Model 7107 VME CHASSIS

Operation and Maintenance Manual

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TABLE OF CONTENTS

Data Rights Provision i
1. CONFIGURATION 1
1.1. Introduction 1

2. GENERAL INFORMATION 4
2.1. Introduction 4
2.2. Application Documents 4
2.3. Equipment Description 4
2.3.1. Backplane/Cardcage 4
2.3.2. Power Subsystem 4
2.3.3. System Environmental Monitoring Board 5
2.3.4. Peripheral Subsystem 5
2.3.5. Cooling System 5
2.3.6. Operator Control Panel 5
2.3.7. Input/Output Interfaces 5
2.4. Specifications 5

3. INSTALLATION 7
3.1. Introduction 7
3.2. Unpacking 7
3.3. Chassis Installation 7
3.3.1. Rack-Mount Configuration 7
3.3.2. Fixed-Installation Configuration 7
3.4. External Cable Installation 9

4. OPERATION 10
4.1. Introduction 10
4.2. Controls and Indicators 10
4.3. Initial Operation 10
4.4. System Software Installation 10
4.5. Normal Operation 10
4.6. Fault Conditions 13
4.7. Shutdown 13
4.8. RS-232 Remote Status Query 13

5. FUNCTIONAL DESCRIPTION 15
5.1. Introduction 15
5.1.1. Power Distribution 15
5.1.2. System Environmental Monitoring Board 15
5.1.3. VMEbus 15
5.1.4. Peripheral Subsystem 18

5.1.5. Cooling System 18

6. MAINTENANCE 20
6.1. Introduction 20
6.2. Tools 20
6.3. Periodic Maintenance 20
6.4. Firmware Upgrades 20
6.5. Fault Isolation 21
6.6. Replaceable Components and Subassemblies 22
6.6.1. VME Modules 24
6.6.2. Peripheral Devices 24
6.6.2.1. Removable Peripherals (Kingston Removable Drive System) 24
6.6.2.2. Fixed-Installation Peripherals 24
6.6.3. Dust Filter 25
6.6.4. Primary Power Supply 25
6.6.5. System Environmental Monitoring Board/ Fan Power Supply 26
6.6.6. Operator Control Panel 26
6.6.7. Cooling Fans 26
6.6.8. Circuit Breaker Switch 27
6.6.8.1. Standalone Switch 27
6.6.8.2. Switch Harness Assembly 27
6.6.9. Electromagnetic Interference Filter 28
6.7. Storage and Transportation 28

FIGURES

Figure 3-1. Rack-Mount Configuration Outline Dimensions 8
Figure 3-2. Rear Panel 9

Figure 4-1. Front Panel 11

Figure 5-1. Chassis Interconnection 16
Figure 5-2. Interconnection Diagram 19

Figure 6-1. System Environmental Monitoring Board RS-232 Interface Connector 21
Figure 6.2. Replaceable Unit Locations 23

TABLES

Table 1-1. System Configuration 1
Table 1-2. Backplane Assignments 1
Table 1-3. Peripheral Devices 2
Table 1-4. External Interfaces 2
Table 1-5. Field Replaceable Units 3

Table 2-1. Physical Specifications 5
Table 2-2. Electrical Specifications 6
Table 2-3. Environmental Specifications 6

Table 4-1. Controls and Indicators 12

Table 5-1. System Environmental Monitoring Board Warning and Fault Limits 17

Table 6-1. Fault Isolation 22

1. CONFIGURATION

1.1. Introduction

This chapter defines the configuration for a specific ruggedized Versa Module Eurocard (VME) chassis. Information is provided concerning the following equipment elements:

- Table 1-1: System Configuration
- Table 1-2: Backplane Assignments
- Table 1-3: Peripheral Devices
- Table 1-4: External Interfaces
- Table 1-5: Field Replaceable Units

Table 1-1. Backplane Assignments

Slot	Device	Slot	Device
1	THEMIS VME BD	10	THEMIS VME BD
2	THEMIS VME DAUGHTER BD	11	THEMIS VME DAUGHTER BD
3	Blank	12	Blank
4	Blank	13	RESERVED FOR THEMIS VME BD
5	Blank	14	RESERVED FOR THEMIS VME DAUGHTER BD
6	THEMIS VME BD	15	Blank
7	THEMIS VME DAUGHTER BD	16	RESERVED FOR THEMIS VME BD
8	Serial 16 Port BD	17	RESERVED FOR THEMIS VME DAUGHTER BD
9	Blank	18	Blank

Table 1-3. Peripheral Devices

Bay	Device	SCSI ID	Bay	Device	SCSI ID
A21	RWB and JMCIS Control Compact Disk-Read-Only Memory (CD-ROM)	6	A24	Removable Drive Module Control Processor and Info Transfer	0
A22	Removable Drive Module (Spare)	0	A25	Removable Drive Module Gate Guard	0
A23	Removable Drive Module RWB/JMCIS	0	A26	Removable Drive Module (Spare)	0

Table 1-4. External Interfaces 140275-100

Jack	Signal	Connector
J2	10/100 BASET ENET	RJ-45 Female
J3	10/100 BASET ENET	RJ-45 Female
J4	10/100 BASET ENET	RJ-45 Female
J5	10/100 BASET ENET	RJ-45 Female
J6	RS232 UPS	DB-15 Female
J7	RS422	DB-15 Female
J8	RS422	DB-15 Female
J9	RS422	DB-15 Female
J10	RS422	DB-15 Female
J11	RS422	DB-15 Female
J12	RS422	DB-15 Female
J13	RS422	DB-15 Female
J14	RS422	DB-15 Female
J15	10/100 BASET ENET	RJ-45 Female
J16	NOT USED	
J17	NOT USED	
J18	NOT USED	
J19	NOT USED	
J20	NOT USED	
J21	RWB EW AUDIO	Twinax
J22	10 BASET ENET	DB-9 Female
J28	10/100 BASET ENET	RJ-45 Female

Table 1-5. Field Replaceable Units

Description	Part No.
Power Supply Assembly, Single Phase (PH), alternating current (ac)	
Power Supply Assembly, 24 Volts direct current (Vdc)	
Operator Control Panel Assembly	
Fan, 24 Vdc	
Cable Assembly, Thermistor	
Cable Assembly, Alarm	

2. GENERAL INFORMATION

2.1. Introduction

This manual provides information and instructions required for the operation and maintenance of the ruggedized VME Chassis manufactured by DataMetrics Corporation (DMC).

2.2. Applicable Documents

Military Standards

MIL-STD-461E	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
MIL-STD-810E	Environmental Engineering Considerations and Laboratory Tests

Commercial Standards

ANSI/IEEE 1014.1987	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference

2.3. Equipment Description

The VME chassis is a ruggedized VMEbus platform with integrated peripheral subsystem. The equipment is packaged using environmental management techniques that protect internal components from shock, vibration, temperature extremes, and electromagnetic interference/radio frequency interference (EMI/RFI). The chassis is provided in rack-mount configuration. The VME chassis includes the following primary functional elements:

- Backplane/cardcage
- Power subsystem
- System Environmental Monitor
- Peripheral subsystem
- Cooling system
- Operator Control Panel (OCP)
- Input/output (I/O) interfaces

2.3.1. Backplane/Cardcage

The VME chassis incorporates an 18-slot cardcage, multiple backplane assembly, which supports dual-height [6U x 188 millimeter (mm)] VME modules. Supported devices include central processing unit (CPU), memory, and I/O modules. The backplane is an industry-standard J1/J2 configuration that supports the VME specification (ANSI/IEEE 1014.1987). The backplane may be configured for voice message exchange (VMX), VSB, or user-defined signals. The cardcage can accommodate single-height VME modules when an adapter is used. VME modules optionally installed by procuring agency are identified in Chapter 1.

2.3.2. Power Subsystem

The power subsystem includes an EMI filter, power switch/circuit breaker, primary power supply, and system environmental monitoring board (SEMB)/fan power supply. The primary power supply configuration for the delivered VME chassis is identified in Chapter 1.

2.3.3. System Environmental Monitoring Board

The VME chassis incorporates an SEMB that protects internal components from conditions that could cause equipment damage. The SEMB monitors temperature, output voltages, and

fan operation. System status is provided at the OCP. Automatic shutdown during fault conditions can be disabled by activating the battle short function at the control panel. The SEMB includes user-activated diagnostics, RS-232 remote interface, and firmware upgrade capability.

2.3.4. Peripheral Subsystem

The VME chassis supports up to eight peripheral devices. Storage modules may be configured as removable or non-removable devices. The standard VME chassis configuration supports small computer standard interface (SCSI)-based devices. Peripheral devices installed on the delivered configurations are identified in Chapter 1.

2.3.5. Cooling System

The VME chassis incorporates three, 130-cubic feet per minute (cfm) cooling fans that are mounted on the back of the cardcage at the rear panel. Cooling air enters the chassis at the front panel. Air is drawn through the peripheral cardcage and is exhausted at the rear of the chassis. Fan speed is controlled by the SEMB based on temperature.

2.3.6. Operator Control Panel

The OCP is located at the front of the chassis. This console and operator terminal serves as the primary operator interface. VME chassis controls and indicators are described in Chapter 4.

2.3.7. Input/Output Interfaces

The rear panel of the VME chassis includes connections for prime power, chassis ground, and external I/O. Signal assignments for external interfaces are identified in Chapter 1.

2.4. Specifications

VME chassis specifications are defined in Tables 2-1 through 2-3.

Table 2-1. Physical Specifications

Characteristic	Description
Dimensions: Rack-mount configuration	19.00” wide x 12.25” high x 24.56” deep (1)
Weight	65 to 70 lb (2)

(1) Excluding handles
(2) Excluding VME modules and peripherals

Table 2-2. Electrical Specifications

Characteristic	Description
Input Voltage: 115 Volts alternating current (Vac)	 102 to 124 Vac
Input Frequency: 115 Vac configuration	 47 to 440 Hertz (Hz)
Output Current: 115 Vac configuration	+5 Vdc at 120 amperes (A) +12 Vdc at 36 A -12 Vdc at 18 A

Table 2-3. Environmental Specifications

Characteristic	Description
Temperature: Operating (1) Non-operating	 0 to 60 degrees Celsius (^{o}C) -40 to 70 ^{o}C
Relative humidity (non-condensing)	10 to 95%
Altitude: Operating Non-operating	 Up to 15,000 feet Up to 40,000 feet
Vibration	MIL-STD-810E, Method 514.4, Procedure I.
Shock: Operating Non-operating	 20 accelerations of gravity (g) 40 g
Inclination	Up to 90° off-level on any axis (configuration dependent)
EMI/electromagnetic compatibility (EMC)	MIL-STD-461E for submarines, Test methods CE101(30Hz to 20 kHz), CE102, CS101, CS114, CS116, RE101, RE102, RS101, and RS103. In addition, the chassis shall meet MIL-STD 461C, RS02 and CS06 requirement for submarine applications.
Fungus	MIL-STD-810E, Method 508.4.
Explosive Atmosphere	MIL-STD810E, Method 511.3, Procedure I.

(1) Fully functional without battle short enabled.

3. INSTALLATION

3.1. Introduction

This chapter provides information and instructions required for installation of the VME chassis. Information is included concerning rack mounting and connection of external cabling.

3.2. Unpacking

Carefully remove the chassis from the shipping container. Inspect the unit for any evidence of damage. Retain packing materials for future use.

3.3. Chassis Installation

The VME chassis is provided in a 19 inch rack-mount configuration (Figure 3-1).

CAUTION
LIFTING AND MOVEMENT OF THE VME CHASSIS REQUIRES AT LEAST TWO MAINTENANCE PERSONNEL.

3.3.1. Rack-Mount Configuration

a. Separate the chassis and rack sections of the left and right slide assemblies.
b. Install the left and right chassis sections of the slide assemblies on the side extrusions of the unit.
c. Install the right and left rack sections of the slide assemblies on the rack.
d. Align the chassis sections of the slide assemble in the rack sections. Slide the unit back until the left and right safety latches engage.
e. Secure the chassis to the rack frame with the front panel screws.

3.3.2. Fixed-Installation Configuration

Not applicable.

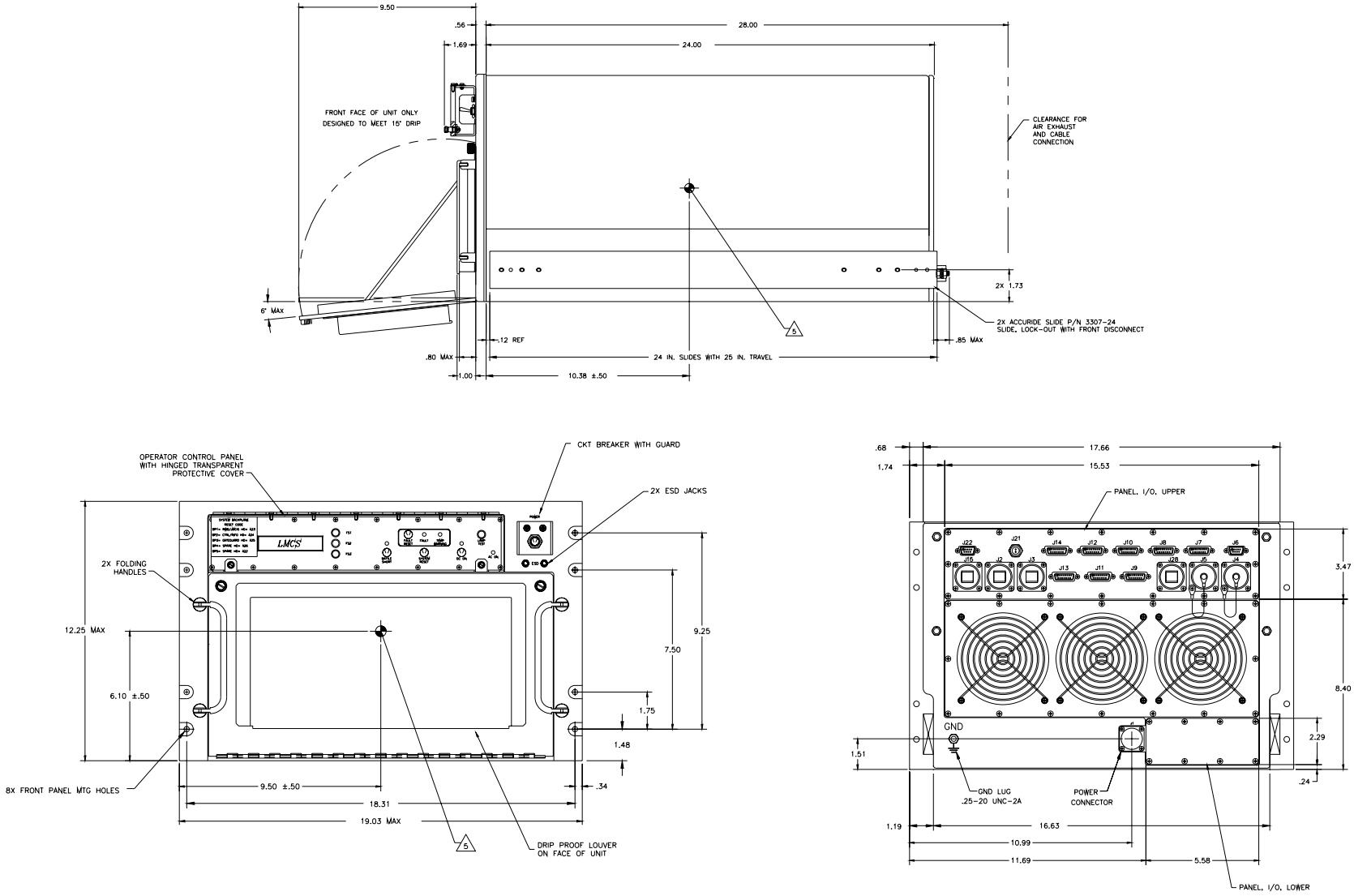

Figure 3-1. Rack-Mount Configuration Outline Dimensions

3.4. External Cable Installation

All external interfaces for the VME chassis are located at the rear panel (Figure 3-3). External connector signal assignments are defined in Chapter 1. Perform the following steps to connect external cabling.

CAUTION
VERIFY THAT THE POWER SOURCE CONFORMS TO THE LIMITS DEFINED IN TABLE 2-2 FOR THE APPLICABLE POWER SUPPLY CONFIGURATION.

a. Verify that the front panel circuit breaker is in the “off” position.
b. Connect the system ground cable to the ground stud on the rear panel.
c. Connect the I/O interface cables to the applicable rear panel connectors.
d. Connect the power cable to the J1 connector on the rear panel.

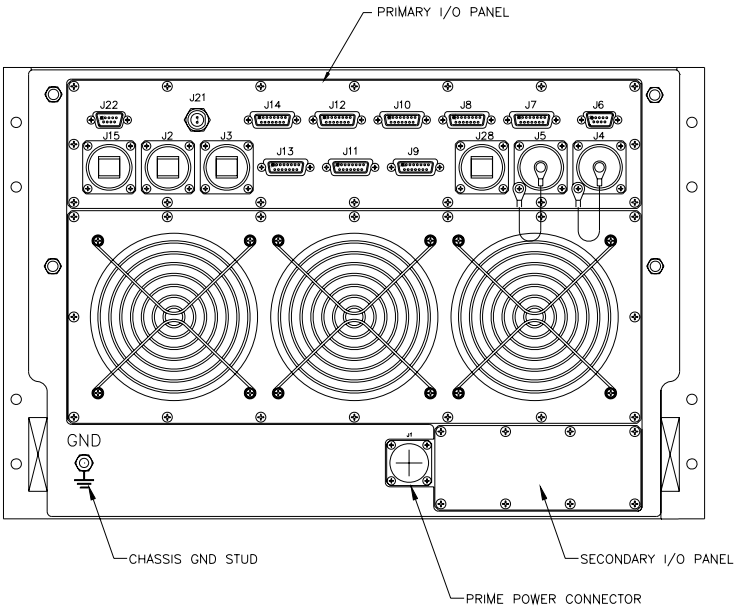

Figure 3-2. Rear Panel

4. OPERATION

4.1. Introduction

This chapter provides information concerning VME chassis controls and indicators, normal operation, software installation, error conditions, and shutdown. Before the unit is powered up for the first time, verify that the installation procedures defined in Chapter 3 have been performed.

4.2. Controls and Indicators

All controls and indicators required for operation of the VME chassis are located at the front panel of the unit (Figure 4-1). Controls and indicators are described in Table 4-1.

4.3. Initial Operation

Follow the instructions defined below when operating the VME chassis for the first time.

a. Power up any external peripheral equipment that is to be used with the VME chassis.

b. Verify that the BATTLE SHORT switch is in the “off” (down) position.

c. Place the front panel POWER and DC ON switches in the “on” position. Verify the following at the OCP:

- AC ON and DC ON indicators are illuminated.
- TEMP WARNING, FAULT, and BATTLE SHORT indicators are extinguished.
- No error messages are present at the status display.

4.4. System Software Installation

The operational characteristics of a specific VME chassis will vary based on the CPU and operating system used. Operating system software will be provided by the procuring activity and installed on the removable hard drive modules. Peripheral device location assignments are defined in Chapter 1, Table 1-3.

4.5. Normal Operation

The basic startup sequence for regular operation is the same as that defined for initial operation. When the VME chassis is powered up under normal conditions, the unit will either boot the operating system automatically or halt and display a console prompt. Refer to documentation for the applicable processor and operating system for a description of startup characteristics and options.

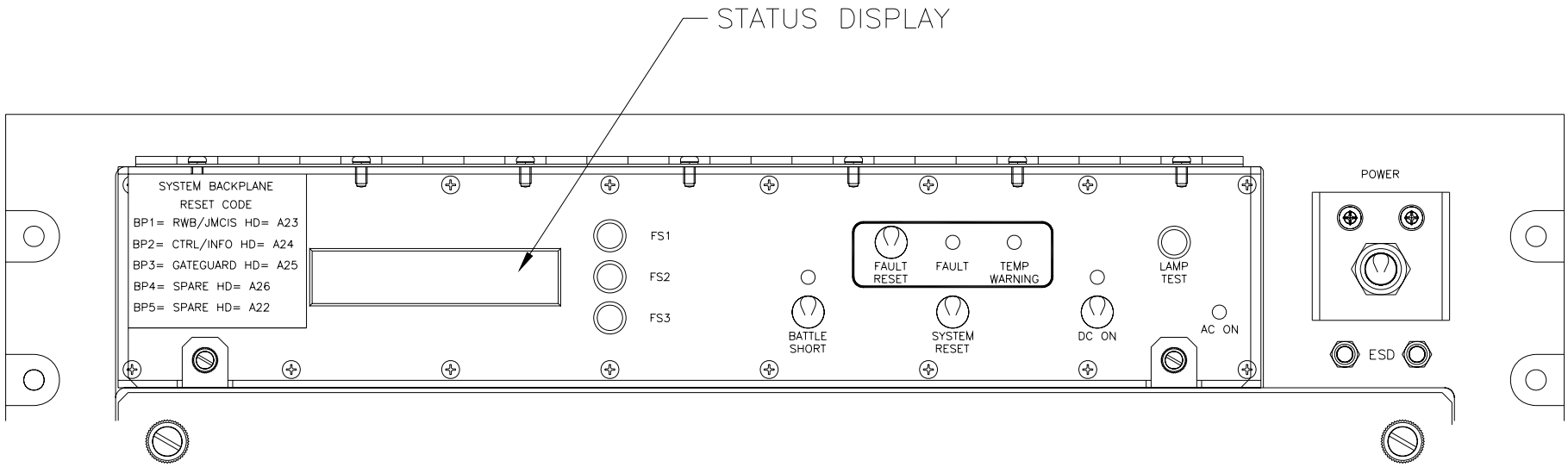

Figure 4-1. Front Panel

Table 4-1. Controls and Indicators

Identification	Description	Function
POWER	Circuit breaker switch	When placed in the “on” position, prime power is supplied to the chassis.
AC ON	Indicator (GRN)	When illuminated, prime power is supplied to the chassis.
LAMP TEST	Switch	When pressed, all front panel indicators will illuminate. Initiates actions associated.
DC ON	Switch and indicator (GRN)	When enabled (switch up), the direct current (dc) outputs of the primary power supply are active.
TEMP WARNING	Indicator (YEL)	Illumination indicates that chassis temperature has exceeded the limits for normal operation.
SYSTEM RESET	Switch	When pressed, the VME chassis is reset. Actions associated Function Switch 3 (FS3).
FAULT	Indicator (RED)	Illumination indicates that temperature and/or dc output voltage is not within acceptable operational parameters or that a cooling fan failure has occurred.
FAULT RESET	Switch	When pressed, recoverable faults are cleared.
BATTLE SHORT	Switch and indicator (RED)	When enabled (switch up), the unit will attempt to operate under voltage and temperature conditions that would normally cause a system shutdown. Voltage and temperature limits for battle short operation are identified in Table 5-1.
Function Switch 1 (FS1)	Switch	When pressed once, the current +5 Volt (V) output of the primary power supply will be shown on the status display. Subsequent activation will display the +12 V and -12 V readings. After the last reading is momentarily shown, the status display will return to the normal operational state.
Function Switch 2 (FS2)	Switch	When pressed once, the current inlet air temperature will be shown on the status display. Subsequent activation will display the power supply baseplate and exhaust temperatures. Continued activation will display Fan #1, Fan #2, and Fan #3 status. After the last reading is momentarily shown, the status display will return to the normal operational state.
FS3	Switch	When pressed once, the backplane reset option “Rset” ALL is displayed. Subsequent activation will scroll through the backplane reset options: Rset BP1, Rset BP2, Rset BP3, Rset BP4, Rset BP5 and back to Rset ALL. After the desired option is selected, activating the SYSTEM RESET switch will reset that particular Backplane.
Status Display	8-digit display	Provides system status information.

4.6. Fault Conditions

The SEMB monitors temperature, dc output voltages, and fan operation. When acceptable limits for these conditions are exceeded, a warning or fault indication is displayed at the control panel. Fault limits and status messages are identified in Chapter 5. When a fault is incurred, all VME chassis subsystems except the SEMB and cooling fans are shut down. If a cold-temperature condition occurs, the fault will be reset automatically once temperature returns to the normal operating range. Other faults are latched and must be cleared by pressing the FAULT RESET switch once the fault condition is corrected. If a fault condition cannot be cleared at the control panel, refer to the troubleshooting information provided in Chapter 6. If the battle short function is activated during a fault condition that is within tolerable parameters (Table 5-1), the unit will attempt to continue operating. In battle short mode, faults are cleared automatically once the condition is no longer present.

4.7. Shutdown

Follow the instructions defined below to power down the VME chassis:

a. Perform an orderly shutdown of the network and/or operating system using the procedure defined in the applicable software documentation.

b. Place the VME chassis POWER switch in the “off” position.

c. Power down any external peripheral equipment that is connected to the VME chassis.

4.8. RS-232 Remote Status Query (Alarm Out)

The OCP is equipped to provide VME system status through a serial RS-232 interface. Connect host terminal to cable assembly W120P1/A1TTYB connector using an asynchronous serial port set at 19.2 kilobaud (Kbaud), 1 start, 8 data, and 1 stop bit using Xon/Xoff protocol. The “Alarm Out” connector is a DB-MICRO-15M with pin 2 RxD, Pin 3 TxD, pin 5 Gnd, and pin 10 RTS.

Two message structures are used for the remote status query, simple and verbose. An example of a simple message structure would be: Host sends a query in American Standard Code for Information Exchange (ASCII) letter “S” (case sensitive); the VME sends back an ASCII “OK” or fault code (see below):

VME Response	Fault Indication
OK	No Faults
V5	5 V Fault
V12	12 V Fault
ITW	Inlet Air Temp Warning
OTW	Outlet Air Temp Warning
BTW	Baseplate Temp Warning
ITF	Inlet Air Temp Fault
OTF	Outlet Air Temp Fault
BTF	Baseplate Temp Fault
F1	Fan #1 Warning

A verbose message structure is used employing a 100 millisecond telemetry frame controlled by XON/XOFF. Host sends a query ASCII letter “R” (case sensitive); the VME sends back a telemetry frame (see below):

Example verbose structure:

+5 VOLTS	=	5.00	C7h
+12 VOLTS	=	12.00	C8h
-12 VOLTS	=	-12.00	39h
HEATSINK TEMP	=	30 C	71h
EXHAUST TEMP	=	25 C	80h
INLET TEMP	=	22 C	86h
FAN 1 CURRENT	=		0Fh
FAN 2 CURRENT	=		0Bh
FAN 3 CURRENT	=		12h

5. FUNCTIONAL DESCRIPTION

5.1. Introduction

This chapter describes the major functional elements of the VME chassis. Information is provided concerning power distribution, the SEMB, VMEbus, peripheral subsystem, and cooling system. Chassis interconnections are identified in Figure 5-1. VME chassis subsystems are described in the following paragraphs.

5.1.1. Power Distribution

Prime power enters the chassis at the rear panel J1 connector. An EMI filter provides attenuation of interference related to input voltage and output current. Prime power exits the filter and is routed to a circuit breaker/power switch at the front panel. The load side of the circuit breaker provides power to the primary power supply and the SEMB/fan supply. The primary power supply provides dc outputs of +5 V, +12 V, and -12 V for the VMEbus and internal peripheral subsystems. The SEMB/fan supply provides +5 V for the SEMB and +24 V for cooling fans. The SEMB regulates the actual voltage supplied to the fans based on temperature. The SEMB/fan supply is active whenever prime power is applied. The dc outputs of the primary power supply are switched under control of the SEMB. A chassis ground stud is provided on the rear panel of the unit.

5.1.2. System Environmental Monitoring Board

The SEMB monitors the following conditions within the VME chassis:

- Inlet, exhaust, and power supply baseplate temperature
- +5 V, +12 V, and -12 V outputs of the primary power supply
- Cooling fan operation

When limits for monitored conditions are exceeded, a warning or fault indication is displayed at the control panel. Warning and fault limits are identified in Table 5-1. The SEMB is powered whenever prime power is applied. The SEMB interfaces with the primary power supply, backplane, and cooling fans.

5.1.3. VMEbus

The chassis incorporates a backplane/cardcage assembly that accommodates up to 18 VMEbus slots. The VMEbus consists of a data transfer bus (DTB), DTB arbitration bus, priority interrupt bus, and utilities bus. The DTB is a high-speed, parallel, asynchronous bus that transfers data between VME devices. The DTB arbitration bus provides a means for transferring control of the DTB from one device to another. The priority interrupt bus provides a means for devices to request service. Up to seven levels of bus priority can be established. The utilities bus provides periodic timing, initialization, and failure detection for the VMEbus. The VME backplane interfaces with the primary power supply and the SEMB.

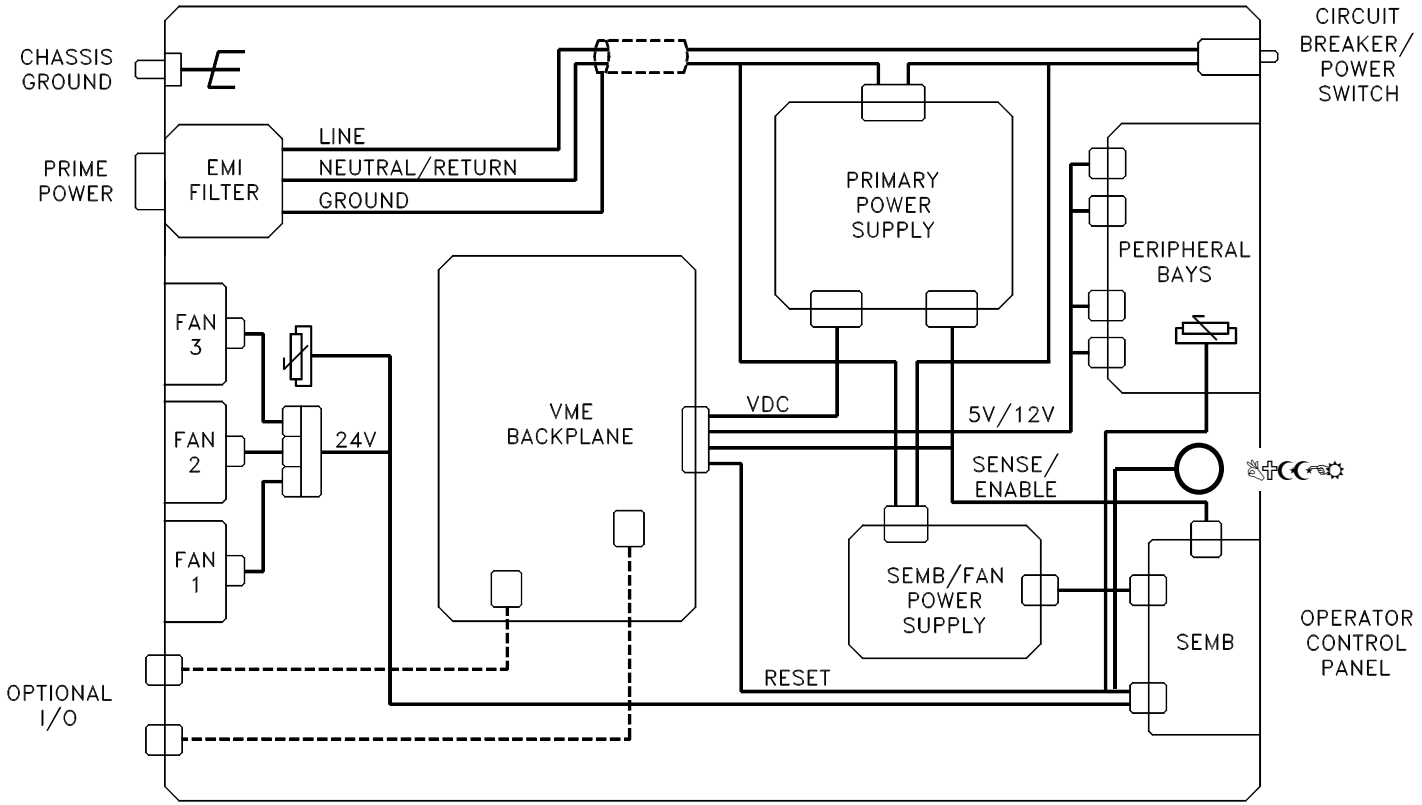

Figure 5-1. Chassis Interconnections

Table 5-1. System Environmental Monitoring Board Warning and Fault Limits

Condition	Chassis Response
Temperature <-40 °C	Unit will not operate in any mode
Temperature -25 to -40 °C	"TOO COLD" message is provided at status display Control panel active Input voltage applied to primary power supply DC outputs of primary power supply switched off
Temperature -25 to 0 °C	Temperature fault condition Unit will operate with battle short enabled Cooling fans turn slowly above -10 °C
Temperature 0 to 10 °C	Temperature warning condition Cooling fans turn slowly
Temperature 10 to 50 °C	Normal operating range Fan speed regulated to maintain ~5 °C temperature rise between inlet and exhaust
Temperature 50 to 55 °C	Temperature warning condition (continuous tone) Cooling fans at maximum speed
Temperature 55 to 60 °C	Temperature working condition Cooling fans at maximum speed
Temperature 60 to 70 °C	Temperature fault condition and audible alarm. Shuts off VME power supply if battle short is disabled Unit will operate with battle short enabled Cooling fans at maximum speed
Temperature >70 °C	Unit will not operate in any mode
DC outputs within nominal limits: +5: 4.75 to 5.25 Vdc +12: 11.75 to 13.00 Vdc -12: -11.75 to -13.00 Vdc	Normal operating range
DC outputs within battle short limits: +5: 4.25 to 5.75 Vdc +12: 11.50 to 13.50 Vdc -12: -11.50 to -13.50 Vdc	Chassis will operate with battle short enabled
Cooling fan failure	Temperature warning condition Remaining fans accelerate to maximum speed

5.1.4. Peripheral Subsystem

The peripheral subsystem includes a VME-based controller and one or more storage devices. When removable storage devices are used, a docking module is used that provides docking interface for power and data-bus signals. Peripheral power (+5V/±12 V) is provided by the primary power supply.

5.1.5. Cooling System

The VME chassis incorporates three, 130-cfm cooling fans. Fan power is provided by the SEMB/fan supply. The fans operate whenever prime power is applied and temperature is above -10°C. Fan speed is regulated by the SEMB based on temperature. The operational state of a malfunctioning fan is reported at the status display. If one cooling fan fails, the remaining fans accelerate to maximum speed.

Figure 5-2. Interconnection Diagram

6. MAINTENANCE

6.1. Introduction

This chapter provides information and instructions concerning VME chassis tools and test equipment, periodic maintenance, firmware upgrades, fault isolation, removal and installation of replaceable components and subassemblies, and storage/transportation considerations.

6.2. Tools and Test Equipment

The following tools and test equipment are required to maintain the VME chassis:

- Common hand tools
- Digital multimeter
- Monitor and keyboard that are compatible with the resident processor

6.3. Periodic Maintenance

The only periodic maintenance required for the VME chassis is the cleaning of the dust filter and EMI screens. The recommended frequency for cleaning is dependent on the installation environment. In a typical operating environment, the filter should be vacuumed once per month.

6.4. Firmware Upgrades

Upgrading of the SEMB firmware may be periodically required in order to benefit from program improvements defined after the original VME chassis is delivered. Firmware revision is necessary if the user requires temperature warning/fault trip points that are different from those defined for the standard VME chassis. New microcode is downloaded to the SEMB using the Firmware Upgrade Tool, DMC part number 200243-001. Perform the following procedure to download new firmware to the VME chassis SEMB.

a. Remove the interface cable connector from the RS-232 (J2) connector of the SEMB (Figure 6-1).
b. Install the Firmware Upgrade Tool on the J2 connector of the SEMB.
c. Power up the VME chassis.
d. Place the upgrade tool toggle switch in the “download” position.
e. Verify that the upgrade tool light emitting diode (LED) begins blinking.
f. When the upgrade tool LED stops blinking, power down the VME chassis.
g. Remove the upgrade tool from the SEMB connector.
h. Connect the interface cable to the J2 connector of the SEMB.
i. Power up the VME chassis and verify that the control panel reflects a normal operational state.

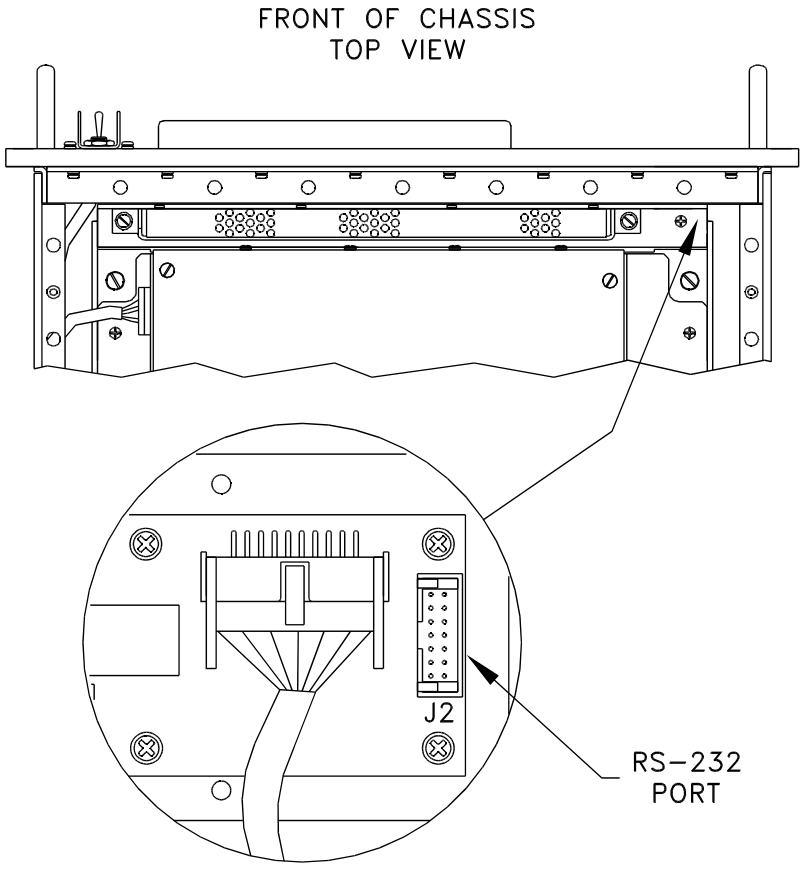

Figure 6-1. SEMB RS-232 Interface Connector

6.5. Fault Isolation

If the VME chassis exhibits an error condition or degraded performance, refer to the troubleshooting information provided in Table 6-1. Possible causes and corrective action for fault conditions are listed in the sequence of anticipated probability.

WARNING
POTENTIALLY LETHAL VOLTAGES EXIST WITHIN THE VME CHASSIS. SERIOUS INJURY MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED. FAULT DIAGNOSIS PROCEDURES REQUIRE THAT INTERNAL COMPONENTS BE TESTED WHEN PRIME POWER IS APPLIED. THESE COMPONENTS MUST ONLY BE TOUCHED WITH THE APPROPRIATE TEST EQUIPMENT.

NOTE
FAULTY CABLES OR IMPROPER CABLE CONNECTIONS OFTEN CAUSE FAILURES. BEFORE REPLACING A COMPONENT OR SUBASSEMBLY, VERIFY THE CONTINUITY OF RELATED CABLING AND CONNECTORS.

Table 6-1. Fault Isolation

Fault Condition	Recommended Action
Chassis will not power up when POWER switch is placed in “on” position; control panel is inoperative.	Verify that input power is within the limits defined in Table 2-2. Verify that voltage at circuit breaker line terminals is the same as that applied to the EMI filter input terminals. Replace the EMI filter if voltage is not correct. With the power source removed and the circuit breaker closed, verify the continuity between breaker terminals; replace switch if faulty. Verify that +5 Vdc is present at Pin 1 (+) and Pin 6 (-) of the SEMB/fan supply output connector (J1). Replace the SEMB/fan supply if the voltage is not correct. Replace the operator control panel assembly if the voltage is correct.
AC ON indicator is illuminated, but chassis will not power up when DC ON function is enabled.	Using the control panel FS1 switch, verify that dc output voltages are within the limits defined in Table 5-1 for normal operation. Replace the primary power supply if output voltages are not within specified limits. If voltages are correct, replace the operator control panel assembly.
Voltage fault message appears on control panel status display.	Perform a fault reset. Cycle VME chassis power. If fault remains, replace the primary power supply.
In a normal ambient environment, the control panel status display indicates a temperature warning or fault. Fans are operating properly.	Perform a fault reset. Cycle VME chassis power. If the fault remains, replace operator control panel assembly.
A control panel function is inoperative, but the chassis otherwise functions normally.	Cycle VME chassis power. If the fault remains, replace the operator control panel assembly.
Fan fault message appears on control panel status display.	Verify that voltage (16 to 24 Vdc) is present at the fan harness connector. If voltage is correct, replace the applicable cooling fan. If the voltage is not correct, verify that +24 Vdc is present at Pin 5 (+) and Pin 2 (-) of the SEMB/fan supply output connector (J1). Replace the SEMB/fan supply if the voltage is not correct. If the SEMB/fan power supply checks correctly, replace the operator control panel assembly.

6.6. Replaceable Components and Subassemblies

The following paragraphs include information concerning removal and installation of the replaceable components and subassemblies identified in Chapter 1. Item locations are shown in Figure 6-2.

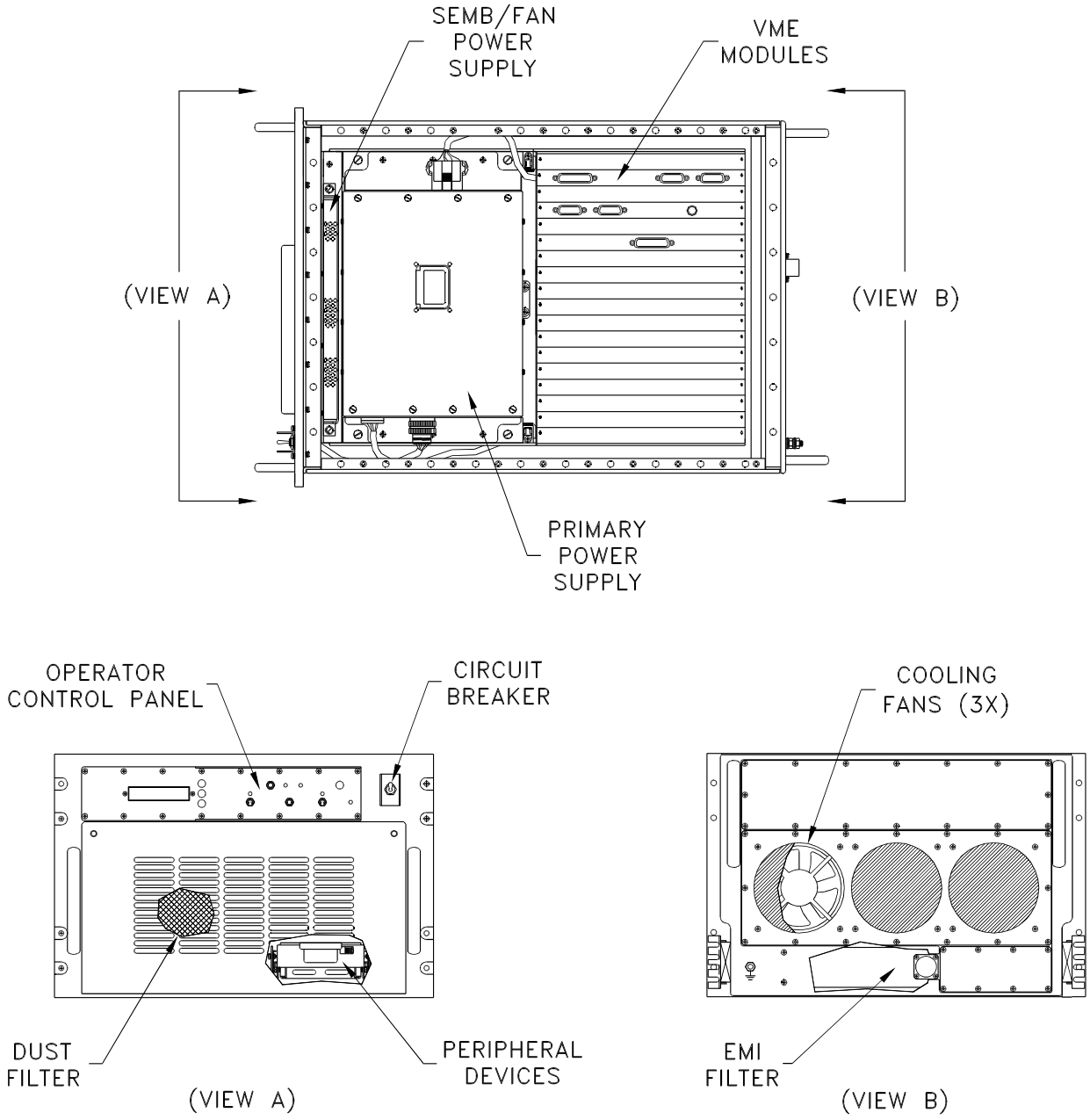

Figure 6-2. Replaceable Unit Locations

WARNING
POTENTIALLY LETHAL VOLTAGES EXIST WITHIN THE VME CHASSIS. SERIOUS INJURY MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED. DISCONNECT THE POWER SOURCE BEFORE INITIATING MAINTENANCE PROCEDURES.

NOTE
OBSERVE PRECAUTIONS RELATING TO ELECTROSTATIC DISCHARGE (ESD) WHEN HANDLING COMPONENTS THAT INCLUDE INTEGRATED CIRCUITRY.

6.6.1. VME Modules

Removal:

a. Remove the top cover of the chassis.
b. Remove the VME modules interface cable connectors (if applicable).
c. Loosen the screws that secure the VME module to the cardcage.
d. Unseat the card by pulling up on the module handles.

Installation:

a. Position the card in the backplane and seat the board by pushing down on the faceplate and the rear of the card.
b. Replace the screws that secure the module to the cardcage.
c. Install interface cable connectors (if applicable).
d. Install the top cover of the chassis.

6.6.2. Peripheral Devices

6.6.2.1. Removable Peripherals (Kingston Removable Drive System)

Removal:

a. Open the front panel door.
b. Rotate the Locking Key to the vertical Position before attempting to remove the canister from the receiver module.
c. Unscrew the two captive fasteners holding the canister in the receiver module.
d. Using the handle on the canister pull the canister straight out of the receiver module.

Installation:

a. Position the canister in the receiver module.
b. Push the canister straight back to seat the docking container.
c. Close and secure the front panel door.

6.6.2.2. Fixed-Installation Peripherals

Removal:

a. Open the front panel door.
b. Remove identifier (ID) plate between RH and LH peripheral bays and four captive fasteners.
c. Remove the top and bottom covers of the chassis.
d. Remove primary power supply per paragraph 6.6.4.

e. From the top, remove 8 fasteners holding the RH and LH peripheral bay side brackets.
f. From the bottom, remove 8 fasteners holding the RH and LH peripheral bay side brackets.
g. From the front, part way pull out the RH or LH peripheral bay.
h. Disconnect the power and data cables from back side of peripheral device.
i. Pull the peripheral bay the rest of the way out.
j. Remove hardware that secures the peripheral device to the mounting brackets.
k. Replace the module.

Installation:

a. Reverse the removal sequence.

6.6.3. Dust Filter

Removal:

a. Open the front panel door.
b. Loosen the captive screws that secure the filter mounting bracket and remove the bracket from the door.
c. Remove the filter from the front panel door.
d. If required for cleaning, remove the EMI screen from the door.

Installation:

a. Position the EMI screen on the back of the front panel door.
b. Position the dust filter and mounting bracket on the door.
c. Tighten the screws that secure the filter mounting bracket.
d. Close and secure the front panel door.

6.6.4. Primary Power Supply

Removal:

a. Remove the top cover of the chassis.
b. Disconnect the power supply interface cable connectors.
c. Loosen the captive screws that secure the power supply housing to the chassis.
d. Lift the power supply straight up out of the chassis using the handle located at the top of the enclosure.

Installation:

a. Position the power supply in the chassis and tighten the screws that secure the enclosure.
b. Connect the power supply interface cable connectors.
c. Install the top cover of the chassis.

6.6.5. System Environmental Monitoring Board/Fan Power Supply

Removal:

a. Remove the top cover of the chassis.
b. Disconnect the power supply interface cable connectors.
c. Loosen the two captive fasteners that secure the power supply mounting bracket to the chassis.
d. Remove the power supply from the chassis.

Installation:

a. Position the power supply in the chassis and tighten the screws that secure the module.
b. Connect the power supply interface cable connectors.
c. Install the top cover of the chassis.

6.6.6. Operator Control Panel

Removal:

a. Remove the hardware that secures the OCP assembly to the front bezel of the chassis.
b. Pull the OCP away from the chassis.
c. Disconnect the interface cable connectors for the assembly.

Installation:

a. Position the OCP at the front bezel.
b. Install the interface cable connectors for the assembly.
c. Install the hardware that secures the OCP assembly to the front bezel.

6.6.7. Cooling Fans

Removal:

a. Remove the cooling fan exhaust cover plate from the rear panel of the chassis.
b. Disconnect the fan power connector.
c. Remove the hardware that secures the fan housing to the mounting bracket.
d. Remove the fan from the chassis.

Installation:

a. Position the cooling fan on the mounting bracket.
b. Install the hardware that secures the fan.
c. Connect the fan power connector.
d. Install the fan exhaust cover plate on the rear panel of the chassis.

6.6.8. Circuit Breaker Switch

The VME chassis is provided with two types of circuit breaker. Some units incorporate a standalone breaker configuration where the switch can be disconnected from its associated harness. Other units use a breaker assembly configuration where the switch and harness are inseparable.

6.6.8.1. Standalone Switch

Removal:

a. Remove the top cover of the chassis.
b. Remove the nut that secures the circuit breaker switch at the front panel of the chassis.
c. Remove the switch guard.
d. Remove the circuit breaker and terminal cover from the panel.
e. Disconnect the power harness terminals from the switch.
f. Ensure that terminal assignments are noted.

Installation:

a. Connect the harness terminals to the circuit breaker switch.
b. Position the circuit breaker and terminal cover on the front panel.
c. Install the switch guard.
d. Install the nut that secures the circuit panel switch.
e. Install the top cover of the chassis.

6.6.8.2. Switch Harness Assembly

Removal:

a. Remove the top and bottom covers of the chassis.
b. Remove the nut that secures the circuit breaker switch at the front panel of the chassis.
c. Remove the switch and switch guard from the panel.
d. Remove the switch harness connectors from the power supply.
e. Remove the switch harness terminals from the EMI filter.
f. Ensure that terminal assignments are noted.
g. Remove the cable ties that secure the switch harness.
h. Remove the circuit breaker switch harness assembly from the chassis.

Installation:

a. Position the circuit breaker switch harness in the chassis between the front panel and EMI filter.
b. Connect the switch harness terminals to the EMI filter.
c. Connect the switch harness connectors for the power supply.
d. Position the switch and switch guard on the front panel.

e. Install the nut that secures the circuit breaker.
f. Install new cable ties to secure the switch harness in the chassis.
g. Install the top and bottom covers of the chassis.

6.6.9. Electromagnetic Interference Filter

Removal:

a. Remove the bottom cover of the chassis.
b. Remove the VMEbus reset interface connector from the backplane. The connector is adjacent to the EMI filter.
c. Remove the power harness terminals from the EMI filter.
d. Ensure that terminal assignments are noted.
e. Remove the hardware that secures the EMI filter to the rear panel of the chassis.
f. Carefully remove the filter from the chassis.

Installation:

a. Position the EMI filter at the rear panel mounting points.
b. Install the hardware that secures the filter.
c. Connect the power harness terminals to the EMI filter.
d. Install the VMEbus reset interface connector on the backplane.
e. Install the bottom cover of the chassis.

6.7. Storage and Transportation

If the VME chassis is to be stored or transported, the unit should be packaged as originally shipped. The chassis can be stored or transported in any manner that is consistent with the environmental conditions identified in Table 2-3.