View

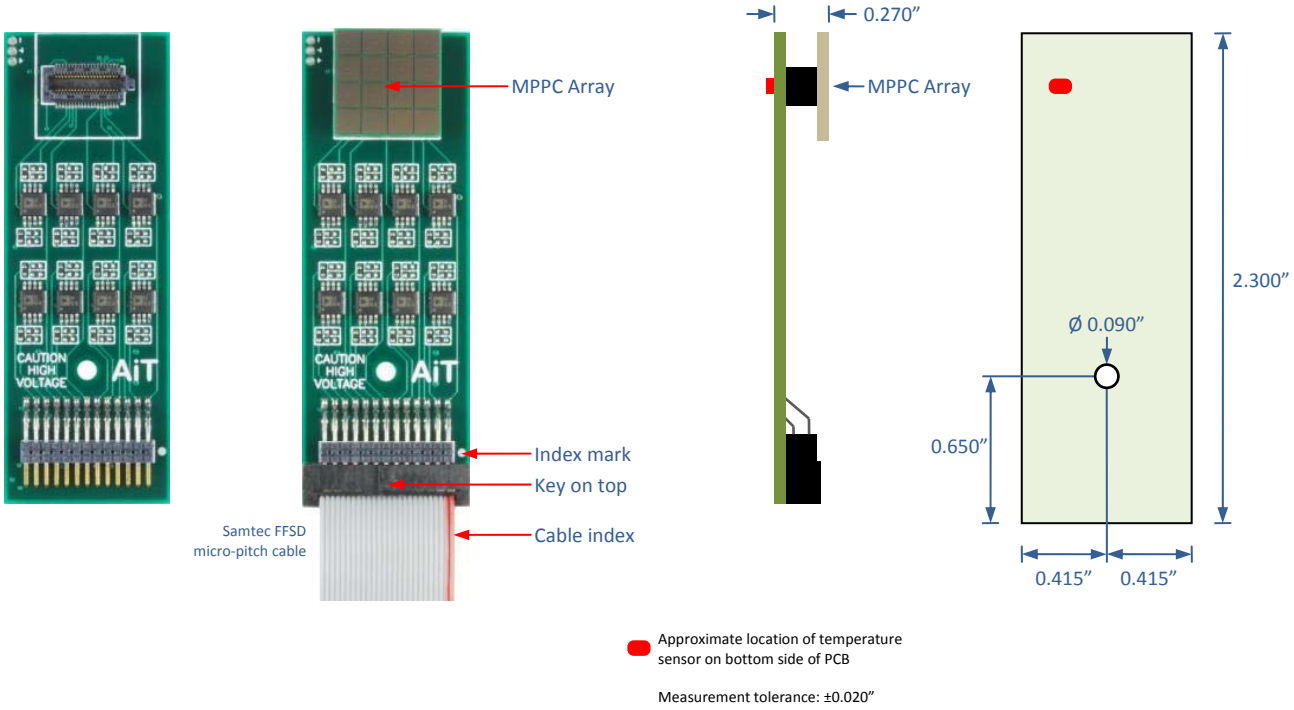
Signal Connector



PCB Side View

Pin	Function	Pin	Function
1	D4	2	Temperature
3	D1	4	GND
5	D2	6	D3
7	C4	8	GND
9	C1	10	C3
11	C2	12	-VA
13	B4	14	GND
15	B1	16	+VA
17	B2	18	B3
19	A4	20	GND
21	A1	22	A3
23	A2	24	GND
25	+Bias	26	GND

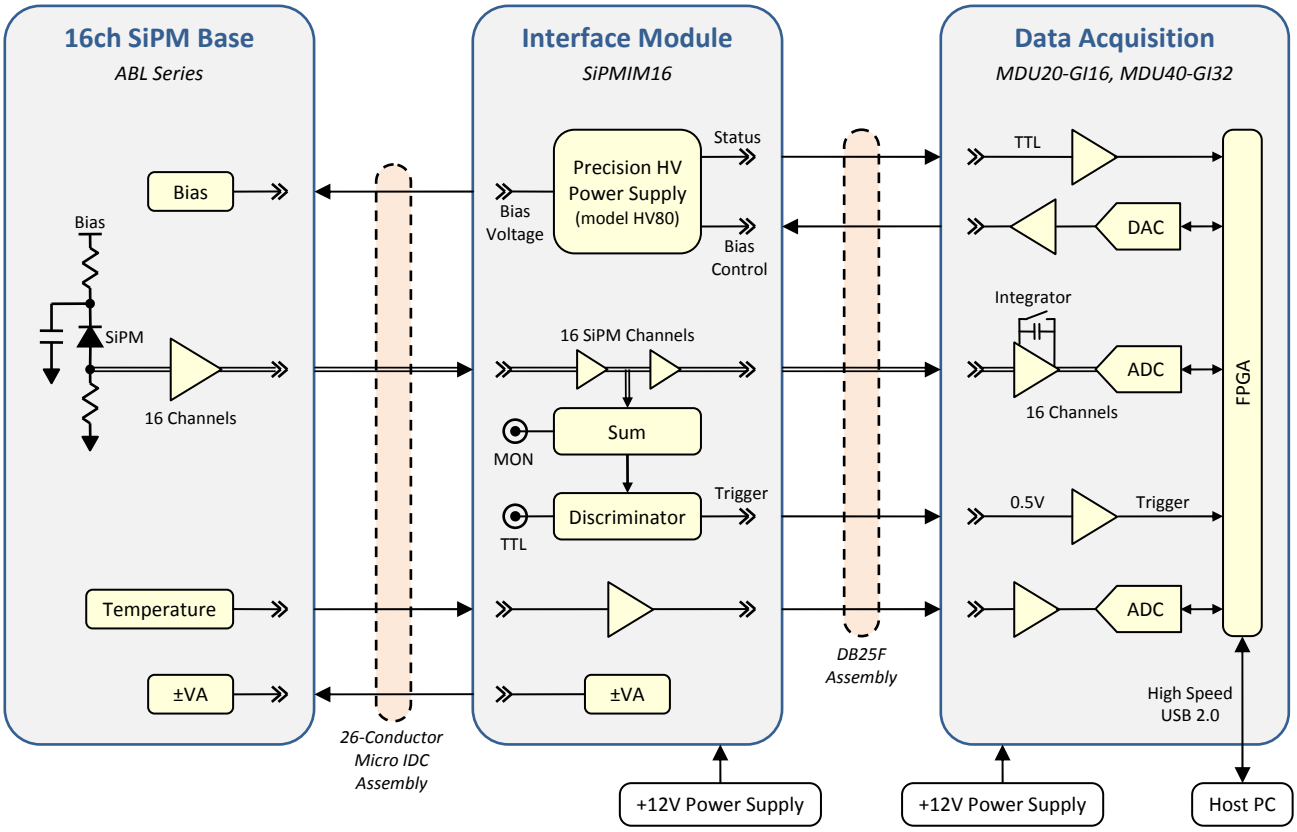
Mechanical



Approximate location of temperature sensor on bottom side of PCB

Measurement tolerance: ±0.020”

ABL Series 16-Channel SiPM Readout System



Summary

A 16-channel SiPM array readout system consists of an ABL series 16-channel SiPM Base, a SiPMIM16 ("IM16") Interface Module, and a 16/32-channel simultaneous sampling USB gated integrator model MDU20-GI16 or MDU40-GI32.

SiPM Base and Interface Module

The ABL Base connects to the IM16 through a micro-pitch ribbon cable that permits versatile placement of the Base. The IM16 powers the Base, buffers SiPM signals, and forms a trigger from the discriminated analog sum of all SiPM signals.

MDU20-GI16 and MDU40-GI32

The MDU20-GI16 has 16 simultaneous gated integrators followed by 16 simultaneous sampling ADCs. Each integrator is preceded by a 100ns analog delay to compensate for trigger latency. A 16-bit DAC controls SiPM bias and a 16-bit ADC monitors SiPM temperature. The IM16 connects to the MDU20-GI16 through a DB25F cable assembly. The MDU40-GI32 is a dual version of the MDU20-GI16 capable of controlling two IM16s.

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 or without 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/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.