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# VMEBUS INPUT/OUTPUT BOARDS

## AVME947x Industrial Digital I/O

- AVME9470/71: 80 channels, front/P2 access
- AVME9475: 40 channels, P2 access

The AVME947x boards offer a variety of features to simplify complex industrial control applications. They can perform up to four independent functions at the same time to replace four other boards and save three card cage slots. This is possible because the I/O are divided into four individually configurable sections. Functions for each section are field-selectable with a choice of up to five I/O modes including Debounce, Interrupts, handshaking or general purpose I/O.

### Features

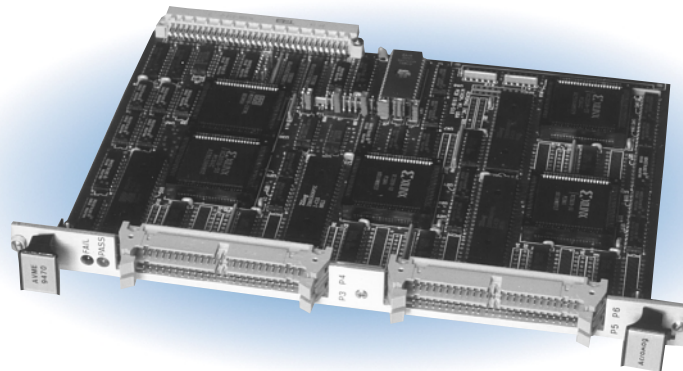
#### AVME9470 and AVME9471

- 64 points bidirectional I/O also usable as 32 bidirectional I/O with 8 counter/timers
- 16 points bidirectional I/O also usable as 4 handshaking ports or 4 counter/timers
- Programmable debounce delays on 64 I/O points
- Change-of-state monitor with vectored interrupts:
  - Change in signal from high to low
  - Change in signal from low to high
  - Matching an 8-bit word
  - Any value change
- Four handshaking modes
- Twelve 16-bit counter/timers
- TTL and CMOS compatible

#### AVME9475

Same features as above except:

- 32 points bidirectional I/O also usable as 16 bidirectional I/O with 4 counter/timers
- 8 points bidirectional I/O also usable as 2 handshaking ports or 2 counter/timers



*These I/O boards are extremely flexible to perform a variety of different I/O functions simultaneously on one card.*

### Operation

Many I/O functions can be performed by these boards. Typical uses include change-of-state monitoring. Vectored interrupts signal the host computer upon a change in the digital input value or an 8-bit pattern match. Or, programmable counter/timers may be used to generate pulse and square wave outputs or count events.

Each I/O section contains two 8-bit ports and one 4-bit port. This allows 64 general-purpose points to be programmed individually as inputs and/or outputs on a bit-by-bit basis. The other 16 I/O points optionally serve as handshake lines for the 8-bit ports, counter/timers, or as bit I/O. Three selectable operating configurations are available for each section: debounce, handshake, and standard bit I/O.

Debounce configuration implements a delay upon detection of a signal variation before rechecking for a change in status. This allows the signal to settle and prevents mechanical switch noise and electrical spikes from being read as a change in the input value. The delay duration is controlled by the programmable counter/timers.

The handshaking configuration helps control data capture for orderly communications. Choose interlocked, strobed, three-wire, or pulsed mode.

# VMEBUS INPUT/OUTPUT BOARDS

## Specifications

Meets or exceeds all written VMEbus specifications per revision C.1 dated October 1985 and IEC 821-1987.

### Digital I/O

Points per board:

- (each point configurable as an input and/or output)
- 80 (Model AVME9470 and AVME9471).
- 40 (Model AVME9475).

Input voltage range: 0 to 5V DC.

Input threshold (H to L): 0.8V DC nominal.

Input threshold (L to H): 2.0V DC nominal.

Input current: 20uA @ 5V DC  
(pull-up resistors removed).

Output type: open collector with pull-up resistor.

Output voltage range: 0 to 5V DC.

Output current sink:

- I<sub>OL</sub> = 100mA, maximum (8-bit ports).
- I<sub>OL</sub> = 60mA, maximum (4-bit port).

Output saturation voltage @ 100mA:  
0.6V maximum, 0.4V typical.

Counter/timer output:

- Square wave from 15.26 Hz to 100KHz;
- One-shot pulse width from 500nS to 32mS,
- retriggerable or nonretriggerable under program control.

Input debounce: programmable for no debounce or 3uS minimum to 0.2S maximum.

Counter/timer input: up to 3.3MHz with 170nS minimum pulse width.

### Typical port combinations

AVME9470/71 has 4 sections,  
AVME9475 has 2 sections.

Section Configuration Combinations (20 bits/section)								
Functions	A	B	C	D	E	F	G	H
Bidirectional I/O lines	0	8	0	20	16	12	8	4
Handshake	2	1	1	0	0	0	0	1
Counter/timer (4 lines/timer)	0	0	2	0	1	2	3	1

### Connectors

VMEbus, P2: 603-2-IEC-C096-F.

Front panel: four 50-contact connectors.

### Power Supply Requirements

+5V DC ±5% @ 3.0 A, maximum.

### Environmental

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

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

Humidity: 5 to 95%, non-condensing.

Isolation: Non-isolated.

### VME Compliance

Data transfer bus: A24/A16:D16/D08 (E0) DTB slave;  
D08 (O) ROAK interrupter.

Interrupts: I(1-7) request levels; single or multiple interrupt vectors; priority, sense and enabling under software control.

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

Memory map: standard or short I/O address space, user or supervisor occupying 1K consecutive byte locations, base address jumper configurable.

## Ordering Information

### Digital I/O Boards

#### AVME9470

80 pts, front cable access

#### AVME9471

80 pts, rear cable access (P2), see warning below

#### AVME9475

40 pts, rear cable access (P2)

**WARNING:** Do not plug AVME9471 into a P2 backplane slot. The middle row of P2 pins are used for I/O. Instead, use a 9921 adapter (below) and a P2 backplane with an open slot.

### Adapters

#### 9921-16

Interfaces AVME9471 (rear access, P2) to up to four 16-channel termination panels

#### 9922-16

Interfaces AVME9475 (rear access, P2) to one or two 16-channel termination panels

### Termination Panels

**NOTE:** Series AVME947x Digital Boards are compatible with industry standard PB24 and PB16 termination panels. If the PB16 panel is used, then only the 64 output points with 100mA capability are usable.

#### 5025-552

DIN rail-mounted termination panel.

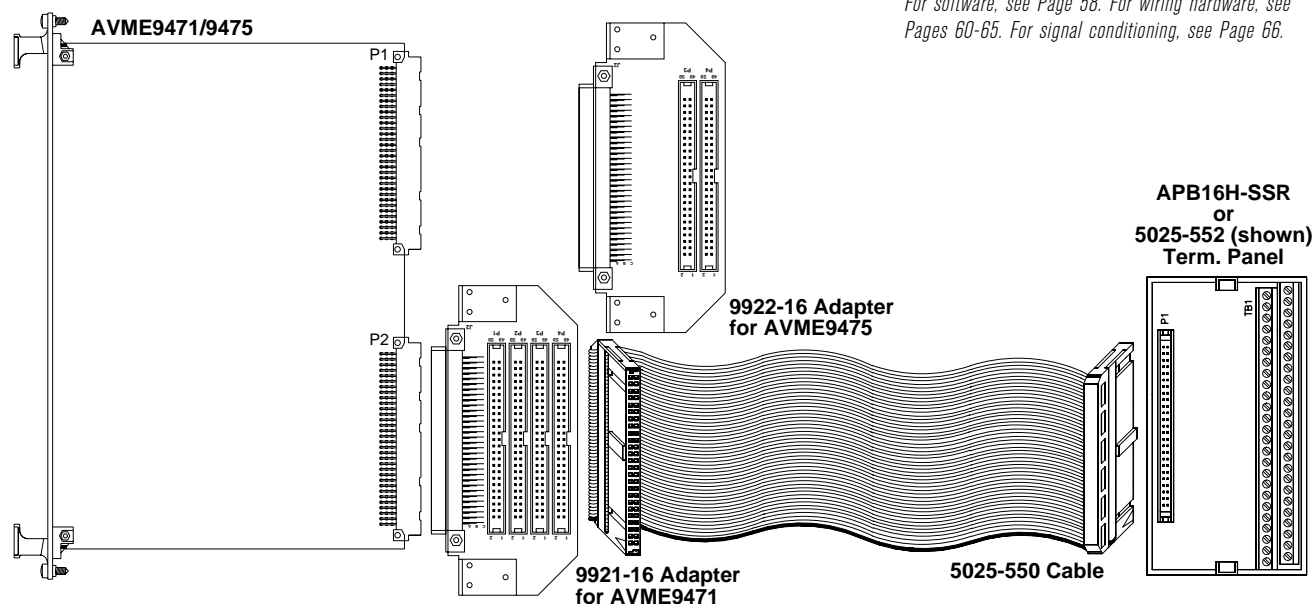
### Signal Cables

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

#### 5025-550-x

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

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





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