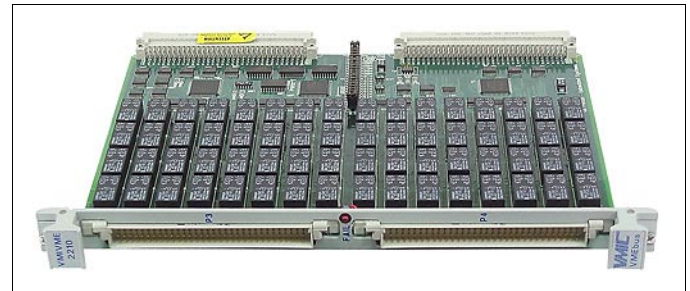


- **Latching contacts will hold their state with power off**
- **Available in latching and nonlatching versions**
- **1 Form C contacts (SPDT) with 96-conductor cable**
- **1 Form A contacts (SPST) with 64-conductor cable**
- **8-, 16-, or 32-bit data transfers**
- **Supports real time and offline fault detection and isolation**
- **2.0 A current rating**
- **Protection from relays changing during power up/down**
- **Compatible with ANSI/IEEE C37.90.1-1982 surge protection when used with companion surge suppression panel (for example, VMIVME-3459)**

Functional Characteristics

Introduction: The VMIVME-2210 provides 64 *One Form C* (SPDT) contacts to the user via two 96-pin DIN connectors. These relays are the magnetic latching type which means that, once a contact is set it will remain set (even if power is removed from the relay) until it is reset. All three contact points are brought out via the connector. They are the N.O. (Normally Open), N.C. (Normally Closed), and the Common contact points. The N.O. and the Common can be used to create One Form A contacts while the N.C. and common can be used as One Form B contacts. The N.O. contacts are on Row A of the connectors and the common contacts are on Row C of the connector as shown in Figure 1. This arrangement permits 64-conductor cables to be used for Form A switches.

The VMIVME-2210 is populated with double pole relays, but only one pole is brought out to the user. The other pole is used by the Built-in-Test (BIT) logic. The state of the controlling Data Registers or the N.C. poles is read during read accesses of the board. The Control Registers are located at the same address as the relays. This allows the user to monitor both the state of the user contacts and the Control Registers. Because the read pole and the user's pole are controlled by the same coil, BIT can monitor the user's contacts via the N.C. contacts of the second pole.



The N.C. contacts provide a logic *one* from the contacts for a logic *one* written to the Data Register. This provides positive data feedback from the contact BIT logic. When a logic *one* is written to the Control Register, it activates the relay which causes the N.O. contacts to close and the N.C. contacts to open. When the contact BIT logic is read, a logic *one* is returned.

Ordering Options							
August 12, 2004 800-002210-000 J		A	B	C	D	E	F
VMIVME-2210		—		0	0	0	0
A = Relay Type 0 = Latching Relays 1 = Nonlatching Relays B = Number of Channels 0 = 64-Channel 1 = 32-Channel C through F = 0 (Options reserved for future use.)							
Recommended Connector Components for Cabling to P3 and P4							
Style	Description			I/O Connectors			
96-pin IDC	Mating Connector (96-pin Mass Terminated)			ERNI No. 913.031			
	0.033-inch Ribbon Cable (96-pin Mass Terminated)			ERNI No. 913.049			
96-pin Discrete Wire	Mating Connector (96-pin Discrete)			Harting No. 09 03 096 3214			
	Female Crimp Contacts (96-pin Discrete)			Harting No. 09 02 000 8484			
	Connector Shell Housing (96-pin Connectors)			Harting No. 09 03 096 0501			
	PC Board Connector Part Number			ERNI No. 913.216			
* The Harting crimp tool part number is 09 99 000 0075.							
Refer to connector specifications and cable conductor size for current carrying capacity.							
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.gefanuc.com/embedded Copyright © 2004 by VMIC Specifications subject to change without notice.							

The Control Data Registers are also monitored because the relays take a long time (7 ms maximum) to change their contacts. VMEbus accesses of the board can execute so quickly the relays seem to be faulty resulting in erroneous conclusions. To prevent this the user can check the Data Register's state, instead of waiting for the relay's contacts to close.

This board uses latching relays which hold their state when power is removed. This means that closed contacts stay closed until commanded to open.

Board Functions: Sixty-four one Form C latching relay contacts via two 96-pin DIN connectors. One extra set of contacts (the N.C. set) is used for BIT. Latching relays hold their state (even with power removed) until commanded to change.

Compliance: The VMIVME-2210 conforms to the ANSI/IEEE STD 1014-1987 IEC 821 and 297 VMEbus specification with the following mnemonics: A24, A16: 3D/39, 2D/29: D32, D16, D08(EO): Slave.

Addressing Scheme: The base address of this board contains the board ID. Stacked above this 16-bit word is a 16-bit CSR. The Output Registers are placed at the next longword boundary above the CSR. Finally, the Contact Registers are stacked above the Output Registers. The Output and the Contact Registers are addressable as sixteen 8-bit bytes, eight 16-bit words, or four 32-bit longwords, located on any 128-bit boundary within standard data or short supervisory or nonprivileged I/O space.

Board Addressing: Twenty jumpers are used to select the base address of the board. One jumper determines the address space (standard data or short I/O) of the board. Another chooses supervisory, nonprivileged, or either access mode. And the remaining 18 set up the base address of the board.

Built-in-Test: Board testing is accomplished by performing a read operation. Reading the address of the relay in question will place the state of its Data Register on the bus. Reading the Contact Register transfers the state of the second N.C. contact to the bus. Both the data controlling the relay and the contact state can now be compared. This is done because the relay takes so long (7 ms maximum) to change its state. With this information, the user can determine when the relay contacts have changed state.

Nonlatching Option: If the nonlatching option is ordered, then standard relays are used. The contact data is not affected. However, the contacts will NOT hold when power is interrupted. This option will permit resets and power loss to place the relays in their normal position. Thus, N.O. contacts will open and the N.C. contacts will close. All other board operations are the same as those for the latching version.

Output Characteristics

Contact Material: Silver alloy (Gold clad)

Maximum Switching Voltage: 220 VDC, 250 VAC resistive load

Maximum Switching Current: 2 A DC, AC resistive load

Switching Power: 60 W or 125 VA resistive

Initial Contact Resistance: 50 mW (by voltage drop 6 VDC 1 A)

Contact Connect Times — Opening or Closing: 6.5 ms maximum with .5 ms typical bounce time

Dielectric Strength: 750 VAC, 50/60 Hz for 1 minute between contacts of the same pole

Surge Withstand Voltage: Conforms to Part 68 of FCC Regulations

Service Life: 5×10^5 minimum operations at rated current

Physical/Environmental Specifications

Dimensions: 6U double slot Eurocard form factor

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), 4 A maximum

Temperature:

Operating: 0 to +55 °C

Storage: -20 to +85 °C

Relative Humidity: 20% to 80%, noncondensing

Cooling: Forced air convection

Output Connector: Two front panel mounted 96-pin DIN connectors

MTBF: 2,091,858 hours*

* MTBF calculated using industry standard algorithm, $1 / (\Sigma \text{FIT} * 1.0 \times 10^{-9})$. Wherever possible using component FIT values directly from the respective manufacturers own reliability test programs, not from estimates or known reliability databases.

Trademarks

All registered trademarks are the property of their respective owners.

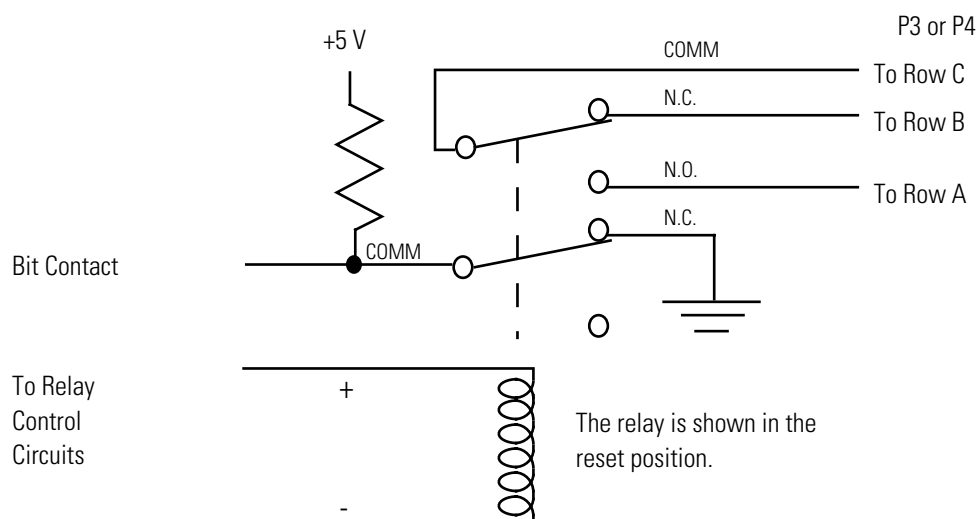


Figure 1. A Typical Relay Circuit

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Additional Resources

**For more information, please visit the
GE Fanuc Embedded Systems web site at:
www.gefanuc.com/embedded**