VMIVME-345X

FAMILY MANUAL

INSTRUCTION MANUAL

DOCUMENT NO. 500-003450-000 E

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RECORD OF REVISIONS

REVISION LETTER	DATE	PAGES INVOLVED	CHANGE NUMBER
A	03/04/94	Release	94-0243
B	05/20/94	Changes Per ECO	94-0386
C	04/07/95	Cover, pages ii, 3-3 through 3-5	95-0232
D	05/16/95	Cover, pages ii, v, vi, Section 6, and Added Appendix A	95-0338
E	07/13/95	Cover, pages ii, 3-3, 3-6, and 3-7	95-0448

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SAFETY SUMMARY

THE FOLLOWING GENERAL SAFETY PRECAUTIONS MUST BE OBSERVED DURING ALL PHASES OF THE OPERATION, SERVICE, AND REPAIR OF THIS PRODUCT. FAILURE TO COMPLY WITH THESE PRECAUTIONS OR WITH SPECIFIC WARNINGS ELSEWHERE IN THIS MANUAL VIOLATES SAFETY STANDARDS OF DESIGN, MANUFACTURE, AND INTENDED USE OF THIS PRODUCT. VME MICROSYSTEMS INTERNATIONAL CORPORATION ASSUMES NO LIABILITY FOR THE CUSTOMER'S FAILURE TO COMPLY WITH THESE REQUIREMENTS.

GROUND THE SYSTEM

To minimize shock hazard, the chassis and system cabinet must be connected to an electrical ground. A three-conductor AC power cable should be used. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the system in the presence of flammable gases or fumes. Operation of any electrical system in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove product covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY SYSTEM

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to VME Microsystems International Corporation for service and repair to ensure that safety features are maintained.

DANGEROUS PROCEDURE WARNINGS

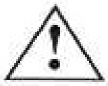
Warnings, such as the example below, precede only potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS SYSTEM. USE EXTREME CAUTION WHEN HANDLING, TESTING, AND ADJUSTING.

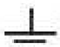
SAFETY SYMBOLS

GENERAL DEFINITIONS OF SAFETY SYMBOLS USED IN THIS MANUAL



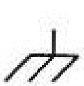
Instruction manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the system.

Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts are so marked).

 OR 

Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal which must be connected to ground before operating equipment.

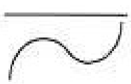
Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault. Before operating the equipment, terminal marked with this symbol must be connected to ground in the manner described in the installation (operation) manual.

 OR 

Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.

Alternating current (power line).

Direct current (power line).



Alternating or direct current (power line).

WARNING

The WARNING sign denotes a hazard. It calls attention to a procedure, a practice, a condition, or the like, which, if not correctly performed or adhered to, could result in injury or death to personnel.

CAUTION

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, a practice, a condition, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the system.

NOTE:

The NOTE sign denotes important information. It calls attention to a procedure, a practice, a condition or the like, which is essential to highlight.

VMIVME-345X FAMILY MANUAL

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SECTION 1

INTRODUCTION

1.1 FEATURES

This family of 6U VMEbus boards provides high energy surge protection for many of VMIC's products. These boards simplify the interconnect wiring between the sensor and the input/output board while providing surge protection for the channels on the board. All of these boards provide protection that meets the ANSI/IEEE C37.90.1-1989 Surge Withstand Capability (SWC) (formerly the IEEE 472) specification. This specification provides protection from 3 kVpk 1 MHz decaying sine wave and 5 kVpk 150 nsec pulse transients. These boards also protect the associated I/O boards from sustained high current faults such as accidental connection to the 120 VAC power line.

These boards are built on a 6U form factor and are designed to work with a specific I/O board from VMIC. The following table each the surge protection board and the I/O board it is designed to protect.

Table 1.1-1. Surge Board Usage

VMIC Surge Protection Boards	VMIC I/O Boards
VMIVME-3451	VMIVME-1111
VMIVME-3456	VMIVME-4150
VMIVME-3457	VMIVME-3417A
VMIVME-3459	VMIVME-2210

SECTION 2

SPECIFICATIONS

2.1 SPECIFICATIONS

Please refer to the specification sheet for the particular board of interest. The VMIC document numbers for these specifications are listed in the following table.

Table 2.1-1. Specification Document Numbers

Surge Protection Boards	VMIC Specification Numbers
VMIVME-3451	800-003451-000
VMIVME-3456	800-003456-000
VMIVME-3457	800-003457-000
VMIVME-3459	800-003459-000

SECTION 3

THEORY OF OPERATION

3.1 INTRODUCTION

The VMIVME-345X family of 6U form factor Surge Protection boards protects the input or output circuitry of various VMIC Input/Output products from high voltage, high energy transients. The IEEE/ANSI Specification C37.90-1989 defines an oscillatory and a fast rise transient that will simulate these high energy transients. A high power bi-directional Transient Voltage Suppression (TVS) diode protects the input circuitry from excessive voltages when the transient is present. A spark gap prevents the common of the input from exceeding the isolation voltage of the I/O board and directs the surge's current away from the I/O board.

Additional circuitry used by the I/O board is also protected. For example: the VMIVME-3456 Surge Protection board protects the VMIVME-4150 Analog Output board. If the VMIVME-4150 is ordered with voltage outputs, the VMIVME-3456 will have an additional diode (optional) installed to protect the external voltage output pin for the VMIVME-4150. If the VMIVME-4150 is ordered with current outputs, then the VMIVME-4150 will not use the external voltage and the VMIVME-3456 will not have the diode installed. The surge protection board purchase description must be compatible with the associated I/O board.

3.2 VMIVME-3451

The VMIVME-3451 Surge Protection board provides optical isolation as well as transient protection for the VMIVME-1111 Input board. The input of the surge protection board is a relay contact or switch to an external voltage source's return. The transistor output of the surge protection board becomes the input of the VMIVME-1111. Figure 3.2-1 shows the basic circuit topology, and Figure 3.2-2 shows the recommended jumper configuration for the VMIVME-1111 for reading a logic zero when the switch is closed. Figures 3.2-3 and 3.2-4 shows the circuitry and configuration for reading a logic one when the contacts or switch is closed.

When the contacts are open there is no current in the LED and the surge protection board's output transistor is off. The pull-up resistor on the VMIVME-1111 forces the comparator's output to a logic one. When the contacts are closed there is current in the LED and the surge protection output transistor saturates. This places a very low voltage on the input to the VMIVME-1111 and will cause the comparator to output a logic zero. Diode D1 is a bi-directional high voltage zener that clamps any signal greater than ±85 V (typically). This diode and the spark gap protect the rest of the circuitry from the high energy transients stipulated in the IEEE/ANSI Specification C37.90-1989. Resistor R2 limits the current in the LED to 5 mA.

Resistor R3 diverts any excess current when the external voltage is great enough to force the LED's forward voltage greater than 1 V. Diode D2 prevents the LED's reverse voltage from exceeding 0.7 V. The resistor network (R1 through R3) provides a contact wetting current of approximately 9 mA when the external voltage is 48 V. If the supply rises to 60 V (the maximum supply voltage) the resistor network will hold the current to 11 mA. This limits the network power to approximately 1/2 Watt.

RF1 on the surge protection board is a Positive Temperature Coefficient (PTC) resistor. RF1 initially is a very small resistance, but if an excessive current is drawn through it the resistance jumps to a very high value. It will maintain this high resistance as long as some current continues to flow through it. This resistor and diode D3 are to protect the circuitry from accidental connection to high voltage - high power lines, such as the 110 VAC line. If AC power is connected and draws current through the PTC resistor fuse, it will open and prevent any damage to the surge circuitry (and the input circuits of the protected I/O board). The PTC resistor will remain open until the source is disconnected for enough time to allow the resistor to cool down to normal operating temperature. In normal operation the resistance of this part is negligible compared to the rest of the circuitry.

3.2.1 VMIVME-1111 Configuration to Read a Zero with a Close Switch

To read a logic zero for a closed switch configure the VMIVME-1111 as shown in Figure 3.2.1-2. Jumper fields JA through JH ground the row C pins of the input connectors P3 and P4. Jumper fields JK and JL set the input pull-up voltage and the threshold reference voltage. Jumper fields JM and JN set the comparator bias. Jumpers JO through JR are the address headers that establish the base address of the data registers and the address of the Control and Status Register (CSR) of each VMIVME-1111 in the system. Jumper JI selects the source of any external voltage used for the input pull-up or threshold voltages and is not used.

Jumper JS is used with Split Test and Single Test modes. Use position 1-2 for Split Test mode operation or position 2-3 for Single Test mode (all inputs go into test mode when bit 15 of the CSR is cleared). In Split Test mode all of the inputs associated with one of the input connectors can be switched to test mode, while the rest of the inputs are still active. In test mode, the active inputs are overwritten by test data stored in the Test Data registers. The registers are located at the same addresses as their respective Input Data registers. Writing data to these registers and then reading the same addresses provides information about the integrity of the board.

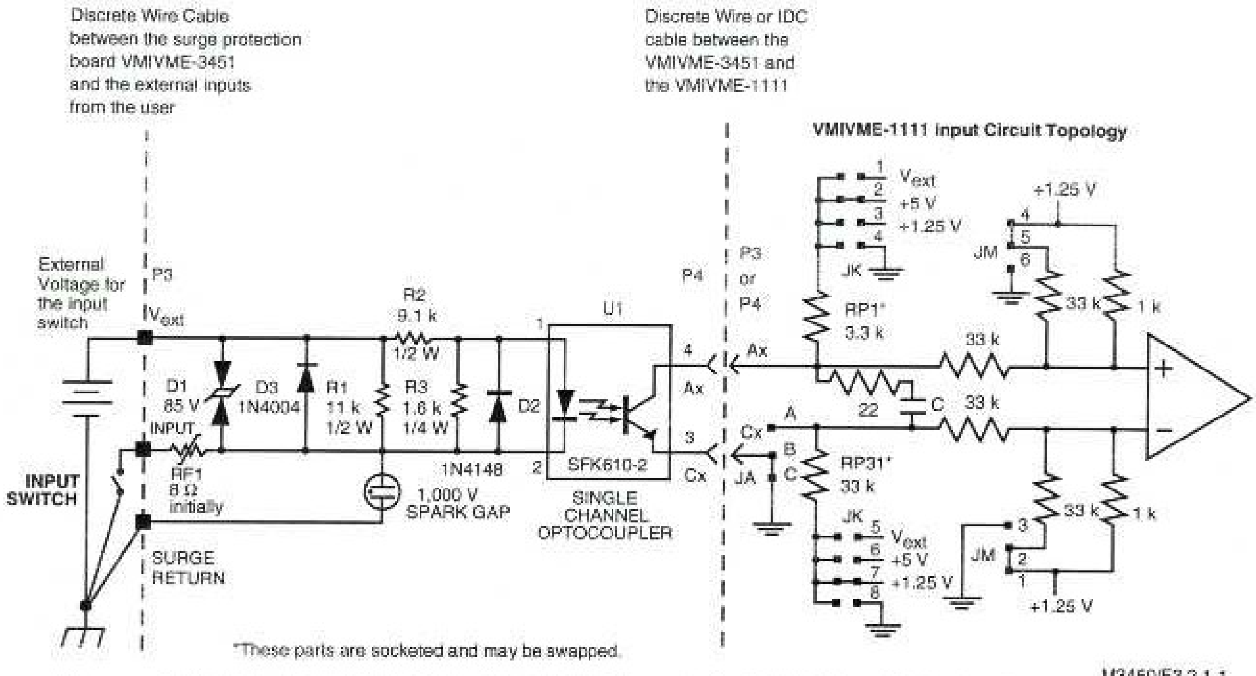

Figure 3.2.1-1. VMIVME-3451/-1111 Closed Switch Circuit Returning a Logic 0

In Split Test mode, half of the board will process test data and the other half will process active external data. To enter the test mode, bits 15 or 13 in the Control and Status Register (CSR) must be cleared. When testing is finished, set these bits to disengage the test data registers and to permit the input circuitry to process active external data.

Resistors RP1, RP4, RP7, RP10, RP13, RP16, RP19, and RP22 are the pull-up resistors for the surge protection board's output transistors, and then RP31, RP38, RP45, RP51, RP59, RP66, RP73, and RP80 are the threshold setting resistors. The resistors can be swapped to choose a different threshold setting, but it is not recommended. It is recommended that the VMIVME-1111 input configuration have the optocoupler pull-up resistor be the 3.3 kΩ. This makes the threshold resistor 33 kΩ. The threshold reference voltage chosen by JL and JK jumpers 6 through 8 establish the threshold voltages in Table 3.2.1-1 below. Positions 1 and 5 are not recommended. The differences in threshold levels is a function of the optocoupler's current transfer ratio (CTR) and LED voltage. Some optocouplers can have a CTR of 600 percent and an LED voltage of 1.0 V, which has a dramatic effect on the threshold voltage of the external supply.

Table 3.2.1-1. External Voltage Threshold Table

VMIVME-1111 Threshold V_R	OPTION - AB0 V_{EXT} = 48 V MAX/MIN	OPTION - AB1 V_{EXT} = 5 V MAX/MIN	OPTION - AB2 V_{EXT} = 12 V MAX/MIN	OPTION - AB3 V_{EXT} = 24 V MAX/MIN	OPTION - AB4 V_{EXT} = 28 V MAX/MIN	OPTION - AB5 V_{EXT} = 48 V MAX/MIN
5.0 V	21.24/7.54 V	2.49/1.28 V	5.96/2.44 V	11.77/4.38 V	13.70/5.02 V	23.17/8.18 V
1.25 V	31.72/8.41 V	2.94/1.32 V	8.26/2.63 V	17.18/4.83 V	20.15/5.56 V	34.69/9.14 V
0 V (GND)	31.90/8.43 V	2.95/1.32 V	8.30/2.63 V	17.27/4.84 V	20.26/5.57 V	34.89/9.16 V
I/CHANNEL	11.94/7.5 mA	13.4/10.7 mA	8.0/6.6 mA	8.5/7.1 mA	8.9/7.4 mA	10.9/9.1 mA

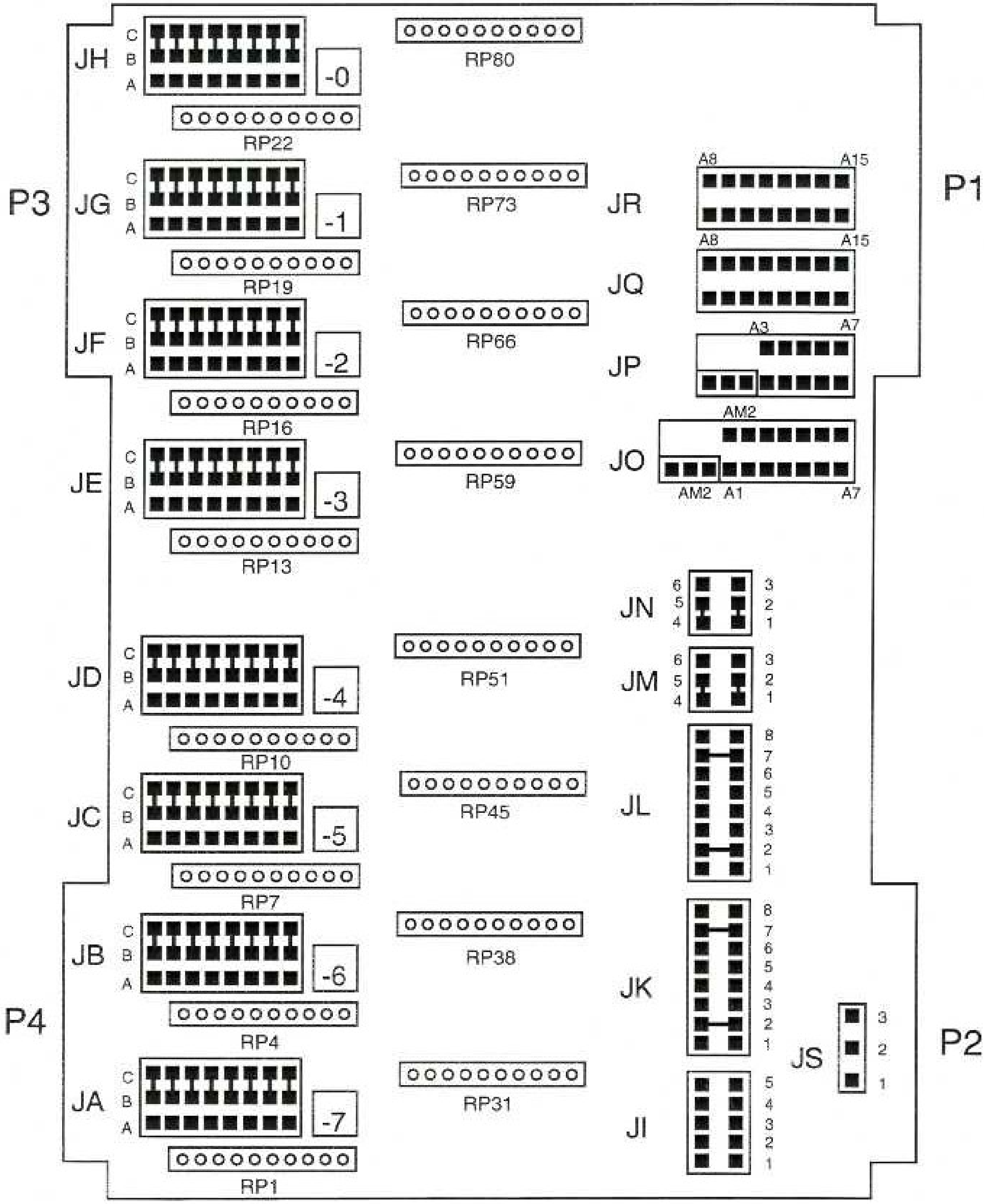

Figure 3.2.1-2. The VMIVME-1111 Configuration for a Closed Switch Returning a Logic 0

3.2.2 VMIVME-1111 Configuration to Read a One with a Close Switch

To configure the VMIVME-1111 to read a logic one for a closed switch the circuit shown in Figure 3.2.2-1 is used. To set up this circuit, configure the VMIVME-1111 as shown in Figure 3.2.2-2. In this configuration, a discrete wire cable is required. The collectors of the output transistors of the surge protection board are connected to the minus inputs of the VMIVME-1111's comparators, via the row C pins of the input connectors. The input connector's row A pins are left open. Now the plus input of the comparator establishes the threshold. The emitters of the output transistors of the surge protection board must be routed to a chassis ground on the VMEbus chassis. This ground is not supplied by the VMIVME-1111 because the jumper fields JA through JH route the collectors to the minus inputs of the comparators. Jumper fields JK and JL set the input pull-up voltage and the threshold reference voltage. Jumper fields JM and JN set the comparator bias. Jumper Fields JO through JR are headers that establish the base address of the data registers and the address of the Control and Status Register (CSR) of each VMIVME-1111 in the system. Jumper JI selects how any external voltage used for the input pull-up or threshold voltages is brought in to the board using either the P3 or P4 connector and is not used.

Jumper JS is used with Split Test and Single Test mode. Use position 1-2 for Split Test mode operation or position 2-3 for Single Test mode (all inputs go into test mode when bit 15 of the CSR is cleared). In Split Test mode, all of the inputs associated with one of the input connectors can be switched to test mode, while the rest of the inputs are still active. In test mode, the active inputs are overwritten by test data stored in the Test Data registers. These registers are located at the same addresses as their Input Data registers. Writing data to these registers and then reading the same addresses provides information about the health of the board. In Split Test mode, half of the board will process test data and the other half will process active external data. To enter test mode, bits 15 or 13 or both in the Control and Status Register (CSR) must be cleared. When testing is finished set these bits to disengage the test data registers and permit the input circuitry to process active external data.

Figure 3.2.2-1 shows RP1, RP4, RP7, RP10, RP13, RP16, RP19, and RP22 as the threshold setting resistors, and then resistors RP31, RP38, RP45, RP51, RP59, RP66, RP73, and RP80 become the pull-up resistors for the surge protection board's output transistors. These resistors can be swapped to choose a different threshold setting. It is recommended that the pull-up resistors be 3.3 kΩ and the threshold resistors be 33 kΩ. Then the threshold voltage Table 3.2.1-1 can be used for the external voltage thresholds. When the contacts are open there is no current in the LED and the surge protection output transistor is off. The pull-up resistor on the VMIVME-1111 forces the comparator's output to a logic zero (0). When the contacts are closed, there is current in the LED and the surge protection output transistor saturates. This places a very low voltage on the minus input to the VMIVME-1111's comparator and causes the comparator to output a logic one.

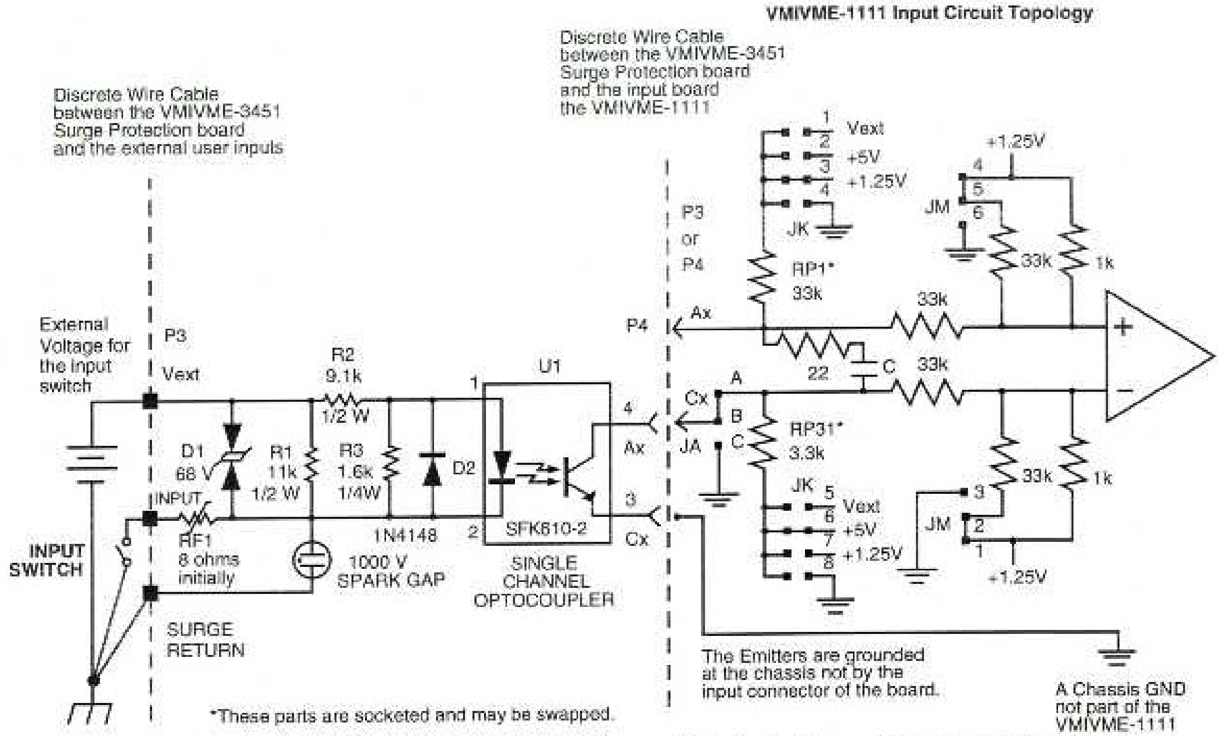

Figure 3.2.2-1. VMIVME-3451/1111 Closed Switch Circuit Returning a Logic 1

3.3 VMIVME-3456

The VMIVME-3456 Surge Protection board provides protection for the VMIVME-4150 Analog Output board. Figure 3.3-1 shows the circuit topology of the two boards. If the VMIVME-4150 is ordered with voltage outputs, diode D1 will be installed on the VMIVME-3456 to protect the external voltage pin on the VMIVME-4150. If the VMIVME-4150 is ordered with current outputs, then the VMIVME-4150 will not use VEXT and the VMIVME-3456 will not have diode D1 installed. The VMIVME-3456 configuration, ordered must match the configuration of the VMIVME-4150 it is to protect. Diodes D1 and D2 are Transient Voltage Suppression (TVS) diodes that keep the surge voltage from damaging the output buffers of the VMIVME-4150. The spark gap prevents the common of the channel from exceeding the isolation level of the VMIVME-4150 and steers the surge current away from the VMIVME-4150. PTC resistors RF1 and RF2 protect the surge protection circuitry and the VMIVME-4150 output buffers from accidental applications of AC power. In normal operation, the load is large enough to make this resistance negligible. If AC power is applied to the surge protection board, the PTC resistor fuse will open and prevent any damage to the VMIVME-3456 or the VMIVME-4150 boards.

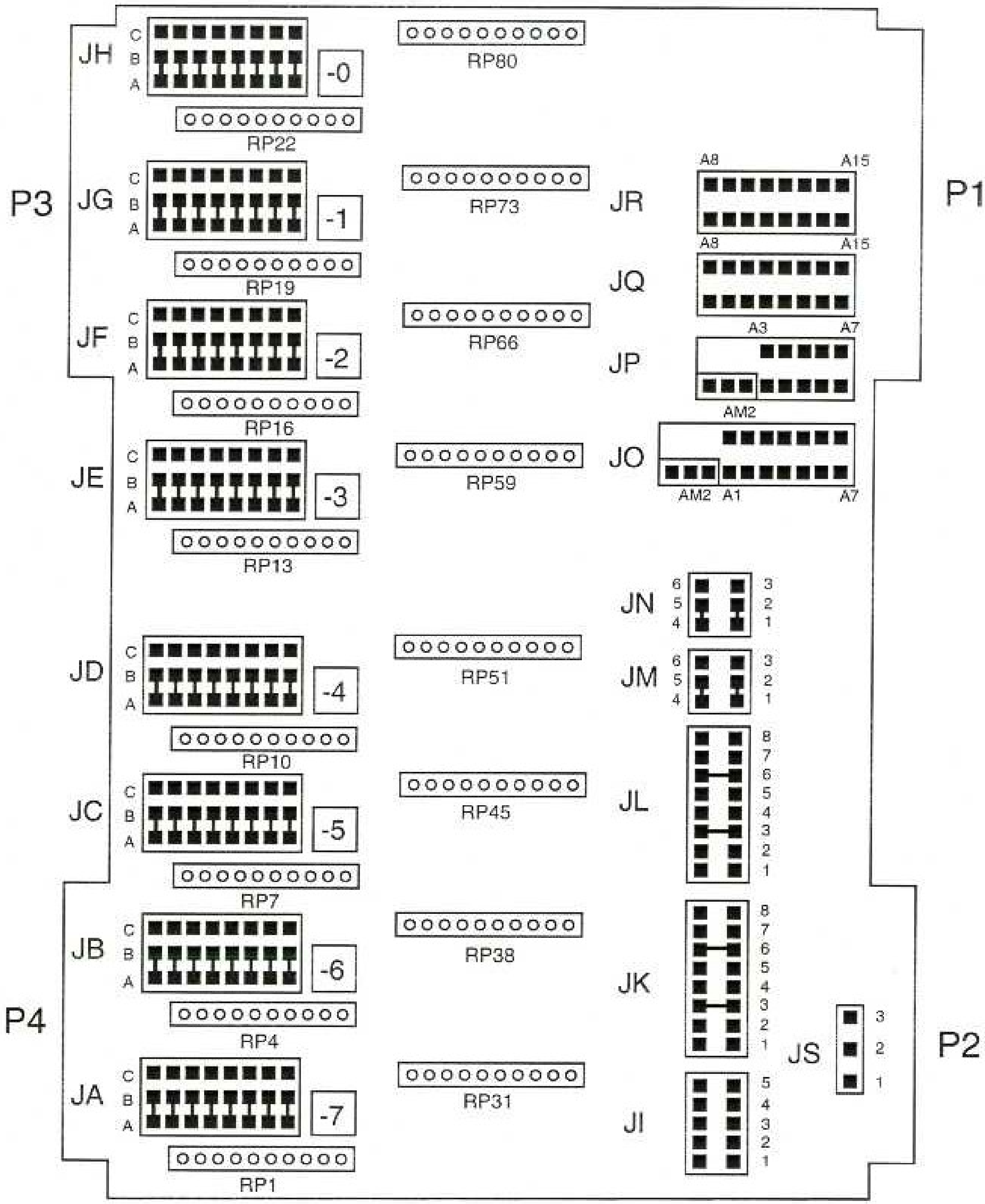

Figure 3.2.2-2. VMIVME-1111 Configuration for a Closed Switch Returning a Logic 1

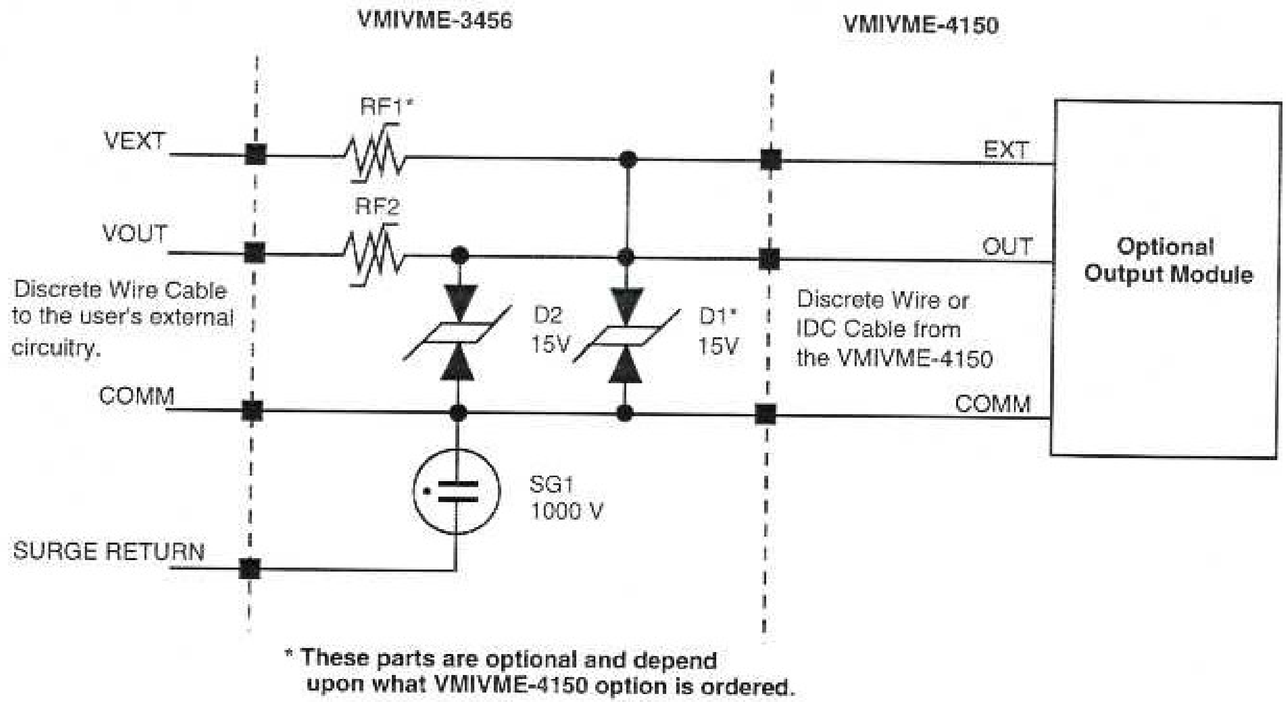

Figure 3.3-1. A Typical VMIVME-3456/4150 Circuit

3.4 VMIVME-3457

The VMIVME-3457 Surge Protection board Provides protection for the VMIVME-3417A Analog Input board. Figure 3.4-1 shows the circuit topology of the two boards. Diodes D1 and D2 are Transient Voltage Suppression (TVS) diodes that keeps the surge voltage from damaging the inputs of the VMIVME-3417A. The spark gap prevents the common of the channel from exceeding the isolation level of the board and steers the surge current away from the VMIVME-3417A. PTC resistors RF1 and RF2 protect the surge protection circuitry and the VMIVME-3417A inputs from accidental applications of AC power. In normal operation, the input resistance of the VMIVME-3417A is large enough to make this resistance negligible. If AC power is applied to the surge protection board, the PTC resistor fuse will open and prevent any damage to the VMIVME-3457 or the VMIVME-3417A boards.

3.5 VMIVME-3459

The VMIVME-3459 Surge Protection board provides protection for the VMIVME-2210 Relay board. Figure 3.5-1 shows the circuit topology of the board. Diode D1 is a TVS diode that keeps the surge voltage from damaging the contacts of the relays on the VMIVME-2210. The spark gap prevents the common of the channel from exceeding the isolation level of the board and steers the surge current away from the VMIVME-2210. PTC resistor RF1 protects the surge protection circuitry and the VMIVME-2210 contacts from accidental applications of AC power. In normal operation, the load resistance is large enough to make this resistance negligible.

If AC power is applied to the surge protection board, the PTC resistor fuse will open and prevent any damage to the VMIVME-3459 or the VMIVME-2210 boards.

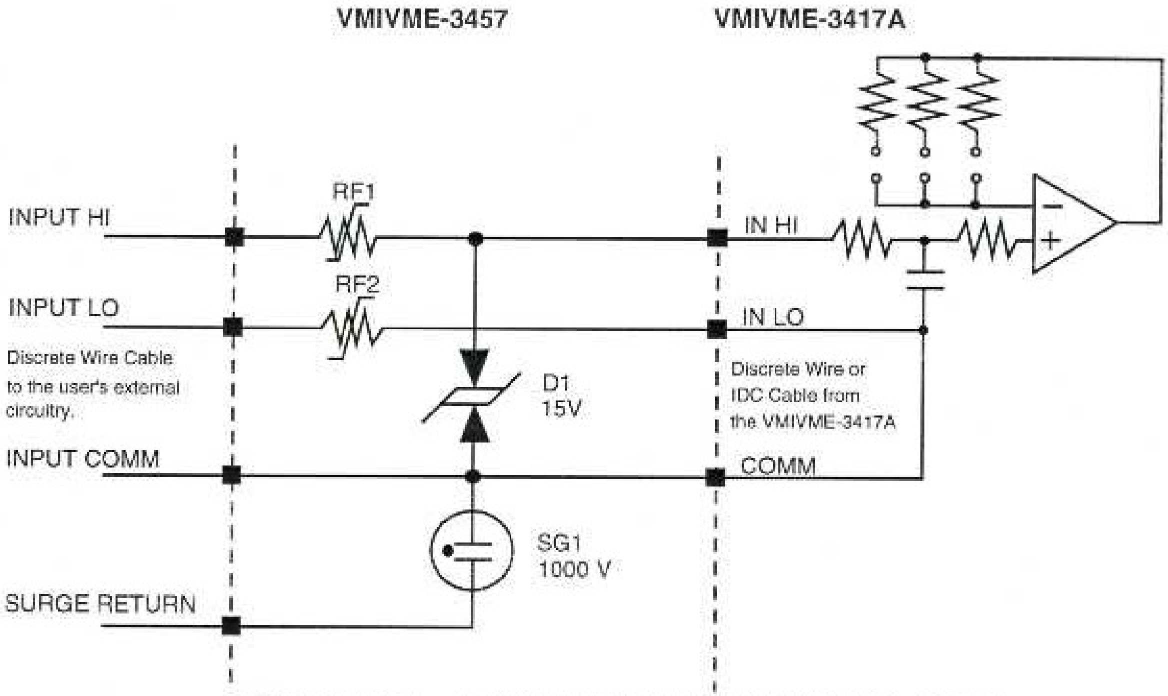

Figure 3.4-1. A Typical VMIVME-3457/3417A Circuit

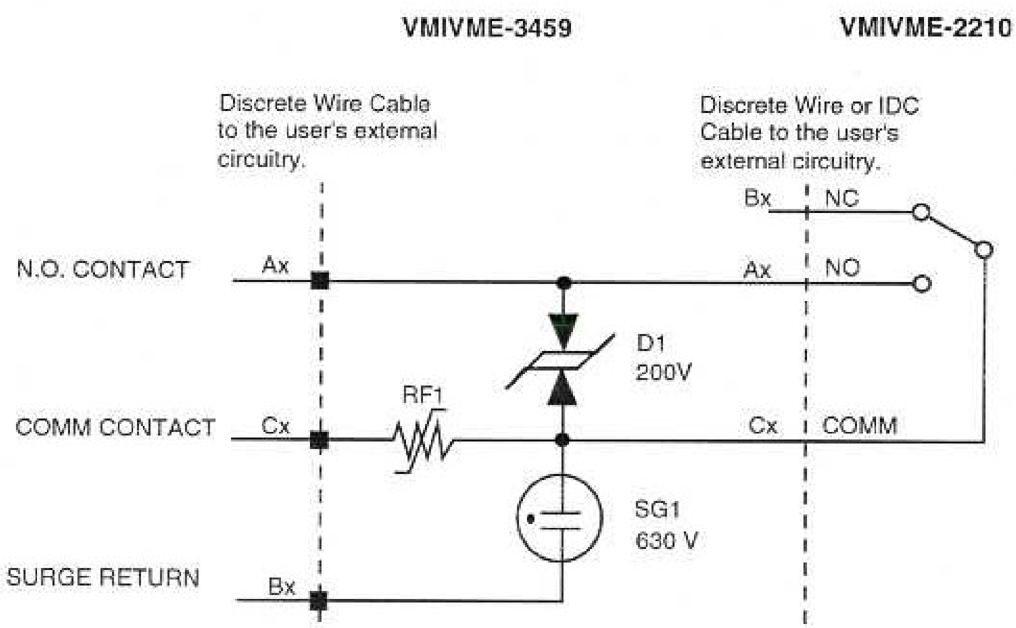

Figure 3.5-1. A Typical VMIVME-3459/2210 Circuit

SECTION 4

PROGRAMMING

These boards do not use any of the VMEbus backplane signals and require no programming.

SECTION 5

CONFIGURATION AND INSTALLATION

5.1 UNPACKING PROCEDURES

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*****************
*    CAUTION    *
*****************
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SOME OF THE COMPONENTS ASSEMBLED ON VMIC's PRODUCTS MAY BE SENSITIVE TO ELECTROSTATIC DISCHARGE AND DAMAGE MAY OCCUR ON BOARDS THAT ARE SUBJECTED TO A HIGH ENERGY ELECTROSTATIC FIELD. UNUSED BOARDS SHOULD BE STORED IN THE SAME PROTECTIVE BOXES IN WHICH THEY WERE SHIPPED. WHEN THE BOARD IS PLACED ON A BENCH FOR CONFIGURING, ETC., IT IS SUGGESTED THAT CONDUCTIVE MATERIAL BE INSERTED UNDER THE BOARD TO PROVIDE A CONDUCTIVE SHUNT.

Upon receipt, any precautions found in the shipping container should be observed. All items should be carefully unpacked and thoroughly inspected for damage that might have occurred during shipment. The board(s) should be checked for broken components, damaged circuit board(s), heat damage, and other visible contamination. All claims arising from shipping damage should be filed with the carrier and a complete report sent to VMIC together with a request for advice about the disposition of the damaged item(s).

5.2 PHYSICAL INSTALLATION

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*****************
*    CAUTION    *
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DO NOT INSTALL OR REMOVE BOARDS WHILE POWER IS APPLIED.

De-energize the equipment and insert the board into an appropriate slot of the chassis. While ensuring that the board is properly aligned and oriented in the supporting card guides, slide the board smoothly forward against the mating connector until firmly seated.

5.3 I/O CABLES AND FRONT PANEL CONNECTOR CONFIGURATIONS

The front panel connectors of the VMIVME-345x boards bring in the field signals via discrete wire cables using a Harting connector shell. This cable is connected to the P3 connector of the VMIVME-345x board. Table 5.3-1 lists the cable connector housings, pins and crimp tools for the different VMIVME-345x boards.

P3 brings in the field connections and P4 ties the surge protection board to the VMIC I/O board. P4 can be a mass terminated IDC cable or a discrete wire cable. Table 5.3-1 lists the various P4 connectors used with the VMIVME-345x boards.

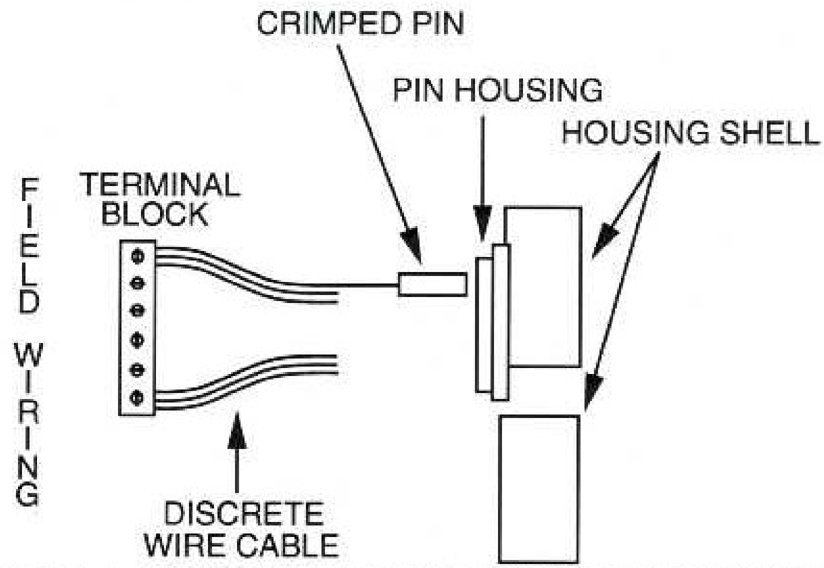


Figure 5.3-1. Expolded View of Discrete Wire and Pin Connection

Table 5.3-1. VMIVME-345X Connector Usage

	DISCRETE WIRE FIELD CABLES				DISCRETE WIRE INTERFACE CABLES			
SURGE BOARD	P3 CONN PINS	P3 CONN HOUSING	P3 CONN SHELL	CRIMP TOOL FOR P3 CONN PINS	P4 CONN PINS	P4 CONN HOUSING	P4 CONN SHELL	CRIMP TOOL FOR P4 CONN PINS
VMIVME-3451	AMP # 530151-6	AMP # 925486-1	HARTING 09 03 096 0501	AMP # 90301-2	AMP # 530151-6	AMP # 925486-1	HARTING 09 03 096 0501	AMP # 90301-2
VMIVME-3456	AMP # 530151-6	AMP # 925486-1	HARTING 09 03 096 0501	AMP # 90301-2	Standard 37 pin D-Shell subminiature Connector			
VMIVME-3457	AMP # 530151-6	AMP # 925486-1	HARTING 09 03 096 0501	AMP # 90301-2	AMP # 530151-6	AMP # 925486-1	HARTING 09 03 096 0501	AMP # 90301-2
VMIVME-3459	AMP # 530151-6	AMP # 925486-1	HARTING 09 03 096 0501	AMP # 90301-2	AMP # 530151-6	AMP # 925486-1	HARTING 09 03 096 0501	AMP # 90301-2

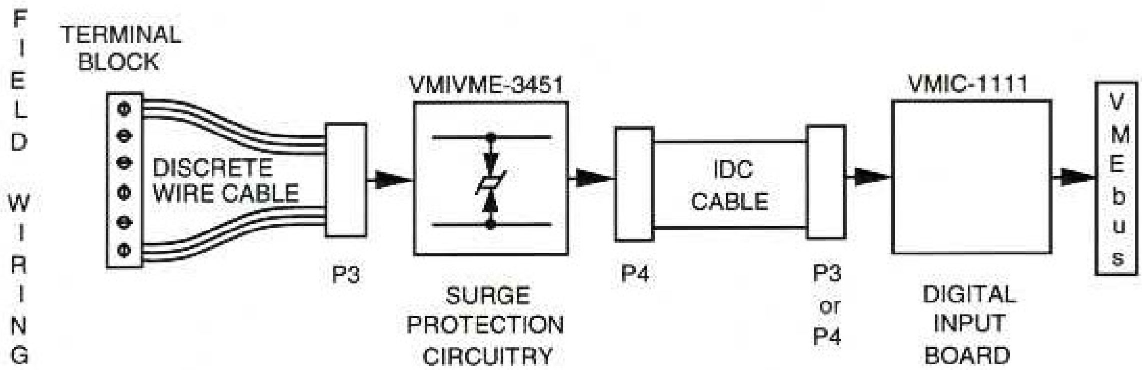


Figure 5.3-2. A Typcial System Showing a VMIVME-3451 Cabled to a VMIVME-1111

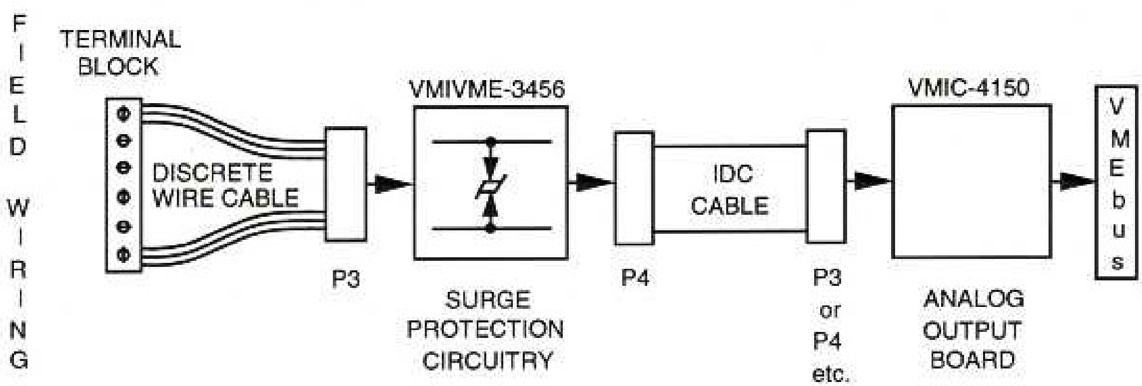


Figure 5.3-3. A Typcial System Showing a VMIVME-3456 Cabled to a VMIVME-4150

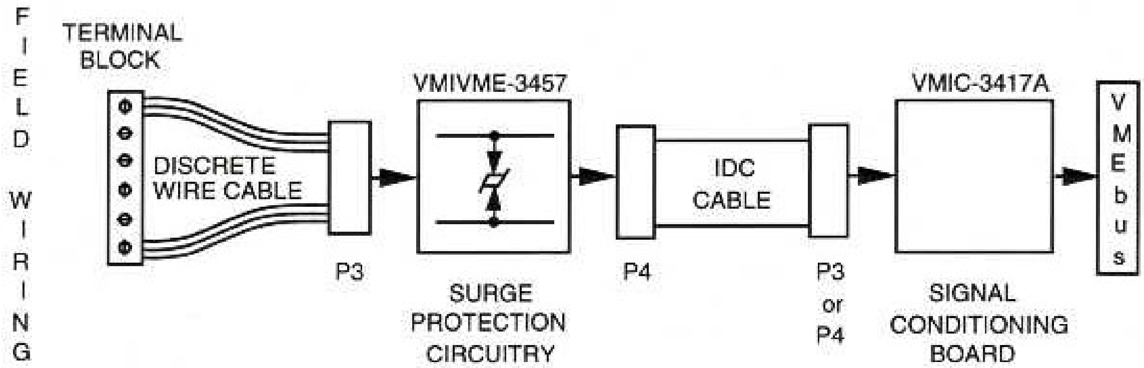


Figure 5.3-4. A Typical System Showing a VMIVME-3457 Cabled to a VMIVME-3417A

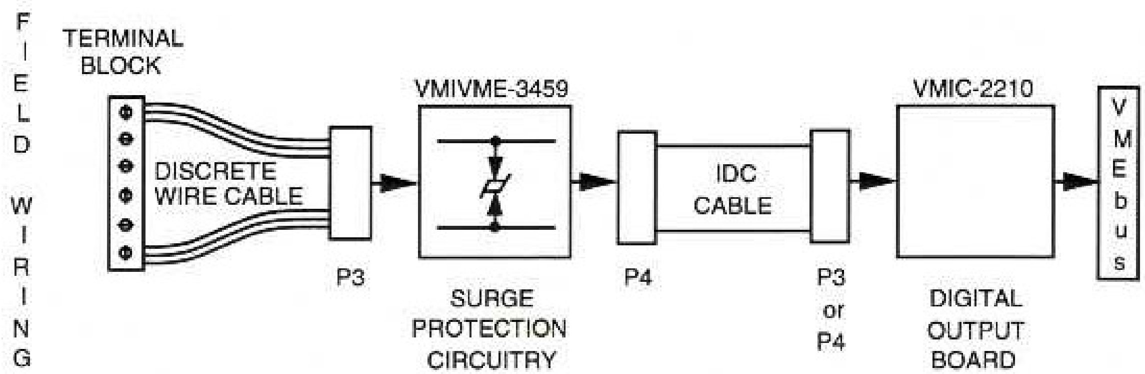
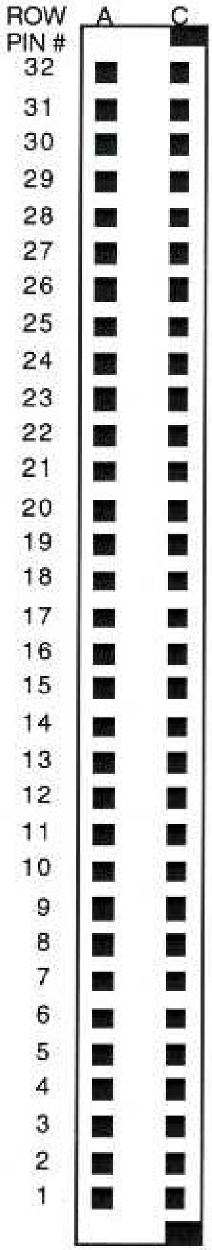


Figure 5.3-5. A Typical System Showing a VMIVME-3459 Cabled to a VMIVME-2210

Table 5.3-2. VMIVME-3451 I/O Connector Pin-Outs

P3			P4		
Pin #	**Row A Function**	**Row C Function**	**Pin #**	**Row A Function**	**Row C Function**
1	Input 00	Surge RTN	1	Output 00	Common
2	Input 01	Surge RTN	2	Output 01	Common
3	Input 02	Surge RTN	3	Output 02	Common
4	Input 03	Surge RTN	4	Output 03	Common
5	Input 04	Surge RTN	5	Output 04	Common
6	Input 05	Surge RTN	6	Output 05	Common
7	Input 06	Surge RTN	7	Output 06	Common
8	Input 07	Surge RTN	8	Output 07	Common
9	Input 08	Surge RTN	9	Output 08	Common
10	Input 09	Surge RTN	10	Output 09	Common
11	Input 10	Surge RTN	11	Output 10	Common
12	Input 11	Surge RTN	12	Output 11	Common
13	Input 12	Surge RTN	13	Output 12	Common
14	Input 13	Surge RTN	14	Output 13	Common
15	Input 14	Surge RTN	15	Output 14	Common
16	Input 15	Surge RTN	16	Output 15	Common
17	Input 16	Vext 1	17	Output 16	Common
18	Input 17	Vext 2	18	Output 17	Common
19	Input 18	Vext 3	19	Output 18	Common
20	Input 19	Vext 4	20	Output 19	Common
21	Input 20	Vext 5	21	Output 20	Common
22	Input 21	Vext 6	22	Output 21	Common
23	Input 22	Vext 7	23	Output 22	Common
24	Input 23	Vext 8	24	Output 23	Common
25	Input 24	Vext 9	25	Output 24	Common
26	Input 25	Vext 10	26	Output 25	Common
27	Input 26	Vext 11	27	Output 26	Common
28	Input 27	Vext 12	28	Output 27	Common
29	Input 28	Vext 13	29	Output 28	Common
30	Input 29	Vext 14	30	Output 29	Common
31	Input 30	Vext 15	31	Output 30	Common
32	Input 31	Vext 16	32	Output 31	Common

Table 5.3-3. VMIVME-3456 P3 Connector Pin-Out



PIN #	ROW A FUNCTION	ROW B FUNCTION	ROW C FUNCTION
32	OUT A	not used	COMM A
31	VEXT A	not used	N/C
30	N/C	not used	N/C
29	N/C	not used	N/C
28	N/C	not used	N/C
27	N/C	not used	N/C
26	OUT B	not used	COMM B
25	VEXT B	not used	N/C
24	N/C	not used	N/C
23	N/C	not used	N/C
22	N/C	not used	N/C
21	N/C	not used	N/C
20	OUT C	not used	COMM C
19	VEXT C	not used	N/C
18	N/C	not used	N/C
17	N/C	not used	N/C
16	N/C	not used	N/C
15	N/C	not used	N/C
14	OUT D	not used	COMM D
13	VEXT D	not used	N/C
12	N/C	not used	N/C
11	N/C	not used	N/C
10	N/C	not used	N/C
9	N/C	not used	N/C
8	OUT E	not used	COMM E
7	VEXT E	not used	N/C
6	N/C	not used	N/C
5	N/C	not used	N/C
4	N/C	not used	N/C
3	N/C	not used	N/C
2	OUT F	not used	COMM F
1	VEXT F	not used	N/C

Front View (Cable Side)
of "P4" Connector

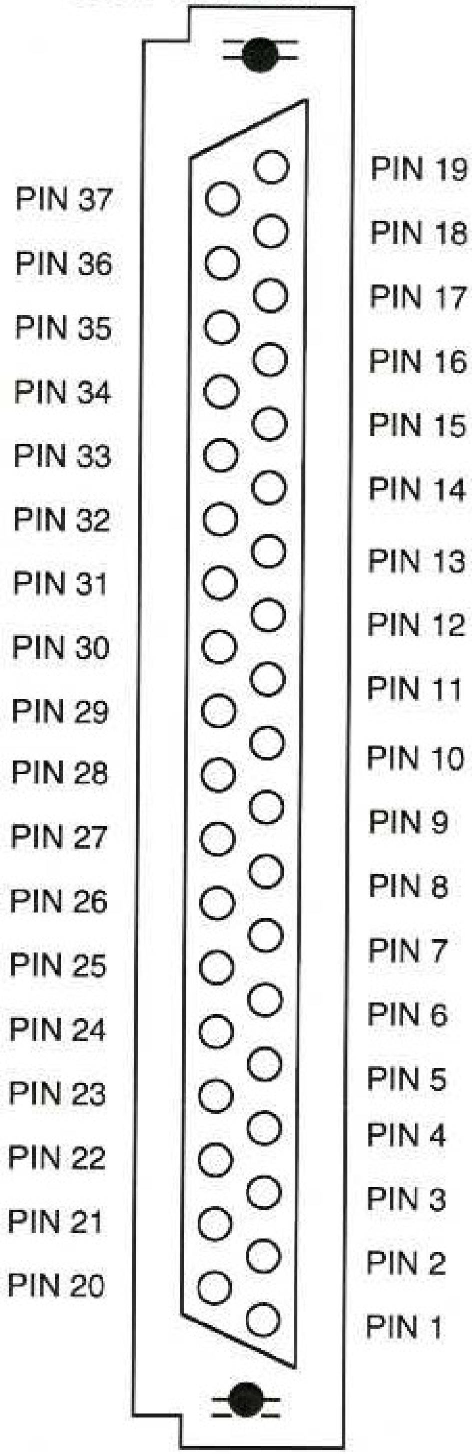


Figure 5.3-6. VMIVME-3456 P4 Connector Pin Layout

Table 5.3-4. VMIVME-3456 P4 Pin Assignments

Pin #	Data Bit	Pin #	Data Bit
37	COMM A	19	OUT A
36	N/C	18	VEXT A
35	N/C	17	N/C
34	COMM B	16	OUT B
33	N/C	15	VEXT B
32	N/C	14	N/C
31	COMM C	13	OUT C
30	N/C	12	VEXT C
29	N/C	11	N/C
28	COMM D	10	OUT D
27	N/C	9	VEXT D
26	N/C	8	N/C
25	COMM E	7	OUT E
24	N/C	6	VEXT E
23	N/C	5	N/C
22	COMM F	4	OUT F
21	N/C	3	VEXT F
20	N/C	2	N/C
		1	N/C

Table 5.3-5. VMIVME-3457 Connector Pin-Outs

P3			P4		
Pin #	Row A Function	Row C Function	Pin #	Row A Function	Row C Function
1	Input 00 HI	Input 00 LO	1	Output 00 HI	Output 00 LO
2	Surge RTN	CH00 Comm	2		CH00 Comm
3	Input 01 HI	Input 01 LO	3	Output 01 HI	Output 01 LO
4	Surge RTN	CH01 Comm	4		CH01 Comm
5	Input 02 HI	Input 02 LO	5	Output 02 HI	Output 02 LO
6	Surge RTN	CH02 Comm	6		CH02 Comm
7	Input 03 HI	Input 03 LO	7	Output 03 HI	Output 03 LO
8	Surge RTN	CH03 Comm	8		CH03 Comm
9	Input 04 HI	Input 04 LO	9	Output 04 HI	Output 04 LO
10	Surge RTN	CH04 Comm	10		CH04 Comm
11	Input 05 HI	Input 05 LO	11	Output 05 HI	Output 05 LO
12	Surge RTN	CH05 Comm	12		CH05 Comm
13	Input 06 HI	Input 06 LO	13	Output 06 HI	Output 06 LO
14	Surge RTN	CH06 Comm	14		CH06 Comm
15	Input 07 HI	Input 07 LO	15	Output 07 HI	Output 07 LO
16	Surge RTN	CH07 Comm	16		CH07 Comm
17	Input 08 HI	Input 08 LO	17	Output 08 HI	Output 08 LO
18	Surge RTN	CH08 Comm	18		CH08 Comm
19	Input 09 HI	Input 09 LO	19	Output 09 HI	Output 09 LO
20	Surge RTN	CH09 Comm	20		CH09 Comm
21	Input 10 HI	Input 10 LO	21	Output 10 HI	Output 10 LO
22	Surge RTN	CH10 Comm	22		CH10 Comm
23	Input 11 HI	Input 11 LO	23	Output 11 HI	Output 11 LO
24	Surge RTN	CH11 Comm	24		CH11 Comm
25	Input 12 HI	Input 12 LO	25	Output 12 HI	Output 12 LO
26	Surge RTN	CH12 Comm	26		CH12 Comm
27	Input 13 HI	Input 13 LO	27	Output 13 HI	Output 13 LO
28	Surge RTN	CH13 Comm	28		CH13 Comm
29	Input 14 HI	Input 14 LO	29	Output 14 HI	Output 14 LO
30	Surge RTN	CH14 Comm	30		CH14 Comm
31	Input 15 HI	Input 15 LO	31	Output 15 HI	Output 15 LO
32	Surge RTN	CH15 Comm	32		CH15 Comm

Table 5.3-6. VMIVME-3459 Connector Pin-Outs

P3				P4		
Pin #	Row A Function	Row B Function	Row C Function	Pin #	Row A Function	Row C Function
1	Field 00 NO	Surge RTN	Field 00 COMM	1	CH 00 NO	CH 00 COMM
2	Field 01 NO	Surge RTN	Field 01 COMM	2	CH 01 NO	CH 01 COMM
3	Field 02 NO	Surge RTN	Field 02 COMM	3	CH 02 NO	CH 02 COMM
4	Field 03 NO	Surge RTN	Field 03 COMM	4	CH 03 NO	CH 03 COMM
5	Field 04 NO	Surge RTN	Field 04 COMM	5	CH 04 NO	CH 04 COMM
6	Field 05 NO	Surge RTN	Field 05 COMM	6	CH 05 NO	CH 05 COMM
7	Field 06 NO	Surge RTN	Field 06 COMM	7	CH 06 NO	CH 06 COMM
8	Field 07 NO	Surge RTN	Field 07 COMM	8	CH 07 NO	CH 07 COMM
9	Field 08 NO	Surge RTN	Field 08 COMM	9	CH 08 NO	CH 08 COMM
10	Field 09 NO	Surge RTN	Field 09 COMM	10	CH 09 NO	CH 09 COMM
11	Field 10 NO	Surge RTN	Field 10 COMM	11	CH 10 NO	CH 10 COMM
12	Field 11 NO	Surge RTN	Field 11 COMM	12	CH 11 NO	CH 11 COMM
13	Field 12 NO	Surge RTN	Field 12 COMM	13	CH 12 NO	CH 12 COMM
14	Field 13 NO	Surge RTN	Field 13 COMM	14	CH 13 NO	CH 13 COMM
15	Field 14 NO	Surge RTN	Field 14 COMM	15	CH 14 NO	CH 14 COMM
16	Field 15 NO	Surge RTN	Field 15 COMM	16	CH 15 NO	CH 15 COMM
17	Field 16 NO	Surge RTN	Field 16 COMM	17	CH 16 NO	CH 16 COMM
18	Field 17 NO	Surge RTN	Field 17 COMM	18	CH 17 NO	CH 17 COMM
19	Field 18 NO	Surge RTN	Field 18 COMM	19	CH 18 NO	CH 18 COMM
20	Field 19 NO	Surge RTN	Field 19 COMM	20	CH 19 NO	CH 19 COMM
21	Field 20 NO	Surge RTN	Field 20 COMM	21	CH 20 NO	CH 20 COMM
22	Field 21 NO	Surge RTN	Field 21 COMM	22	CH 21 NO	CH 21 COMM
23	Field 22 NO	Surge RTN	Field 22 COMM	23	CH 22 NO	CH 22 COMM
24	Field 23 NO	Surge RTN	Field 23 COMM	24	CH 23 NO	CH 23 COMM
25	Field 24 NO	Surge RTN	Field 24 COMM	25	CH 24 NO	CH 24 COMM
26	Field 25 NO	Surge RTN	Field 25 COMM	26	CH 25 NO	CH 25 COMM
27	Field 26 NO	Surge RTN	Field 26 COMM	27	CH 26 NO	CH 26 COMM
28	Field 27 NO	Surge RTN	Field 27 COMM	28	CH 27 NO	CH 27 COMM
29	Field 28 NO	Surge RTN	Field 28 COMM	29	CH 28 NO	CH 28 COMM
30	Field 29 NO	Surge RTN	Field 29 COMM	30	CH 29 NO	CH 29 COMM
31	Field 30 NO	Surge RTN	Field 30 COMM	31	CH 30 NO	CH 30 COMM
32	Field 31 NO	Surge RTN	Field 31 COMM	32	CH 31 NO	CH 31 COMM

SECTION 6

MAINTENANCE

6.1 MAINTENANCE

This section provides information relative to the care and maintenance of VMIC's products. If the products malfunction, verify the following:

a. Software
b. System configuration
c. Electrical connections
d. Jumper or configuration options
e. Boards are fully inserted into their proper connector location
f. Connector pins are clean and free from contamination
g. No components of adjacent boards are disturbed when inserting or removing the board from the chassis
h. Quality of cables and I/O connections

If the products must be returned, contact VMIC for a Return Material Authorization (RMA) Number. **This RMA Number must be obtained prior to any return.**

6.2 MAINTENANCE PRINTS

User-level repairs are not recommended. The appendix to this manual contains drawings and diagrams for reference purposes only.

APPENDIX A

ASSEMBLY DRAWING, PARTS LIST, AND SCHEMATIC

ACKNOWLEDGEMENTS

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