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GE Fanuc Automation

PMC237

PMC Expansion Card for VME Systems

HARDWARE REFERENCE MANUAL

Document Number: Rx-URMH 040 Rev A

Embedded Systems

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1 Introduction

This manual describes operation, configuration, and installation instructions for the GE Fanuc Embedded Systems PMC237 Peripheral Component Interconnect (PCI) common mezzanine card (CMC) Module. The PMC237 is designed so that it can be plugged into a slot, above the host's printed circuit board.

1.1 Features

- Capacity:
  - The board can either be populated with 3 PMC modules, or 2 PMC modules and a PCMCIA/PC Cardbus socket
  - PCMCIA Input/Output (I/O) connection is through the end of the PCMCIA Cards. The PCMCIA card is inserted through the bezel opening
  - PCMCIA Release 2.1
  - PMC I/O connection through PMC front panel
  - One PMC slot has J4 connector with P2 option
- IEEE1386
- Card Voltages:
  - 3.3V, 5V or 12V
- Expands the Host Processor to a variety of PMC slots
- 32-bit PCI on the primary PCI bus
- Option for PCMCIA/Card bus
- Option for PCMCIA cards to be mounted outside chassis

The PMC237 is a 6U form factor card that expands a single PMC slot on a VMEbus processor board to either two PMC slots and one PCMCIA/CardBus socket, or to 3 PMC slots. Based on the latest PCI bridge technology, the PMC237 is an upgrade to the popular PMC235. Compatible with many VMEbus Single Board Computers, it provides an extension of PCI and PCMCIA capacity within the VMEbus form factor. The PMC237 has the option for the PCMCIA/CardBus cards to be mounted outside the chassis using an 18" (inch) cable. Functionally, the PMC237 consists of performance PCI/PCI bridge (assuring compliance with PCI loading) and an optional PCI/PCMCIA Host Bus Adapter (see the GE Fanuc Embedded Systems PCMCIA/PC Card Host Bus Adapters). Full PCI bandwidth can be maintained to PMC devices installed on the PMC237.

The PMC237 offers several configurations tailoring on-board functionality and host Single Board Computer (SBC) connections. The board can either be populated with 3 PMC modules, or 2 PMC modules and a PCMCIA/PC Cardbus socket.

The PMC237 generates the +3.3V for the on-board devices. The PMC237 takes only Power and Ground from the VMEbus.

- Simple connection to the Host

Connection to the host is either via a PMC connector on the host (DY4, VMIC, SBS, FORCE) or via a vendor-specific PCI expansion connector. Currently, this option is available for the Motorola MVME23xx, 24xx, 26xx, 27xx, 51xx, 36xx series as well as the SBS VR7 board. With minimum assembly, this vendor specific support can be made available to further manufacturers. Please contact GE Fanuc Embedded Systems for further information.

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2 Hardware And Installation

2.1 Handling Precautions

Electronic assemblies use devices that are sensitive to static discharge. Observe anti-static procedures when handling these boards. All products should be in an anti-static plastic bag or conductive foam for storage or shipment. Work at an approved anti-static workstation when unpacking boards.

2.2 Handling And Cooling Requirement

The PMC237 uses metal-oxide semiconductor (MOS) technology devices that are sensitive to static discharge. The module should never be plugged in or out of card cage while the power is applied.

> ***Note**:* Static discharge can damage circuits. Avoid touching areas of integrated circuitry.

2.3 PMC237 PCI CMC Installation

The PMC237 Module is now ready for installation. Turn all system power off. Take the Central Processing Unit (CPU) Card out of the chassis and carefully plug into the CMC on the Hosts processor. There are two connection options supported on the PMC237:

- Using the standard PMC connectors on the host processor
- For Motorola 2600/3600 Single Board Computers (SBCs) using the PCI expansion connector

> ***Note**:* Only one of the connection mechanisms will be installed as per the purchase order.

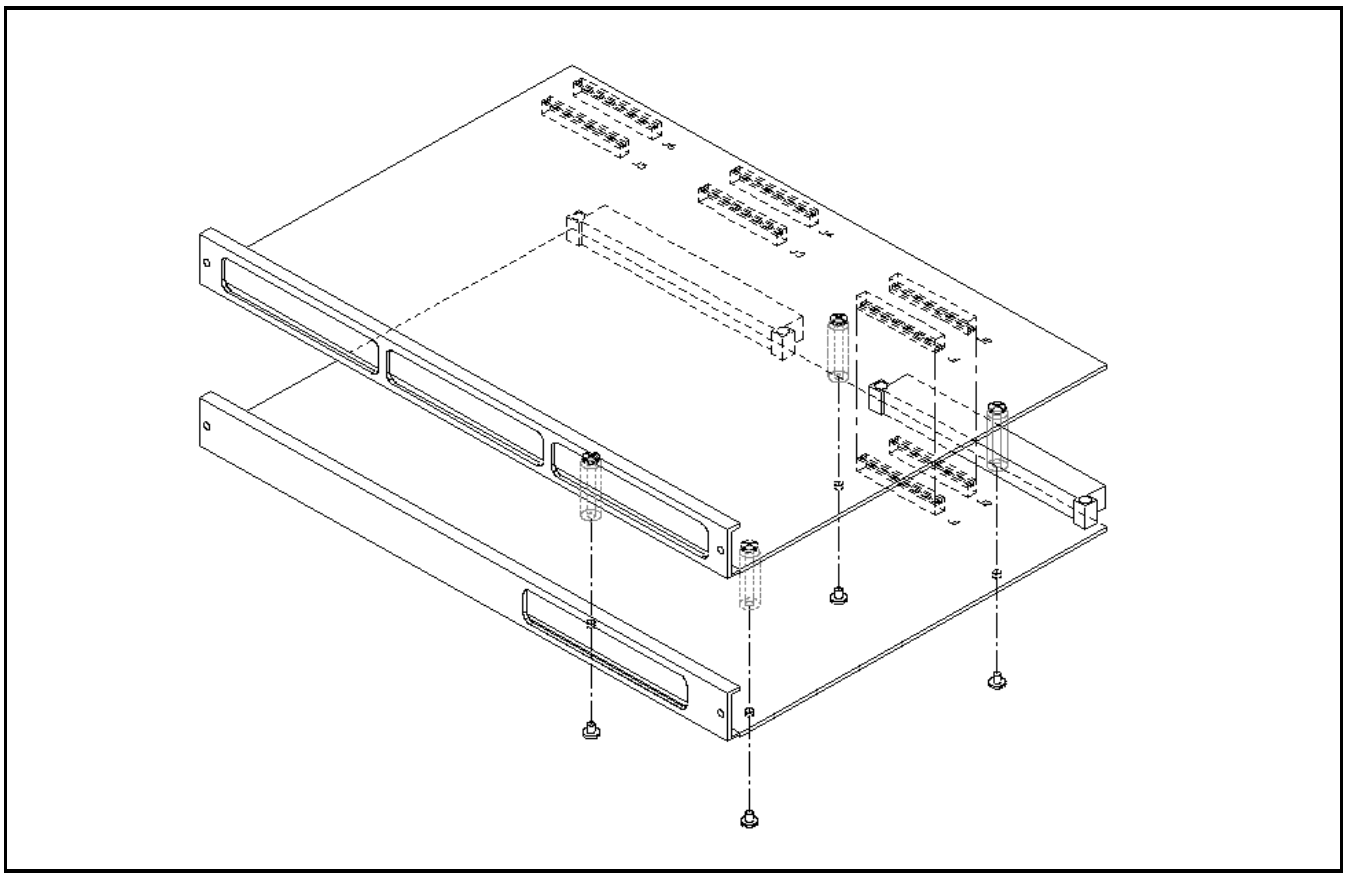
2.3.1 Using the PMC Connection:

Included with your PMC237 is a PMC extension module. This consists of two PCB boards, bolted together into a single assembly. Plug one end into the CMC connectors on the Host Processor. Ensure the module is seated properly into CMC connectors on the host. Use screws to fasten module into host Printed Circuit Board (PCB). (Refer to the block diagram.)

2.3.2 Using the PMC237 with Motorola 2600/3600

Attach the PMC237 to the Host Processor using the PMC expansion connector. This is located between the P1, and P2 virtual memory environment (VME) bus connectors and is labeled P3.

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§ If the user has any PMC modules, add those to the PMC237 first.

§ Remove the four screws from bottom of the stand-offs.

§ Connect the PMC237 to the host processor as per the above instructions.

§ Push the PMC237 down (ensure the connectors, J1 and J2 are positioned properly). Inspect the connection for the proper alignment.

- Use the four screws to connect the PMC237 stand-offs to host Processor Board.

2.4 Interconnection Signals

The PMC237 Module interconnects with PCIbus through Connector J11, and J12 (CMC connection option) or through Connector P2 (Motorola connection option). One of the CMC attachments has its J4 connector routed to P2 connector.

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3 Theory of Operation

This chapter discusses the necessary information to use the PMC237 module in a system configuration. The PCI firmware, unlike most other buses, configures the PMC237, and the PMC modules that are attached to the module. There is no need for jumper settings. The Operating System (OS) software drivers configure any additional setup for the PCMCIA or the PMC modules during the boot.

3.1 General Information

The PMC237 is a PCIbus Expansion module that extends the PCI capability of a VMEbus SBC. It can be configured with an option of accepting PCMCIA devices.

The PMC237 implements a PCI to PCI bridge immediately after the connection to the host SBC, ensuring full compliance with PCI loading specifications.

If the PCMCIA option is installed, the PCI to PCMCIA bridge appears as one of the PCI devices on the secondary PCI bus (local to the PMC237).

The initialization firmware or basic input/output system (BIOS) of the SBC should correctly configure the PCI to PCI bridge as well as any PMC devices (including the PCMCIA bridge, if installed). Additional interaction with devices on the PMC237 is the responsibility of drivers specific to the PMC (or PCMCIA) module installed.

The PMC modules are assigned with the following device number:

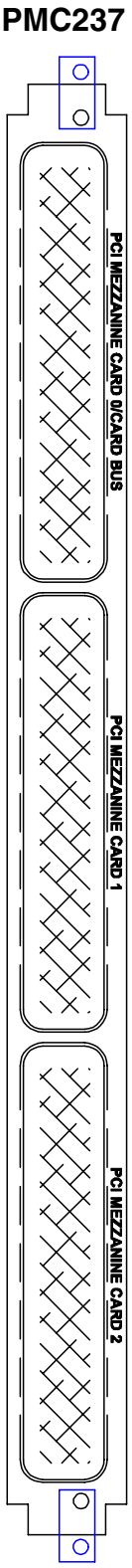
PCI Device	Device ID
PMC 0 (J1, J2)	Device #0
PMC 1 (J3, J4)	Device #1
PMC 2 (J5, J6)	Device #2
PC Card Option, PCMCIA HBA	Device #3

The PCI bus has four interrupt lines, INTA, INTB, INTC, and INTD. The PMC237 routes these interrupts to the host PMC attachment in the following fashion:

	PMC 0				PMC 1				PMC 2				PC Card Option	
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**
Host INTA	A				B				C				D	
Host INTB		B				C				D				A
Host INTC			C				D				A			
Host INTD				D				A				B		

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3.2 Front Panel Connectors And Indicators



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3.3 Connections

3.3.1 J4 (CMC Slot 1)

CMC Slot 1				CMC Slot 1		
J4	**P2**			**J4**	**P2**	
Pin No.	**D**	**Z**		**Pin No.**	**D**	**Z**
1	1	-		24	16	-
2	-	1		25	17	-
3	2	-		26	-	17
4	3	-		27	18	-
5	-	3		28	19	-
6	4	-		29	-	19
7	5	-		30	20	-
8	-	5		31	21	-
9	6	-		32	-	21
10	7	-		33	22	-
11	-	7		34	23	-
12	8	-		35	-	23
13	9	-		36	24	-
14	-	9		37	25	-
15	10	-		38	-	25
16	11	-		39	26	-
17	-	11		40	27	-
18	12	-		41	-	27
19	13	-		42	28	-
20	-	13		43	29	-
21	14	-		44	-	29
22	15	-		45	30	-
23	-	15		46	-	31

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3.3.2 J4 (CMC Slot 2)

CMC Slot 2				CMC Slot 2		
J4	**P2**			**J4**	**P2**	
Pin No.	**A**	**C**		**Pin No.**	**A**	**C**
1	-	1		33	-	17
2	1	-		34	17	-
3	-	2		35	-	18
4	2	-		36	18	-
5	-	3		37	-	19
6	3	-		38	19	-
7	-	4		39	-	20
8	4	-		40	20	-
9	-	5		41	-	21
10	5	-		42	21	-
11	-	6		43	-	22
12	6	-		44	22	-
13	-	7		45	-	23
14	7	-		46	23	-
15	-	8		47	-	24
16	8	-		48	24	-
17	-	9		49	-	25
18	9	-		50	25	-
19	-	10		51	-	26
20	10	-		52	26	-
21	-	11		53	-	27
22	11	-		54	27	-
23	-	12		55	-	28
24	12	-		56	28	-
25	-	13		57	-	29
26	13	-		58	29	-
27	-	14		59	-	30
28	14	-		60	30	-
29	-	15		61	-	31
30	15	-		62	31	-
31	-	16		63	-	32
32	16	-		64	32	-

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4 Functional Specifications

PMC237 PMC expansion card for VME systems

Power	**1 Total Watt**
@ 5 V	**0.2 Amps**
Form Factor	
VMEbus	**6U Single Slot**
MTBF	
MIL 217-F Nav Shel 25 Deg. C	**273000 Hours**
Temperature	
Operating	**0 to +60° C**
Storage	**-40 to +85° C**
Humidity	
Operating	**5% to 95% Non-Condensing**
Storage	**5% to 95% Non-Condensing**

Conformal Coating	**Yes, additional charge**

PCI Bus Characteristics	
Signaling	**3 & 5V**
Specification	**2.2**
Speed	**33/66MHz**
Width	**32**

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