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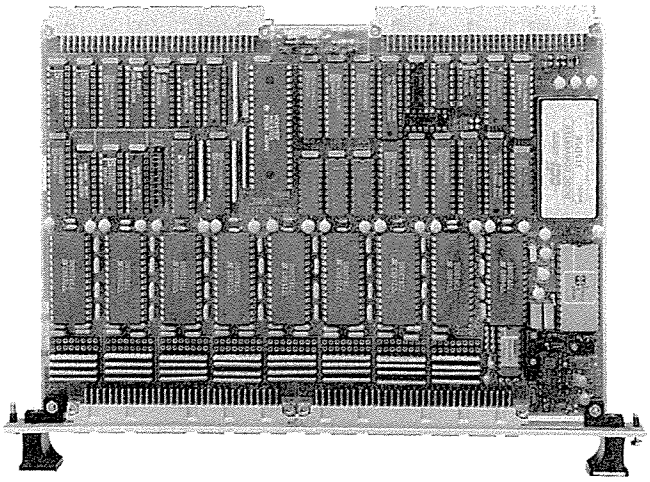
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VMIVME-3112

SCANNING 12-bit ANALOG-TO-DIGITAL CONVERTER BOARD



FEATURES

- 64 DIFFERENTIAL OR SINGLE-ENDED INPUTS
- POWERS UP IN AUTO SCANNING MODE - NO SOFTWARE INITIALIZATION REQUIRED
- CONTINUALLY DIGITIZES INPUT CHANNELS AND STORES THE RESULTS IN A DEDICATED CHANNEL DUAL PORT REGISTER (AUTO SCANNING MODE)
- JUMPER-SELECTABLE SCANNING OF 2 TO 64 CHANNELS
- FIVE OPERATING MODES
  - AUTO SCANNING MODE (GAIN=1)
  - RANDOM POLL MODE
  - RANDOM INTERRUPT MODE
  - SCANNING POLL MODE
  - SCANNING INTERRUPT MODE
- VMEbus INTERRUPTS MAY BE PROGRAMMED TO INTERRUPT UPON COMPLETION OF A SINGLE A/D CONVERSION OR UPON COMPLETION OF A 2- THROUGH 64-CHANNEL SCAN
- USER-PROGRAMMABLE INTERVAL TIMER SUPPORTS SCANNING OF ALL CHANNELS AT PERIODIC INTERVALS
- JUMPER-PROGRAMMABLE GAIN 1, 10, 100, 200, AND 500
- SELECTABLE A/D RANGES OF 0 TO +10 V, ±5 V, AND ±10 V
- LOW-LEVEL AND HIGH-LEVEL INPUTS: ±10 mV TO ±10 V
- OPTIONAL LOW PASS FILTER
- OVERVOLTAGE PROTECTED INPUTS
- 5×10^6 Ω INPUT IMPEDANCE
- 33 kHz CONVERSION RATE
- SELECTABLE OUTPUT CODE: BINARY, OFFSET BINARY, TWO'S COMPLEMENT WITH SIGN EXTENSION

APPLICATIONS

- FACTORY AUTOMATION AND INSTRUMENTATION
- PROCESS CONTROL
- LABORATORY INSTRUMENTATION
- MACHINE MONITORING
- DATA ACQUISITION

VME MICROSYSTEMS INTERNATIONAL CORPORATION
12090 South Memorial Parkway
Huntsville, Alabama 35803-3308
(205) 880-0444 FAX No.: (205) 882-0859
1-800-322-3616

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VMIVME-3112
SCANNING 12-bit ANALOG-TO-DIGITAL CONVERTER (ADC) BOARD

SPECIFICATIONS

FUNCTIONAL CHARACTERISTICS

INTRODUCTION:

This product is designed to support 64 channels of differential or single-ended wide range (±10 mV to ±10 V) analog inputs.

The board supports the following operating modes which are described below:

- AUTO SCANNING
- RANDOM POLLING
- RANDOM INTERRUPT
- SCANNING POLL
- SCANNING INTERRUPT

A 64-word dual port provides storage for a continuous scan of all channels. The scanning modes are executed automatically at power-up, system reset, or are entered under program control. The dual port registers allow VMEbus access at any time to read the latest stored data.

A jumper-selectable, programmable gain amplifier supports gain ranges of 1, 10, 100, 200, and 500. A/D conversion time is 15 µs. A wide variety of low pass filters are supported.

A functional block diagram is provided in Figure 1 and ordering information is provided on the last page of this specification.

OPERATING MODES:

AUTO SCANNING MODE - The mode is executed by a power-up system reset or program selection. All channels are continuously scanned and the digitized data is stored in 64, 16-bit dual port registers. No other programming is required to start the A/D conversion process. The user has only to read the digitized data from the dual port register of the desired channel. This mode is for gains of 1 only and for a minimum of 16 connected channels.

RANDOM POLLING MODE - This mode requires the controlling program to generate a single conversion. End of conversion is determined by polling an end of conversion status bit.

RANDOM INTERRUPT MODE - This is the same as RANDOM POLL MODE except end of conversion generates an interrupt to the CPU board.

SCANNING POLL MODE - This is a scanning mode which executes a single scan of all channels. An end of scan control bit is polled to determine when the scan is completed.

SCANNING INTERRUPT MODE - This is a scanning mode which executes a single scan of all channels and generates an end of scan interrupt when the scan is completed.

PROGRAMMABLE INTERVAL TIMER:

A triple, 16-bit timer (may be cascaded to 48 bits) is programmable to generate a periodic trigger to start an A/D scan.

EXTERNAL TRIGGER:

A user-connected signal may be used to start a scan.

PROGRAMMABLE GAIN AMPLIFIER:

A jumper-programmable gain amplifier supports conversions of low level inputs (from ±10 mV to ±10 V full scale).

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END OF CONVERSION/SCAN INTERRUPTS: The SCANNING INTERRUPT MODE and the RANDOM SCANNING MODE generate an end of conversion or end of scan interrupt, respectively. All VMEbus interrupt levels (1 to 7) are supported through a user-programmable on-board Bus Interrupter Module (BIM).

COMPATIBILITY: The ADC Board is a standard double height printed circuit board which is compatible with the VMEbus specification (Rev. C.1).

BOARD ADDRESS: The physical address for the board may be selected by on-board jumpers. VMEbus address lines A08 through A15 are decoded for board selection. The board occupies 256 bytes in the short I/O address space.

ADDRESS MODIFIER: Address modifier bits are jumper-selected and decoded to support either nonprivileged short I/O, supervisory short I/O, or both. The board is factory configured for supervisory short I/O.

ANALOG INPUT FORMAT: Analog inputs are digitized and stored in 64 dual port registers as a 12-bit digital value (D11 to D00) which may be read by the user.

Selectable data codes are binary, offset binary, and two's complement. The sign is extended to the upper four bits (D12, D13, D14, and D15).

SYSTEM RESET: System reset automatically places the board in the AUTO SCANNING MODE.

FRONT PANEL DIAGNOSTIC LED: A software controlled LED may be extinguished upon successful completion of diagnostics. The LED is illuminated by system reset.

IMPROVED HIGH FREQUENCY REJECTION OPTION: This option is single-ended with 0 Ω SIPs used to tie the row C pins (INPUT channel LO signals) to ground. This will prevent high frequency noise from appearing as a common mode signal.

SPECIFICATIONS

(TYPICAL @ +25 °C AND RATED POWER SUPPLIES UNLESS OTHERWISE STATED)

INPUT CHARACTERISTICS

NUMBER OF INPUT CHANNELS:	64 differential or 64 single-ended
FULL SCALE A/D INPUT RANGES:	±5 V, ±10 V, and 0 to +10 V
AMPLIFIER GAIN RANGES:	1, 10, 100, 200, and 500 Jumper-programmable
FULL SCALE INPUT RANGE:	±10 mV to ±10 V
INPUT IMPEDANCE:	5×10^6 Ω differential 2×10^6 Ω single-ended
INPUT OVERVOLTAGE PROTECTION:	±40 V, maximum
OPTIONAL SINGLE-POLE ANALOG INPUT FILTER:	-3 dB @ 40 Hz
IMPROVED HIGH FREQUENCY REJECTION OPTION'S SINGLE-POLE INPUT FILTER:	-3 dB @ 80 Hz

TRANSFER CHARACTERISTICS

RESOLUTION:	12 bits
ANALOG INPUT ACQUISITION TIME:	
G = 1, 10, 100, 200	15 µsec
G = 500	28 µsec

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TRANSFER CHARACTERISTICS (Concluded)

A/D CONVERSION TIME: 15 µsec

A/D CONVERSION RATE (MAXIMUM):

G = 1, 10, 100, 200	33 kHz
G = 500	23 kHz

CHANNEL CONVERSION RATE (MAXIMUM):

G = 1, 10, 100, 200	33 kHz÷number of channels scanned
G = 500	23 kHz÷number of channels scanned

ACCURACY

INSTRUMENTATION AMP NONLINEARITY, DC:

G = 1	±0.001 percent FSR
G = 10	±0.002 percent FSR
G = 100	±0.004 percent FSR
G = 200	±0.006 percent FSR
G = 500	±0.01 percent FSR

SYSTEM ACCURACY (INCLUDING LINEARITY ERROR):

G = 1	0.035 percent FSR
G = 500	0.075 percent FSR

STABILITY (OVER TEMPERATURE)

INSTRUMENTATION AMP DRIFT: ±(2.0 + 20/G) µV/°C

SYSTEM ACCURACY DRIFT:

G = 1	5 ppm/°C
G = 500	50 ppm/°C

BUS INTERFACE

COMPATIBILITY: VMEbus A16: D16

INTERRUPT: IRQ1 through IRQ7

INTERRUPTER RELEASE: ROAK (Release-on-Acknowledge)

PHYSICAL SPECIFICATIONS

DIMENSIONS: Standard VME double height board 160 mm x 233.5 mm

TEMPERATURE:

OPERATING RANGE:	0 to 55 °C
STORAGE RANGE:	-25 to +85 °C

RELATIVE HUMIDITY: 20 to 80 percent, noncondensing

COOLING: Convection

POWER REQUIREMENTS: +5 VDC (±5 percent) @ 2.5 A maximum

FRONT PANEL ANALOG INPUT CONNECTOR: Board connector (P3 and P4) - Panduit male connector type 120-964-455E. Input cable connector - female type 120-964-053A.

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APPLICATION AND CONFIGURATION GUIDES

The following Application and Configuration Guides are available from VMIC to assist the user in the selection, specification, and implementation of systems based on VMIC's products.

TITLE	DOCUMENT NO.
Digital Input Board Application Guide	825-000000-000
Analog I/O Products (with Built-in-Test) Configuration Guide	825-000000-005
Synchro/Resolver (Built-in-Test) Subsystem Configuration Guide	825-000000-004
Change-of-State Board Application Guide	825-000000-002
Connector and I/O Cable Application Guide	825-000000-006
Low Level Analog I/O Configuration Guide	825-000000-001
Digital I/O (with Built-in-Test) Product Line Description	825-000000-003

NOTE

IN APPLICATIONS WHERE HIGH FREQUENCY (ABOVE 1 kHz) COMMON MODE OR NORMAL MODE NOISE IS PRESENT ON INPUT SIGNALS, THE USE OF A SIGNAL CONDITIONING BOARD IS RECOMMENDED. PLEASE REFER TO SPECIFICATION SHEETS FOR THE VMIVME-3413, VMIVME-3417, AND VMIVME-3418.

THE VMIVME-3113 IS SIMILAR TO THE VMIVME-3112 BUT PROVIDES A GROUND PIN FOR EACH DIFFERENTIAL INPUT. IN MANY APPLICATIONS, THE USE OF THIS GROUND PIN CAN ELIMINATE HIGH FREQUENCY COMMON MODE NOISE.

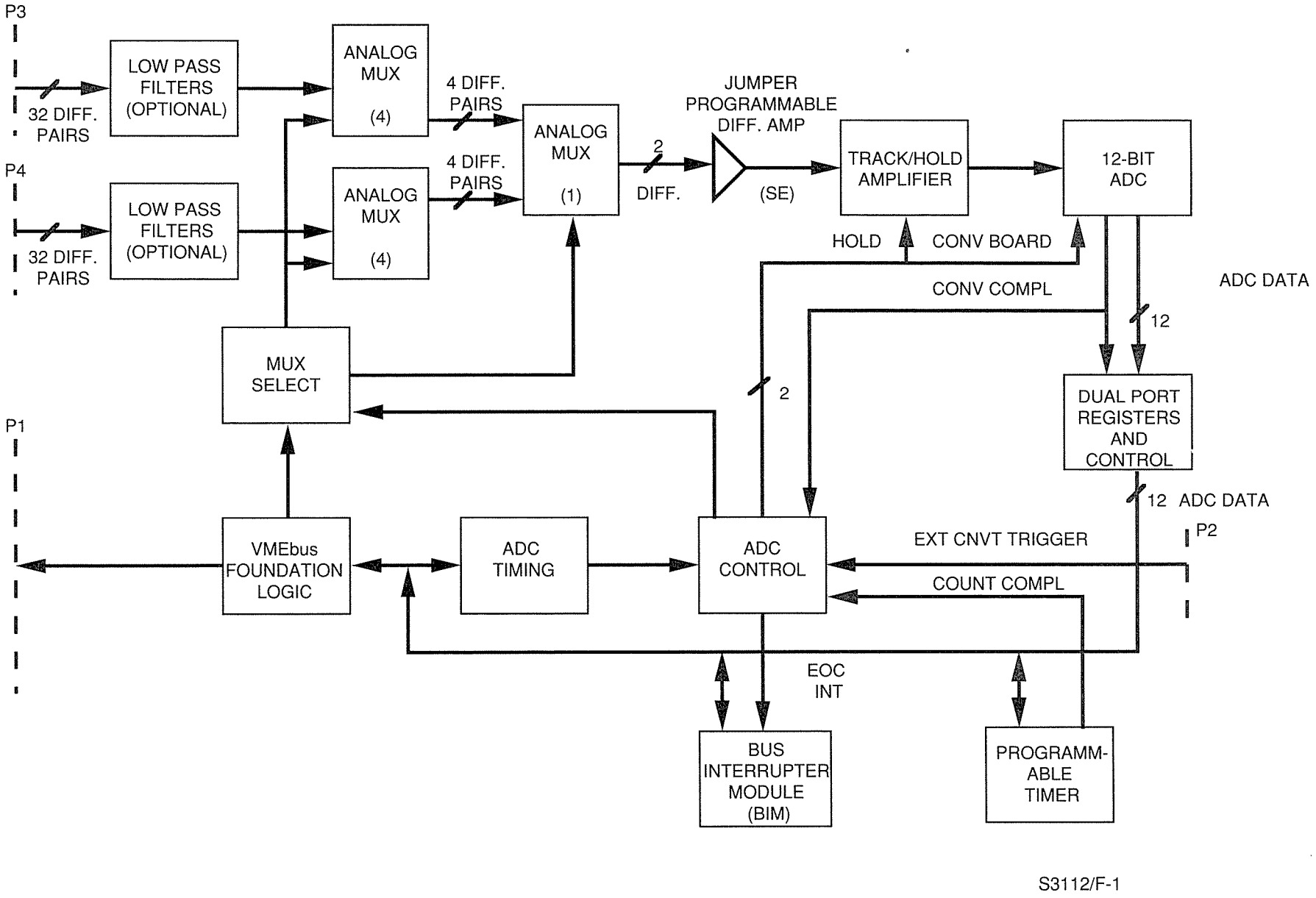


Figure 1. VMIVME-3112 Functional Block Diagram

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VMIVME-3112
SCANNING 12-bit ANALOG-TO-DIGITAL CONVERTER BOARD

ORDERING INFORMATION

VMIVME - 3112 - A B C

- **C** — 0 = Not Used
- **B** — INPUT OPTION
  - 0 = 64 Differential/Single-ended Analog Input Channels
  - 1 = 64 Single-ended Analog Input Channels with Improved High Frequency Rejection
- **A** — INPUT FILTER OPTION
  - 0 = No Filter
  - 1 = 40 Hz (3 dB Cut-off Frequency) for input Option 0
    80 Hz (3 dB Cut-off Frequency) for input Option 1

P3 and P4 CONNECTOR DATA

COMPATIBLE CABLE CONNECTOR	PANDUIT NO. 120-964-435E
STRAIN RELIEF	PANDUIT NO. 100-000-032
P.C. BOARD HEADER CONNECTOR	PANDUIT NO. 120-964-033A

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