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VMIVME-2127

128-bit VOLTAGE SOURCE DIGITAL OUTPUT BOARD WITH BUILT-IN-TEST SUPPORT

INSTRUCTION MANUAL

DOCUMENT NO. 500-002127-000 B

Revised February 16, 1994

VME MICROSYSTEMS INTERNATIONAL CORPORATION
12090 SOUTH MEMORIAL PARKWAY
HUNTSVILLE, ALABAMA 35803-3308
(205) 880-0444
1-800-322-3616

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RECORD OF REVISIONS

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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.

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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.

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

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

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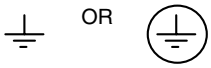
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Instruction manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the system.



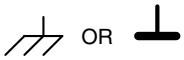
Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts are so marked).



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.



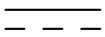
Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault. Before operating the equipment, terminal marked with this symbol must be connected to ground in the manner described in the installation (operation)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



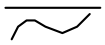
Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.



Alternating current (power line).



Direct current (power line).



Alternating or direct current (power line).



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.



The CAUTION sign denotes a hazard. It calls attention to an operating a 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.

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128-bit VOLTAGE SOURCE DIGITAL OUTPUT BOARD WITH BUILT-IN-TEST SUPPORT

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A Assembly Drawing, Parts List, and Schematic

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SECTION 1

INTRODUCTION

1.1 FEATURES

The VMIVME-2127 is capable of delivering 128 channels of high voltage and/or high-current source outputs. The VMIVME-2127 emitter-follower output drivers are capable of supporting output voltages from 7 to 35 VDC. A unique feature of the VMIVME-2127 Board is the Built-in-Test (BIT) logic, which allows the user, under software control, to verify the operation of each channel.

A brief overview of the VMIVME-2127's features include the following:

a. 128 channels of high voltage digital outputs (7 to 35 VDC)
b. 8-, 16-, or 32-bit VMEbus data transfers
c. High current emitter-follower drivers (350 mA source) with built-in suppressor diodes
d. Heavy load option available
e. Fault protection for the outputs (outputs shutdown when current exceeds 370 mA)
f. Built-in-Test logic
g. Front panel software controlled Fail LED (for Built-in-Test)
h. User configurable address jumpers allow for contiguous addressing when more than one board is used in a VMEbus system.

1.2 REFERENCE MATERIAL LIST

The reader should refer to "The VMEbus Specification" for a detailed explanation of the VMEbus. "The VMEbus Specification" is available from the following source:

VITA
VMEbus International Trade Association
10229 N. Scottsdale Road
Scottsdale, AZ 85253
(602) 951-8866

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SECTION 2

PHYSICAL DESCRIPTION AND SPECIFICATIONS

REFER TO 800-002127-000 SPECIFICATION

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SECTION 3

THEORY OF OPERATION

3.1 OPERATIONAL OVERVIEW

The VMIVME-2127 is designed for a variety of applications such as:

a. Relay drivers
b. Lamp drivers
c. Solenoid drivers
d. Hammer drivers
e. Stepper motor drivers
f. LED drivers
g. High-current, high-voltage drivers

The design of the VMIVME-2127 Board as shown in the functional block diagram in Figure 3.1-1 consists primarily of four sections which are:

a. VMEbus Foundation Logic
b. Device Addressing
c. Output Drivers
d. Built-in-Test Logic

The VMIVME-2127 Board is designed using eight 16-bit bi-directional registers, a Control and Status Register (CSR), high performance output drivers, typical VMEbus foundation logic, and a device address jumper bank. The jumper bank provides the user with the capability to select the VMIVME-2127 base address.

3.2 DEVICE ADDRESSING

The VMIVME-2127 is designed to support data transfers in short or standard I/O memory space with supervisory and/or nonprivileged data access. Jumpers are provided as shown in Figure 3.2-1 (Address Selection Block Diagram) to allow user selection of either I/O access type. The VMIVME-2127 is factory configured to respond to short supervisory I/O access.

3.3 VMEbus FOUNDATION LOGIC

The typical VMEbus foundation logic is comprised of drivers, receivers, and control logic. The DTACK generator is designed to provide high data transfer rates.

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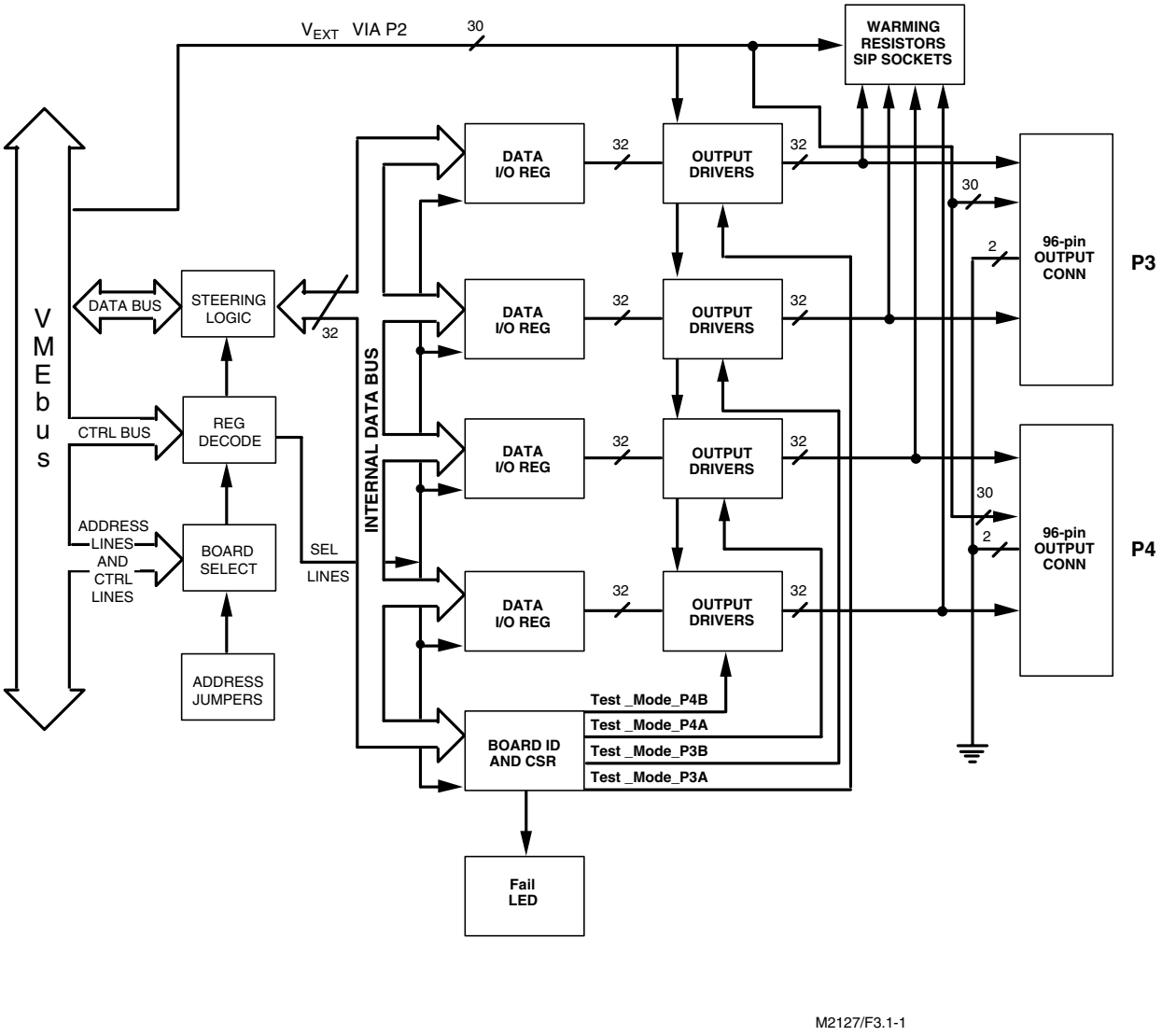


Figure 3.1-1. VMIVME-2127 Functional Block Diagram

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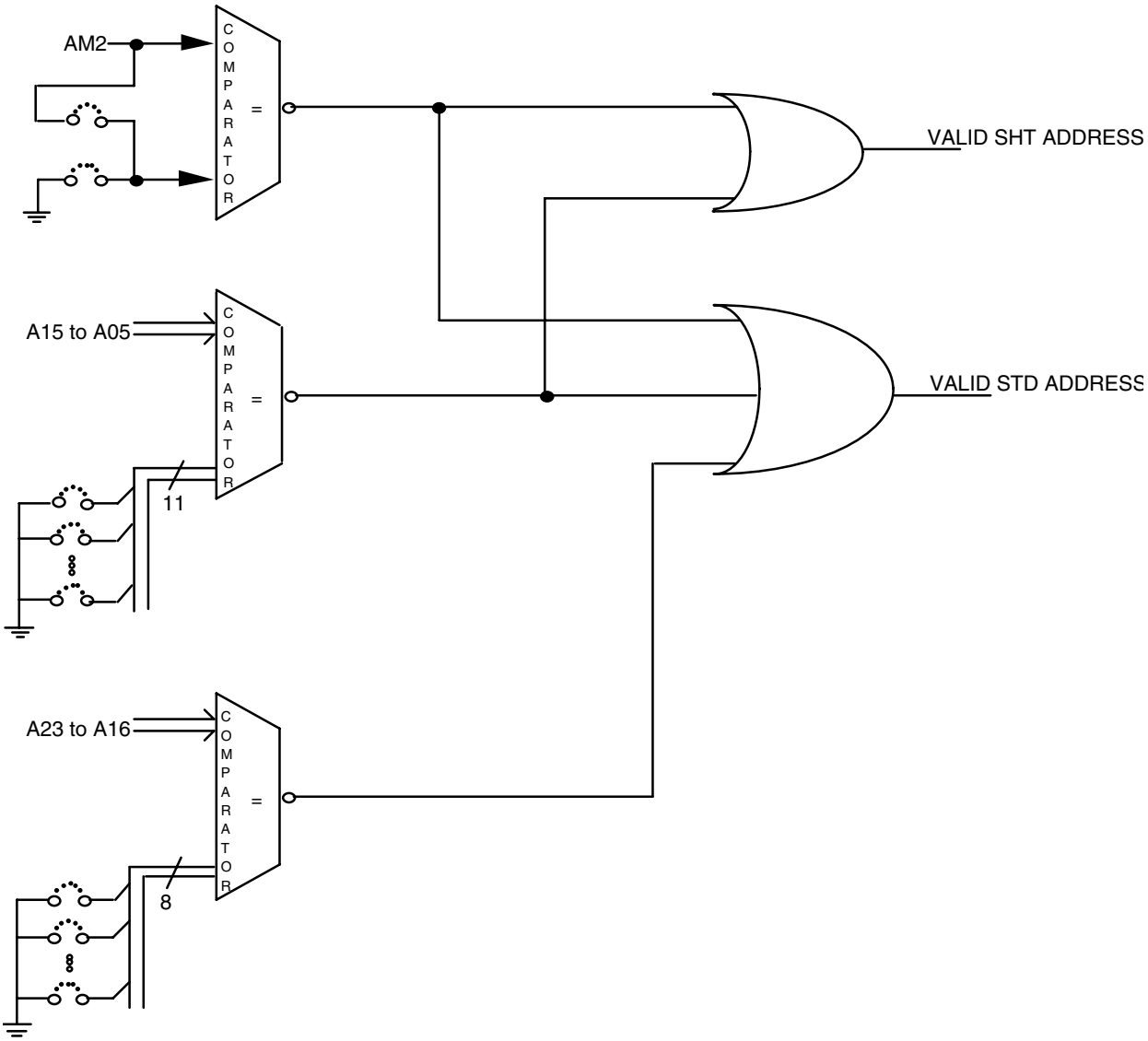


Figure 3.2-1. Address Selection Block Diagram

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3.4 DATA TRANSFERS

Data transfer transceivers are shown in Figure 3.4-1. The data transceivers are designed to support write and read operations on 8-, 16-, and 32-bit boundaries.

3.5 REGISTER CONTROL LOGIC

The VMIVME-2127 Board register control logic is designed to support *write* and *read* operations to and from eight 16-bit bi-directional dual-port latches and from a CSR that controls the test mode and front panel LED.

To perform output data transfers, data is transferred via transceivers, which are selected by address bits A4, A3, A2, A1, and the data strobes. The 128 bits of high voltage outputs are addressable as four 32-bit longwords, eight 16-bit words, or as sixteen 8-bit bytes.

3.6 BUILT-IN-TEST

The Built-in-Test feature of the VMIVME-2127 is enabled by asserting the test mode bits in the CSR. While in test mode, test data may be written to any Output Data Register (ODR), and read back on a *read* operation. While in test mode, all drivers are OFF. The ODRs may be read at any time independent of the test mode bits.

The Built-in-Test features of this product provide the user with the capability of performing real-time loopback testing with the output drivers connected, and off-line diagnostic testing with the output drivers disconnected from the field devices.

A front panel Fail LED is provided for quick fault isolation to the board level. The Fail LED is illuminated at power-up or system reset and may be extinguished by the user upon successful diagnostic execution.

3.7 OUTPUT DRIVERS

The output drivers provide overcurrent (short circuit) and thermal shutdown protection. Overcurrent protection occurs at 370 mA minimum (500 mA typical) allowing for safe operation at currents as high as 350 mA. The thermal shutdown is a function of the load, number of channels per byte that are ON and the duty cycle. Figure 3.7-1 shows the allowable output current as a function of duty cycle and the number of ON channels at 25 and 50 °C.

Since the thermal shutdown restricts the allowable output current for many applications, a heavy load option is available in which two output devices are placed in parallel. VMIC cannot guarantee that the heavy load option will provide two times as much current per output as the standard load option. But the user should be aware that the short circuit protection may not occur until 1 A or more. Figure 3.7-2 shows the allowable output current as a function of duty cycle and the number of ON channels for the heavy load option at 25 and 50 °C.

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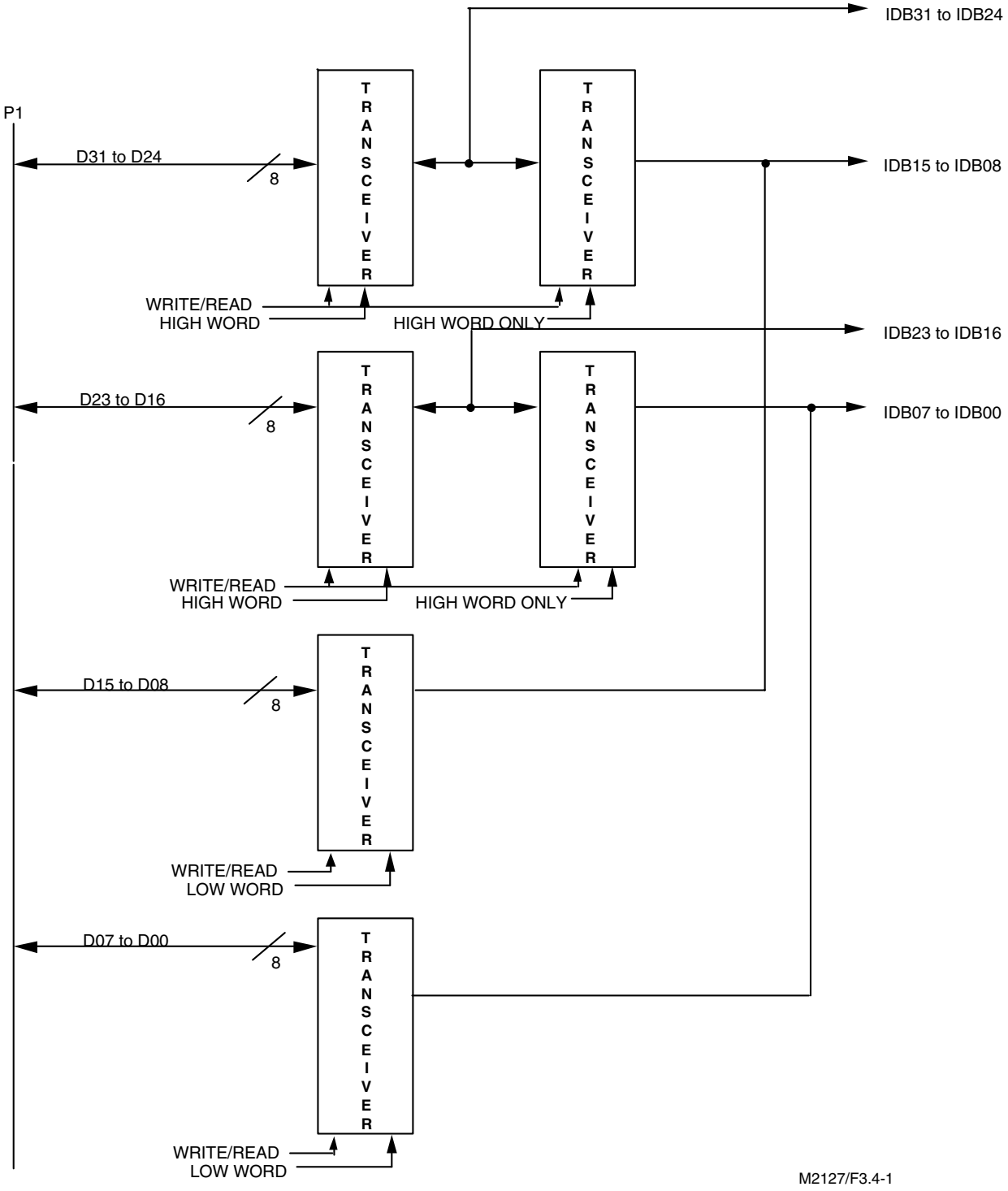
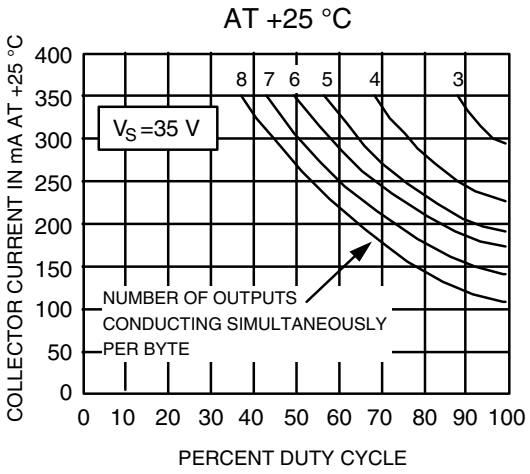
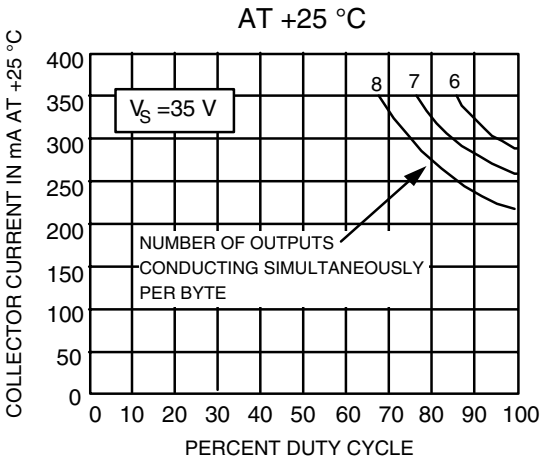
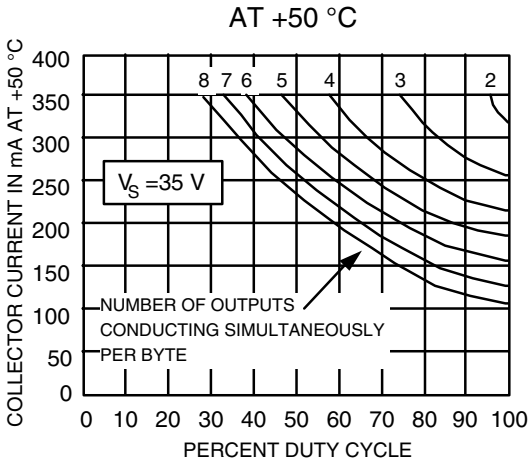


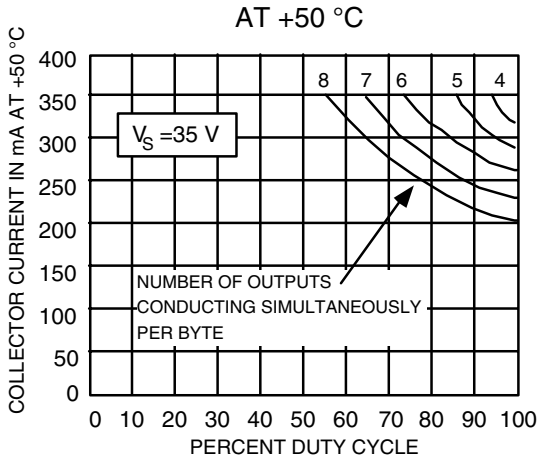
Figure 3.4-1. Data Transfer Block Diagram

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M2127/F3.7-1

Figure 3.7-1 Allowable Output Current as a Function of Duty Cycle for Standard Load Option

M2127/F3.7-2

Figure 3.7-2 Allowable Output Current as a Function of Duty Cycle for Heavy Load Option

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3.8 FAULT INDICATION

Overcurrent conditions cause the channel(s) affected to be turned OFF. Thermal shutdown causes the entire byte affected to be turned OFF. Overcurrent conditions are latched, thus keeping the affected channels OFF until reset by the user. In the case of thermal shutdown, once the overheated part has cooled, the byte will turn back ON.

In either case, fault bits are available in the Control and Status Register (CSR) to indicate that shutdown has occurred. Eight bits are available for fault indication. One fault bit is available for every 16 outputs. See Section 4.2.3 for programming information regarding faults.

3.9 LAMP WARMING RESISTORS

Incandescent lamp turn-on/in-rush current can be 10 to 12 times the normal current. If the in-rush current exceeds the VMIVME-2127 channel shutdown threshold, the output driver for that channel will shut down. Lamp warming resistors may be used to minimize this occurrence. See Section 5.6 for information regarding the usage of lamp warming resistors with the VMIVME-2127.

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SECTION 4

PROGRAMMING

4.1 REGISTER MAP

The VMIVME-2127 contains a 16-bit Board ID Register, a 16-bit Control and Status Register (CSR), and eight 16-bit Output Data Registers (ODRs). Register address maps are shown in Table 4.1-1. The ODRs allows control of 128 high voltage, digital output channels and are addressable as four 32-bit longwords, eight 16-bit words, or as sixteen 8-bit bytes. The ODRs can be read under program control for data validation or diagnostic testing. The CSR and Board ID are each addressable as a 16-bit word or as two 8-bit bytes. The ID and CSR bit maps are shown in Table 4.1-2. The ODRs' bit map is shown in Table 4.1-3. The board uses 32 bytes of address space.

Table 4.1-1. Data Register Address Map

OFFSET	MNEMONIC	NAME/FUNCTION
$00	IDU	BOARD ID UPPER BYTE
$01	IDL	BOARD ID LOWER BYTE
$02	CSRU	CSR UPPER BYTE
$03	CSRL	CSR LOWER BYTE
$04 THROUGH $0F	NOT USED *	
$10	DR0U	DATA REGISTER 0 UPPER BYTE
$11	DR0L	DATA REGISTER 0 LOWER BYTE
$12	DR1U	DATA REGISTER 1 UPPER BYTE
$13	DR1L	DATA REGISTER 1 LOWER BYTE
$14	DR2U	DATA REGISTER 2 UPPER BYTE
$15	DR2L	DATA REGISTER 2 LOWER BYTE
$16	DR3U	DATA REGISTER 3 UPPER BYTE
$17	DR3L	DATA REGISTER 3 LOWER BYTE
$18	DR4U	DATA REGISTER 4 UPPER BYTE
$19	DR4L	DATA REGISTER 4 LOWER BYTE
$1A	DR5U	DATA REGISTER 5 UPPER BYTE
$1B	DR5L	DATA REGISTER 5 LOWER BYTE
$1C	DR6U	DATA REGISTER 6 UPPER BYTE
$1D	DR6L	DATA REGISTER 6 LOWER BYTE
$1E	DR7U	DATA REGISTER 7 UPPER BYTE
$1F	DR7L	DATA REGISTER 7 LOWER BYTE

M2127 /T4.1-1

*A read or write access to these addresses will not result in a bus error, however any data written to these addresses will not be stored. Any data read from these addresses will not be meaningful.

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Table 4.1-2. CSR and ID Register Bit Map

$00			BOARD ID UPPER BYTE				(Read Only)
bit 31	bit 30	bit 29	bit 28	bit 27	bit 26	bit 25	bit 24
L	L	H	L	H	L	L	L

$01			BOARD ID LOWER BYTE				(Read Only)
bit 23	bit 22	bit 21	bit 20	bit 19	bit 18	bit 17	bit 16
L	L	L	L	L	L	L	L

$02			CSR UPPER BYTE		(bits10-bit 08 are Read Only)		
bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 09	bit 08
Fail LED*	TEST_ MODE_ P3A_L*	TEST_ MODE_ P3B_L*	TEST_ MODE_ P4A_L*	TEST_ MODE_ P4B_L*	L	L	L

$03			CSR LOWER BYTE				(Read Only)
bit 07	bit 06	bit 05	bit 04	bit 03	bit 02	bit 01	bit 00
FAULT 7*	FAULT 6*	FAULT 5*	FAULT 4*	FAULT 3*	FAULT 2*	FAULT 1*	FAULT 0*

M2127/T4.1-2

* Denotes active low signals.

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Table 4.1-3. Output Data Registers Bit Map

$10	DATA REGISTER 0 UPPER BYTE					(Read/Write)	
bit 31	bit 30	bit 29	bit 28	bit 27	bit 26	bit 25	bit 24
OD127	OD126	OD125	OD124	OD123	OD122	OD121	OD120

$11	DATA REGISTER 0 LOWER BYTE					(Read/Write)	
bit 23	bit 22	bit 21	bit 20	bit 19	bit 18	bit 17	bit 16
OD119	OD118	OD117	OD116	OD115	OD114	OD113	OD112

$12	DATA REGISTER 1 UPPER BYTE					(Read/Write)	
bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 09	bit 08
OD111	OD110	OD109	OD108	OD107	OD106	OD105	OD104

$13	DATA REGISTER 1 LOWER BYTE					(Read/Write)	
bit 07	bit 06	bit 05	bit 04	bit 03	bit 02	bit 01	bit 00
OD103	OD102	OD101	OD100	OD099	OD098	OD097	OD096

0 = OFF

1 = ON

M2127/T4.1-3

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Table 4.1-3. Output Data Registers Bit Map (Continued)

$14	DATA REGISTER 2 UPPER BYTE					(Read/Write)	
bit 31	bit 30	bit 29	bit 28	bit 27	bit 26	bit 25	bit 24
OD095	OD094	OD093	OD092	OD091	OD090	OD089	OD088

$15	DATA REGISTER 2 LOWER BYTE					(Read/Write)	
bit 23	bit 22	bit 21	bit 20	bit 19	bit 18	bit 17	bit 16
OD087	OD086	OD085	OD084	OD083	OD082	OD081	OD080

$16	DATA REGISTER 3 UPPER BYTE					(Read/Write)	
bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 09	bit 08
OD079	OD078	OD077	OD076	OD075	OD074	OD073	OD072

$17	DATA REGISTER 3 LOWER BYTE					(Read/Write)	
bit 07	bit 06	bit 05	bit 04	bit 03	bit 02	bit 01	bit 00
OD071	OD070	OD069	OD068	OD067	OD066	OD065	OD064

0 = OFF
1 = ON

M2127/T4.1-3/2

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Table 4.1-3. Output Data Registers Bit Map (Continued)

$18	DATA REGISTER 4 UPPER BYTE					(Read/Write)	
bit 31	bit 30	bit 29	bit 28	bit 27	bit 26	bit 25	bit 24
OD063	OD062	OD061	OD060	OD059	OD058	OD057	OD056

$19	DATA REGISTER 4 LOWER BYTE					(Read/Write)	
bit 23	bit 22	bit 21	bit 20	bit 19	bit 18	bit 17	bit 16
OD055	OD054	OD053	OD052	OD051	OD050	OD049	OD048

$1A	DATA REGISTER 5 UPPER BYTE					(Read/Write)	
bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 09	bit 08
OD047	OD046	OD045	OD044	OD043	OD042	OD041	OD040

$1B	DATA REGISTER 5 LOWER BYTE					(Read/Write)	
bit 07	bit 06	bit 05	bit 04	bit 03	bit 02	bit 01	bit 00
OD039	OD038	OD037	OD036	OD035	OD034	OD033	OD032

0 = OFF
1 = ON

M2127/T4.1-3/3

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Table 4.1-3. Output Data Registers Bit Map (Concluded)

$1C	DATA REGISTER 6 UPPER BYTE					(Read/Write)	
bit 31	bit 30	bit 29	bit 28	bit 27	bit 26	bit 25	bit 24
OD031	OD030	OD029	OD028	OD027	OD026	OD025	OD024

$1D	DATA REGISTER 6 LOWER BYTE					(Read/Write)	
bit 23	bit 22	bit 21	bit 20	bit 19	bit 18	bit 17	bit 16
OD023	OD022	OD021	OD020	OD019	OD018	OD017	OD016

$1E	DATA REGISTER 7 UPPER BYTE					(Read/Write)	
bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 09	bit 08
OD015	OD014	OD013	OD012	OD011	OD010	OD009	OD008

$1F	DATA REGISTER 7 LOWER BYTE					(Read/Write)	
bit 07	bit 06	bit 05	bit 04	bit 03	bit 02	bit 01	bit 00
OD007	OD006	OD005	OD004	OD003	OD002	OD001	OD000

0 = OFF
1 = ON

M2127/T4.1-3/4

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4.2 DETAILED PROGRAMMING

4.2.1 Output Data Transfers

The register bit map in Section 4.1 shows the correspondence between the ODRs (DR0 to DR7) and the output data channels 127 to 0.

NOTE

DO NOT ASSUME THAT THE OUTPUT DATA REGISTERS ARE CLEARED AT SYSTEM RESET. THE USER MUST WRITE ZEROS TO A DATA REGISTER TO BE ASSURED THAT IT IS CLEARED.

4.2.2 Built-in-Test

The Built-in-Test features of the VMIVME-2127 provides the user with the capability of real-time readback data verification and off-line diagnostic execution. The off-line Built-in-Test feature is initiated by setting the Test Mode (TM) bits in the CSR to a logic "zero". When the TM bits are zero, the output drivers are tristated, and test data can be written to the selected Data Register and read back on a *read* transfer without affecting the user's equipment. Data can also be read back when Test Mode is OFF. This permits on-line testing of the board. The TM bits are organized as shown in Table 4.2.2-1. The two P3 TM bits can be used to tristate the P3 outputs. Likewise, the two P4 TM bits can be used to tristate the P4 outputs.

The TM bits and the Fail LED control bit are initialized ACTIVE at power-up or upon system reset. Thus, the Fail LED is ON and the output drivers are DISABLED. Simplified programming flowcharts are shown in Figures 4.2.2-1 and 4.2.2-2.

Table 4.2.2-1. Organization of Test Mode Bits and Fault Bits

The corresponding CSR bit numbers are shown in parenthesis.

FAULT SIGNAL NAME	TM BIT SIGNAL NAME	OUTPUT CHANNELS AFFECTED
Fault 7* (07)	Test_Mode_P3A_L (14)	OD112 through OD127
Fault 6* (06)	Test_Mode_P3A_L (14)	OD96 through OD111
Fault 5* (05)	Test_Mode_P3B_L (13)	OD80 through OD95
Fault 4* (04)	Test_Mode_P3B_L (13)	OD64 through OD79
Fault 3* (03)	Test_Mode_P4A_L (12)	OD48 through OD63
Fault 2* (02)	Test_Mode_P4A_L (12)	OD32 through OD47
Fault 1* (01)	Test_Mode_P4B_L (11)	OD16 through OD31
Fault 0* (00)	Test_Mode_P4B_L (11)	OD00 through OD15

M2127/T4.2.2-1

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4.2.3 Faults

There are eight fault bits in the CSR as shown in Table 4.1-2. Each fault bit corresponds with 16 output bits as shown in Table 4.2.2-1. If a fault bit in the CSR is zero, either one (or more) of the channels associated with this fault bit has experienced a short circuit condition or one of the two bytes associated with this fault bit was experiencing thermal shutdown at the time the CSR was read. Once a short circuit condition occurs, the channel that has experienced it will remain OFF, and the fault bit will remain active, until the TM bit associated with this channel is set to zero for at least 1 µsec. A system reset will also return all of the fault bits back to their inactive states (ones). The TM bits and the fault bits are organized as shown in Table 4.2.2-1.

EXAMPLE: If a short circuit condition occurs on channel 52, FAULT 3* will become active (zero). To turn channel 52 back ON and return FAULT 3* back to its inactive state (one), TEST_MODE_P4A_L (CSR bit 12) must be set to zero for at least 1 µsec and then returned to a one.

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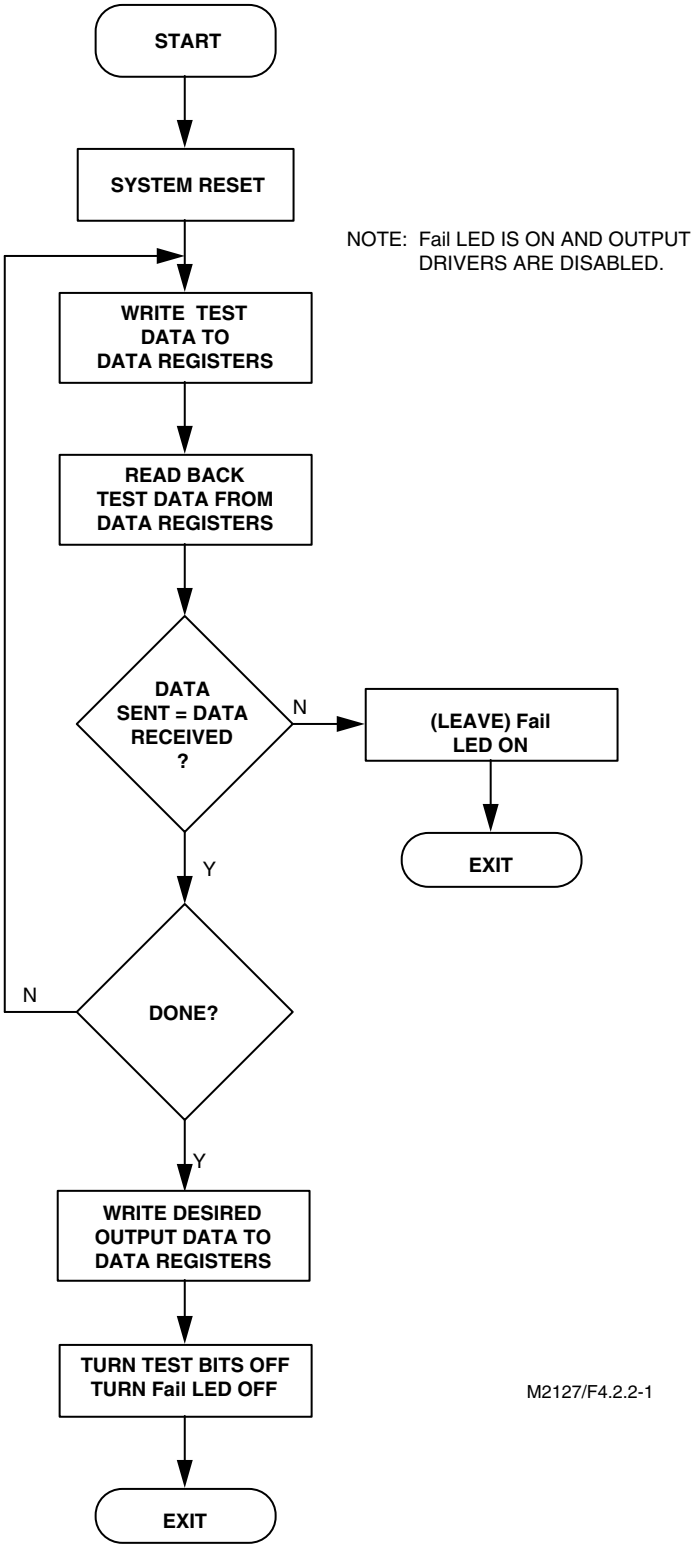


Figure 4.2.2-1. Programming Flowchart (Initialization with Off-Line Testing)

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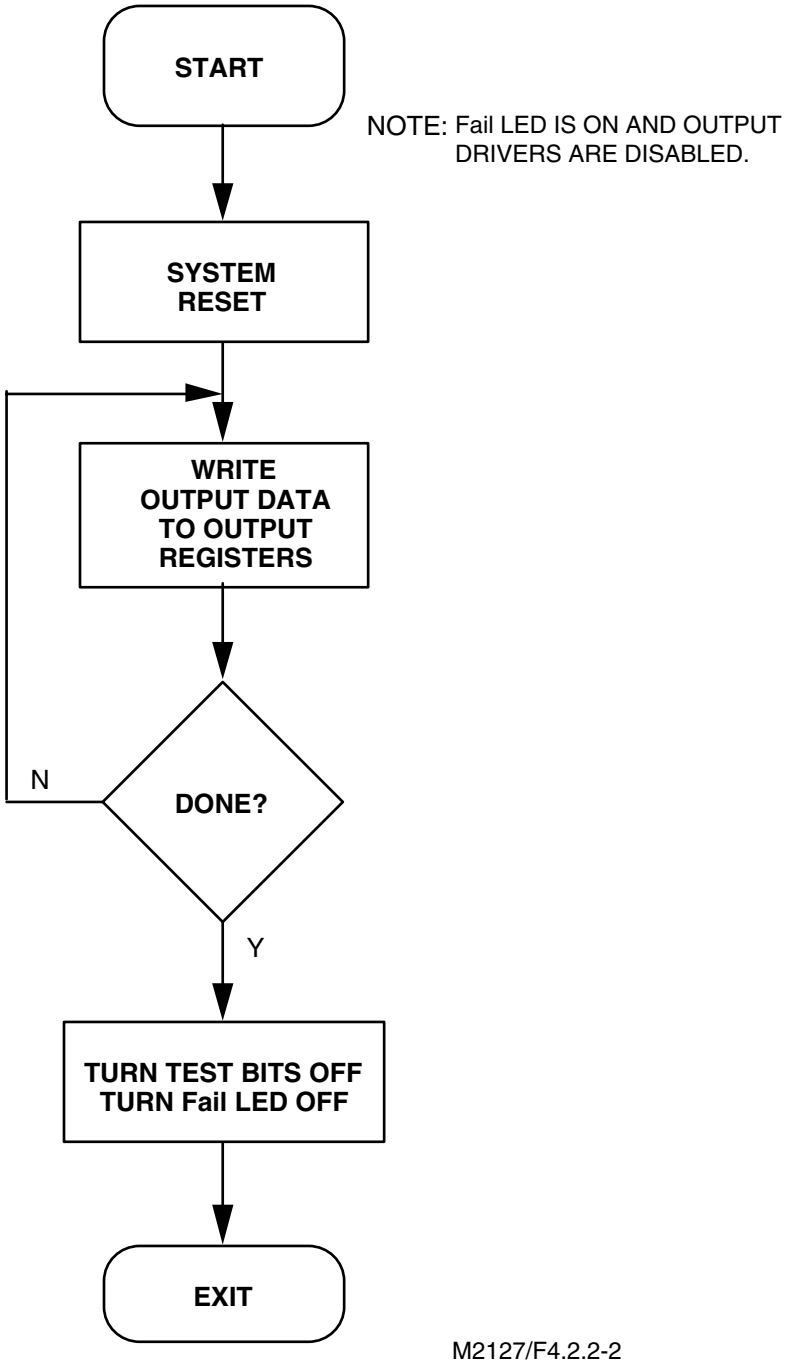


Figure 4.2.2-2. Programming Flowchart (Initialization without Off-Line Testing)

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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 printed 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 concerning the disposition of the damaged item(s).

5.2 JUMPER AND SWITCH LOCATIONS

The physical locations of the jumpers described in this section are shown in Figure 5.2-1.

5.3 ADDRESS MODIFIERS

The VMIVME-2127 is configured at the factory, as shown in Figure 5.3-1, to respond to short supervisory I/O access. This configuration can be changed by installing jumpers at the appropriate locations in header E1 as shown in the corresponding figures.

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I/O ACCESS	CORRESPONDING FIGURE
Short Supervisory	Figure 5.3-1 (Factory Configuration)
Standard Supervisory	Figure 5.3-2
Short Nonprivileged	Figure 5.3-3
Standard Nonprivileged	Figure 5.3-4
Short (Responds to either Supervisory or Nonprivileged)	Figure 5.3-5
Standard (Responds to either Supervisory or Nonprivileged)	Figure 5.3-6

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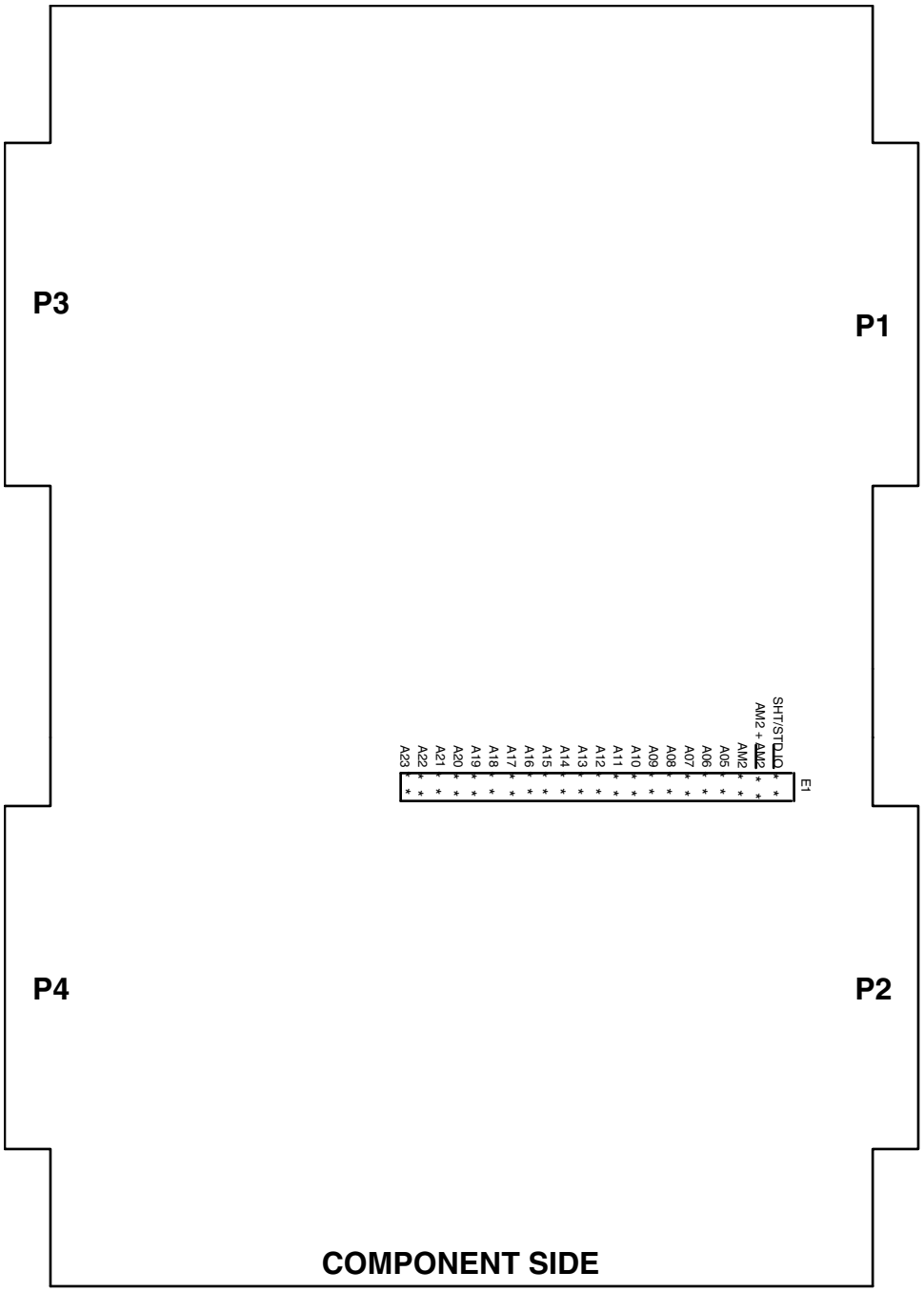
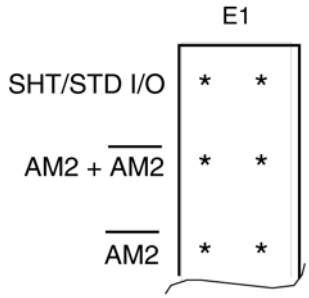


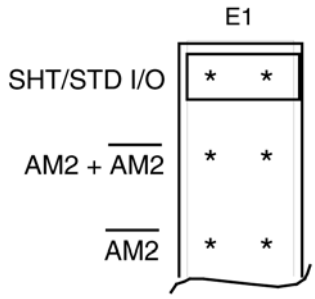
Figure 5.2-1. Jumper Locations

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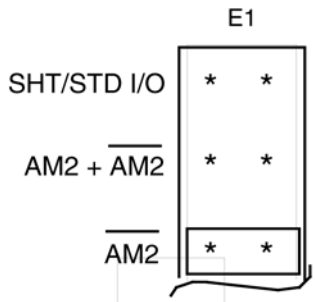
M2127/F5.3-1

Figure 5.3-1. Jumper Configuration for Short Supervisory Access



M2127/F5.3-2

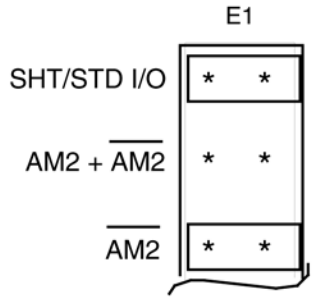
Figure 5.3-2. Jumper Configuration for Standard Supervisory Access



M2127/F5.3-3

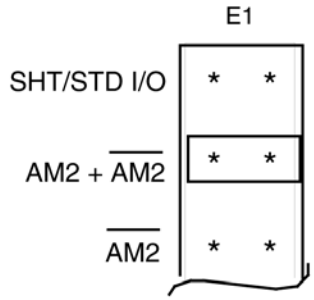
Figure 5.3-3. Jumper Configuration for Short Nonprivileged Access

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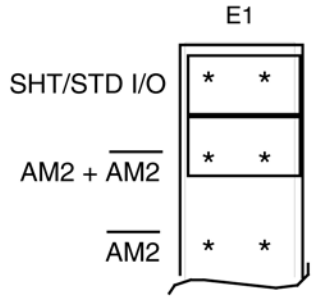
M2127/F5.3-4

Figure 5.3-4. Jumper Configuration for Standard Nonprivileged Access



M2127/F5.3-5

Figure 5.3-5. Jumper Configuration for Short Addressing and Supervisory or Nonprivileged Access



M2127/F5.3-6

Figure 5.3-6. Jumper Configuration for Standard Addressing and Supervisory or Nonprivileged Access

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5.4 ADDRESS SELECTION JUMPERS

The VMIVME-2127 is designed with a bank of address select jumpers that specify the beginning board address for data transfers. The address selection jumpers are shown in Figure 5.4-1. The VMIVME-2127 is factory configured to respond to 0000 HEX in short supervisory or nonprivileged space.

5.5 I/O CABLE AND FRONT PANEL CONNECTOR CONFIGURATION

The output connectors (P3 and P4) on the VMIVME-2127 are 96-pin DIN standard and were selected by VMIC because of their high quality. Although these connectors are generally used with flat-ribbon cables, a variety of cables and mating connectors are available for most user requirements. The user should refer to VMIC's Connector and I/O Cable Application Guide (VMIC Document No. 825-000000-006) for additional information concerning the variety of possible cabling and connector types available.

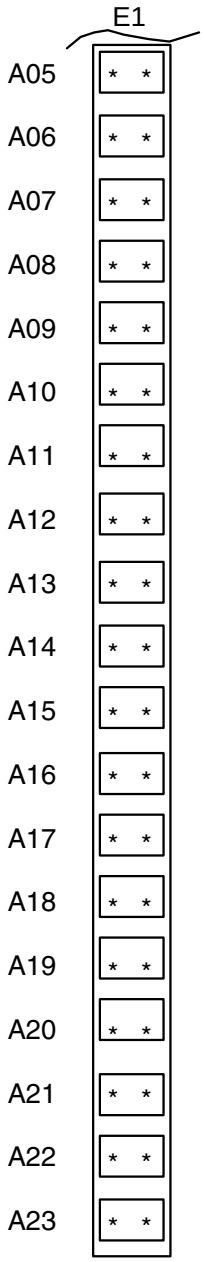
Details concerning connector P2 user I/O pins and the use of the external voltage input is shown in Figure 5.5-1 and Table 5.5-1. Connector pin configurations for P3 and P4 are shown in Figures 5.5-2 and 5.5-3, and Tables 5.5-2 and 5.5-3. Recommended connector components for cabling to P3 and P4 are listed in the VMIVME-2127 Specification (800-002127-000).

The VMIVME-2127 Board was designed to be operated as shown in Figure 5.5-4 and Figure 5.5-5. Figure 5.5-4 is a block diagram showing the VMIVME-2127 with the user-supplied external voltage connections made at P2. Figure 5.5-5 is a block diagram showing the VMIVME-2127 with the user-supplied external voltage connections made at P3 and P4. To facilitate connections made at P2 as shown in Figure 5.5-4, VMIC offers the VMIACC-0127 P2 Power Accessory which is recommended but is not required. The VMIACC-0127 can be slid over the wire-wrap pins on the rear side of a P2 backplane, thus making it convenient for the user to supply up to 40 A of continuous current to the VMIVME-2127.

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*    CAUTION    *
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IT IS IMPORTANT THAT THE VMIVME-2127 BE CONNECTED TO EXTERNAL POWER AS SHOWN IN EITHER FIGURE 5.5-4 OR FIGURE 5.5-5. FAILURE TO DO SO COULD RESULT IN DAMAGE TO THE BOARD AND/OR SYSTEM THE BOARD IS INSTALLED IN.

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The example shown is for a short I/O base address of 0000 HEX (000000 for standard I/O access).

Figure 5.4-1. Base Address Select Jumpers

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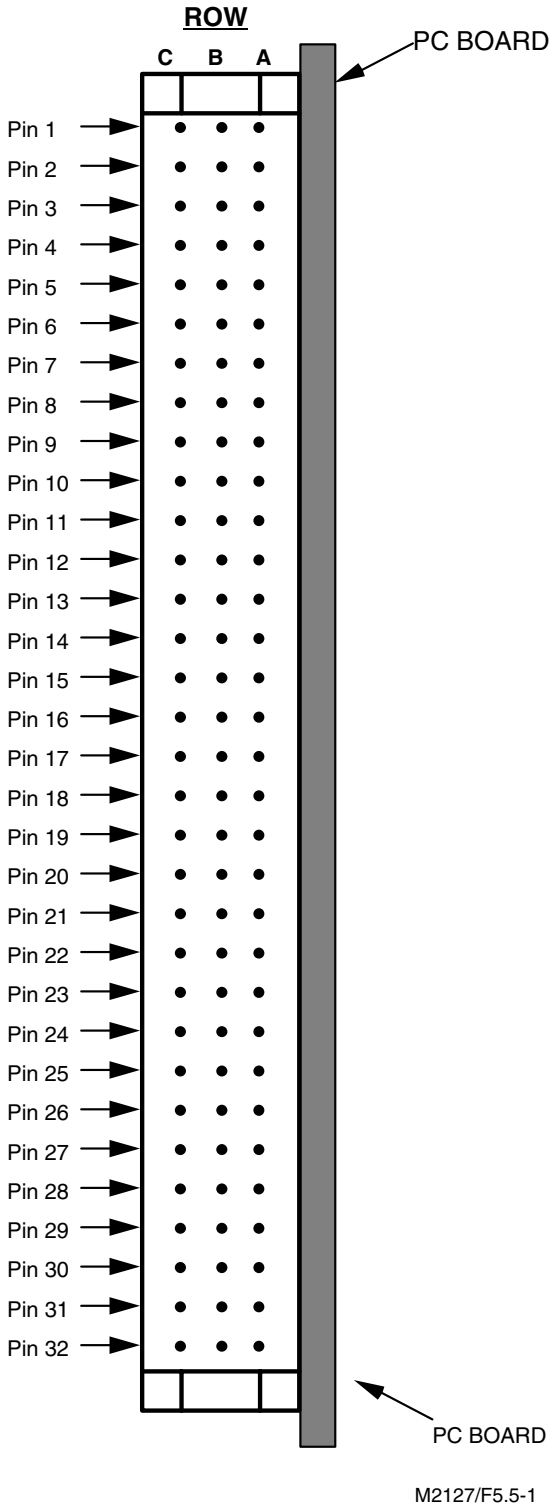


Figure 5.5-1. P2 Connector - Pin Layout

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Table 5.5-1. P2 Connector Pin Assignments

PIN NO.	ROW A	ROW B	ROW C
1	VEXT	+5 V	N/C
2	VEXT	GND	N/C
3	VEXT	N/C	N/C
4	VEXT	N/C	N/C
5	VEXT	N/C	N/C
6	VEXT	N/C	N/C
7	VEXT	N/C	N/C
8	VEXT	N/C	N/C
9	VEXT	N/C	N/C
10	VEXT	N/C	N/C
11	VEXT	N/C	N/C
12	VEXT	GND	N/C
13	VEXT	+5 V	N/C
14	VEXT	D16	N/C
15	VEXT	D17	N/C
16	VEXT	D18	N/C
17	VEXT	D19	N/C
18	VEXT	D20	N/C
19	VEXT	D21	N/C
20	VEXT	D22	N/C
21	VEXT	D23	N/C
22	VEXT	GND	N/C
23	VEXT	D24	N/C
24	VEXT	D25	N/C
25	VEXT	D26	N/C
26	VEXT	D27	N/C
27	VEXT	D28	N/C
28	VEXT	D29	N/C
29	VEXT	D30	N/C
30	VEXT	D31	N/C
31	UGND	GND	N/C
32	UGND	+5 V	N/C

M2127/T5.5-1

NOTE: External Voltage and User Ground (UGND) are supplied by the user.

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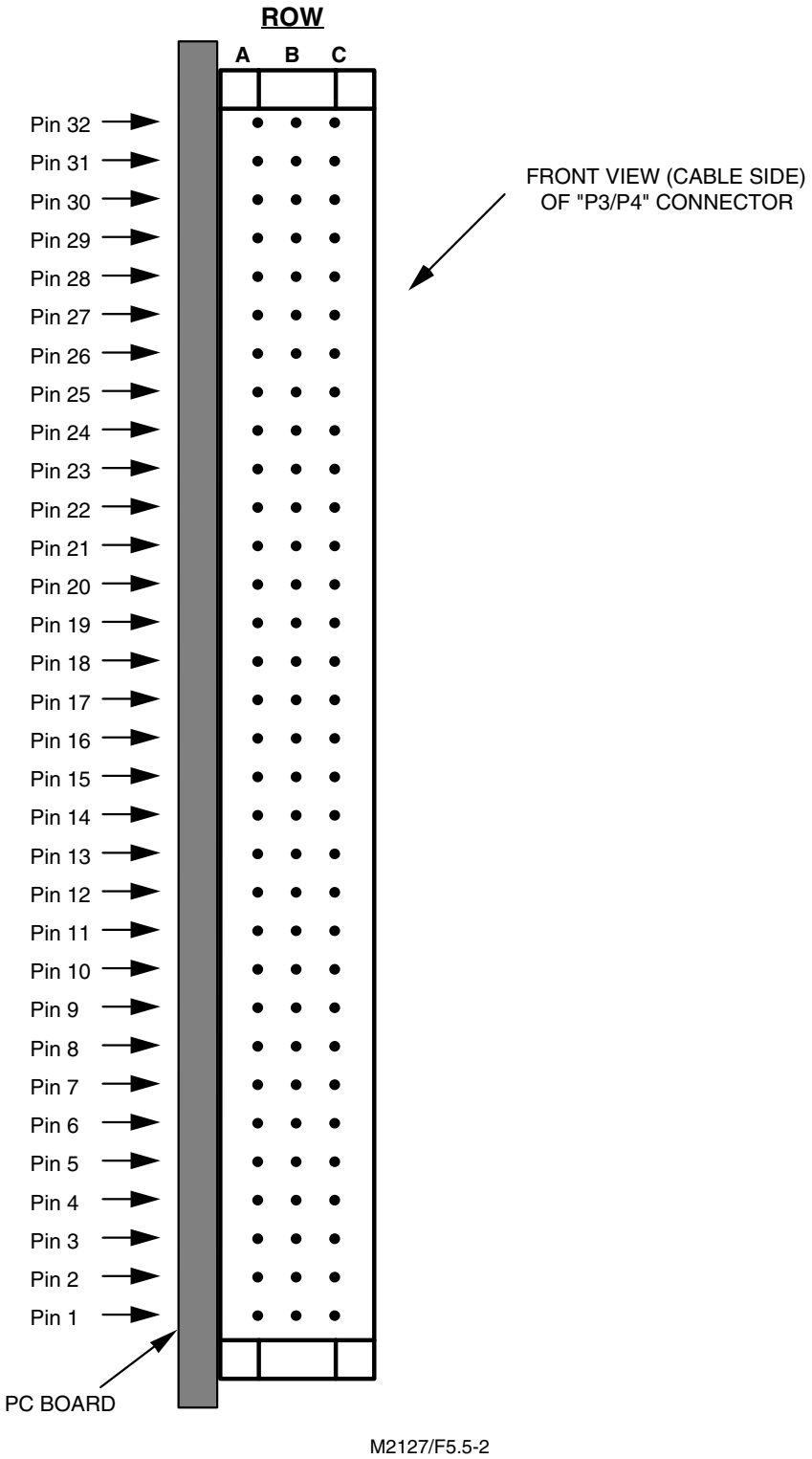


Figure 5.5-2. P3/P4 Connector - Pin Layout

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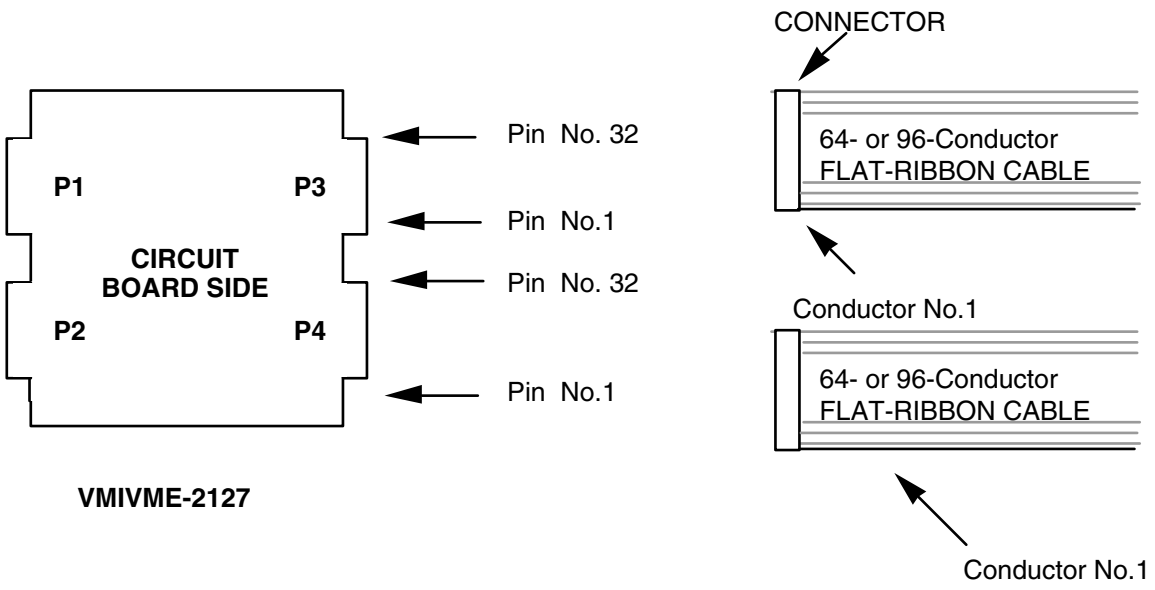


Figure 5.5-3. Cable Connector Configuration

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Table 5.5-2. P3 Pin - Channel Assignments

P3		P3	
ROW C Pin	CHANNEL No.	ROW A PIn	CHANNEL No.
32	127	32	95
31	126	31	94
30	125	30	93
29	124	29	92
28	123	28	91
27	122	27	90
26	121	26	89
25	120	25	88
24	119	24	87
23	118	23	86
22	117	22	85
21	116	21	84
20	115	20	83
19	114	19	82
18	113	18	81
17	112	17	80
16	111	16	79
15	110	15	78
14	109	14	77
13	108	13	76
12	107	12	75
11	106	11	74
10	105	10	73
09	104	09	72
08	103	08	71
07	102	07	70
06	101	06	69
05	100	05	68
04	99	04	67
03	98	03	66
02	97	02	65
01	96	01	64

M2127/T5.5-2

ROW B CONNECTIONS ARE IDENTICAL TO P2 ROW A AS SHOWN IN TABLE 5.5-1.

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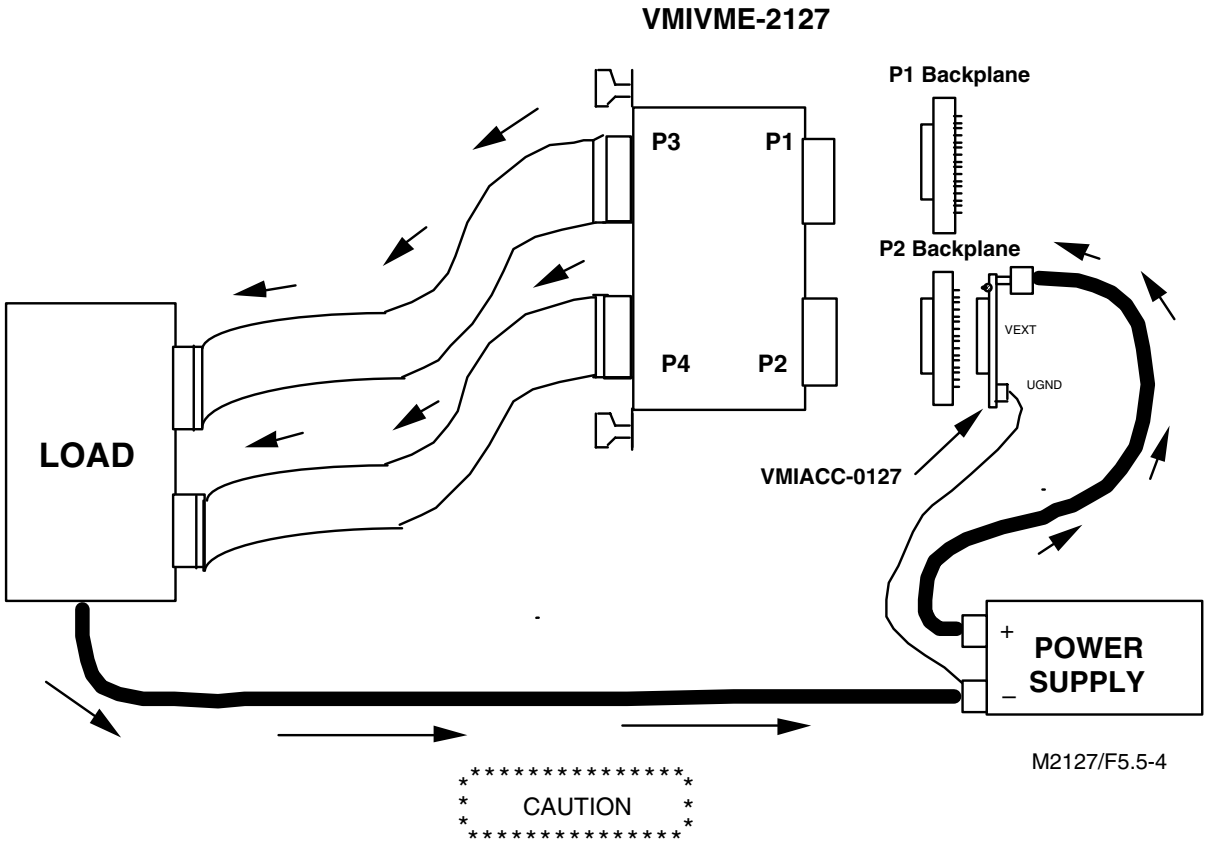
Table 5.5-3. P4 Pin - Channel Assignments

P4		P4	
ROW C PIn	CHANNEL No.	ROW A Pin	CHANNEL No.
32	63	32	31
31	62	31	30
30	61	30	29
29	60	29	28
28	59	28	27
27	58	27	26
26	57	26	25
25	56	25	24
24	55	24	23
23	54	23	22
22	53	22	21
21	52	21	20
20	51	20	19
19	50	19	18
18	49	18	17
17	48	17	16
16	47	16	15
15	46	15	14
14	45	14	13
13	44	13	12
12	43	12	11
11	42	11	10
10	41	10	09
09	40	09	08
08	39	08	07
07	38	07	06
06	37	06	05
05	36	05	04
04	35	04	03
03	34	03	02
02	33	02	01
01	32	01	00

M2127/T5.5-3

ROW B CONNECTIONS ARE IDENTICAL TO P2 ROW A AS SHOWN IN TABLE 5.5-1.

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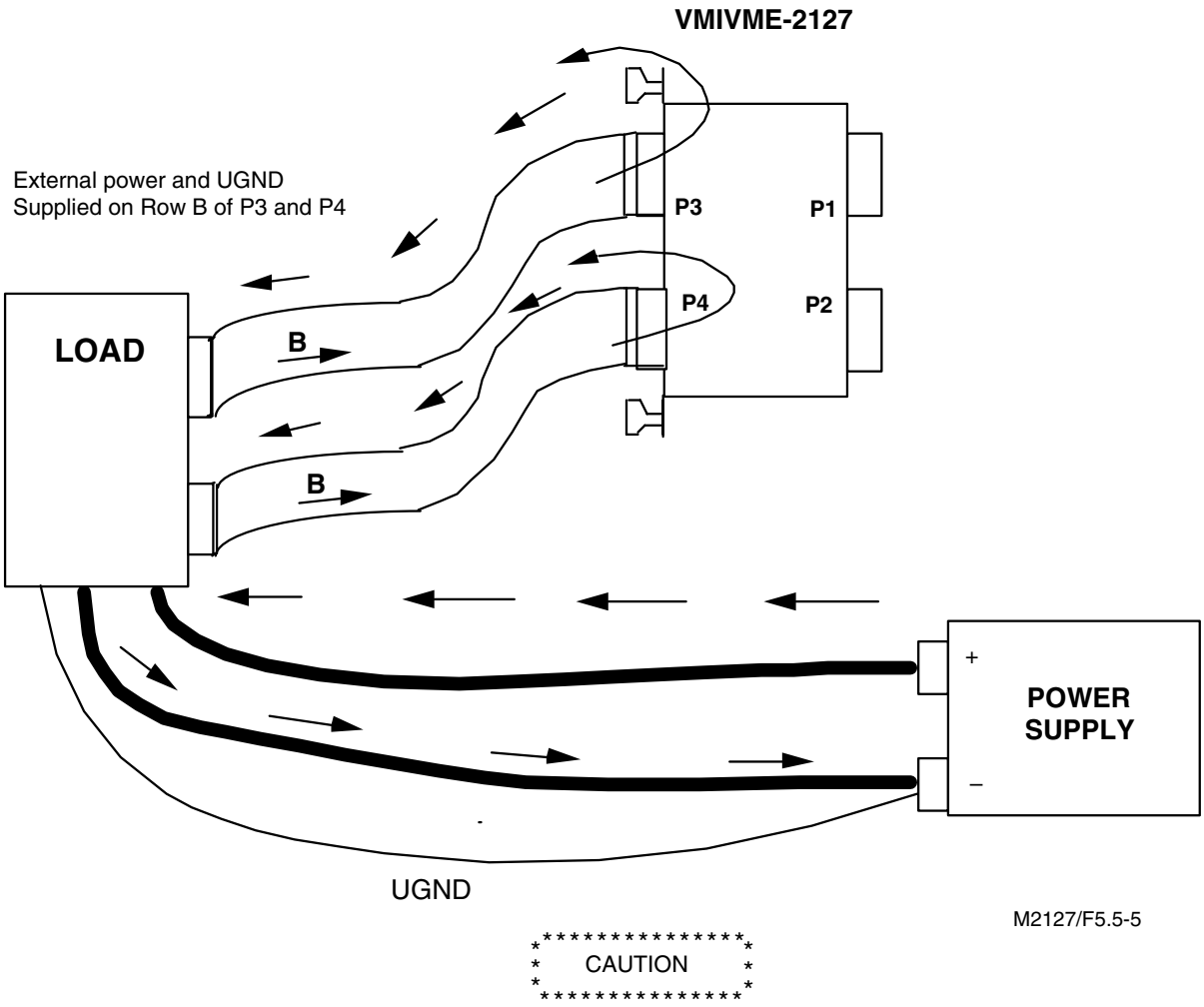


CAUTION

THE ARROWS DENOTE CURRENT FLOW. IT IS VERY IMPORTANT THAT THE CURRENT IS RETURNED TO THE POWER SUPPLY AS SHOWN AND IS NOT RETURNED THROUGH THE VMIVME-2127

Figure 5.5-4. P2 External Power Connections

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CAUTION

THE ARROWS DENOTE CURRENT FLOW. IT IS VERY IMPORTANT THAT THE CURRENT IS RETURNED TO THE POWER SUPPLY AS SHOWN AND IS NOT RETURNED THROUGH THE VMIVME-2127. THE ARROWS LABELLED "B" SHOW THE CURRENT SUPPLIED TO THE VMIVME-2127 ON ROW B OF P3 AND P4.

Figure 5.5-5. P3 and P4 External Power Connections

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5.6 LAMP WARMING RESISTORS

The VMIVME-2127 provides 16 empty 10-pin SIP sockets for the user to supply lamp warming resistors if he/she so desires. These resistors must be 10-pin bussed resistor SIPS. It is the user's responsibility to determine the proper resistance value. See schematic sheets 10 through 25 in Appendix A for the circuit implementation of the warming resistors (RP1-RP16). Also, see Figure 5.6-1 for the board location and orientation of the warming resistors.

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THE USER MUST NOT EXCEED THE POWER RATINGS OF THE WARMING RESISTOR CHOSEN. DOING SO COULD CAUSE THE RESISTOR TO OVERHEAT.

Example: Two 40 mA, 28 V filament lamps may have as much as (40 mA x 2) x12= 960 mA of cold filament in-rush current. The warming resistors should draw approximately 10 percent of the rated (warm) current of the lamp or lamps in use. For this example, the current would be (40 mA x 2) x 0.1 = 8 mA. Since the warming resistor value will be at least 10 times greater than the resistance of the lamp itself, the following formula can be used to calculate the warming resistance. R = 28 V/0.008 mA = 3,500 Ω. The power dissipated by these resistors would then be $P = I^2 * R = (0.008A)^2 * 3500\ \Omega = 0.224$ W. It is recommended that the user try out the selected values to ensure that they are functioning correctly.

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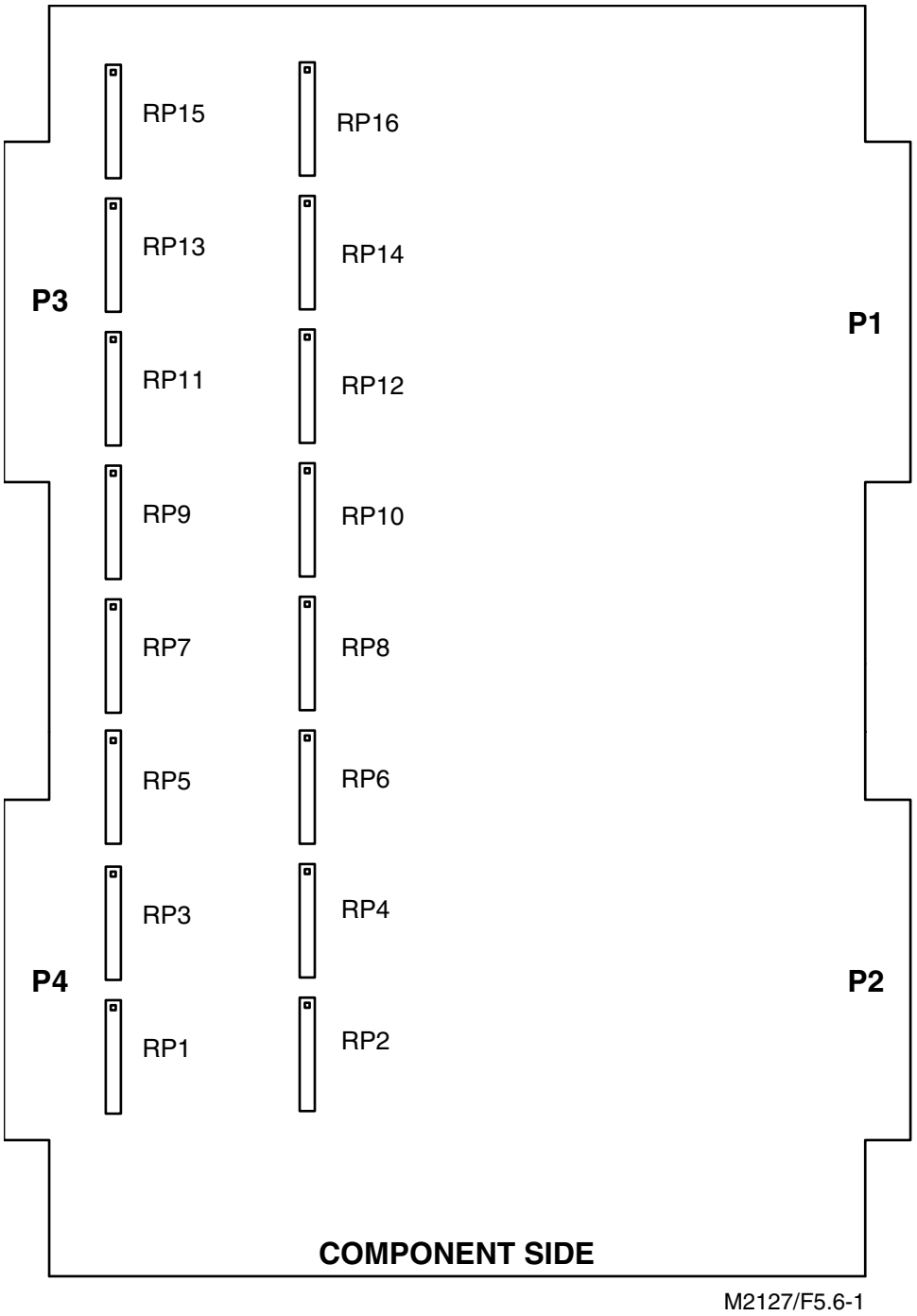


Figure 5.6-1. Lamp Warming Resistor Locations

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SECTION 6

MAINTENANCE AND WARRANTY

6.1 MAINTENANCE

This section of the technical manual provides information relative to the care and maintenance of VMIC's products. Should the products malfunction, the user should verify the following:

a. Software
b. System configuration
c. Electrical connections
d. Jumper or configuration options
e. Boards 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 VMEbus card cage
h. Quality of cables and I/O connections

User level repairs are not recommended. Contact VMIC for a Return Material Authorization (RMA) Number. This RMA Number must be obtained prior to any return.

6.2 MAINTENANCE PRINTS

The appendix(ices) to this manual contain(s) drawings and diagrams for reference purposes.

6.3 WARRANTY

VMIC's Standard Products are warranted to be free from defects in material and workmanship for a period of two years (24 months) from the date of shipment. In discharge of this warranty, VMIC, at its option, agrees to either repair or replace, at VMIC's facility and at VMIC's discretion, any part, component, subassembly accessory, or any hardware, software, or system product, which under proper and normal use proves defective in material and workmanship.

The customer shall provide notice to VMIC of each such defect within a reasonable time after the customer's discovery of such defect.

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In order to return the defective product(s) or part(s), the customer must contact VMIC's Customer Service Department to obtain a Call Ticket Number. The defective product(s) or part(s) must also be properly boxed and weighed. After a VMIC Call Ticket Number and RMA Number have been obtained, the defective product(s) or part(s) may be returned (transportation collect for surface UPS) to VMIC. Any replaced or repaired product(s) or part(s) will be shipped back to the customer's at the expense of VMIC (also UPS surface).

The customer should be aware that the above process can sometimes take up to eight (8) days for the shipment to reach VMIC. The customer has the option to ship the defective product(s) or part(s) at the customer's own expense if the customer cannot afford this possible delay.

There shall be no warranty or liability on any VMIC product(s) or part(s) that is (are) damaged or subjected to accident(s), perils of nature, negligence, overtemperature, overvoltage, misapplication of electrical power, insertion or removal of boards from backplanes and/or I/O connectors with power applied by the customer(s), appointee(s), or any other person(s) without the expressed approval of VMIC.

Final determination of warranty eligibility shall be made by VMIC, and if a warranty claim is considered invalid for any reason, the customer will be charged for services performed and expenses incurred by VMIC in repair, handling and shipping the returned product or part. Determination as to whether the item is within warranty, coverage shall not be unreasonably withheld.

The warranty period of the replacement or repaired product(s) or part(s) shall terminate with the termination of the warranty period with respect to the original product(s) or part(s) for all replacement parts supplied or repairs made during the original warranty period.

THE FOREGOING WARRANTY AND REMEDY ARE EXCLUSIVE AND VMIC SHALL HAVE NO OTHER OR ADDITIONAL LIABILITY TO BUYER OR TO ANYONE CLAIMING UNDER BUYER (THIRD PARTY) UNDER ANY OTHER AGREEMENT OR WARRANTY, EXPRESS OR IMPLIED EITHER IN FACT OR BY OPERATION OF THE LAW, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS, STATUTORY, OR OTHERWISE. VMIC SHALL HAVE NO LIABILITY FOR SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND OR FROM ANY CAUSE ARISING OUT OF THE INSTALLATION OR USE OF ANY PRODUCT FURNISHED HEREUNDER.

6.4 OUT-OF-WARRANTY REPAIR POLICY

The following sections describe VMIC's policy on repairs and warranties on repaired products.

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6.4.1 Repair Category

VMIC's repair policy of standard products is divided into two categories, depending on the item to be repaired. These categories are:

a. Product Exchange
b. Fixed Price Repair

Category 1 (product exchange) represents the fastest turn around of the two categories. In this case, the customer sends the malfunctioning product to VMIC. VMIC will return an operational product to the customer within 72 hours of receipt provided VMIC has the product in stock.

Provided that the returned product is repairable customers should contact VMIC prior to returning products for repair to determine stocking status.

Category 2 (Fixed Price Repair) applies to products returned to VMIC for repair and subsequent return to the customer.

Return authorizations are required on all product repairs, and all purchase orders should refer to VMIC's RMA Number which is assigned by VMIC's Customer Service Department.

6.4.2 Repair Pricing

Contact your factory representative for repair pricing. Current pricing can be found in the Repair and Replacement Policy in the most current Standard Conditions of Sales Document (F0109-91). Refer to exclusions (Section 6.4.7).

6.4.3 Payment

Payment is due upon delivery or at VMIC's option, net thirty (30) days from the date of delivery. Payment should be made to:

VME Microsystems International Corporation
12090 South Memorial Parkway
Huntsville, Alabama 35803-3308
Attention: Accounts Receivable

VMIC allows a one (1) percent discount for payment made within ten (10) days of invoice date or a two (2) percent discount on payment made prior to shipment of order. This payment discount, however, does not apply to freight.

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6.4.4 Shipping Charges

Shipping charges are the customer's responsibility, with the exception of warranty repairs, whereby VMIC will pay the return to customer shipping charges.

6.4.5 Shipping Instructions

The type of packaging used to ship the product depends on whether the product is shipped singly, in a chassis, or packaged with other boards. The shipper should carefully pack the product(s), using the same precautions listed in the "unpacking procedures". The user should utilize the same (or equivalent) protective packaging container for re-shipment as provided by VMIC. Approved ESD procedures are recommended when handling VMIC's products.

6.4.6 Warranty on Repairs

Products repaired by VMIC are warranted against defects in workmanship and material for a period of ninety (90) days from date of shipment to the customer for all products that were repaired out of warranty. See Standard Conditions of Sale for products repaired within the warranty.

6.4.7 Exclusions

Repair rates may not apply to products which have received unusual physical or electrical damage. In such cases, VMIC will provide an estimated price for product repair or replacement. The customer may then choose to have the product repaired at the estimated price, returned unrepaired at no charge, or replaced at VMIC's current list price.

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APPENDIX A

ASSEMBLY DRAWING, PARTS LIST, AND SCHEMATIC

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