Features

Connects to one 16-channel active SiPM base

Wideband DC-coupled signal path

- Switch-selectable output gain per channel

Sum of 16 SiPM signals for triggering

- Gain adjustment potentiometer
- Offset adjustment potentiometer
- DC or AC coupling selection jumper
- Polarity selection jumper

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

Mounting holes for #4 or M3 hardware

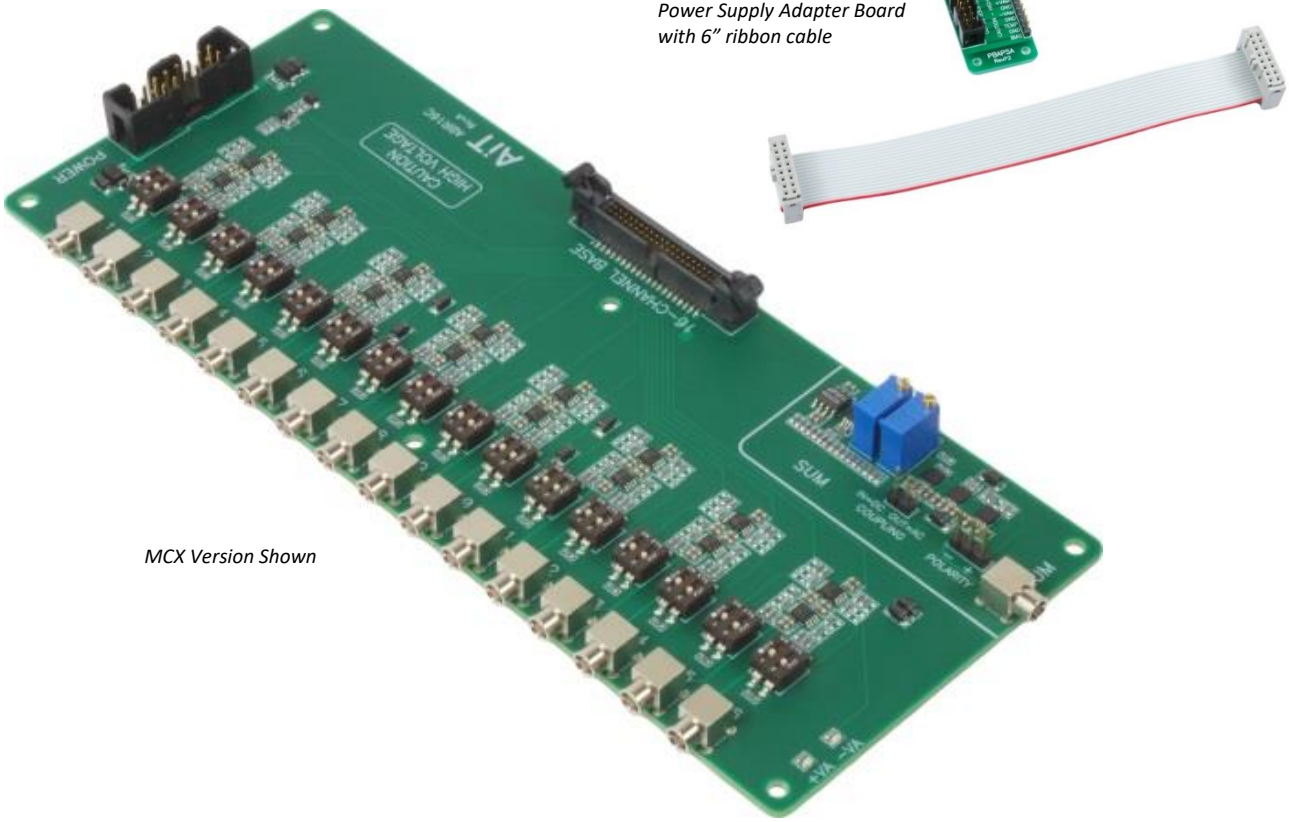
Standard Accessories

- 40-conductor Samtec micro-pitch FFSD ribbon cable assembly
- 16-conductor ribbon cable assembly, 6” (152mm) length standard
- Power supply breakout board
- Six threaded standoffs with #4-40 screws

Part Number

ABR16x: x designates the signal connector type
M=MCX, A=SMA, B=SMB, L=LEMO

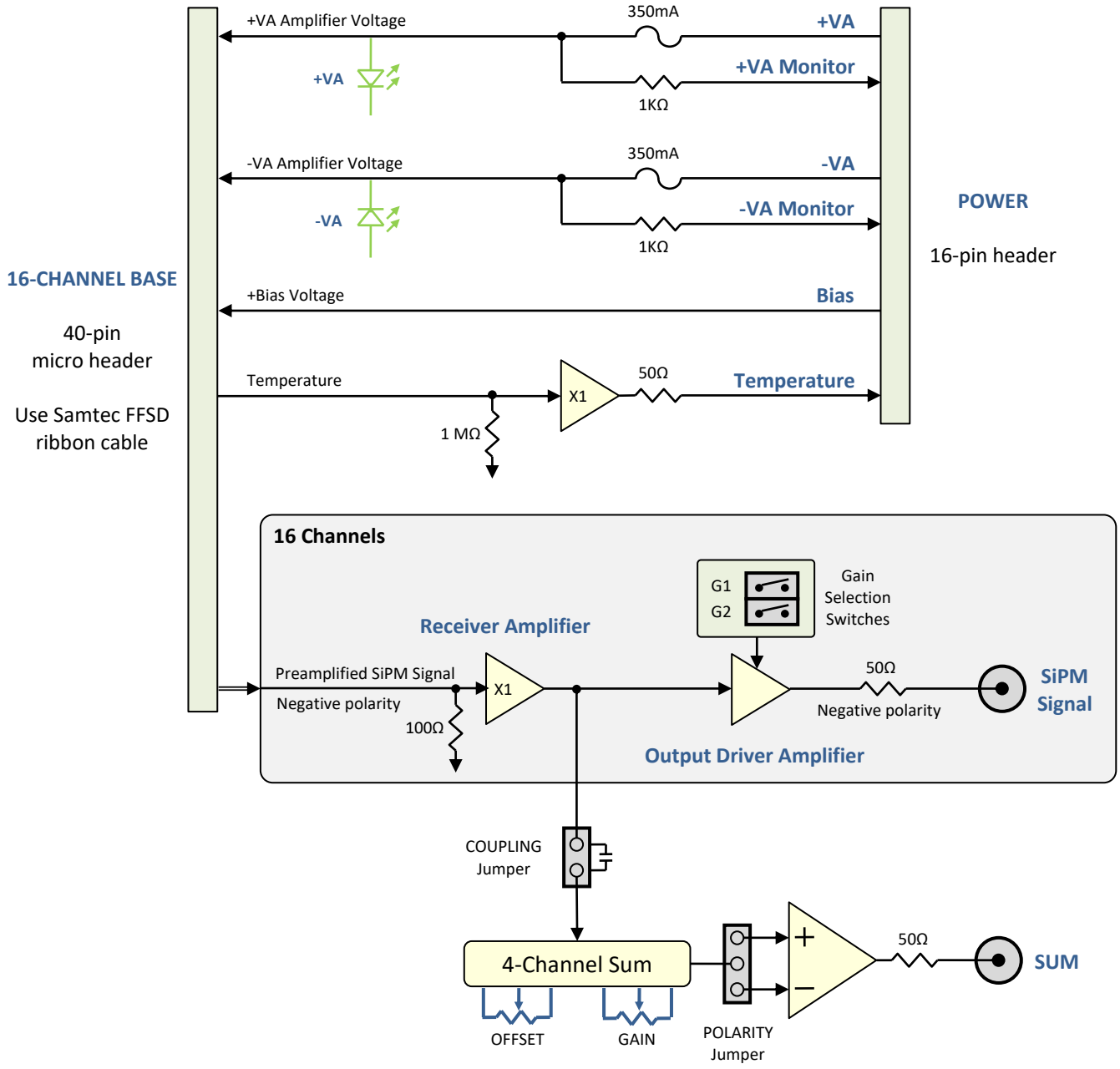
Example: ABR16M
MCX connectors



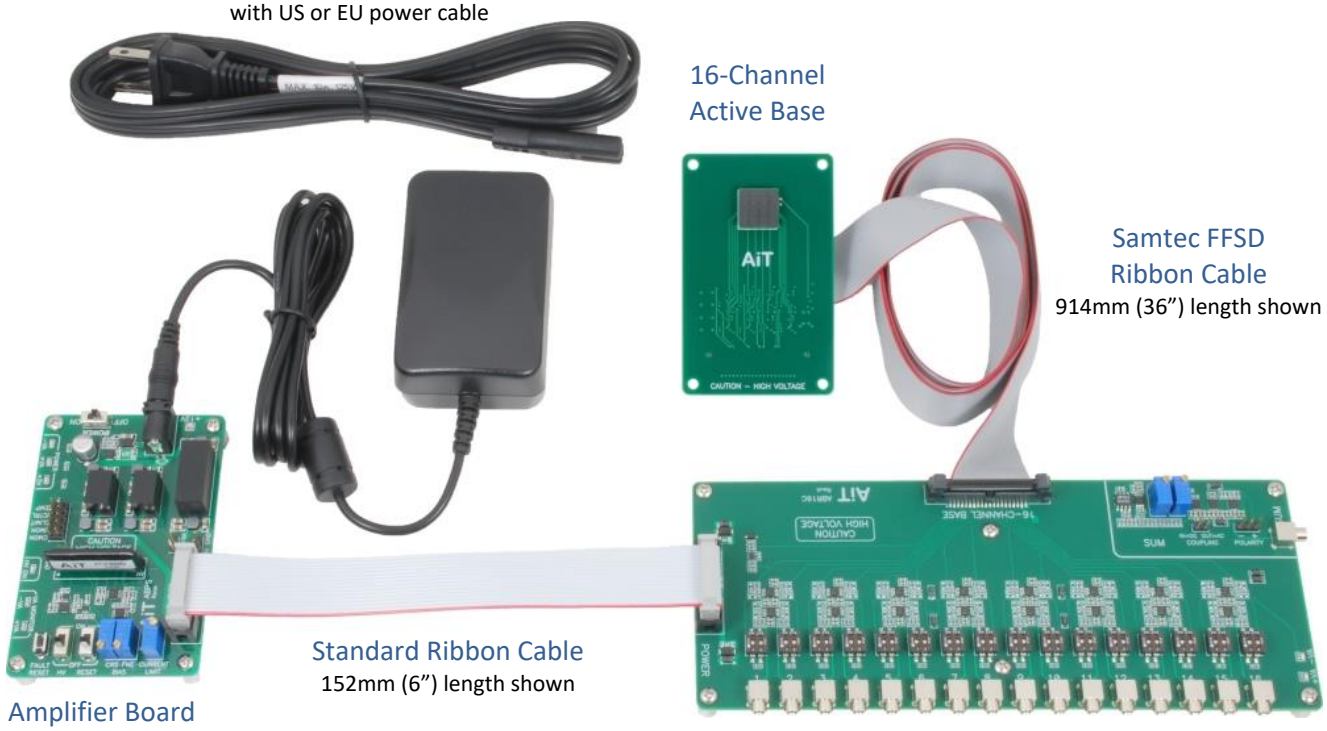
MCX Version Shown

Power Supply Adapter Board with 6” ribbon cable

Architecture



16-Channel Active Base Readout Kit



Components

Each component is available separately. Refer to each datasheet for details.

The Active Base includes a 914mm (36”) Samtec FFSD micro-pitch ribbon cable.

The Amplifier Board Power Supply includes a 12V desktop power supply and a HV80 bias voltage power supply.

The 16-channel Active Base Receiver includes a 152mm (6”) power supply ribbon cable and a breakout board to connect any external power supply.

Specifications

Test conditions: VA = ±5.0V

Amplifier Voltage	±VA = ±2.5V → ±5.5V DC
Current	±70mA at ±5.0V (Iq, no base, no load)
Current limit	350mA resettable fuses
Voltage clamp	±5.6V Zener diode
Bias Voltage	
Voltage clamp	+82V Zener diode 375mW maximum
Caution	This device does not limit bias current
Input Buffer Amplifiers	
Input impedance	100Ω
Input polarity	Bipolar, normally negative
Output Driver Amplifiers	
Gains	x1, x2, x3, x4, switch selectable
Output polarity	Bipolar, normally negative
Output voltage range	±4.0V maximum (±2.0V into 50Ω)
Output current	±100mA maximum
Output impedance	50Ω
Signal Sum	
Output polarity	Positive or negative, jumper selectable
Gain adjustment	x0 → x2, referred to one output channel at channel gain = 1 25-turn potentiometer
Input offset adjustment	±200mV at sum gain = 1 (into 50Ω) 25-turn potentiometer Sum gain adjusted to match an output channel at channel gain = 1
Coupling	AC or DC, jumper selectable
AC coupling time constant	1.9μs
Output voltage	±4.0V maximum (±2.0V into 50Ω)
Output current	±100mA maximum
Output impedance	50Ω
Temperature Monitor Buffer	
Input voltage	+3.0V maximum
Input impedance	1 MΩ
Output voltage	+3.0V maximum
Output current	10mA maximum

Output impedance	50Ω

LEDs

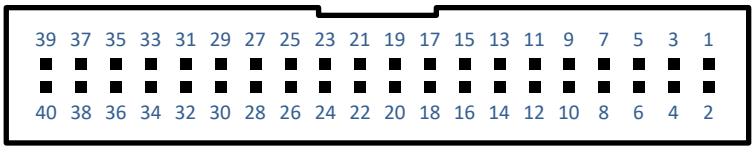
+VA	Green = Positive amplifier voltage
-VA	Green = Negative amplifier voltage

Connectors

16-CHANNEL BASE	Vertical 40-pin, 2-row latch-eject header, 0.050” pin pitch Mating assembly = Samtec FFSD-20-D-XX.XX-01-N (XX.XX = length in inches)
POWER	Vertical 16-pin shrouded header, 0.100” pin pitch

Connectors

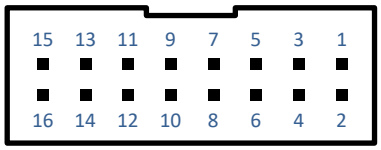
16-CHANNEL BASE



40-pin 0.050" vertical latch-eject header

Pin	Function	Pin	Function
1	Bias	2	Ground
3	Temperature	4	Ground
5	Channel 1	6	Ground
7	Channel 2	8	Ground
9	Channel 3	10	Ground
11	Channel 4	12	Ground
13	Channel 5	14	Ground
15	Channel 6	16	Ground
17	Channel 7	18	Ground
19	Channel 8	20	Ground
21	Channel 9	22	Ground
23	Channel 10	24	Ground
25	Channel 11	26	Ground
27	Channel 12	28	Ground
29	Channel 13	30	Ground
31	Channel 14	32	Ground
33	Channel 15	34	Ground
35	Channel 16	36	Ground
37	-VA	38	Ground
39	+VA	40	Ground

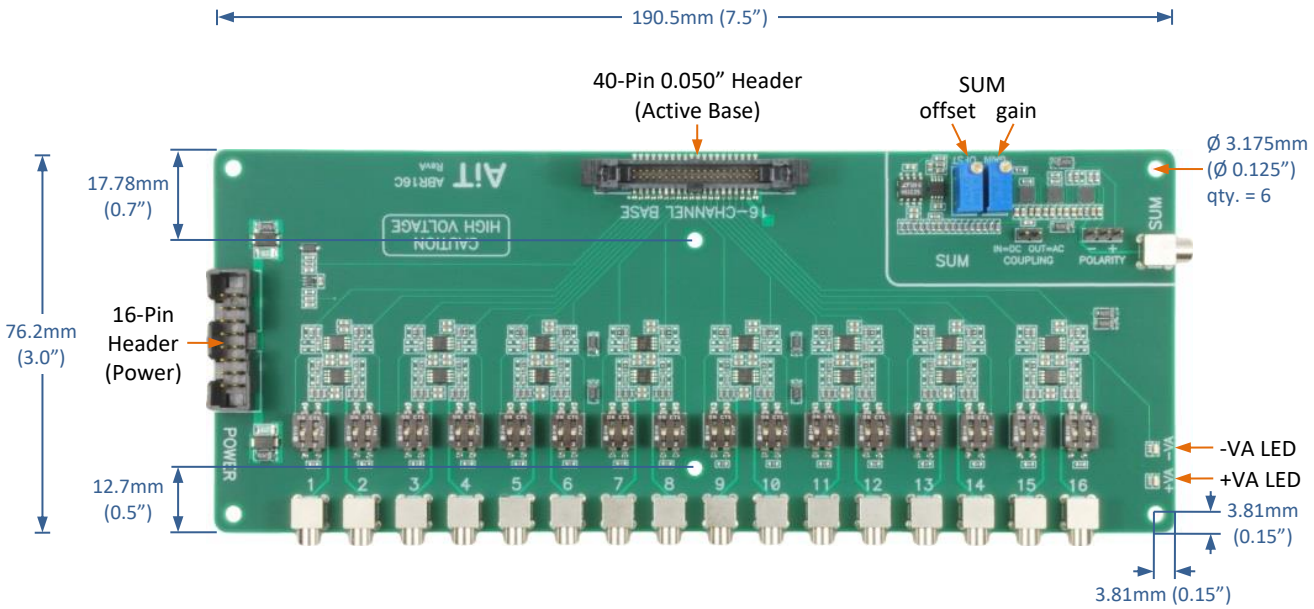
POWER



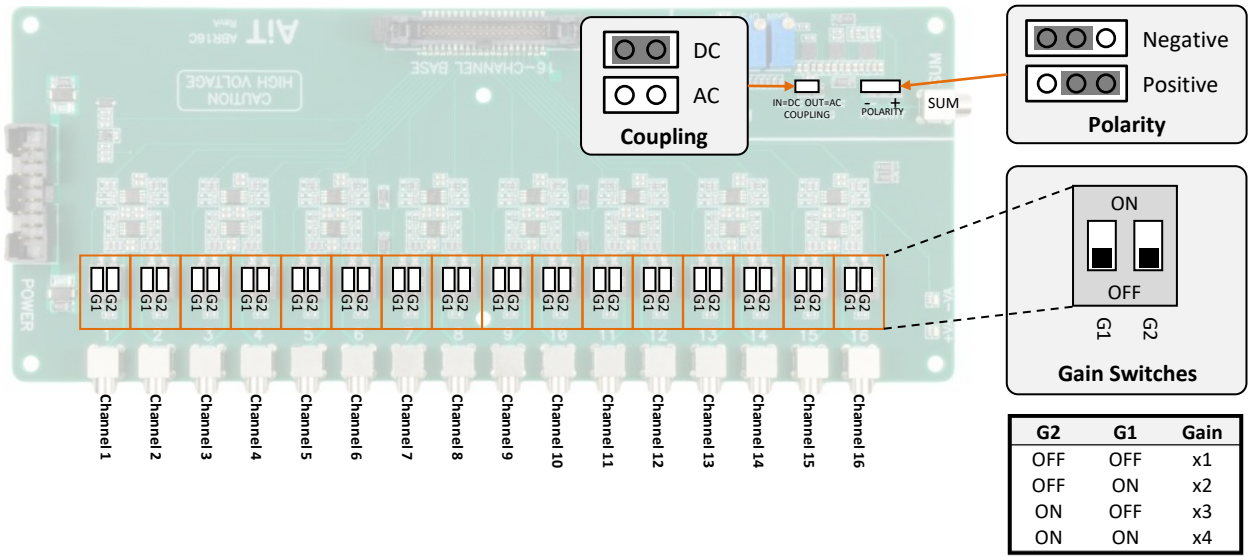
16-pin 0.100" vertical header

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

Mechanical



Jumpers and Gain Switches



G2	G1	Gain
OFF	OFF	x1
OFF	ON	x2
ON	OFF	x3
ON	ON	x4

Operation

Typical Setup Procedure

1. Make sure the Amplifier Board bias voltage and amplifier voltage are off

   Always handle the amplifier and base with bias voltage and amplifier voltage off

2. Configure the gain jumpers, sum coupling jumper, and sum polarity jumper

   DC coupling is recommended for most applications

3. Connect the Base
4. Connect an oscilloscope to the SUM output and one or more SiPM signals
5. Apply power to the Amplifier Board
6. With SiPM signals present, adjust the bias voltage, *SUM Offset*, and *SUM Gain* as needed
   a. Adjust the SiPM bias voltage until SiPM signals are present
   b. Adjust the *SUM Offset* until the SUM signal baseline is zero
   c. Adjust the *SUM Gain* to the desired level
7. Changes in bias voltage may require offset adjustment

Sum Coupling Jumper

DC coupling is selected when the jumper is installed. DC coupling is recommended for high-rate signals. AC coupling is selected when the jumper is removed. AC coupling is recommended for low-rate signals.

Sum Polarity Jumper

Placing the jumper in the “- / center” (negative) position will select the same polarity as the SiPM output signals. Placing the jumper in the “+ / center” (positive) position will select the inverted polarity. A standard Active Base produces a negative output signal polarity. A negative sum signal polarity is selected by placing the jumper in the negative position.

System Assembly Guidelines

SiPM Base FFSD Cable

The Samtec micro-pitch FFSD cable connector must be inserted firmly into the header. During insertion, the header latches will clamp over the edges of the cable connector body and hold it firmly in place. The cable is oriented correctly when the cable exits directly away from the Amplifier Board without interference, and the red index conductor is located on the right side of the FFSD header when facing the header.

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 and the SiPM BASE connector
- SiPM base signal cable
- SiPM base

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 use 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 circuit 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.