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Find the *Abaco Systems / VMIC VMIVME-3801-100* at our website: ***Click HERE***

VMIVME-3801

Isolated Scanning 12-bit 31-Channel Analog-to-Digital Converter Board (6U) with Built-in-Test and Screw Terminal Interface

- 31 single-ended or 16 differential inputs (note 5)
- Autoscanning; continuously digitizes inputs and stores results in dual-ported data registers
- Input ranges from ±50 mV to ±10 V
- Jumper-programmable gains of x1, x10, x100
- Selectable A/D ranges of ±5 V, ±10 V, 0 to +10 V
- 40 kHz aggregate conversion rate
- Supports real time Built-in-Test
- Input connector compatible with discrete wire cables
- Selectable data coding; offset binary or two's complement
- Overvoltage protected inputs
- Low pass input filters: 50 kHz, optional 40 Hz
- Pull-down resistors prevent floating inputs
- 1,500 V channel-to-bus isolation
- Accepts pluggable barrier strip cable connector with user screw interface
  — Connectors are latchable
  — Connectors are provided

APPLICATIONS

- Instrumentation
- Process control
- Data acquisition
- Voltage measurement
- Factory automation
- MTBF: 139,800 hours (217F)

INTRODUCTION — The VMIVME-3801 provides isolated 12-bit analog-to-digital conversion for 31 single-ended analog input channels (16 differential) on 6U Eurocard for the VMEbus. Selectable gain and A/D ranges support input voltage ranges from ±50 mV to ±10 V. To minimize system software overhead, all inputs are scanned and digitized continuously at an aggregate sample rate of 40,000 channels per second. Measurement data for each channel is constantly available to the VMEbus through a dual-ported Data Register. Optional 40 Hz low pass input filters are available to minimize the effects of system noise. The standard unit comes equipped with 50 kHz low pass filters.

A jumper-selectable Programmable-Gain Amplifier (PGA) supports in-line voltage gains of x1, x10, or x100 for all channels. Full-scale ranges for the A/D Converter are selectable as ±5 V, ±10 V, or 0 to +10 V. Data coding is software selectable as either offset binary or two's complement.

Inputs can be jumper configured either as 16 differential channels, or as 31 single-ended channels. A single front panel 32-pin DIN connector allows user with 32 screw contacts for easy interface for all input channels.

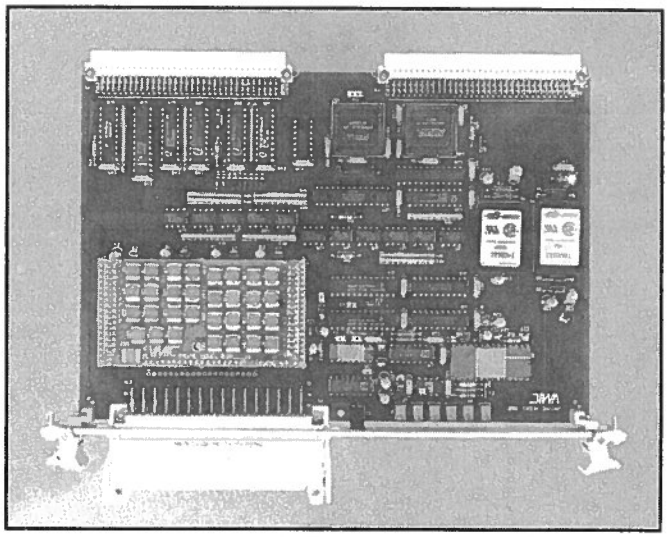


Figure 1 illustrates the internal functional organization of the VMIVME-3801 board.

OPERATING MODE — All 16 or 31 input channels are scanned continuously at the maximum sampling rate, and the resulting data is stored in dual-ported Data Registers for VMEbus access. Scanning starts automatically after any reset operation, and no other programming is required to start the A/D conversion process.

BUILT-IN-TEST FUNCTION (BIT) — Operation of the PGA, ADC, and associated control logic can be verified by selecting the BIT operating mode. In this mode, an internal reference voltage is applied to the input of the PGA, bypassing the analog input multiplexer. All data channels read through the control interface will reflect the selected BIT reference voltage.

ORDERING INFORMATION

Dec. 16, 1997 800-003801-000 D		A	B	C	-	D	E	F
VMIVME-3801	-		0	0	-			

A = Input Option
0 = 50 kHz Input Filter (-3 dB Cutoff Frequency, Voltage Input)
1 = 40 Hz Input Filter (-3 dB Cutoff Frequency, Voltage Input)
2 = 250 Ω 0.01 Percent Termination (High Accuracy Current Input)
3 = 500 Ω 0.01 Percent Termination (High Accuracy Current Input)

BC = 00 (Options reserved for future use)

COMPATIBLE CONNECTOR DATA

Mating Connector	LMI Part No. 302 432.32.100 Form E
PC Board Connector	LMI Part No. 397 948.92.000 Form E

For Ordering Information, Call:
1-800-322-3616 or 1-256-880-0444 • FAX (256) 882-0859
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FUNCTIONAL CHARACTERISTICS

VMEbus Compliance: This product complies with VMEbus specification ANSI/IEEE ST 1014-1987 IEC821 and 297 with the following mnemonics: A16:D16/D08 (EO) DTB Slave: 6U form factor

Board Address: The physical address is selected by on-board address jumpers, using VMEbus address lines A07 through A15. The VMIVME-3801 board occupies 128 bytes of address space, and can be located on any 64-word boundary in the Short I/O (A16) space.

Address Modifiers: Address modifier bits are jumper selected and decoded to respond to Nonprivileged Short I/O access, Supervisory Short I/O access, or to both access privileges.

System Reset: A System Reset establishes the following board status:
- Automatic scanning of all channels
- Front panel diagnostic LED indicator ON
- Offset Binary Data Format

Front Panel System Diagnostic LED: A software-controlled front panel LED turns ON at System Reset, and can be turned OFF under software control to provide an external indication that Built-in-Test has been completed.

Analog Input Data Format: Analog inputs are digitized and stored in 32 dual-ported Data Registers (16 registers for differential operation) as 12-bit right-justified digital values.

Software-selectable data codes are Offset Binary and Two's Complement. In two's complement coding, the sign bit (D11) is extended through the most significant bits of the Data Register (D12 through D15).

SPECIFICATIONS

(At +25 °C and rated power supplies unless otherwise noted.)

INPUT CHARACTERISTICS

Number of Channels: 31 single-ended or 16 differential input channels (Note 5)

Voltage Ranges: ±50 mV to ±10 V, bipolar: or 0 to +100 mV, 0 to +10 V unipolar (see Note 1). Factory configured for ±10 V input range.

Current Termination: 250 Ω 0.01 percent 500 Ω 0.01 percent.

Current Ranges: 0 to 20 mA, 4 to 20 mA, +5 to 25 mA

Input Impedance: 10 MΩ minimum, line-to-line and line-to-common (Note 2)

Common-Mode Voltage (CMV): ±11 V, maximum CMV for differential inputs; zero input signal. CMV is referenced to an analog ground common to all inputs.

Common-Mode Rejection Ratio (CMRR): Minimum CMRR for differential inputs; 350 Ω source unbalance, DC-60 Hz:

x100:	90 dB
x10:	90 dB
x1:	72 dB

Input-to-VMEbus Isolation: 1,500 VDC

Input Noise: Maximum noise referred to input, 10 to 1,000 Hz, at 3 σ (Note 3):

x100:	300 µVp-p
x10:	1.0 mVp-p
x1:	4.0 mVp-p

Bandwidth, Each Input: DC-to-Fc, where Fc is 50 kHz for the 50 kHz filter or 40 Hz for the 40 Hz filter option unit.

Input Filter: Single-pole passive low pass filter: -3 dB at 50 kHz or 40 Hz ±20 percent

Overvoltage Protection: ±40 V maximum sustained, power applied; ±25 V power removed; ±40 V transient for one second

Grounding: A user-configurable jumper connects the low input of channel 31 to an isolated ground reference.

TRANSFER CHARACTERISTICS

Measurement Resolution: 12 bits (2^{-12})

Channel Scan Rate: 40 KSPS (Kilosamples per second) minimum aggregate rate

Transfer Function:

$$E_{IN} = E_{LO} + E_{FSR} \times \frac{N_{ADC}}{4,096}$$

Where:

E_{IN}	=	Input voltage
E_{FSR}	=	Full-scale input range
E_{LO}	=	Lower end of input range
N_{ADC}	=	A/D Converter reading

Example:
For an N_{ADC} value of 0B33 HEX (2,867 decimal) in the ±5 V range:

E_{IN} = -5.000 + [10.000 x (2,867/4,096)];
= +2.000 V

A/D Converter Input Range: ±5 V, ±10 V, 0 to +10 V; jumper selectable (Note 1)

A/D Converter Input Gain: x1, x10, x100 (±0.3 percent, jumper selectable; see Notes 1 and 4)

Accuracy (See Note 4):
Maximum Error:
Voltage Input = ±0.04 percent reading
±0.03 percent range ±2.0 mV

Example:
For a +2.000 V reading in the ±5 V range:
Maximum Error = ±0.8 mV ±3.0 mV ±2.0 mV
= ±5.8 mV

Stability:
Temperature Drift, per Degree Celsius =
±30 PPM Reading ±25 PPM Range ±20 µV
Long-Term Drift, per 1,000 hr =
±50 PPM Reading ±45 PPM Range ±100 µV

Interchannel Crosstalk:
-73 dB maximum, DC to 1 kHz with 50 kHz filter
-67 dB maximum, DC to 1 kHz with 40 Hz filter

BIT Reference Voltage: Software selectable as 0.000 V, +4.980 V, +0.4928 V, 9.91 mV

BIT Reference Accuracy: ±30 mV ±30 PPM per °C

PHYSICAL/ENVIRONMENTAL

Power Supply Requirements: +5 VDC (±5 percent) at 2.5 A maximum

Temperature: 0 to +65 °C, operating
-40 to +85 °C, storage

Humidity: 20 to 80 percent relative, noncondensing

Altitude: Operation to 3,000 m

Cooling: Forced air convection (standard VME slot)

Dimensions: Dual height Eurocard (6U) board

Weight: 0.7 kgm maximum

Input Connector (P3): 32-pin DIN 41 612, VG and IEC connectors. Connectors interface with 22 - 14 AWG wire utilizing binding screw terminals and connector latches.

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1. Input voltage range is determined as:
   INPUT RANGE = A/D RANGE ÷ A/D GAIN.
2. To prevent isolated differential signal sources from "floating" beyond the input CMV range, a pull-down resistance of approximately 22 MΩ is provided between each input pin and analog return.
3. 3 σ includes 99.7 percent of all noise in a normal distribution.
4. Indicated accuracy applies after calibration at the selected input voltage range. To maintain full accuracy, calibration should always be performed if the range or gain is changed.
5. See "Grounding."

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