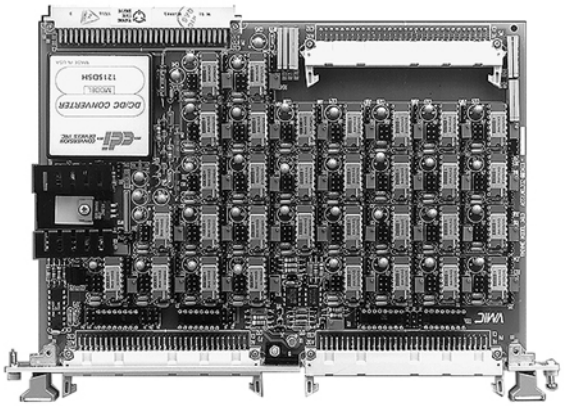
GE Fanuc Automation

VMIVME-3413 Specifications



32-Channel Signal Conditioning Board

Features:

- 32 differential or single-ended low-level analog input channels
- Buffered high-level analog outputs
- Isolation from VME; 500VDC
- Analog current loop inputs (optional)
- Full-scale input ranges from 5mV to 10V (GE Fanuc Embedded Systems' 64-channel scanning A/D boards)
- Each channel provides individual
  - 3-pole low pass filters 10Hz, 100Hz, or 1kHz
  - Selectable as a factory option
  - Gain selection of x1, x10, x100, or x1,000
  - Configurability for RTD, strain gauge bridge, thermocouple, or direct analog input
  - Half-bridge completion for strain gauge bridge
  - Provision for RTD excitation; 0.1 to 10mA per channel; 32mA total
  - Optional current loop terminators, 250Ω
  - Strain gauge bridge excitation; 2.5, 5, or 10V at 150mA
  - Reference (cold) junction compensation for thermocouple types E, J, K, N, B, T, R, S; local or remote sensing
  - Output cable matches inputs for GE Fanuc Embedded Systems' 64-channel scanning A/D boards
  - Applied-wire or insulation displacement (IDC) input connectors
- Input connectors provide guard lines between signal pairs

Applications:

- Transducer input conditioning
- Low-level input filtering
- Pressure monitoring
- Temperature monitoring
- Analog current loops

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Ordering Options							
June 12, 2007 800-003413-000 K		A	B	C	D	E	F
VMIVME-3413	–				0	0	

A = Filter Frequency Option
0 = No Filters
1 = 10Hz
2 = 100Hz
3 = 1kHz
4 = 250Ω Current Loop Terminators
5 = Option Reserved
B = Gain Options
0 = Option Reserved
1 = x1, x10, x100, x1,000 Standard Accuracy
2 = Option Reserved
3 = x1, x10, x100, x1,000 Standard Accuracy
C = Input P3, P4 Mating Connector Style
0 = Applied (Discrete) Wire
1 = Insulation-Displacement (IDC)
2 = Option Reserved
3 = Option Reserved
D = 0 (Option reserved for future use)
E = 0 (Option reserved for future use)
F = Conformal Coating
0 = Standard VME front panel without conformal coating
1 = Reserved
2 = Standard VME front panel with conformal coating

Example

Part number VMIVME-3413-211 specifies:
100Hz input filters
Standard accuracy
Insulation-displacement mating for P3 and P4

Note

All VME single board computer products come standard with a VME specification compliant front panel.

I/O Connector Component Data for P3 and P4 for the Applied (Discrete) Wire Connector Option

Component Description	Part Number	Manufacturer
PC Board Connector	100-964-033	Panduit
Compatible Mating Connector	09-03096-3214	Harting
Female Crimp Contacts (Individual)	09-02-000-8484	Harting
Recommended Crimp Tool	09-99-000-0075	Harting
Connector Shell Housing	09-03-096-0501	Harting

I/O Connector Component Data for P3 and P4 for the Insulation-Displacement (IDC) Option

Component Description	Part Number	Manufacturer
PC Board Connector	120-964-033A3	Panduit
Compatible Mating Connector	120-964-435	Panduit
Strain Relief Device	100-000-072	Panduit

I/O Connector Component Data for P5

Component Description	Part Number	Manufacturer
PC Board Connector	120-964-1470	Panduit
Compatible Mating Connector	120-964-435	Panduit
Strain Relief Device	100-000-072	Panduit

Note

Panduit is also known as ITW/Pancon.

For Ordering Information, Call:
1-800-322-3616 or 1-256-880-0444 • FAX (256) 882-0859
Email: info.embeddedsystems@gefanuc.com
Web Address: www.gefanucembedded.com

Functional Characteristics

General Description: The VMIVME-3413 (Figure 1) is a 32-channel signal conditioning board that is designed to accept low-level differential or single-ended inputs directly from temperature and pressure transducers, or from any other low-level analog signal source. Although the VMIVME-3413 board can be used with any high-level analog multiplexer, it is designed specifically as a companion to GE Fanuc Embedded Systems' 64-channel scanning A/D boards (VMIVME-3113A, -3122, etc. See Related Products and Applications.)

Analog Input Description: Each channel can be configured individually to accept RTD, strain gauge, thermocouple, or direct low-level analog inputs. Channel gain is individually jumper-selectable as x1, x10, x100, or x1,000, and when used in conjunction with the compatible ADC boards provide bipolar and unipolar full-scale input ranges from 5mV to 10V. Each channel includes a 3-pole low pass filter which can be specified as 10, 100, or 1,000Hz, common-mode rejection is specified for 60Hz and below. VMIVME-3413 inputs and outputs can be galvanically isolated from the VME.

RTD and Strain Gauge Bridge Excitation: Excitation for strain gauge bridges is selectable as 2.5, 5, or 10VDC, with a total capacity of 150mA. Remote sensing of both the drive and return lines ensures accurate control of bridge excitation voltages. Individual RTD excitation can be substituted for strain gauge excitation, in groups of eight channels and can be adjusted with header-mounted resistors, from 0.1 to 10mA. Total RTD excitation available from the board is 32mA. RTD bridge completion, if required, is provided externally.

Thermocouple Cold Junction Compensation: Reference (cold) junction compensation is provided for thermocouple types E, J, K, N, B, T, R, and S, and is jumper-selectable as originating either at the VMIVME-3413 input connectors (P3 and P4 have a common isothermal strip), or at a remote thermocouple termination location.

Calibration: To support system-level calibration, the board can be jumpered to supply either analog ground, or a precision calibration voltage of +10.000VDC, at all excitation pins in the P3 and P4 input connectors. Calibration of the VMIVME-3413 board, and of the associated multiplexer/converter board, can be verified by using appropriately wired jumper connectors at P3 and P4 to connect the calibration pin to all 16 inputs of each input connector. All channels are jumpered for unity gain to use this feature for gain calibration.

Compatibility: Standard 6U double height VME board with front panel. VME electrical connectivity is limited to the 5VDC power bus. No VME control functions are supported.

Electrical Characteristics: (At 25°C, with rated power supply.)

Number of Channels: 32

Input Characteristics (Each Channel)

Configuration: Differential, single-ended or half-bridge, noninverting. Jumper configurable.

Input Ranges: Ordering options -A1C, -A3C: ±10mV, ±100mV, ±1V, ±10V, for ±10V full-scale output; ±5mV, ±50mV, ±500mV, ±5V, for ±5V full-scale output.

Low Pass Filters: Three-pole passive filters (no switching noise). Standard options of 10Hz, 100Hz, or 1kHz. See the Ordering Options.

Current Loop Termination: Optional 250Ω 0.01 percent resistor replaces the input section of the low pass filter. See the Ordering Options. ±40mA maximum input.

Input Offset Voltage: Maximum channel offset, referred to input:

x1,000:	±60mV maximum
x100:	±200mV
x10:	±800mV
x1:	±3.0mV

Offset Voltage Stability: Maximum drift with temperature and time, referred to input:

x1,000:	±1.5mV/×C	±8mV/1,000 hr
x100:	±8.0mV/×C	±30mV/1,000 hr
x10:	±45mV/×C	±250mV/1,000 hr
x1:	±600mV/×C	±1.5mV/1,000 hr

Input Resistance: 10MΩ minimum, line-to-line and line-to-common

Common-Mode Voltage (CMV): ±11V, zero input signal

Common-Mode Rejection (CMRR): DC-60 Hz, minimum, 350Ω unbalance, filter option - 0BC (10Hz); 6dB less for all other filter options.

Referred to 4-channel group common:

GAIN	-A1C, -A3C
x1,000:	120dB
x100:	108
x10:	96
x1:	78

Referred to VME power supply common; all gains: 125dB.

Input Noise, 10 to 1,000Hz: Maximum noise at 3 σ[1], R_{source}<100Ω, referred to inputs.

Gain	-1BC (10Hz) Filter	All Other Filters
x100:	25mV p-p	55mV p-p
x10:	100mV p-p	200mV p-p
x1:	1.0mV p-p	2.0mV p-p

Offset Configuration: Jumper-selectable as: Zero (no offset), thermocouple CJC, or bridge completion (50 percent of strain gauge bridge excitation voltage).[2]

P3/P4 Calibration Pins: Excitation outputs for all channels are jumper-selectable as ground or +10.000 ±0.005VDC.

Electrical Connections: Front panel, P3 and P4. Mating cable connectors can be 64-pin IDC or applied (discrete) wire. See the Ordering Options.

Overvoltage Protection: ±15V indefinitely; ±35V for one second

Transfer Characteristics

Transfer Function:

$E_{out} = E_{in} \times {}^{GAIN}$,

where:

E_{out} = Output voltage, output pin to output common

E_{in} = Input voltage, input HI to input LO

GAIN = Selected channel gain

Channel Gain: Jumper-selectable for each channel individually as: Options -A1C, A3C: x1, x10, x100, x1,000

Gain Accuracy: Maximum GAIN error (±percent) at +25°C. Typical gain error is 0.25 times the indicated value:

	Error	
Gain	-A1C	-A3C
x1:	0.06	0.03
x10:	0.26	0.11
x100:	0.51	0.26
x1,000:	2.0	0.5

Gain Stability: Maximum GAIN drift (±PPM) with temperature and time. Typical drift is 0.2 times the indicated value:

	Drift	
Gain	-A1C	-A3C
x1:	20/×C ±50/100 hr	10/×C ±30/1,000 hr
x10:	20/×C ±50/1,000 hr	10/×C ±30/1,000 hr
x100:	40/×C ±75/1,000 hr	30/×C ±80/1,000 hr
x1,000:	100/×C ±200/1,000 hr	55/×C ±120/1,000 hr

Nonlinearity: 0.01 percent maximum (-A1C and -A3C options)

Interchannel Crosstalk: Maximum crosstalk, DC to 1,000Hz, all filter options:

x1,000:	-120dB
x100:	-108dB
x10:	-96dB
x1:	-78dB

Channel Output Characteristics

Output Voltage Range: ±10V maximum full scale

Output Impedance, DC to 1.0 kHz: 5Ω maximum, in parallel with 50pF

Loading: ±2mA, 3000pF, maximum

Strain Gauge Bridge Excitation Supply

Output Voltage: Jumper-selectable as +2.5, +5, or +10VDC

Loading: 0 to 150mA maximum; 10mF maximum capacitance

Remote Sensing: Remote sensing for both output and return lines through P3

Accuracy, No Load: ±0.03 percent of nominal output

[1] Three standard deviations (3 σ) include 99.7 percent of all noise in a normal distribution.

[2] Offset for thermocouple cold junction compensation (CJC) uses a gain of x 100.

Output Resistance:

Local Sensing:	0.2Ω maximum
Remote Sensing:	1 percent of total line resistance, maximum

Output Noise: 10mV p-p, 10Hz to 10kHz, at 3 σ[1]

Electrical Connections: Front access through P3 and P4

RTD Excitation Outputs

Configuration: Provision for individual series resistor per channel from internal +10.00 ±0.01VDC precision bus

Current Range: 0.1 to 10mA per output; 32mA maximum per board

Thermocouple Reference Junction Compensation

Reference Temperature: Reference Temperature: Jumper-selectable as either the P3, P4 input connector isotherm, or as a remotely located reference signal through P4[3]

Junction Types: Local (P3, P4) compensation is jumper-selectable for thermocouple types E, J, K, N, B, T, R, and S. External compensation can be provided for any thermocouple type[3]

Accuracy: Maximum reference (cold) junction compensation error over the specified operating temperature, after calibration at +25°C, excluding external sensor errors if remote sensing is implemented:

TC Type	Maximum Error
B	±0.5°C
J, K, T	±1.5°C
E, N, R, S	±2.5°C

Physical/Environmental Specifications

Dimensions: 6U (4HP) single slot Eurocard form factor

Height	9.2 in. (233.4mm)
Depth	6.3 in. (160mm)
Thickness	0.8 in. (20.3mm)

Power Requirements: 2.5A typical at +5VDC, 3.0A maximum. Bridge excitation supply fully loaded.

Airflow: Forced air convection

Temperature:
Operating: 0° to +55°C
Storage: -20° to +85°C

Altitude:
Operating: 0 – 10,000 ft (3,000m)

Humidity:
Operating: relative humidity 10% to 80%, noncondensing
Storage: relative humidity 5% to 95%, noncondensing

MTBF: Contact factory.

Related Products And Applications

The VMIVME-3413 is designed to be a companion signal conditioner for GE Fanuc Embedded Systems' 64-channel scanning A/D boards (VMIVME-3113A, -3122, etc.). For the best overall performance, the A/D board should be ordered with the highest frequency filter option available.

Trademarks

[3] A remote compensation input is scaled to +1μA per degree Kelvin. +15VDC is available at P3 for remote sensor power.

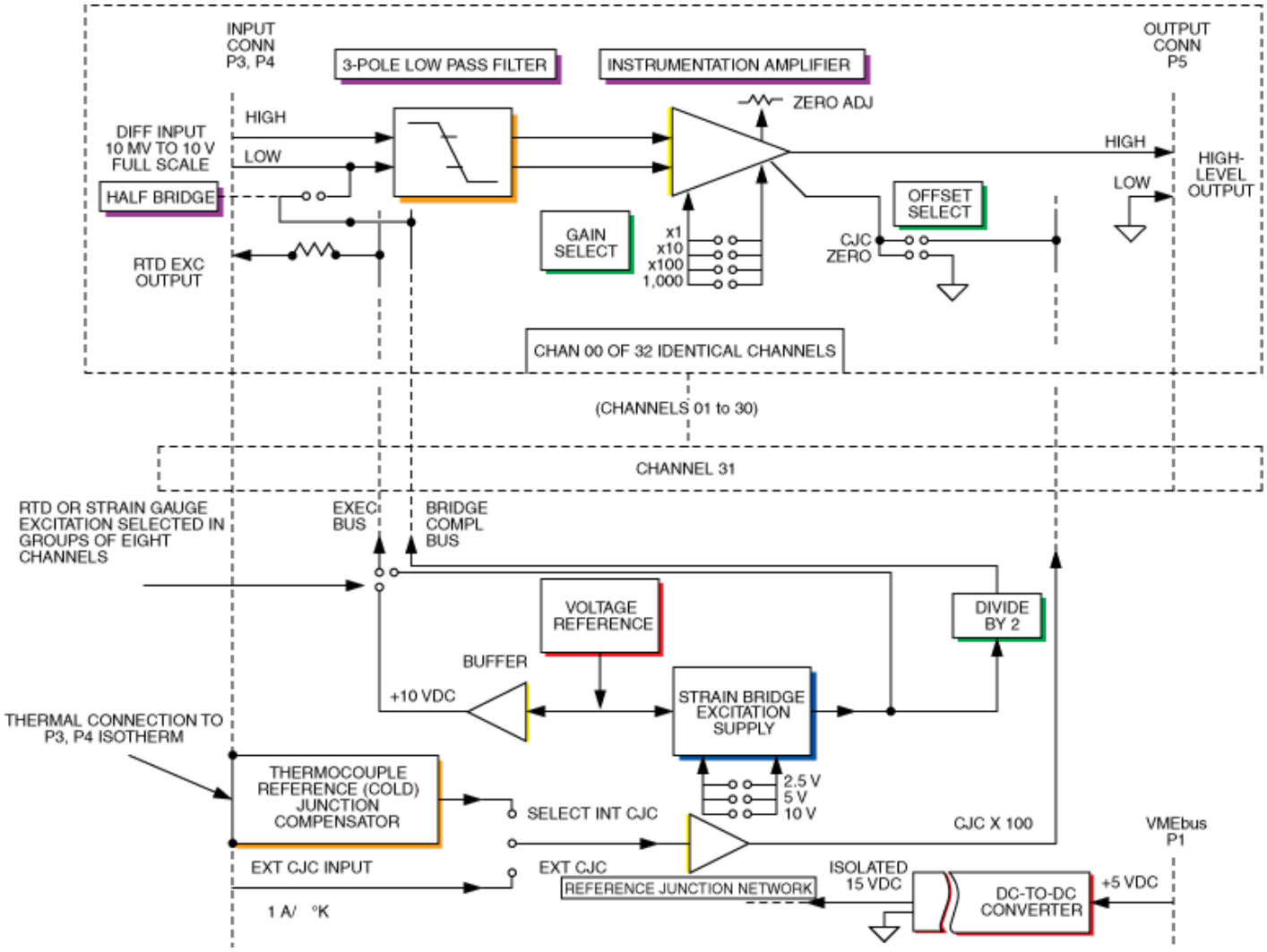

Figure 1. VMIVME-3413 32-Channel Signal Conditioning Board

Embedded Systems

GE Fanuc Embedded Systems Information Centers

Americas:
Huntsville, AL 1 800 322-3616
1 (256) 880-0444
Camarillo, CA 1 (805) 987-9300
Greenville, SC 1 (864) 627-8800
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Europe, Middle East and Africa:
Edinburgh, UK 44 (131) 561-3520
Paris, France 33 (1) 4324 6007

Additional Resources

For more information, please visit the GE Fanuc Embedded Systems web site at:
www.gefanucembedded.com