

SCMVAS

Voltage Attenuator System



Description

The SCMVAS (Signal Conditioning Modular Voltage Attenuator System) is an analog signal conditioning system designed to safely monitor and accurately measure voltage potentials up to 495VAC (1400V peak-to-peak). These high level voltages are typically found in industrial applications such as induction heaters or electric-motor drive controllers. The system reduces the input signal to a level suitable for interface to data acquisition systems, while at the same time providing various filter characteristics and 1500Vrms isolation (Figure 1).

For each channel of analog input, an attenuator module, SCMVAS-Mnnn, pre-conditions the signal which is then filtered, isolated, and converted to a high-level voltage output using an SCM5B30-07 or SCM5B40-07 module. The SCM5B40-07 module with a 10kHz bandwidth is recommended for common 50/ 60Hz signals low in harmonics where the user is interested in measuring only AC voltage. The SCM5B30-07 module is used for low frequency AC signals below 4Hz. The attenuator and signal conditioning modules have excellent stability over time and do not require recalibration. Overall system accuracy is $\pm 0.06\%$.

Input signal connections to the SCMVAS-Mnnn attenuator module are made using a pluggable terminal block for ease of system assembly and reconfiguration. For safety purposes, the terminal block has a cover over the screws and there are no other exposed high-voltage points on the SCMVAS-Mnnn series modules, SCM5B30-07 or SCM5B40-07 module, or the mounting backpanel.

The SCMVAS system has two specially designed backpanels for mounting the attenuator and signal conditioning modules. The SCMVAS-PB8 high density, 8- channel backpanel (Figures 2, 3) can be panel mounted or DIN rail mounted and provides the conditioned output signal on screw terminal blocks. Jumpers are provided on each channel to optionally connect or isolate each module's I/O Common from other channel's I/O Common and/or Power Common. The SCMVAS-PB16 (Figures 4, 5) has 16 channels of analog I/O simultaneously available to high-speed data acquisition (ADC) boards through a 26-conductor ribbon cable. Refer to the SCMPB01 Data Sheet in this catalog and Application Note AN502 at www.dataforth.com for recommended ground connections and host system interfaces. Both the SCMVAS-PB8 and SCMVAS-PB16 backpanels can be mounted on the SCMXRK-002 19-inch metal rack.

Features

- Accepts High Voltage Signals up to 495VAC (1400V Peak-to-Peak)
- 5 or 10 Volt Output for A/D Systems
- 1500Vrms Transformer Isolation
- True 3-Way Isolation
- Up to 160dB CMR
- $\pm 0.06\%$ Accuracy
- Panel or DIN Rail Mounting Options
- CSA Certified
- CE Compliant
- ATEX Compliant (all models except SCMVAS-M400, -M500, -M600, -M650)

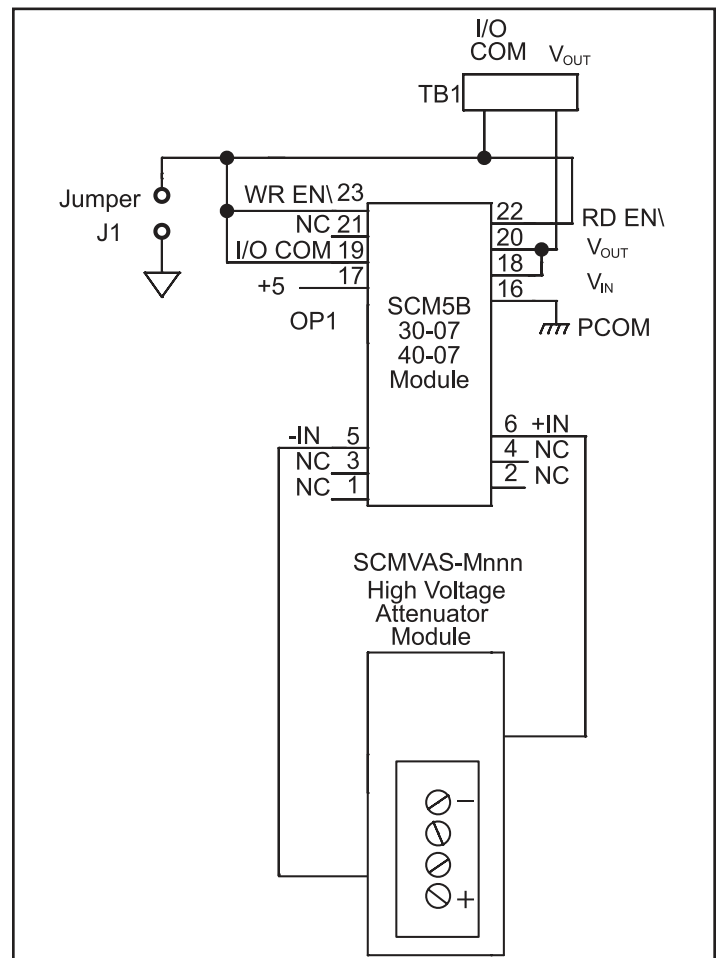


Figure 1: SCMVAS Schematic

SCM5B30/40-07



Isolated Analog Voltage Input Modules

Specifications Typical** at T_A = +25°C and +5VDC power

| Module | SCM5B30-07 | SCM5B40-07 |
|--|--|------------------------------|
| Input Range | -1.0V to +1.0V | * |
| Input Bias Current | ±0.5nA | * |
| Input Resistance | | |
| Normal | 50MΩ | 200MΩ |
| Power Off | 40kΩ | * |
| Overload | 40kΩ | * |
| Input Protection | | |
| Continuous | 240Vrms max | * |
| Transient | ANSI/IEEE C37.90.1 | * |
| CMV, Input to Output | | |
| Continuous | 1500Vrms max | * |
| Transient | ANSI/IEEE C37.90.1 | * |
| CMR (50 or 60Hz) | 160dB | 100dB |
| NMR | 95dB at 50Hz, 90dB at 60Hz | 120dB per Decade above 10kHz |
| Accuracy ⁽¹⁾ | ±0.03% Span | * |
| Linearity | ±0.005% Span | ±0.01% Span |
| Stability | | |
| Input Offset | ±20μV/°C | * |
| Output Offset | ±20μV/°C | * |
| Gain | ±50ppm/°C | * |
| Noise | | |
| Input, DC to 10Hz | 2μVrms | * |
| Output, 100kHz | 200μVrms | 2mVp-p |
| Bandwidth, -3dB | 4Hz | 10kHz |
| Response Time (to 90% final value) | 0.2s | 35μs |
| Output Range | -5V to +5V (-10V to +10V, D model versions) | * |
| Output Resistance | 50Ω | * |
| Output Protection | Continuous Short to Ground | * |
| Output Selection Time (to ±1mV of V _{OUT}) | 6.0μs at C _{load} = 0 to 2000pF | * |
| Output Current Limit | ±8mA | * |
| Output Enable Control | | |
| Max Logic "0" | +0.8V | * |
| Min Logic "1" | +2.4V | * |
| Max Logic "1" | +36V | * |
| Input Current "0,1" | 0.5μA | * |
| Power Supply Voltage | +5VDC ±5% | * |
| Power Supply Current | 30mA | * |
| Power Supply Sensitivity | ±200μV/% RTI ⁽²⁾ | * |
| Mechanical Dimensions (h)(w)(d) | 2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm) | * |
| Environmental | | |
| Operating Temp. Range | -40°C to +85°C | * |
| Storage Temp. Range | -40°C to +85°C | * |
| Relative Humidity | 0 to 95% Noncondensing | * |
| Emissions EN61000-6-4 | ISM, Group 1 | * |
| Radiated, Conducted | Class A | * |
| Immunity EN61000-6-2 | ISM, Group 1 | * |
| RF | Performance A ±0.5% Span Error | * |
| ESD,EFT | Performance B | * |

Ordering Information

| Model | Description |
|-------------|--|
| SCM5B30-07 | V Isolation Module, ±5V Output, 4Hz Bandwidth |
| SCM5B40-07 | V Isolation Module, ±5V Output, 10kHz Bandwidth |
| SCM5B30-07D | V Isolation Module, ±10V Output, 4Hz Bandwidth |
| SCM5B40-07D | V Isolation Module, ±10V Output, 10kHz Bandwidth |

NOTES:

*Contact factory or your local Dataforth sales office for maximum values.

(1) Includes linearity, hysteresis and repeatability.

(2) RTI = Referenced to input.



SCMVAS-Mnnn

High Voltage Attenuator Modules

Specifications Typical* at T_A = +25°C

| Module | SCMVAS-Mnnn |
|---------------------------------|---|
| Input Range | ±100Vpeak to ±700Vpeak (70VAC to 495VAC) |
| Input Voltage Maximum | ±750Vpeak |
| Input Resistance | 10MΩ |
| Accuracy | ±0.03% |
| Stability | ±50ppm/°C |
| Output Range | ±1V |
| Output Resistance | <100kΩ |
| Mechanical Dimensions (h)(w)(d) | 1.70" x 1.98" x 0.69" (44mm x 51mm x 18mm) |
| Environmental | |
| Operating Temp. Range | -40°C to +85°C |
| Storage Temp. Range | -40°C to +85°C |
| Relative Humidity | 0 to 95% Noncondensing |
| HazLoc | |
| CSA | All models except SCMVAS-M700 |
| ATEX | All models except SCMVAS-M400, -M500, -M600, -M650, -M700 |

*Contact factory or your local Dataforth sales office for maximum values.

Ordering Information

| Model | Description | Input Range with V Isolation Module |
|-------------|-------------------------------------|-------------------------------------|
| SCMVAS-M100 | Attenuator Module | ±100V Input (70VAC) |
| SCMVAS-M200 | Attenuator Module | ±200V Input (141VAC) |
| SCMVAS-M300 | Attenuator Module | ±300V Input (212VAC) |
| SCMVAS-M400 | Attenuator Module | ±400V Input (282VAC) |
| SCMVAS-M500 | Attenuator Module | ±500V Input (353VAC) |
| SCMVAS-M600 | Attenuator Module | ±600V Input (424VAC) |
| SCMVAS-M650 | Attenuator Module | ±650V Input (460VAC) |
| SCMVAS-M700 | Attenuator Module | ±700V Input (495VAC) |
| SCMVAS-MPT | Attenuator Module, Pass-Thru 1-to-1 | |

Accessories

| Model | Description |
|--------------|---------------------------------------|
| SCMVAS-PB8 | Backpanel, 8-Channel |
| SCMVAS-PB8D | Backpanel, 8-Channel, DIN Rail Mount |
| SCMVAS-PB16 | Backpanel, 16-Channel |
| SCMVAS-PB16D | Backpanel, 16-Channel, DIN Rail Mount |

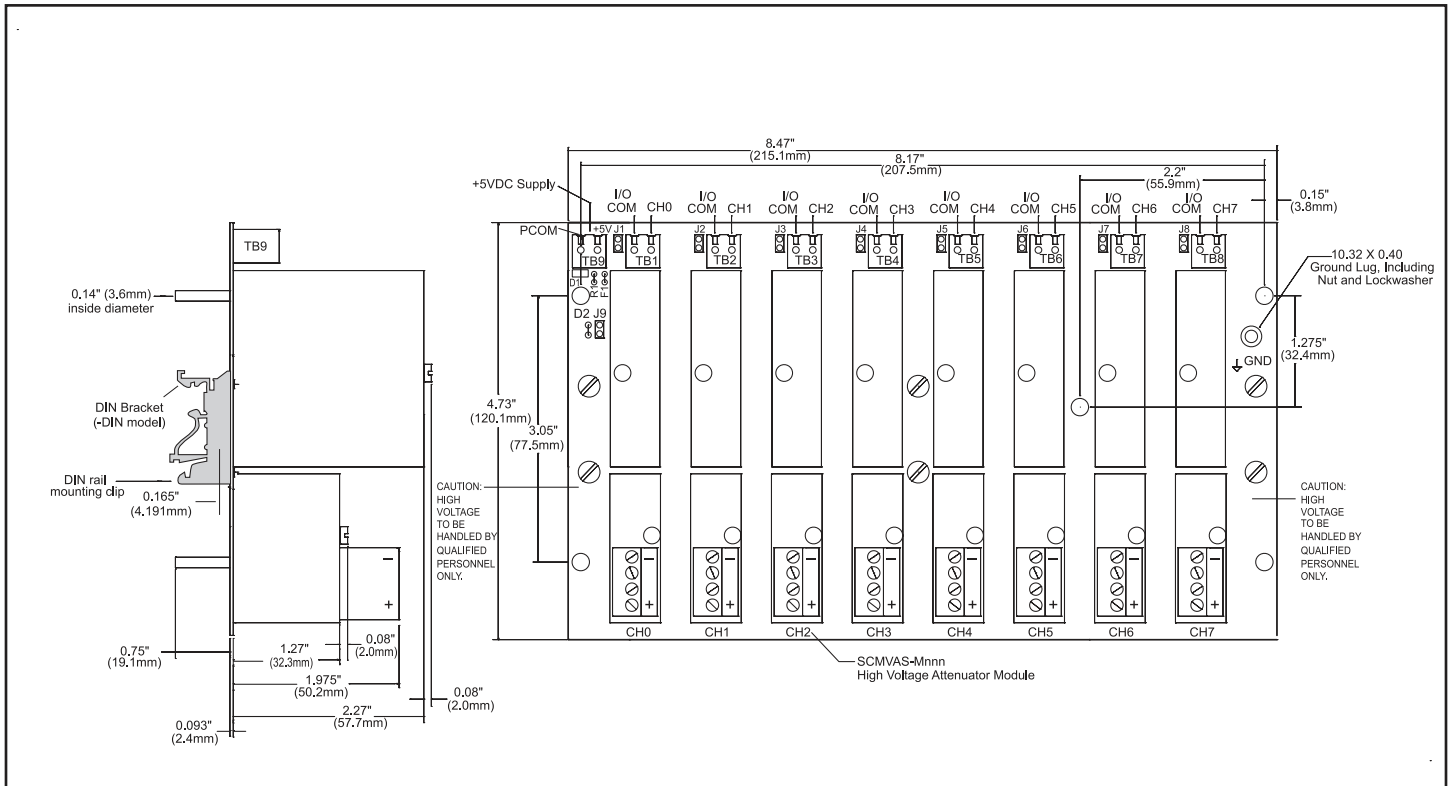


Figure 2: SCMVAS-PB8 Analog I/O Backpanel

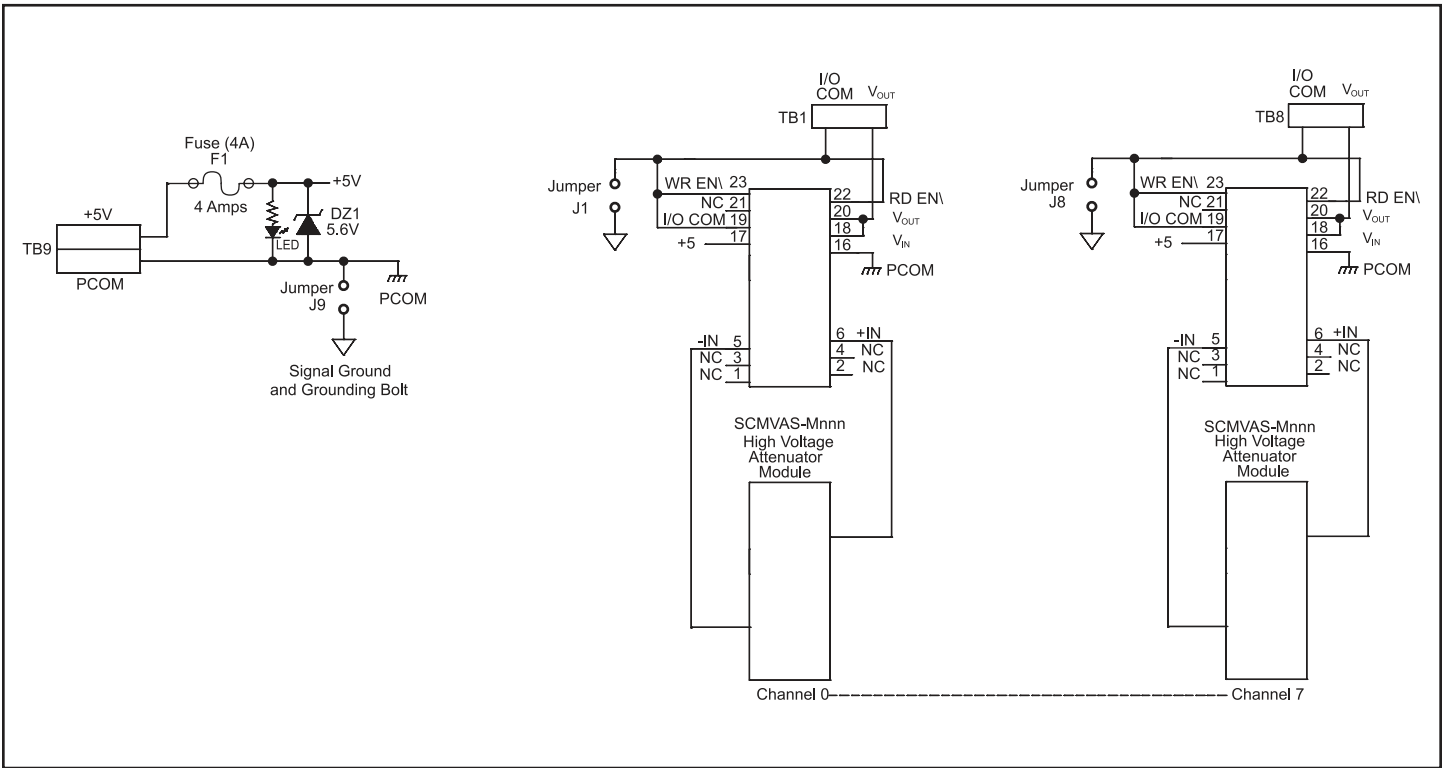


Figure 3: SCMVAS-PB8 Schematic

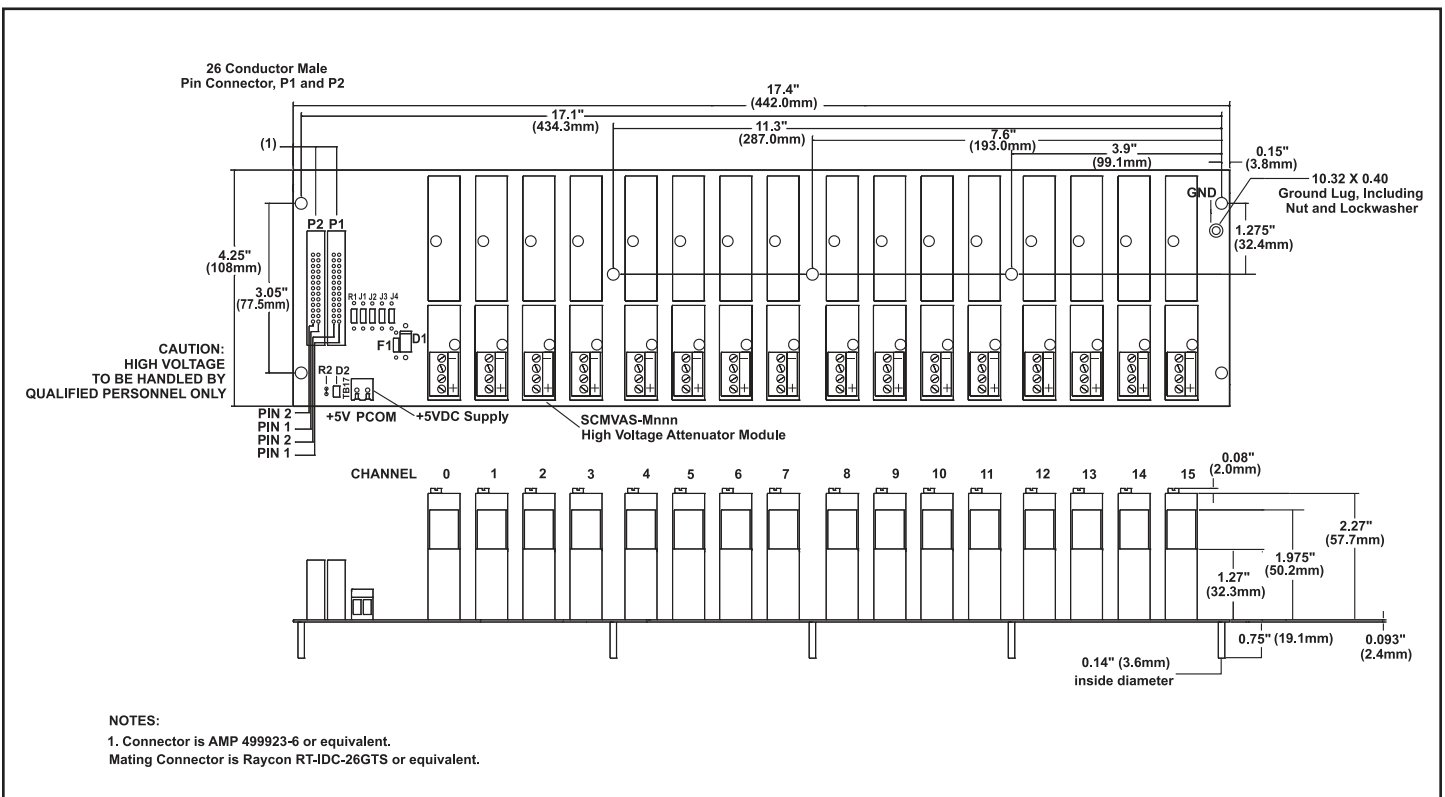


Figure 4: SCMVAS-PB16 Analog I/O Backpanel

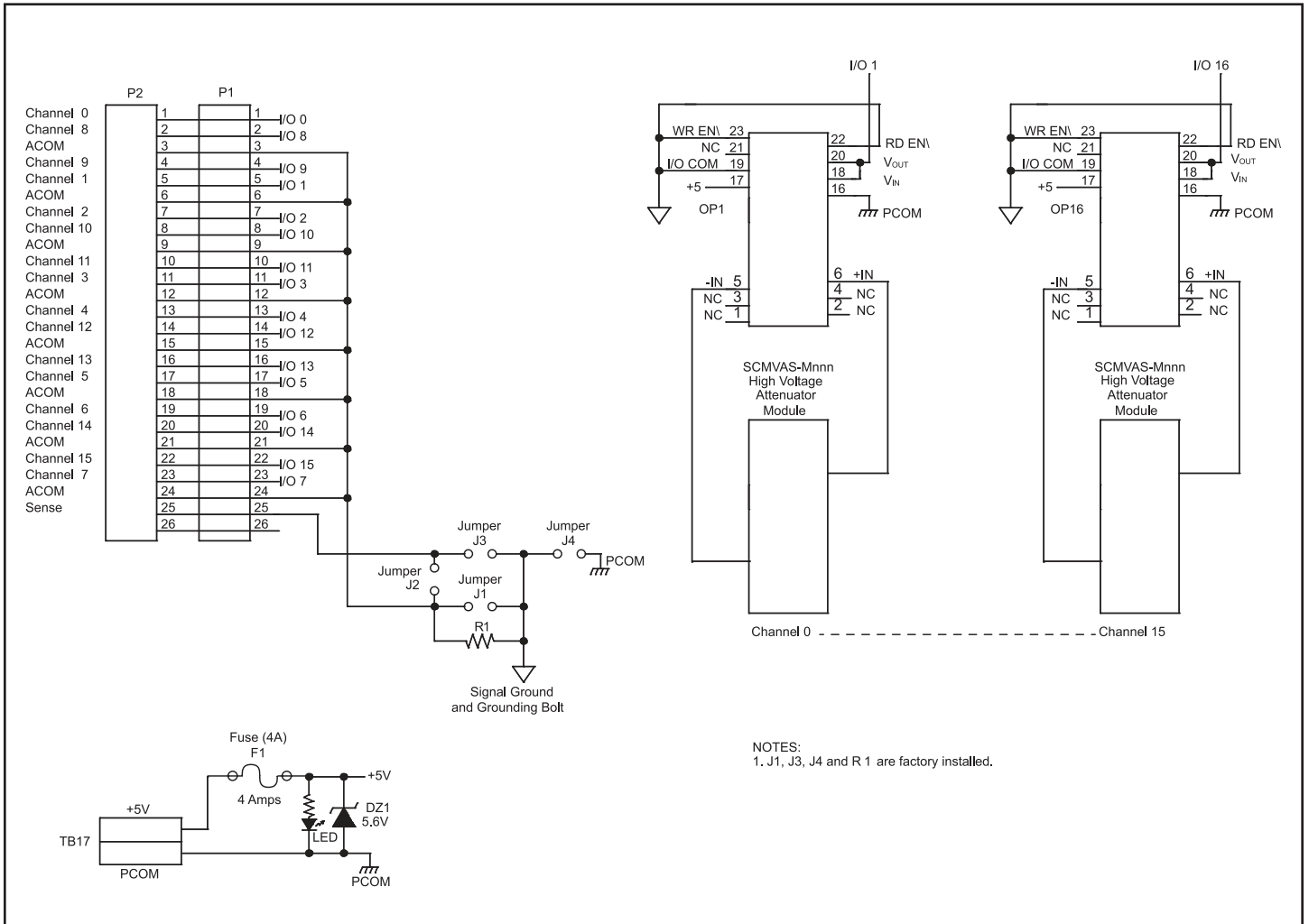


Figure 5: SCMVAS-PB16 Schematic

NOTES:
1. J1, J3, J4 and R 1 are factory installed.