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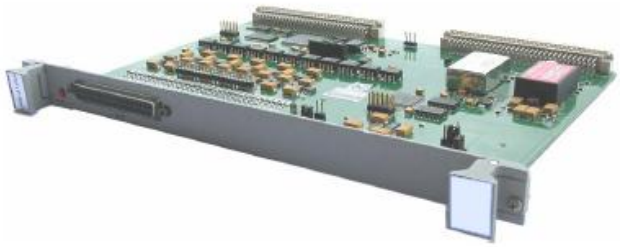
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GFK-2104A
November 2011

Isolated Scanning 12-bit 32-Channel ADC (6U) Board with Built-in-Test and Screw Terminal interface

Features:

- Thirty-two single-ended analog inputs
- Auto-scanning; continuously digitizes inputs and stores results in dual-ported data registers
- 0 to 25 mA Current I/P options, 250 Ohm current sensor resistor
- One 12-Bit A/D converter with built-in-track and hold
- No software initiation required to begin scanning
- Halt and lock scanning feature which enables ability of 40 KSPS of any channel (based on channel pointer)
- 40 kHz aggregate conversion rate
- Supports real-time Built-in-Test
- Input connector compatible with both discrete wire and ribbon cables
- Selectable data coding; offset binary or two's complement
- Over voltage protected inputs
- Pull-down resistors prevent floating inputs
- 1,000 V analog GND/digital GND isolator



Applications:

- Factory automation and instrumentation
- Process control
- Voltage measurement
- Data acquisition

Functional Characteristics

Introduction: The VME- 3125A Analog Input boards provide automatic scanning of thirty-two analog current input channels on a 6U Eurocard for the VMEbus.

Current input option supports thirty-two single-ended channels with 0 to 25 mA range. To minimize system software overhead, all inputs are scanned and digitized continuously at an aggregate sample rate of 40,000 samples per second. Measurement data for each channel is constantly available to the VMEbus through a dual-ported Data Register.

A jumper-selectable Programmable-Gain Amplifier (PGA) supports in-line voltage gains of x1 for all channels. Data coding is software selectable as either offset binary or two's complement.

Inputs can be jumper configured as thirty-two single-ended current channels. A single front panel 37-pin subminiature D provides connections for all input channels.

Operating Modes:

All thirty-two 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.

VMEbus Compliance: This product complies with VMEbus Specification ANSI/IEEE STD 1014-1987 IEC 821 and 297 with the following mnemonics:

- A16:D16/D08 (EO) DTB Slave: 6U form factor

Board Address: The physical address is selected by onboard address jumpers, using VMEbus address lines A07 through A15. The VME-3125A 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 thirty-two dual-ported Data Registers 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).

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Input Characteristics

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

Number of Channels: thirty-two single-ended current input channels.

Voltage Ranges: Factory configured for ±10 V input range.

Current Termination: The applicable configuration is unipolar, single ended, 0-10 V and Gain X 1 only.

250 Ω 0.01%

Current Range: Applicable input ranges as per termination for 250 ohm

-0 to 20 mA
-4 to 20 mA
-5 to 25 mA

Input Bias Current: 44 nA Min/90 nA max

Input Bias Current Drift: 0.30 nA/Deg C

Common-Mode Voltage (CMV): ± 11 V, maximum CMV for differential inputs with zero input signals. CMV is referenced to an analog ground common to all inputs. With other gains, the formula is ±11 V= (V_{CM} + V_{diff}/2)*gain

Common-Mode Rejection Ratio (CMRR): Minimum/Typical CMRR in dB for differential inputs with 350 Ω source unbalance, DC-60 Hz:

- x1: 72dB

Input-to-VMEbus Isolation: 1,500VDC

Input Filter: Single-pole passive low pass filter: -3dB at 40Hz ±20%

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

Grounding: A user-configurable jumper connects the low input of channel 32 to an isolated ground reference.

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Transfer Characteristics

Measurement Resolution: 12 bits

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

Voltage Transfer Function:

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

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 Volts

Current Transfer Function:

$$I_{IN} = \frac{E_{FSR} x N_{ADC} / 4{,}069}{R_{TERMINATION}};$$

Where:

I_{IN} = Input current in amps
E_{FSR} = 10 V unipolar
N_{ADC} = A/D Converter reading
$R_{TERMINATION}$ = 250 Ω

Example:

For an N_{ADC} value of 0800 HEX (2,048 decimal) with a 250 Ω termination: I_{IN} = [10 x (2,048/4,096)]/250; = 20 mA

A/D Converter Input Range: 0 to +10 V; jumper selectable[1]

A/D Converter Input Gain: x1 (±0.3 percent, jumper selectable) [1, 2]

Accuracy[2]**:** Maximum Error = ±0.04 percent reading ±0.03 percent range ±2.0 mV

Current Input = ±0.05 percent reading ±0.03 percent range ±2.44 µA

[2] 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.

[1] Input voltage range is determined: INPUT RANGE = A/D RANGE + A/D GAIN.

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Temperature Stability:

For Current input board options (µA/deg Celsius)

±40 PPM Reading ±25 PPM Range ±20 nA

Long-Term Drift, per 1,000 hr = ±50 PPM Reading ±45 PPM Range ±2 µA

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 (4.98 VDC)

Physical/Environmental Specifications

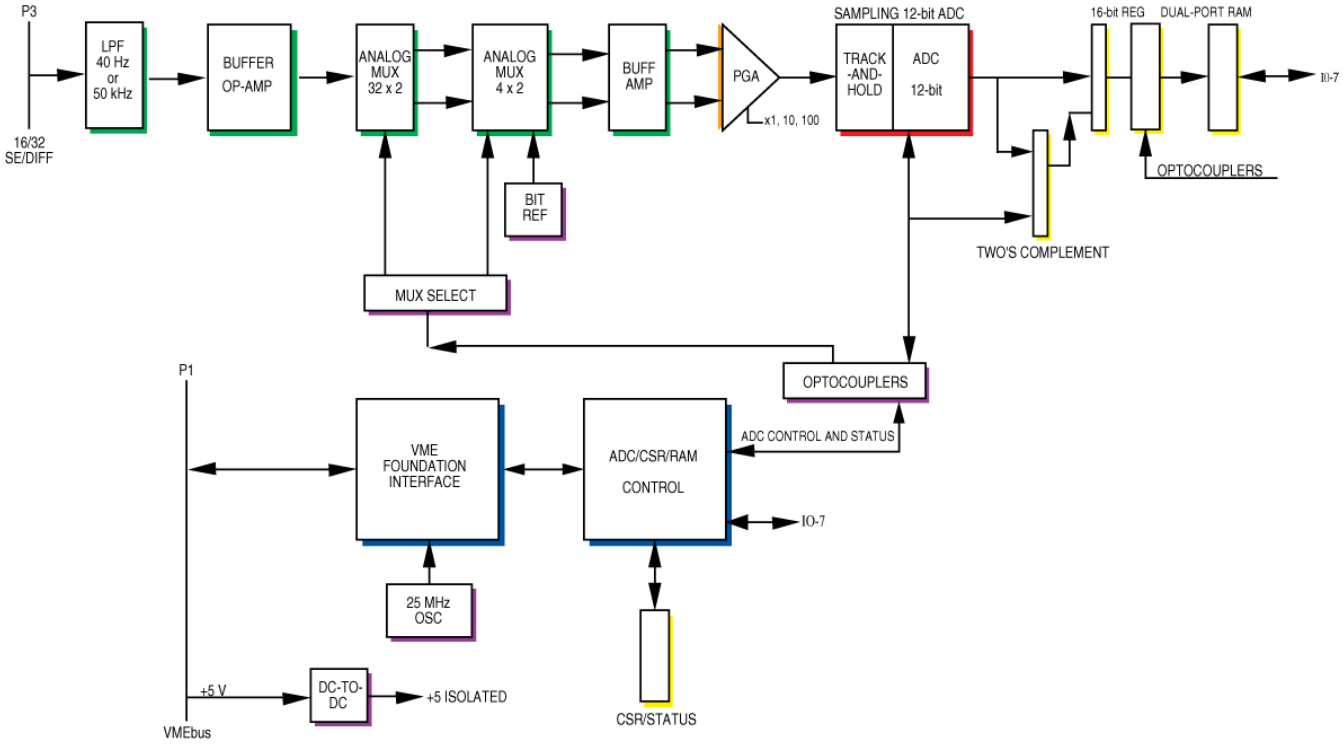
Dimensions:	Standard VME double height board 160 x 233.5 mm
Height	9.2 in. (233.4 mm)
Depth	6.3 in. (160 mm)
Thickness	0.8 in. (20.3 mm)
Power Requirements:	+5 VDC (±5 percent) at 1.5 A maximum
Airflow:	Forced air cooling required
Temperature:	
Operating:	0 to +65° C
Storage:	-40 to +85° C
Cooling:	Forced air convection (standard VME slot)
Humidity:	Operating: relative humidity 20% to 80%, noncondensing
Weight (Mass):	0.7kg maximum

MTBF: Contact factory

Input Connectors (P3): 37-pin subminiature D female connector

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Figure 1. VME-3125A Functional Block Diagram



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Ordering Information

Description	Catalog Number
VME-3125A - Isolated Scanning 12-bit 32-Channel Analog-to-Digital Converter Board (6U) with Built-in-Test (BIT)	VME-3125A-20001x
VME-3125A A B C D E F 2 0 0 0 1 X A = Input Filter Option – 2 = 250 Ω 0.01% Termination (High Accuracy Current Input) BCDE = 0 (Option reserved for future use) F = x (Special Sales Order) – 0 = Standard VME front panel without conformal coating – 1 = Reserved – 2 = Standard VME front panel with conformal coating	
Compatible Cable Connector	
Standard 37-pin subminiature D male connector Discrete Wiring: AMP 747916-2 with 206478-4 shell Ribbon Cable: AMP 747306-1	

Product Documentation

PACSystems RX7i Installation Manual, GFK-2223

PACSystems CPU Reference Manual, GFK-2222

TCP/IP Ethernet Communications for the PACSystems, GFK-2224

PACSystems TCP/IP Ethernet Communications Station Manager Manual, GFK-2225

Proficy Machine Edition Logic Developer Getting Started, GFK-1918

Installation in Hazardous Areas

The following information is for products bearing the UL marking for Hazardous Areas:

- WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.
- WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES.
- WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.
- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C, & D, DIV. 2 HAZARDOUS LOCATIONS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS LOCATIONS ONLY.

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