AVME948x General-Purpose Digital I/O

- **Model AVME9480:** front panel access
- **Model AVME9481:** P2 access

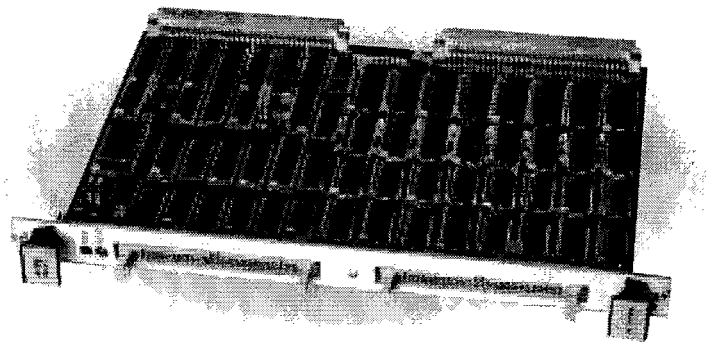
These digital input/output boards interface solid-state or mechanical control relays and other discrete industrial logic devices to the VMEbus. The interfacing is accomplished by providing 64 general purpose I/O points (or lines). Each of the 64 points is selectable as an input, an output, or both - depending on the application.

These boards can handle inputs from a low range of 0 to 5V DC to a high range of 0 to 30V DC. The host can read each of the points configured as an output.

A variety of features includes host interrupt capability and adjustable input threshold.

Features

- 64 points of bidirectional I/O
- I/O range of 0 to 30 volts
- I/O points configurable as eight 8-bit ports or four 16-bit ports
- One 8-bit port (Port 0) for handshaking with latch and interrupt capability
- Read state of points configured as outputs
- Open collector output
- Adjustable input threshold
- Status LEDs
- Built-in protection diodes for driving relay coils
- Byte or word data transfers
- Compatible with industry-standard plug-in solid-state relays and termination panels



AVME9480 and AVME9481 boards offer a price/performance balance that is ideal for a broad range of I/O applications.

Specifications

General

I/O points per board: 64; each point is programmable as an input and/or an output.

Interrupt capability: 8 level-selectable interrupt lines with programmable masks.

Digital Input

Input voltage range: 0 to 30V DC.

Input threshold:
High to low:
Internal reference supply:
V_{IL} = 1.0V DC nominal.
External reference supply:
V_{IL} = (.448 X REF) - 1.22V DC nominal.

Low to high:
Internal reference supply:
V_{IH} = 2.25V DC nominal.
External reference supply:
V_{IH} = (.448 X REF) +0.025V DC nominal.

Input hysteresis: 1.2V DC nominal.

Input current (per point):
I_{IL} = -0.2µA at 0V, V_{REF} = 5V.
I_{IH} = 61µA at 30V DC.

External reference supply: 2.75 to 27.5V DC.

Digital Output

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

Output voltage range: 0 to 30V DC.

Output current (per point): I_{OL} = 100mA maximum.

Power Supply Requirements

Power: +5V DC +5%/-2.5% @ 1.6 A, typical.

Environmental

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

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

Isolation: Non-isolated.

Connector

1P, P2: IEC Type 603-2-C096MX-xxx (96 pin DIN).

P3, P4: (AVME9480 only) 50 pin male header connector.

VME Compliance

Meets VME Specifications per revision C.1 dated October 1985 and IEC 821-1987.

Data transfer bus: A16: D16/D08 (EO) DT8 slave.

Address modifier codes: 29H, 2DH.

Interrupt request levels: IRQ(1) - IRQ(7) eight programmable vectors.

Memory map: short I/O space occupying 1K.

Ordering Information

AVME9480:
Front cable access

AVME9481
Rear cable access (P2), see warning below

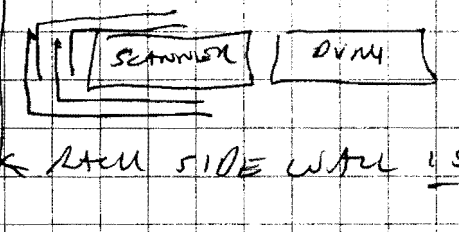
WARNING: Do not plug AVME9481 into a P2 backplane slot. The middle row of P2 pins are used for I/O. Instead, use a 9921 adapter and P2 backplane with an open slot. See termination products for more information.

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

5/15/03 | 0900 | 24-5 ANODE TRIPS 4 TIMES OVERNIGHT

MEASURED CURRENT = −.048 (MOST NEG I'VE
BAD HV CHANNEL?

5/16/03 ACCESS - WORK ON FC SCANNER
1. REMOVE RACK SIDE RAIL - NO HELP.
2. ADD STEEL SHEETS FOR SHIELDING FROM BACK:



AT 28 KV:

Δ=7.2	76.568	76.585	Δ=5.8	* = FIXED
Δ=1.7	76.592	76.592	Δ=1.4	FOR A PA

5/18/03 2 FEE LVPS GO OUT @ ~1800. AT MIDNIGHT ALL OF RACK 2B3 GOES OUT - INTERLOCK.
ACCESS ON 5/19 - FIND BLOWER VERY HOT + 2 CIRCUIT BREAKERS TRIPPED (= 1800 EMISSION).
FIND SPARE BLOWER + INSTALL - ALL LVPS COME ON. THIS BLOWER WAS THE ONE THAT I USED TO KICK TO GET PRESSURE SWITCH ON AFTER SHUTDOWN WAS OFF. KENNY REPLACED PRESSURE SWITCH ~2 MOS AGO. DANNY LOOKING AT FAN BLOWER MOTOR NOW (BEARING WAS VERY STIFF).
CHECKING ON LIFETIME OF BLOWER AND GETTING SPARES.

10/8/03 TURN ON BEFORE ROLL-IN - 2B3 PRESSURE SWI
AGAIN DOESN'T CLEAR. KICKING DOESN'T HELP.

10/17/03 1000 AFTER ROLL IN - BOTH

10/13/2003 TEST FIELD CAGE — DET ROLLED OUT, SVT, SSD, FT.

NO ANK BLOWER, NO MAGNET

	5KV	10 KV	15KV	20KV	25KV	28KV	30 KV
OFCW	13.765	27.422	41.088	54.737	68.377	76.574	82.032
IFCW	13.765	27.422	41.087	54.737	68.374	76.570	82.058
OFCE	13.764	27.421	41.085	54.735	68.381	76.577	82.036
IFCE	13.765	27.422	41.085	54.733	68.782	76.574	82.037

OK

10/13/2003 AFTER POWER OUT ON FRI INTERLOCK FOR 2B7 FEES DION'T CLEAR. LOOKS TO BE WATER SIGNAL ALSO, 2B3 - WENT BAD AGAIN LAST WEEK. CROSS CONNECT LOOKED LIKE FAULTY PRESSURE SWITCH AGAIN.

DISCOVERED THAT PRESSURE SWITCHES ARE ADJUSTABLE + WE HAVE TWO KINDS — ONE HAS LOWER RANGE THAN THE OTHER.

NOT FIXED YET — 2B3 BLOWER CABLE IS UN PLUGG FOR NOW.

10/14/03 ON TURNING OFF, BLOWER SWITCH FOR 2B6 DOESN'T SHUT OFF LVPS IN THAT RACK. ARGH!

ALSO, MEASURE PRESSURE IN BLOWER IN 2B1 = .7" H_2O

10/27/03 1000 AFTER ALL IN — BOTH 2B6 AND 2B7 WO. OK. THUS TURNING OFF BLOWER IN 2A6 DROPS INTERLOCK. 2B7 CROSS CONNECT CLEARS OK. SO

PHIL REPLACES PRESSURE SWITCH IN 2B3 AGAIN PUT IN ONE WITH LOWER PRESS RANGE

START REPLACING FEES

DEAD BAND ON "00" TYPE IS VERY WIDE RANGE = .07 TO .15. WHEN BLOWER GOES ON, WORKS WELL. WHEN BLOWER TURNED OFF

SHOULD USE TYPE "01"

TURN ON ALL SYSTEMS ~~TO~~ FULL VOLTAGE (INCL 20-5) 20-5 TRIPS AFTER ~ 20 MIN

GAIN CH SHOWS NOTHING - NO NOISE, NO Fe, NO PULSES
RESET MCA ON PLATFORM .... STILL NOTHING.
EMAIL PAUL

1640 TURN OFF HV (EXCEPT GG)

19/03 1000 TRY A LASER RUN
GG 20 OUTER STAYS AT 69.5 ALL NIGHT

1530 LASER RUN - BEAMS LOOK ~WEAK
AL CHECKING POWER METER
TIMING AT TCD LOOKS OK 106, 216, 329
$\Delta = 110$

20/03 0900 LASER LOOKS GOOD - IT WAS N2 IN TPC GAS.

24/03 CROSS CONNECT IN 2B7 AGAIN FLAKY. ON TURNING ON FEES NONE OF 4, 5, 6 COME ON (2B7) BUT SLOW CONTROLS DOESN'T SHOW BAD INTERLOCK. FIND CROSS CONNECT RED LED ON - CYCLE POWER ON VME CRATE - AFTER REBOOT ~~[illegible]~~ LED ~1/2 ON THEN FADES OUT - USER 7 WEAK. OK NOW.

→ FIXED? BY PHIL - FOUND THAT MODULE HAD A BAD 10K Ω PULL DOWN RESISTOR IN FAIL SAFE MOD WE HAD MADE. HE PUTS IN 600Ω 10K Ω.

26/03 FIND ONE TPCTEMP THERMOCOUPLE READING 88° (= INNER RDO 7). WE TRY & LOOK INSIDE LOT BORE SCOPE BUT NO GO. FAN BLOWING ON OUTSIDE BRINGS IT DOWN ~2° (THIS ONE WAS ~HIGH LAST YEAR - MAYBE 82 BUT WAS NOT LOOKED AT.

TRY TURNING ON ONE BY ONE -
IF ALL SIX OFF, T = AMBIENT ~79°
TURN ON RDO 1 - 79°
TURN ON RDO 2 - 79°
TURN ON RDO 3 - 86° (RDO 3 = OUTER MANIFOLD!
SO THEORY IS THAT SENSOR FOR INNER RDO 7 IS NOT GLUED TO MANIFOLD & IS HANGING JUST ABOVE RDO 3.

1/11/07 MAGNET WORK FINISHED – HAD 2 FAST CRASHES FROM FC FIELD.

CHECK FC AGAIN – CURRENTS ON AS PER A4 7. Δ ∃ TURN ALL OFF

1/25/07 1100 LECROY 1458 MAINFRAME (FOR OUTER SECTORS) COME BACK FROM VOLTRONICS AGAIN. (REPLACED MOTHERBOA PUT IT IN + IT SEEMS TO WORK. LEAVE ON FOR 24 HR. PUT MEM POWER 1458 IN BOX + PUT ON CLEAN ROOM ROOF. CAN BE TPC OR SVT SPARE.

1/26/07 REPAIRED 1458 STILL OK – SHUT IT DOWN.

2/7/07 DANNY REDOES THE INTERLOCKS FOR THE LVPS. PROBLEM WAS THAT IF THE INTERLOCK CABLE TO THE BLOWER WAS UNPLUGGED (BNC) THE LVPS STAYED ON – SO NOT FAIL SAFE. DANNY REDOES THE LOGIC. I TEST THE LVPS FOR THE MUMPS FEET:

1. UNPLUG BLOWER CABLE – LVPS GO OFF
2. TURN OFF BLOWER – " " "

WILL TEST WATER SKID THIS WEEK

DANNY NOW MODIFYING RACK ROW 2B LVPS (ALL)

2/12/07 1400. PUT POLARITY REVERSING CABLE IN GG FOR SECTOR 8 INNER. THIS SECTOR HAS WHAT ARE PRESUMED TO BE FLOATING GG WIRES IN 2 PLACES THAT CAUSE A GRID LEAK. REVERSE POLARITY SEEMS TO CLEAR IMMEDIATELY CLOSE THIS LEAK.

LVPS FOR OUTER SECTORS MOVED 3/6/07

2/17/07 1000 PUT 1 MΩ IN IFC EAST RESISTOR CHAIN. WAS 2 MΩ AT END OF RUN 6.

TEST FC

	2 KV	5 KV	10 KV	15 KV	20 KV	25 KV	10:30 28 KV	12:00 28 KV
FCW	5.558	13.751	27.395	41.052	54.691	68.325	76.522	76.508
OFCE	5.557	13.750	27.396	41.048	54.687	68.321	76.516	76.505
IFCW	5.557	13.750	27.397	41.049	54.688	68.321	76.515	76.505
IFCE	5.542	13.713	27.321	40.936	54.538	68.173	76.349	76.451
					Δ=150	Δ=150	Δ=160	Δ=50

REMOVE TRANSITION MODULE –

ALSO, CAPUT INTO +12V LOWER TRIP LIMIT DOES NOT WORK.

11/6/08 FINALLY BACK TO NORMAL FOR CRATE 59.
1620 FOUND SMALL SLOW WATER LEAK IN RADIATOR ABOVE CRATE 59 – DROPS MAY HAVE GONE INTO PS. REPLACE RADIATOR.
1ST SPARE CRATE DRAWS 20A ON +12V, THEN TRIPS ON OVERCURRENT – PS SMOKES.
MAY HAVE BEEN DUE TO TRANSITION MODULE CONNECTOR CARD TOUCHING SIDE OF CRATE.
GET YET ANOTHER PS FROM DANNY – REPLACE TRANSITION MODULE CONNECTOR CARD (BLOWN ON BOARD FUSE).
NEW PS + CRATE LOOK GOOD – NO VOLTAGE SPIKES.

BOOT UP WITH REPLACEMENT PROC – OLD PULSER PROCESSOR (SEE PG 33).

11/7/08 0900 CRATE 59 GOOD ALL NIGHT.

11/28/08 0900 END OF DAY ACCESS DAY

1. FOUND COOLING FAILURE ON RACK 2B3 – FIND BLOWER VERY HOT – CALL KEN FOR REPLACEMENT.

2. TONKO PRACTICING WITH TPX FAST RO. UNPLUG GG + TURN OFF GG VOLTAGES.

1630: TOOK ALL DAY TO REPLACE – BLOWER WAS FROZEN BUT ALSO HAD PROBLEMS W/ PRESSURE SWITCH.
2nd PRESSURE SWITCH FINALLY WORKS.

11/27/08 LAST ACCESS
1. INVESTIGATE TPX LVPS #6 – HAD TROUBLE 2 DAYS AGO TURNING ON – KEPT OSCILLATING ON/OFF REPLACED PS
2. CREW REPORTS SC ALARMS DIDN'T WORK FOR ANODE TRIPS – CHECKED OK
3. YURI WANTS CC PROC REBOOTED