

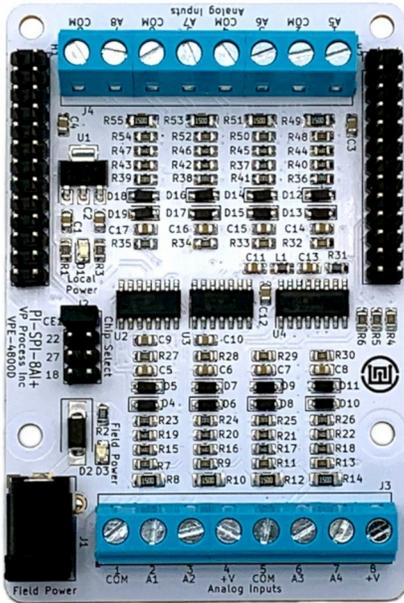


# Model: PI-SPI-8AI+

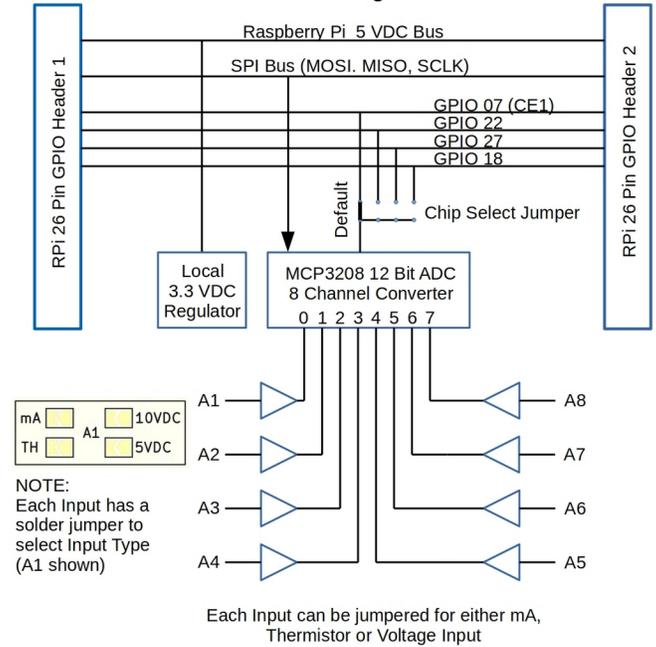
Part No: VPE-4800

## Raspberry Pi Analog Input I/O Module

PCB Module



PI-SPI-8AI+ Block Diagram



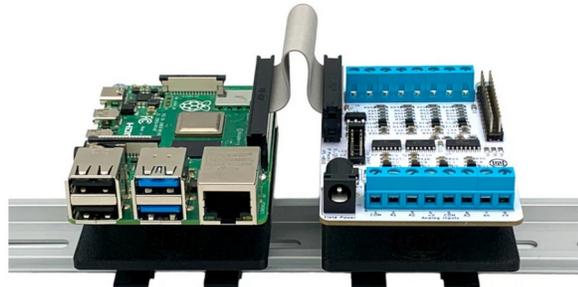
The Pi-SPI-8AI+ is an eight channel analog input I/O module designed to communicate with the Raspberry Pi. The design is based on the Microchip MCP3208 A/D converter which offers 12 bit resolution. Each of the eight channels can be independently configured to be a mA, thermistor or VDC input.

Three mounting versions are available: PCB with mounting holes, DIN Rail enclosure, or DIN rail mounting kit.

DIN Rail Enclosure Option



DIN Rail Mounting Kit Option



### Specifications

- Power Input:** 5VDC via 26 Pin Ribbon Cable (Powered from the Raspberry Pi 5VDC)
- Local Power:** 3.3 via LDO Regulator for logic
- Field Power:** Barrel Jack and/or Terminal Block (Not required for module operation) (Provided as a convenience for field transmitters)
- Interface:** SPI Communications: MOSI, MISO, CLOCK and 4 Chip Select
- Input Channels:** 8 Channels
- A/D:** Microchip MCP3208
- Resolution:** 12 bit, Single Ended
- Sample Speed:** Up to 100KHz on the SPI bus
- Analog Inputs:**
  - mA Option: 150 Ohm Load resistor
  - Thermistor Option: 10K NTC (10K Load)
  - 5 VDC Option: 0 to 6.6 VDC
  - 10 VDC Option: 0 to 11 VDC
- Calibration:** Raw A/D values, cal factors stored in user application code
- Connections:** Dual 26 Pin Ribbon Cable Headers  
Front and rear 8 point terminal blocks  
Barrel Jack for Field power (2.2 x 5 mm)
- Dimensions:** 3.345" L x 2.2" W x .55" H
- Weight:** 40 grams (Typical)
- Software:** Compatible with Raspberry Pi series 4 and 5 when using the libwidgetlords libraries (Python, C and Node-Red Support)
- Indicators:** Blue LED for Local Power  
Blue LED for Field Power



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## Pi-SPI GPIO Mapping

Function	Label	Pin	Pin	Label	Function
	+3.3V	1	2	+5V	
SDA	GPIO2	3	4	+5V	
SCL	GPIO3	5	6	GND	
CS_2AO	GPIO4	7	8	TX	RS485 - Tx
	GND	9	10	RX	RS485 - Rx
CS_8DI	GPIO17	11	12	GPIO18	CS_Spare 3
CS_Spare2	GPIO27	13	14	GND	
CS_Spare1	GPIO22	15	16	GPIO23	
	+3.3V	17	18	GPIO24	
SPI - MOSI	GPIO10	19	20	GND	
SPI - MISO	GPIO9	21	22	GPIO25	DIR_RS485
SPI - SCK	GPIO11	23	24	GPIO8	CS_8KO (CE_0)
	GND	25	26	GPIO7	CS_8AI (CE_1)

## Standard PI-SPI-8AI+ Configurations

### PI-SPI-8AI-8MA:

Inputs 1 thru 8 are 4-20 mA (Load Resistor 150 Ohms)

### PI-SPI-8AI-8VDC:

Inputs 1 thru 8 are 0 to 6.6 VDC Input

### PI-SPI-8AI-4MA-4VDC:

Inputs 1 thru 4 are 4-20 mA Input (load Resistor 150 Ohms)  
Inputs 5 thru 8 are 0 to 6.6 VDC Input

### PI-SPI-8AI-TEMP :

Inputs 1 thru 8 are 10K Thermistor Inputs

### PI-SPI-8AI-4MA-4TEMP :

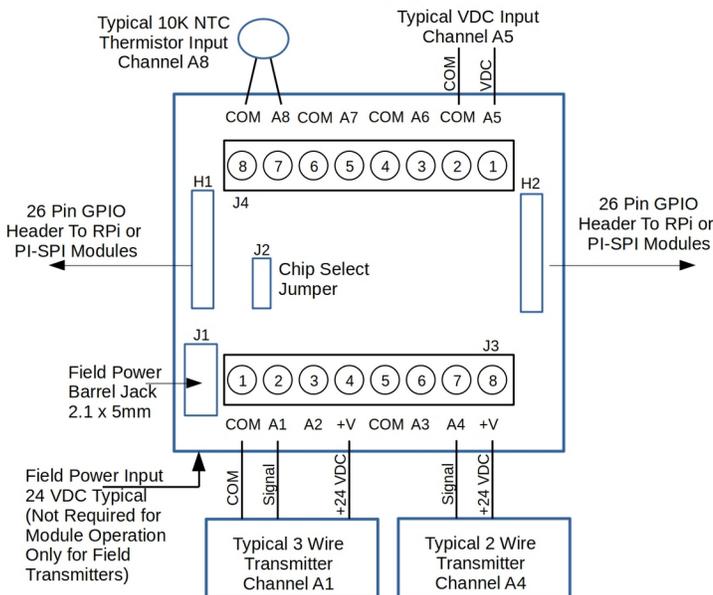
Inputs 1 thru 4 are 4-20 mA Input (load Resistor 150 Ohms)  
Inputs 5 thru 8 are 10K Thermistor Inputs

### PI-SPI-8AI-4TEMP-4VDC :

Inputs 1 thru 4 are 10K Thermistor Inputs  
Inputs 5 thru 8 are 0 to 6.6 VDC Inputs

The libwidgetlords library installation allows access to the above chip selects required by the SPI communications.

## PI-SPI-8AI+ Field Wiring Connections



## Sample Software (Python)

Please download the latest WidgetLords libwidgetlords library. All of the sample code examples are based on the latest library installation. Please note the code samples all use Python 3.

### Basic Python "Read" A/D Counts Program:

```
from time import sleep
from widgetlords.pi_spi import *

init()
inputs = Mod8AI()

while True:
    print(inputs.read_single())
    sleep(0.5)
```

## Online Resources



[PI-SPI-8AI+](#)



[Getting Started](#)



[Node-Red](#)

Each input channel has a solder jumper on the back of the printed circuit board used for input configuration.

To connect the PI-SPI module directly to the Raspberry Pi, a 40 pin to 26 pin ribbon cable is used. To connect one PI-SPI module to another PI-SPI module, a 26 pin to 26 pin ribbon cable is used.

The H1 and H2 26 pin headers are identical to the first 26 pins on the GPIO header of the Raspberry Pi. This allows "daisy-chaining" of multiple PI-SPI modules together.