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AVME9510-i Multifunction I/O (analog & digital I/O)

- **Model AVME9510:** Standard model
- **Model AVME9510-i:** Plus VMEbus isolation

This board economically interfaces both digital and analog I/O signals to the VMEbus. It offers an ideal solution for a wide variety of measurement and control applications where card cage space is limited. The isolation safety feature isolates all the analog and digital I/O channels as a group from the VMEbus to eliminate ground loop errors and provide protection from transient signals.

Features

Analog Input:

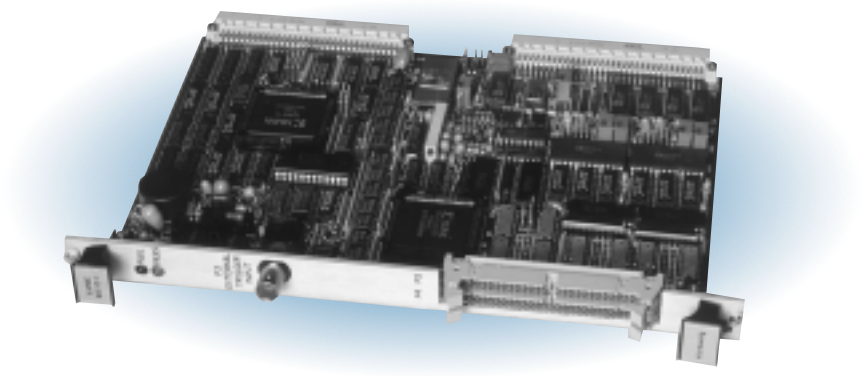
- 16 differential or 32 single-ended inputs
- 12-bit A/D, 32µS conversion rate
- Throughput of 31,250 channels/second
- Three selectable ranges: ±5, ±10, 0 to 10V
- Two channel selection schemes: Individual or sequential channel reads
- Three trigger sources: Software, external, or internal timer
- Four programmable gains: 1, 2, 4, 8

Analog Output:

- Two high-level voltage output channels
- 12-bit D/A, 6µS settling time
- Five selectable ranges: ±2.5, ±5, ±10, 0 to 5, and 0 to 10V

Digital I/O:

- 32 points of bidirectional I/O
- Inputs from a low range of 0-5V to a high range of 0-30V
- TTL and CMOS compatible



The AVME9510 combines the functionality of separate analog and digital I/O boards on a single card. Isolation is also available.

Operation

Digital points are configured as four 8-bit data ports. Each point is individually programmable as either an input or an output. The input points provide the ability to read back the output states. When using the internal power supply, an optional pull-up resistor network pulls the digital I/O lines to +5V.

Nine unique analog input ranges allow a wide variety of signal inputs. Three input ranges are jumper-selectable for all channels. Four programmable gains, selectable on an individual channel basis, enable configuration for additional ranges. Three data format options provide versatile host computer data handling.

Two input selection schemes offer single channel conversion or scanning of a group of consecutive channels. Conversions may be initiated in three different ways. A software trigger provides host computer control while an internal timer can be programmed for precision timing intervals to generate periodic triggers. The BNC connector on the front panel allows triggering synchronized to external events. Completed conversions are reported through a status register and/or interrupts, if enabled.

Two output channels generate high-level voltage signals for control applications. Each channel has its own 12-bit D/A converter and jumper-selectable output ranges. Several format options for the data written to the converters provide user-flexibility. Analog inputs and outputs are connected to the boards via Connector P2.

Specifications

Analog Input

Configuration:
16 differential or 32 single-ended input channels.

Input type: voltage.

Input range: 0-10V unipolar or ±5V, ±10V bipolar.

Programmable gain: 1, 2, 4, and 8.

Input overvoltage protection: ±32V continuous.

Input resistance: 1000M ohms.

Input bias current: 150pA typical.

Common mode rejection ratio: 71dB.

Channel to channel rejection ratio: 71dB.

RFI resistance @ 27, 151, and 467 MHz: <0.25% of FSR @ 10V/m field intensity.

A/D resolution: 12 bits.

No missing codes over temperature: 12 bits.

A/D nonlinearity: ±1/2 LSB.

System accuracy: 0.04% of FSR.

Maximum throughput rate:
One channel: 31KHz (32µS/channel)
32 channels: 1KHz (1mS/32 channels).

Gain temperature coefficient: 50 ppm/°C maximum.

Offset temperature coefficient: 24 ppm/°C maximum.

Analog Output

Configuration: 2 analog output channels.

Output type: non-isolated voltage.

Output ranges: ±2.5, ±5, ±10, 0 to 5, 0 to 10V.

D/A resolution: 12 bits.

Monotonicity over temperature: 12 bits.

D/A nonlinearity: ±1/2 LSB.

System accuracy: 0.025% of FSR.

Short circuit protection: continuous.

Settling time (20V step): 6µS to 0.01% of FSR.

Maximum throughput rate:
One channel: 100KHz (10µS/channel).

Default output on reset: 0V or minus full scale.

Gain temperature coefficient: 25 ppm/°C maximum.

Offset temperature coefficient: 15 ppm/°C maximum.

RFI Resistance @ 27, 151, and 467 MHz: <0.25% of FSR @ 10V/m field intensity.

Digital I/O

Points/board: 32; each point configurable as either an input or output.

Input voltage range: -0.3 to 30V DC.

Input threshold (H to L): 1.3V DC nominal (adjustable).

Input threshold (L to H): 1.0V DC nominal (adjustable).

Input hysteresis: 0.3V DC nominal.

Input current: 7.8mA @ 30V DC (pull-up resistors removed).

Output type: open collector with optional pull-up resistor.

Output voltage range: 0 to 30V DC.

Output current sink: 100mA maximum.

Maximum throughput rate:
One channel: 100KHz (10µS/channel)
32 channels: 40KHz (25µS/32 channels).

Power Supply Requirements

+5V DC +0.25V/-0.125V @ 4A.

+12V DC @ 20mA.

Environmental

Operating temperature: 0 to 70°C (32 to 158°F).

Storage temperature: -25 to 85°C (-13 to 185°F).

Relative humidity: 5 to 95%, non-condensing.

Isolation:
AVME9510: Nonisolated.
AVME9510-i: Field I/O isolated from VMEbus as a group via optocouplers. Rated 250V AC or 354V DC continuous. Withstands 1500V AC surge for 60 sec.

VME Compliance

Meets or exceeds all written VME Specifications per revision C.1 dated October 1985 and IEC821-1987.

Data transfer bus: A24/A16:D16/D08 (EO) DTB slave.

Address modifier codes: 29H, 2DH, 39H, 3DH.

Memory map: standard or short address space, supervisory or non-privileged access, occupying 1K byte, base address jumper-configurable.

Connectors

P1: 96 pin 603-2-IEC class 2.

P2: 64 pin 603-2-IEC class 2.

P3: BNC jack.

P4,P5: Two stacked 50 pin latch/eject headers.

Ordering Information

Multifunction I/O Boards

AVME9510
Standard model

AVME9510-i
Same as above plus VMEbus optocoupler isolation

Termination Panels

Analog I/O

5025-552
DIN rail-mounted termination panel.

6925-16D
16 filtered differential inputs, parallel mounted

Digital I/O

5025-552
DIN rail-mounted termination panel.

Signal Cables

(x = length in feet, 12 feet max.)

5025-275-x
Shielded signal cable, P2 to 50-pin connector. Interfaces the board rear (P2) connector to a 5025-552 termination panel.

5025-550-x
Unshielded signal cable, 50-pin connectors both ends. Interfaces the board front connector to a 5025-552 termination panel.

9940-x
Unshielded analog cable, P2 to 50-contact edge connector. Interfaces the board rear (P2) connector to a 6925-16D termination panel.

9941-x
Shielded analog cable, P2 to 50-contact edge connector. Interfaces the board rear (P2) connector to a 6925-16D termination panel.

For software, see Page 58. For wiring hardware, see Pages 60-65. For signal conditioning, see Page 66.

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