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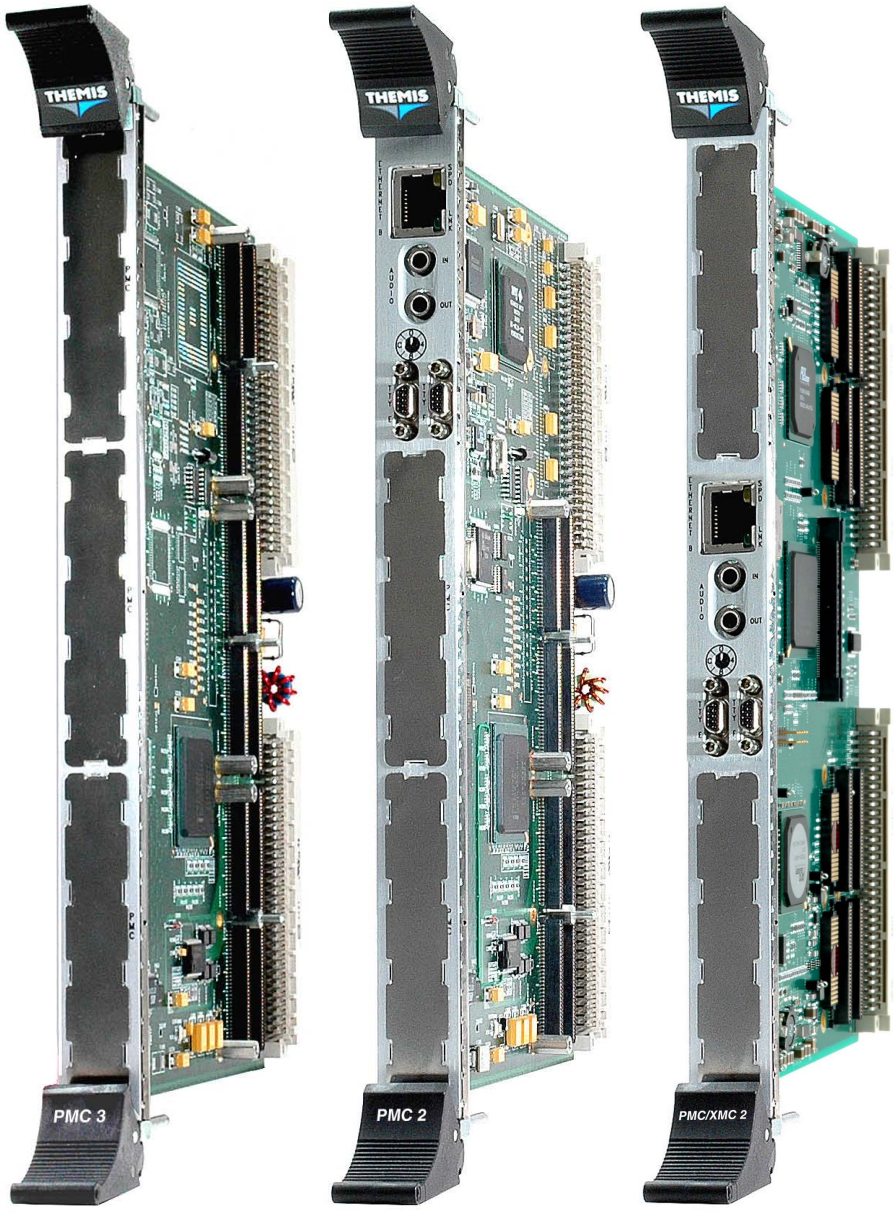
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THEMIS

User Manual



PMC/XMC Carrier Board

Triple PMC, Dual PMC, and Dual PMC/XMC Carrier Boards / 6RU VME64 Platform

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PMC/XMC Carrier Board Manual

Version 3.0—December 2009

Themis Computer—Americas and Pacific Rim
47200 Bayside Parkway
Fremont, CA 94538
Phone (510) 252-0870
Fax (510) 490-5529
World Wide Web http://www.themis.com

Themis Computer—Rest of World
5 Rue Irene Joliot-Curie
38320 Eybens, France
Phone +33 476 14 77 80
Fax +33 476 14 77 89

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Themis Customer Support

North America, South America, and Pacific Rim

Telephone: 510-252-0870
Fax: 510-490-5529
E-mail: support@themis.com
Web Site: http://www.themis.com

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- Added chapter 2—entitled “2P2 PMC/XMC Carrier Board” to consolidate the 2P2 PMC/XMC Carrier Board with the 2P2 and 2P3 PMC Carrier Boards into one manual.
- Added board weights to the appropriate specification tables.
- Assorted minor edits and changes throughout the manual.

Version 2.0.....November 2009

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Overview

Introduction

Thank you for purchasing the Themis PMC/XMC Carrier Board. The PMC/XMC Carrier Board is an add-on expansion board for most Themis VME single-board computers, and supports two (on the 2P2 model) or three (on the 2P3 model) PMC and XMC (if supported) plug-in modules.

This manual describes the following three Carrier Board models:

- 2P2 PMC Carrier Board
- 2P2 PMC/XMC Carrier Board
- 2P3 PMC Carrier Board

Before you begin, carefully read each of the procedures in this manual. Serious damage can be caused by improper handling of the equipment.

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Carrier Board Model Configurations

Table 1 defines the Themis VME computer models that support the various carrier boards (2P2 PMC, 2P2 PMC/XMC, or 2P3 PMC):

Table 1. Carrier Board Model Configurations

Model	Carrier Board Supported		
	2P2 PMC	2P2 PMC/XMC[a]	2P3 PMC
USPIIe	√		√
USPIIe-USB	√		√
USPIIe-Gb	√		√
USPIIIi	√		√
USPIIIi-OPT	√		√
TC2D64		√	√
TA64[b]		√	√
TPPC64[a]		√	√
TP32		√	√

a—The 2P2 PMC/XMC Carrier Board must be specifically ordered for the product to which it will be attached (see *Table 2*).

b—The TA64 and TPPC64 do not support PCI Express (XMC) signaling.

Table 2. 2P2 PMC/XMC Carrier Board Part Numbers

Part Number	Only Used With:
P/N 112794-001	TA64
P/N 112794-002	TPPC64
P/N 112794-004	TP32

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Note: All carrier boards are shipped with VME64-type injector/ejector handles. On special order, Triple-E-type VME ejector handles can be installed (see **A** and **B** in *Figure 1*). For more information on these handles, refer to the Note and *Figure A-2* on page A-3.

All multi-board systems are put together by Themis at the factory. The boards are designed to be installed in a specific order (see the hardware manual for your system; e.g., the USPIIe-USB, USPIIIi, et al.).



A VME64 Injector/Ejector Handle



B Triple-E VME Ejector Handle

Figure 1. Carrier Board Handles

Caution: Do not attempt to take apart and re-order the boards in your system, without contacting Themis Support.

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Table 2 defines the interfaces supported on each carrier board.

Table 2. Carrier Board Interfaces

Interface	2P2 PMC	2P2 PMC/XMC	2P3 PMC
2 PMC Modules	√	√	
2 XMC Modules		√	
3 PMC Modules			√
Ethernet 10/100 Base-T	√		
Gigabit Ethernet 10/100/1000 Base-T		√	
Stereo Audio Line In/Line Out or Microphone In/Headphones	√	√	
Serial Ports E & F (TTYE &TTYF)	√	√	
16-position Rotary-switch (user-defined)	√	√	

Check Configurations

When you first receive your carrier board, confirm that the solder-bead, jumper-pin, and switch configurations are appropriate for your application. For a complete listing of solder-bead, jumper-pin, and switch definitions, see the chapter corresponding to your particular carrier board; i.e., 2P2 PMC, 2P2 PMC/XMC, or 2P3 PMC.

Solder-beads are set by Themis at the factory before shipping and should be changed by Themis at the factory only.



Warning: You specify solder-bead preferences when you order your unit Since, the solder beads are set by Themis at the factory, DO NOT ATTEMPT TO ALTER SOLDER-BEAD CONFIGURATIONS! Attempting to alter a solder-bead configuration could seriously damage the carrier board. If you encounter a problem, contact Themis Customer Support.

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Check Voltage Keys

Each carrier board (as well as some Themis Baseboards) has two voltage-key mounting holes: one 3.3V mounting hole and one 5V mounting hole (see the board diagram in the chapter corresponding to your particular carrier board). Depending on the solder bead configuration, a carrier board will support either a 3.3V or a 5V PMC/XMC Module. A key installed in a 3.3.V hole means your carrier board is configured to accept a 3.3V module. A key installed in a 5V hole means your carrier board is configured to accept a 5V module.

If you attempt to install a 3.3V module into a carrier board that is configured with a 5V key, the absence of a 5V hole will prevent the module from properly seating into its connector. The same is true if you try to install a 5V module into a carrier board that is configured with a 3.3V key. Some PMC/XMC modules will operate with either 3.3 volts or 5 volts, in which case these “universal” modules will have two voltage-key mounting holes, to allow the passage of either 3.3V or 5V keys.



Note: A carrier board that is configured for 3.3 volts will only accept 3.3V (or universal) modules in any of its module slots. A carrier board that is configured for 5 volts will only accept 5V (or universal) modules.

Intended Audience

This manual is written for Themis customers who have purchased a Themis Single-Board Computer (e.g., USPIIe-Gb, USPIIIi, TA64, et al.), and wish to add carrier-board capability.

Unpacking

Carrier boards are factory-installed and ship already assembled to your host computer. Please refer to your system board’s hardware manual for unpacking instructions (e.g., USPIIe-Gb, USPIIIi, TA64, etc.).

In the event that a carrier board needs to be repaired or replaced, please observe the following Caution when handling the board individually.

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Caution: Carrier boards contain statically sensitive components. Industry-standard antistatic measures must be observed when removing the carrier boards from their shipping containers and during any subsequent handling. A wrist strap provides grounding for static electricity between your body and the chassis of the unit. Electric current and voltage do not pass through the wrist strap.

Notes, Cautions, Warnings, and Sidebars

The following icons with accompanying formatted text are included in this document for the reasons described:



Note: A note provides additional information that may be helpful in carrying out the procedure or action being described.



Caution: A caution describes a procedure or action that may result in damage to the equipment. This may involve—but is not restricted to—heavy equipment or sharp objects. To reduce the risk, follow the instructions accompanying this symbol.



Warning: A warning describes a procedure or action that may cause injury or death to the operator. To reduce the risk, follow the instructions accompanying this symbol.



Sidebar: A “sidebar” adds detail to the section within which it is placed, but is not absolutely vital to the description or procedure.

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The Sales and Marketing Department may be reached at info@themis.com.

Product Warranty and Registration

Please review the Themis Computer warranty and complete the product registration card delivered with your carrier board(s). You are not required to return the registration card to activate your product warranty; however, by registering your carrier board, Themis Computer will be better able to provide you with timely information updates and product-enhancement notifications.

Customer Support

Our Customer Support department is committed to providing the best product support in the computer industry. Customer support is available 8am–5pm (PST), Monday through Friday, via telephone, fax, e-mail, and our website.

If the carrier board does not behave as described, or if you encounter difficulties installing or configuring the board, please contact customer support.

Themis Customer Support:

Telephone: +1 510-252-0870
Fax: +1 510-490-5529
E-mail: support@themis.com
Website: http://www.themis.com

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Operation Section

Chapter 1

2P2 PMC Carrier Board

1.1 2P2 PMC Carrier Board Overview

The 2P2 PCI Mezzanine Card (PMC) Carrier Board (see *Figure 1-1*) supports two PMC module slots (to support vendor-specific, 32/64-bit, 33-MHz, PMC expansion Modules) and on-board Audio/Ethernet/Serial-I/O features. *Figure 1-2* on page 1-2 diagrams the functions of the 2P2 PMC Carrier Board.

The 2P2 PMC Carrier Board works in conjunction with the following Themis systems: USPIIe, USPIIe-USB, USPIIe-Gb, USPIIIi, and USPIIIi-OPT.



Figure 1-1. 2P2 PMC Carrier Board

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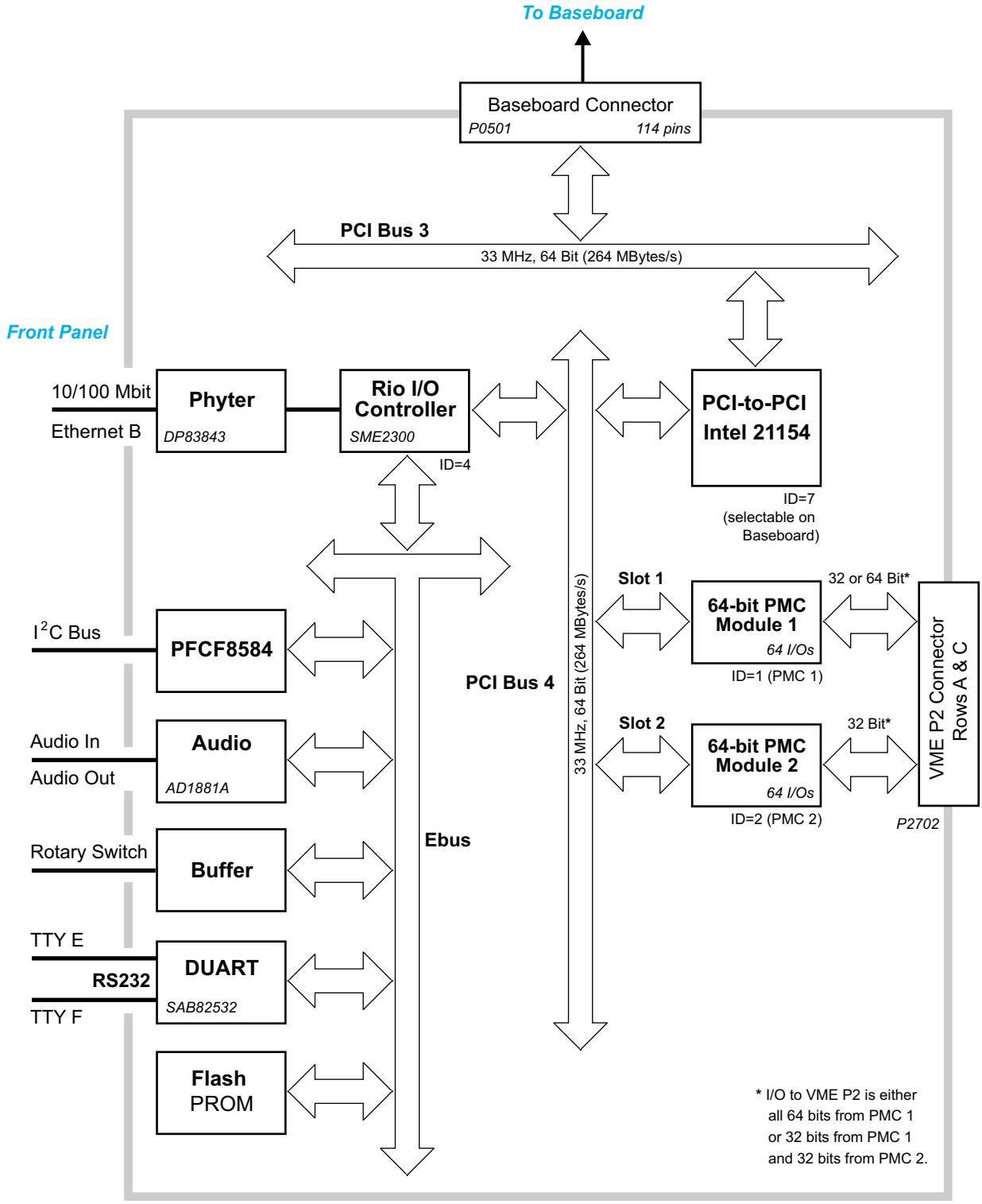


Figure 1-2. 2P2 PMC Carrier Board Block Diagram

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User I/O on the 2P2 PMC Carrier Board can be accessed from both the front-panel and paddle-board connectors. In some instances, accessing a signal from one of these access sources prevents the signal from being accessed from the second source. For example, if TTYE is routed to the VME P2 backplane, then TTYE cannot be accessed from the front panel.

For information regarding paddle boards, refer to your system's hardware manual (USPIIe, USPIIe-Gb, et al.)



Note: Some VME P2 I/O signals cannot be accessed using the available paddle boards. You will need to provide your own connectivity, or call Themis Customer Support for a cost estimate on building a *custom* Paddle Board.



Note: User I/O signals can be brought from PMC Modules in **slot 1** and **slot 2** to the VME P2 connector of the 2P2 PMC Carrier Board.

A PMC Module in **slot 3** has ***no*** I/O-signal access through the VME P2 connector of the 2P2 PMC Carrier Board.

As explained further in Section 1.2.3.1 on page 1-8, user I/O on the 2P2 PMC Carrier Board can be reconfigured. For example, 64 bits of user I/O can be made available on PMC Module slot 1, presuming the user I/O on PMC Module slot 2 is not used. On the other hand, 32 bits of user I/O can be made available on both PMC Module slot 1 and PMC Module slot 2.



Caution: It is important to make sure that a solder-bead configuration does not result in an **unwanted change** of system operational parameters. READ ALL SOLDER-BEAD CONFIGURATION DESCRIPTIONS CAREFULLY.

(See *Table 1-9* on page 1-18.)

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1.2 Connectors

The 2P2 PMC Carrier Board provides two PMC module slots and the following input/output from its front panel:

- Ethernet port B (10/100 Base-T)
- Audio Line-in or Mic-in
- Audio Line-out or Headphone Out
- User-defined 16-position Rotary Switch
- Serial (TTY) port E *RS232*
- Serial (TTY) port F *RS232*
- PMC Module slot 1
- PMC Module slot 2

Attach adapter cables to the appropriate front panel and VME P2 Paddle Board connectors on the 2P2 PMC Carrier Board. The following sections provide detailed information about the Carrier Board connectors.

1.2.1 2P2 PMC Carrier Board VME P1 Connector

The VME P1 connector provides daisy-chaining of IACK and BG signals. There is no need to jumper those signals manually for the position occupied by the 2P2 PMC Carrier Board. See *Table 1-1* on page 1-5 for the VME P1 connector pinouts.

The VME P1 interface employs a standard 3-row VME connector. *Figure 1-3* shows the pin orientation for the VME P1 connector.

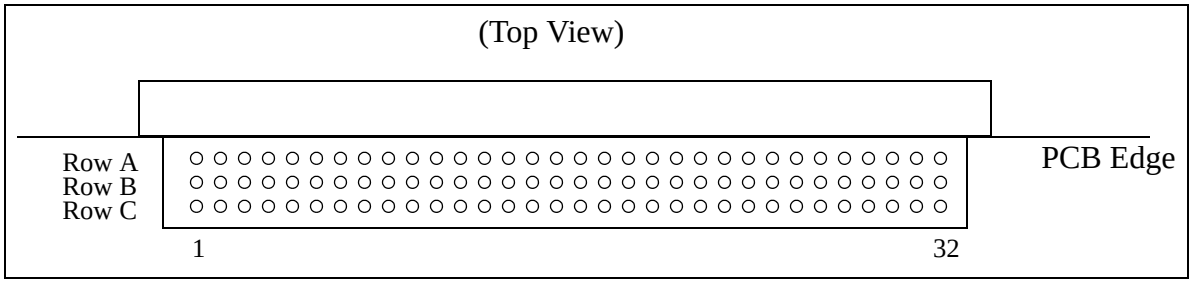


Figure 1-3. 2P2 PMC Carrier Board VME P1 Connector Pin Orientation

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Table 1-1. 2P2 PMC Carrier Board VME P1 Pinouts

Pin	Row A Signal Name	Row B Signal Name	Row C Signal Name
1	NC	NC	NC
2	NC	NC	NC
3	NC	NC	NC
4	NC	DAISY_CHAIN_BGIN_L<0>	NC
5	NC	DAISY_CHAIN_BGOUT_L<0>	NC
6	NC	DAISY_CHAIN_BGIN_L<1>	NC
7	NC	DAISY_CHAIN_BGOUT_L<1>	NC
8	NC	DAISY_CHAIN_BGIN_L<2>	NC
9	GND	DAISY_CHAIN_BGOUT_L<2>	GND
10	NC	DAISY_CHAIN_BGIN_L<3>	NC
11	GND	DAISY_CHAIN_BGOUT_L<3>	NC
12	NC	NC	NC
13	NC	NC	NC
14	NC	NC	NC
15	GND	NC	NC
16	NC	NC	NC
17	GND	NC	NC
18	NC	NC	NC
19	GND	NC	NC
20	NC	GND	NC
21	DAISY_CHAIN_IACKIN_L	NC	NC
22	DAISY_CHAIN_IACKOUT_L	NC	NC
23	NC	GND	NC
24	NC	NC	NC
25	NC	NC	NC
26	NC	NC	NC
27	NC	NC	NC
28	NC	NC	NC
29	NC	NC	NC
30	NC	NC	NC
31	-12V	NC	+12V
32	VCC	VCC	VCC

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1.2.2 2P2 PMC Carrier Board VME P2 Connector

The VME P2 connector of the 2P2 PMC Carrier Board transmits 64 user-defined signals through rows **A** and **C**, all from a combination of signals (solder-bead switchable) from PMC Module slots 1 and 2, Serial Ports E (TTY E) and F (TTY F), the front-panel User Rotary Switch, and the I^2C bus (see *Table 1-15* on page 1-23 for details). See *Table 1-2* on page 1-7 for the VME P2 connector pinouts.

The VME P2 interface employs a standard 3-row VME connector. *Figure 1-4* shows the pin orientation for the VME P2 connector.

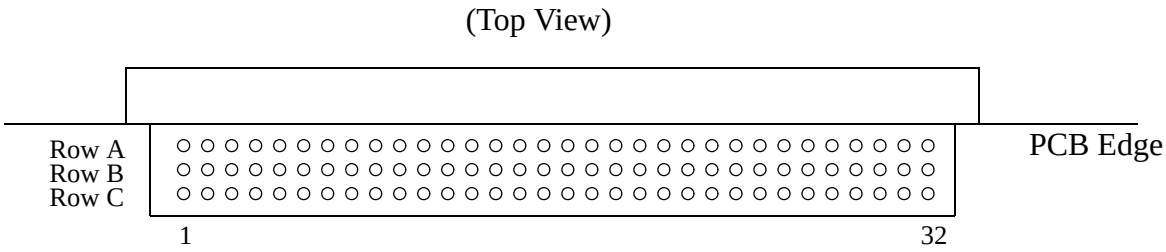


Figure 1-4. 2P2 PMC Board VME P2 Connector Pin Orientation

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Table 1-2. 2P2 PMC Carrier Board VME P2 Pinout

Pin	Row A Signal Name	Row B Signal Name	Row C Signal Name
1	User-switchable[a]	VCC	User-switchable[a]
2	User-switchable[a]	GND	User-switchable[a]
3	User-switchable[a]	NC	User-switchable[a]
4	User-switchable[a]	NC	User-switchable[a]
5	User-switchable[a]	NC	User-switchable[a]
6	User-switchable[a]	NC	User-switchable[a]
7	User-switchable[a]	NC	User-switchable[a]
8	User-switchable[a]	NC	User-switchable[a]
9	User-switchable[a]	NC	User-switchable[a]
10	User-switchable[a]	NC	User-switchable[a]
11	User-switchable[a]	NC	User-switchable[a]
12	User-switchable[a]	NC	User-switchable[a]
13	User-switchable[a]	NC	User-switchable[a]
14	User-switchable[a]	NC	User-switchable[a]
15	User-switchable[a]	NC	User-switchable[a]
16	User-switchable[a]	NC	User-switchable[a]
17	PMC1_IO34	NC	PMC1_IO33
18	PMC1_IO36	NC	PMC1_IO35
19	PMC1_IO38	NC	PMC1_IO37
20	PMC1_IO40	NC	PMC1_IO39
21	PMC1_IO42	NC	PMC1_IO41
22	PMC1_IO44	GND	PMC1_IO43
23	PMC1_IO46	NC	PMC1_IO45
24	PMC1_IO48	NC	PMC1_IO47
25	PMC1_IO50	NC	PMC1_IO49
26	PMC1_IO52	NC	PMC1_IO51
27	PMC1_IO54	NC	PMC1_IO53
28	PMC1_IO56	NC	PMC1_IO55
29	PMC1_IO58	NC	PMC1_IO57
30	PMC1_IO60	NC	PMC1_IO59
31	PMC1_IO62	GND	PMC1_IO61
32	PMC1_IO64	VCC	PMC1_IO63

a—See *Table 1-15* on page 1-23.

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1.2.3 2P2 PMC Module Slot User I/O

In addition to the standard PMC I/O, 64 bits of configurable user I/O are provided from the VME P2 connector directly to the PMC 1 and PMC 2 Module slot positions. All 64 bits may be routed to PMC 1, leaving 0 bits of user I/O for PMC 2. Alternatively, 32 bits may be routed to PMC 1 and 32 bits to PMC 2. In the latter case, PMC 1 will utilize the upper VME P2 signals—VME P2 A[32..17] and VME P2 C[32..17]—while PMC 2 will utilize the lower VME P2 signals—VME P2 A[16..1] and VME P2 C[16..1]. The signals are available on the J1004 connector of PMC slot 1 and the J1104 connector of PMC slot 2. If all 64 bits of user I/O are routed to PMC slot 1, it utilizes all 64 signals of the VME P2 connector. In this case, all 64 signals are available on the J1004 connector of PMC slot 1.

Note: User I/O is directed to PMC 1 and PMC 2 Modules through solder-bead configurations (see *Table 1-9* on page 1-18).

1.2.3.1 2P2 PMC Module Slot Pinouts

This section provides the pinouts of the 64 PMC User I/O signals that can be brought from PMC Module **Slot 1** and **Slot 2** to the VME P2 connector of the 2P2 PMC Carrier Board.

Figure 1-5 shows the pin orientation of the 2P2 PMC Module Slot connector used to install PMC Modules onto the top side of the circuit board (USPIIe, USPIIe-USB, USPIIe-Gb, USPIIIi, or USPIIIi-OPT).

- *Connector Type:* 64-Pin, Female, 10mm, Dual Row
- *Manufacturer; Part Number:* AMP; 120528-1



Figure 1-5. 2P2 PMC Module Slot Connector Pin Orientation

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As seen in *Table 1-11* on page 1-20, three solder-bead-selectable configurations are possible:

- 64 user signals from PMC Slot 1 (through J1004; see *Table 1-3*, page 1-10), and none from PMC Module Slot 2.
- 32 user signals from PMC Module Slot 1 (through J1004; see *Table 1-4*, page 1-11), and the following I/O signals: Serial Ports E and F, I^2C, and User-Programmable Rotary Switch (see *Table 1-15*, page 1-23).
  This is the default configuration.
- 32 user signals from PMC Module Slot 1 (through J1004; see *Table 1-4*, page 1-11) and 32 user signals from PMC Module Slot 2 (through J1104; see *Table 1-5*, page 1-12).

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Table 1-3. 2P2 PMC Carrier Slot 1 with 64 Bits of User I/O

PMC Pin (J1004)	VME P2 Signal	PMC Pin (J1004)	VME P2 Signal
1	PMC IO C1	2	PMC IO A1
3	PMC IO C2	4	PMC IO A2
5	PMC IO C3	6	PMC IO A3
7	PMC IO C4	8	PMC IO A4
9	PMC IO C5	10	PMC IO A5
11	PMC IO C6	12	PMC IO A6
13	PMC IO C7	14	PMC IO A7
15	PMC IO C8	16	PMC IO A8
17	PMC IO C9	18	PMC IO A9
19	PMC IO C10	20	PMC IO A10
21	PMC IO C11	22	PMC IO A11
23	PMC IO C12	24	PMC IO A12
25	PMC IO C13	26	PMC IO A13
27	PMC IO C14	28	PMC IO A14
29	PMC IO C15	30	PMC IO A15
31	PMC IO C16	32	PMC IO A16
33	PMC IO C17	34	PMC IO A17
35	PMC IO C18	36	PMC IO A18
37	PMC IO C19	38	PMC IO A19
39	PMC IO C20	40	PMC IO A20
41	PMC IO C21	42	PMC IO A21
43	PMC IO C22	44	PMC IO A22
45	PMC IO C23	46	PMC IO A23
47	PMC IO C24	48	PMC IO A24
49	PMC IO C25	50	PMC IO A25
51	PMC IO C26	52	PMC IO A26
53	PMC IO C27	54	PMC IO A27
55	PMC IO C28	56	PMC IO A28
57	PMC IO C29	58	PMC IO A29
59	PMC IO C30	60	PMC IO A30
61	PMC IO C31	62	PMC IO A31
63	PMC IO C32	64	PMC IO A32

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Table 1-4. 2P2 PMC Carrier Slot 1 with 32 Bits of User I/O

PMC Pin (J1004)	VME P2 Signal	PMC Pin (J1004)	VME P2 Signal
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	NC
33	PMC IO C17	34	PMC IO A17
35	PMC IO C18	36	PMC IO A18
37	PMC IO C19	38	PMC IO A19
39	PMC IO C20	40	PMC IO A20
41	PMC IO C21	42	PMC IO A21
43	PMC IO C22	44	PMC IO A22
45	PMC IO C23	46	PMC IO A23
47	PMC IO C24	48	PMC IO A24
49	PMC IO C25	50	PMC IO A25
51	PMC IO C26	52	PMC IO A26
53	PMC IO C27	54	PMC IO A27
55	PMC IO C28	56	PMC IO A28
57	PMC IO C29	58	PMC IO A29
59	PMC IO C30	60	PMC IO A30
61	PMC IO C31	62	PMC IO A31
63	PMC IO C32	64	PMC IO A32

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Table 1-5. 2P2 PMC Carrier Slot 2 with 32 Bits of User I/O

PMC Pin (J1104)	VME P2 Signal	PMC Pin (J1104)	VME P2 Signal
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	NC
33	PMC IO C1	34	PMC IO A1
35	PMC IO C2	36	PMC IO A2
37	PMC IO C3	38	PMC IO A3
39	PMC IO C4	40	PMC IO A4
41	PMC IO C5	42	PMC IO A5
43	PMC IO C6	44	PMC IO A6
45	PMC IO C7	46	PMC IO A7
47	PMC IO C8	48	PMC IO A8
49	PMC IO C9	50	PMC IO A9
51	PMC IO C10	52	PMC IO A10
53	PMC IO C11	54	PMC IO A11
55	PMC IO C12	56	PMC IO A12
57	PMC IO C13	58	PMC IO A13
59	PMC IO C14	60	PMC IO A14
61	PMC IO C15	62	PMC IO A15
63	PMC IO C16	64	PMC IO A16

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Table 1-6. 2P2 PMC Carrier Slot 3 with 0 Bits of User I/O

PMC Pin (J1204)	VME P2 Signal	PMC Pin (J1204)	VME P2 Signal
1	*Not available*	2	*Not available*
3	*Not available*	4	*Not available*
5	*Not available*	6	*Not available*
7	*Not available*	8	*Not available*
9	*Not available*	10	*Not available*
11	*Not available*	12	*Not available*
13	*Not available*	14	*Not available*
15	*Not available*	16	*Not available*
17	*Not available*	18	*Not available*
19	*Not available*	20	*Not available*
21	*Not available*	22	*Not available*
23	*Not available*	24	*Not available*
25	*Not available*	26	*Not available*
27	*Not available*	28	*Not available*
29	*Not available*	30	*Not available*
31	*Not available*	32	*Not available*
33	*Not available*	34	*Not available*
35	*Not available*	36	*Not available*
37	*Not available*	38	*Not available*
39	*Not available*	40	*Not available*
41	*Not available*	42	*Not available*
43	*Not available*	44	*Not available*
45	*Not available*	46	*Not available*
47	*Not available*	48	*Not available*
49	*Not available*	50	*Not available*
51	*Not available*	52	*Not available*
53	*Not available*	54	*Not available*
55	*Not available*	56	*Not available*
57	*Not available*	58	*Not available*
59	*Not available*	60	*Not available*
61	*Not available*	62	*Not available*
63	*Not available*	64	*Not available*

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1.2.4 Serial Ports TTYE and TTYF (RS232)

There are two serial port connections available from the front panel of the 2P2 PMC Carrier Board or from the 2P2 PMC Carrier Board VME P2 bus. They are Serial Port E (TTYE—RS232) and Serial Port F (TTYF—RS232). These serial ports are supported by the Siemens SAB82532 DUART serial controller, located on the 2P2 PMC Carrier Board. *Figure 1-6* shows the pin orientation of the serial port connectors.

Use the following connector type to connect to the 2P2 PMC serial ports:

- *Connector Type:* Dual-stacked 9-pin Micro-D
- *Part Number:* ITT Cannon MDSM-18PE-Z10-VR25
- *Themis Cable (optional):* 108113

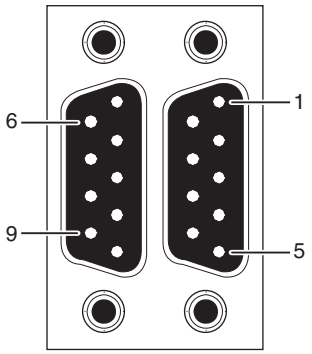


Figure 1-6. Front-Panel Serial Port Pin Orientation

Table 1-7. Serial Ports E and F Connector Pinouts

Carrier Board is marked:	Port E Pin[a]	Signal Name: TTY E Signal	Signal Name: Description	Signal Name: TTY F Signal	Port F Pin[a]	*Carrier Board is marked:*
B1	1	DCD	Data Carrier Detect	DCD	1	**A1**
	2	RD	Receive Data	RD	2	
	3	TD	Transmit Data	TD	3	
	4	DTR	Data Terminal Ready	DTR	4	
B5	5	SIG GND	Signal Ground	SIG GND	5	**A5**
B6	6	DSR	Data Set Ready	DSR	6	**A6**
	7	RTS	Request to Send	RTS	7	
	8	CTS	Clear to Send	CTS	8	
B9	9	RI	Ring indicator	RI	9	**A9**

a—***Important:*** The A and B associated with Serial Port connector pins on PC boards are interpreted as follows: Port E pins are marked with a B. Port F pins are marked with an A.

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1.2.5 Ethernet Port B

The 2P2 PMC Carrier Board features an RJ45 port on the Front Panel for 10/100 Base-T Ethernet connection.

In units where only the Baseboard is present, a single network connection (Ethernet A) is available through the RJ45 connector. With the addition of a 2P2 PMC Carrier Board, a second network connection (Ethernet B) is available through the carrier board front panel. Both Ethernet A and B may be active simultaneously.

After attaching the 2P2 PMC Carrier Board to a network, you can verify proper physical connection by executing the OBP network selftest (`test net`). This test will indicate external loopback failure on each of the network interfaces when there is not a proper physical connection.

Use the following connector to attach to the 2P2 PMC Ethernet port:

- *Connector Type:* RJ45 TPE
- *Connector Part Number:* AMP 406549-1

Figure 1-8 shows the pin orientation of the Ethernet B connector.

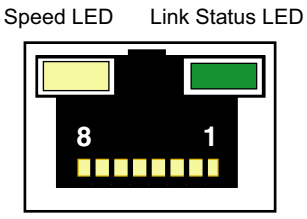


Figure 1-7. Ethernet B Connector Pin Orientation

Table 1-8. RJ45 Ethernet B Pinout

Pin	Signal Name
1	TXD+
2	TXD-
3	RXD+
4	4T_D3P
5	4T_D3P
6	RXD-
7	4T_D4P
8	4T_D4P

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1.2.6 Rotary Switch

The 2P2 PMC Carrier Board provides a 16-position Rotary Switch that is connected to the Coolrunner Complex Programmable Logic Device (CPLD). This switch allows you to change the switch position from the 2P2 PMC Carrier Board front panel. The 16 positions correspond to 16 user-defined meanings.

Depending on the solder bead settings, the rotary switch position may also be presented as a binary value on VME P2 connector pins A2 through A5. Refer to *Table 1-15* on page 1-23 for details.

Note: OBP records the value of the user-defined Rotary Switch as an OBP environment variable called `themis-switch-value`. The default value for this variable is 255 (0xff), which is assigned if the 2P2 PMC Carrier Board *is not* connected. If the board *is* connected, a value from 0 through 15 is assigned.

To find the value of the switch setting from OBP, type:

```
ok printenv themis-switch-value
```

To find the value of the switch setting from Solaris, type:

```
# prtconf -vp | grep themis
```

1.2.7 Stereo Audio Connectors

The 2P2 PMC Carrier Board provides audio input and output via two audio jacks on the board's front panel.

The audio jacks (shown in *Figure 1-8*) can be configured to provide one of two I/O options, depending on the setting of particular solder beads on the 2P2 PMC board (see *Table 1-9* on page 1-18 and *Table 1-10* on page 1-19 for Audio I/O solder bead settings). You specify solder-bead preferences when you order your unit. You may chose to have the 2P2 PMC board configured with one of following options:

- Line In/Line Out
- MIC In/Headphone Out

Warning: Solder beads are set by Themis at the factory. DO NOT ATTEMPT TO ALTER SOLDER-BEAD CONFIGURATIONS! Attempting to alter a solder-bead configuration could seriously damage the carrier boards. If you encounter a problem, contact Themis Customer Support.

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Use the following connector type to attach to the 2P2 PMC Audio ports:

- *Connector Type:* Industry-standard 1/8″ Mini Stereo Jack
- *Connector Part Number:* ASTRON AT-JY3540-050B

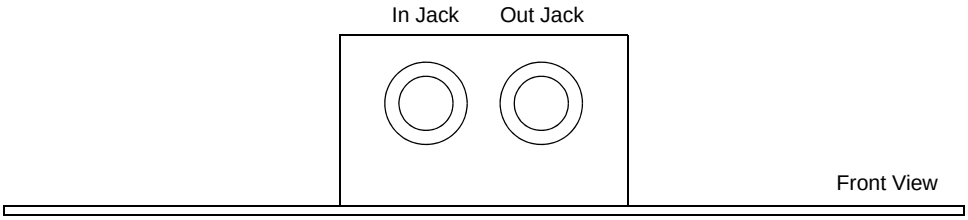


Figure 1-8. Dual Stereo Audio Connector

1.3 2P2 PMC Carrier Board Solder Beads

Solder beads are found only on *the bottom side* of the 2P2 PMC Carrier Board and are described in *Table 1-9*.

In *Table 1-9*, if no pad number is given, only **2** solder pads exist. If there are **3 or more** solder pads, the two pads listed are shorted together. **Short** means a solder bead *is* installed, creating an electrical path between contacts. **Open** means a solder bead *is not* installed, hence the path between the contacts is open.

Figure 1-9 on page 1-22, provides the location of the 2P2 PMC Carrier Board solder beads. Remember that **pad 1** is indicated on the board by a **dot** and/or a **thick bar line**.



Caution: When dealing with a **3- or 4-pad** solder-bead switch, a solder bead will short only one set of pads.
If a solder bead shorts more than 2 pads, call Themis Customer Support.



Caution: It is important to make sure that a solder-bead configuration does not result in an **unwanted change** of system operational parameters. READ ALL SOLDER-BEAD CONFIGURATION DESCRIPTIONS CAREFULLY. (See *Table 1-9* on page 1-18.)

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Table 1-9. 2P2 PMC Carrier Board Solder-Bead Settings (Bottom Side)

Solder Bead	Setting[a]	Description
SB0901	**Short 1–2**	Required when the 2P2 PMC Carrier Board (in the *second* VME slot) is directly connected to the Baseboard
	Short 2–3	Required when the 2P2 PMC Carrier Board (in the *third* VME slot) is directly connected to the Graphics Board or the PMC Carrier Board in the *second* VME slot
SB0902	**Short 1–2**	Normal operation
	Short 2–3	*For engineering use only*
SB0903	**Short 1–2**	Required when the 2P2 PMC Carrier Board supports 5V VIO PMC modules
	Short 2–3	Required when the 2P2 PMC Carrier Board supports 3.3V VIO PMC modules
SB1301	**Short 1–2**	Set Rio to Motherboard mode (2P2 PMC Carrier Board must be set to this mode)
	Short 2–3	Set Rio to Add-In mode *(factory use only*)
SB1302	**Short**	Assign Ethernet interrupt to PCI interrupt
	Open	Block Ethernet interrupt *(factory use only*)
SB1801	Short	Disable 5-MHz I^2C clock
	Open	Enable 5-MHz I^2C clock
SB1802	Short	Audio interface configuration (see *Table 1-10*, page 1-19); 2P2 PMC Carrier Board **model 2P2** only
	Open	
SB1803	Short	Audio interface configuration (see *Table 1-10*, page 1-19); 2P2 PMC Carrier Board **model 2P2** only
	Open	
SB1804	*Not used*	
SB2403 and SB2404	Short 1–2	Audio interface configuration (see *Table 1-10*, page 1-19); 2P2 PMC Carrier Board **model 2P2** only
	Short 2–3	
SB2407 and SB2408	Short 1–2	Audio interface configuration (see *Table 1-10*, page 1-19); 2P2 PMC Carrier Board **model 2P2** only
	Short 2–3	
SB2801 to SB2832	Short 1–4	VME P2 connector pinout configuration (see *Table 1-11*, page 1-20)
	Short 2–4	
	Short 3–4	
SB2833	Short	Board type selection (see *Table 1-12*, page 1-20)
	Open	

Note: Footnotes are described at the end of *Table 1-9* on page 1-19.

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Table 1-9. 2P2 PMC Carrier Board Solder-Bead Settings (Bottom Side) (Continued)

Solder Bead	Setting[a]	Description
SB2834	Short	PCB Revision settings indicator (see *Table 1-13*, page 1-20)
	Open	
SB2835	Short	VME P2 connector pinout configuration (see *Table 1-11*, page 1-20)
	Open	
SB2836	Short	VME P2 connector pinout configuration (see *Table 1-11*, page 1-20)
	Open	
SB2837	Short	PCB Revision settings indicator (see *Table 1-13*, page 1-20)
	Open	
SB2838	Short	PCB Revision settings indicator (see *Table 1-13*, page 1-20)
	Open	
SB2839	Short	Board type selection (see *Table 1-12*, page 1-20)
	Open	
SB2840	Short	Board type selection (see *Table 1-12*, page 1-20)
	Open	
SB3002	**Short**	Flash PROM selected is writable
	Open	Flash PROM selected is not writable
SB3003	**Short 1–2**	Enable 5V Flash programming voltage (Vpp)
	Short 2–3	Enable 12V Flash programming voltage (Vpp)

a—Boldface = the default solder-bead position. No boldface indicates there is no default.

Table 1-10. 2P2 PMC Audio Input/Output Settings

Solder Bead	Line In	Line Out	Microphone In	Head-phones
SB1802	**Open**		Short	
SB1803		**Open**		Short
SB2403 and SB2404		**Short 2–3**		Short 1–2
SB2407 and SB2408	**Short 2–3**		Short 1–2	

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Table 1-11. VME P2 Connector Configuration[a]

Definition (32 Pins)	SB2801 to SB2832	SB2835	SB2836
All PMC 1	Short 1–4	Short	Short
PMC 1 (16 pins) and PMC 2 (16 pins)	Short 3–4	**Open**	Short
PMC 1 (16 pins) and PMC Carrier I/O	**Short 2–4**		**Open**

a—See *Table 1-14*, page 1-21, and *Table 1-15*, page 1-23, for details. Dark shaded area indicates no preference.

Table 1-12. PMC Carrier Board Selection Settings

	SB2839	SB2840	SB2833
2 PMCs in first I/O slot (VME card *n*)[a]	Short	Short	Short
3 PMCs in first I/O slot (VME card *n*)	Reserved for 2P3 PMC Carrier Board.		
2 PMCs in second I/O slot (VME card *n+1*)	Short	*Open*	Short
3 PMCs in second I/O slot (VME card *n+1*)	Reserved for 2P3 PMC Carrier Board.		
Reserved	*Open*	Short	Short
Reserved	*Open*	Short	*Open*
Reserved	*Open*	*Open*	Short
Reserved	*Open*	*Open*	*Open*

a—For the USPIIe family of computers, *n* = 2
For single-CPU USPIIIi, *n* = 3
For dual-CPU USPIIIi, *n* = 4

Table 1-13. PCB Revision Settings

Revision	SB2834	SB2837	SB2838
A	Short	Short	Short
B	Short	Short	*Open*
C	Short	*Open*	Short
D	Short	*Open*	*Open*
E	*Open*	Short	Short
F	*Open*	Short	*Open*
Y	*Open*	*Open*	Short
X	*Open*	*Open*	*Open*

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In *Table 1-15* on page 1-23, VME P2 pin signals are interpreted as follows:

Table 1-14. VME P2 Pin Signal Interpretation

Signal	Interpretation
PMC1_IO*n*	The *n*th pin of PMC Module slot 1
PMC2_IO*n*	The *n*th pin of PMC Module slot 2
USR_SW1_*n*	The User Switch is equal to the value *n* (1, 2, 4, or 8)
SSER_E_*xyz*	The *xyz* signal of Serial Port E
SSER_F_*xyz*	The *xyz* signal of Serial Port F
I2C_*abc_xyz*	An I^2C bus signal (1.5A, Vcc Polyswitch fuse)

The bold lines in *Table 1-15* outline the various functions available from the VME P2 connector according to the PMC Carrier Board solder-bead configuration, namely:

- PMC Module slot 1
- PMC Module slot 2
- Serial Port E
- Serial Port F
- User Switch
- I^2C-bus signals

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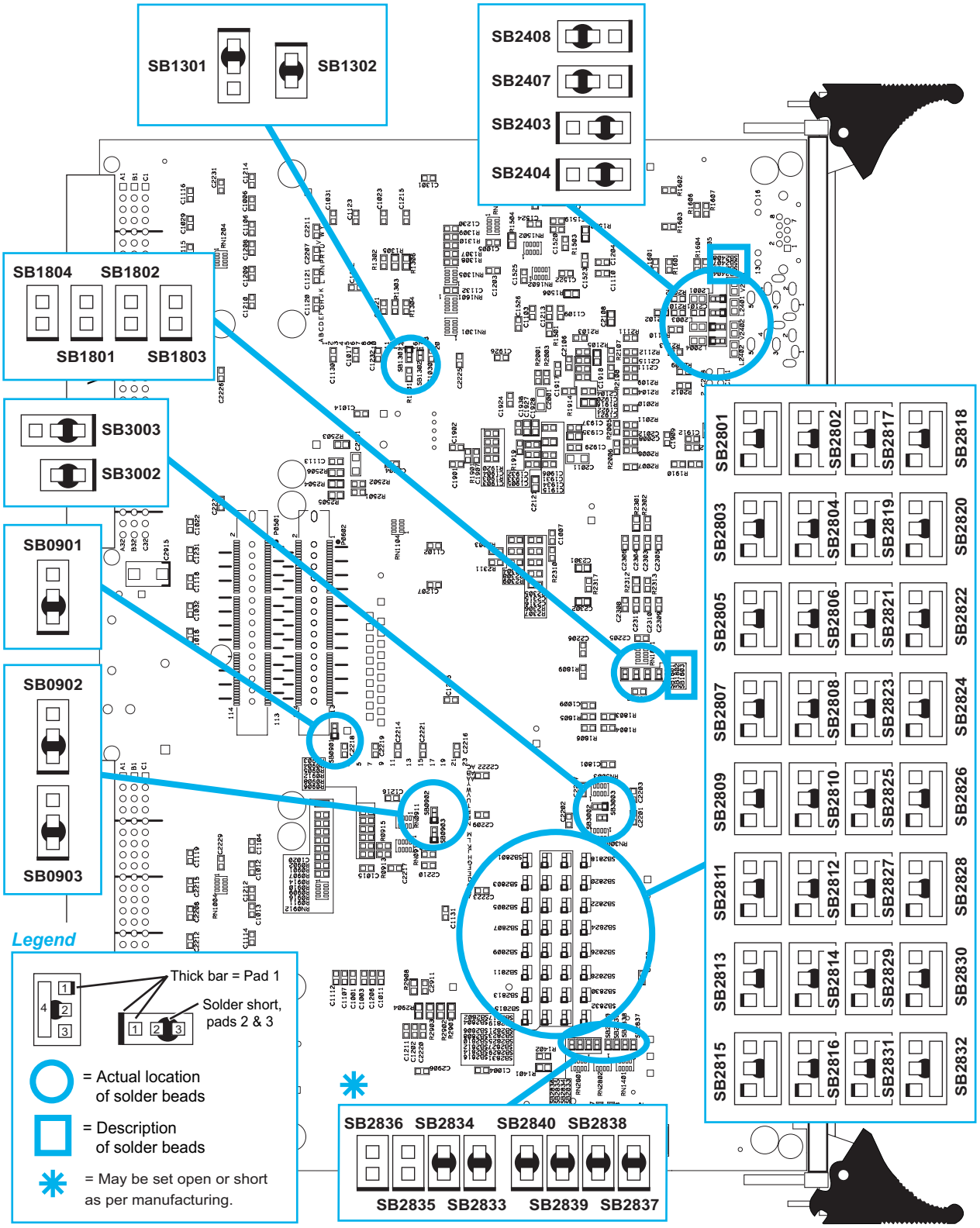


Figure 1-9. 2P2 PMC Carrier Board Solder-Bead Locations (Bottom Side)

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Table 1-15. PMC Carrier Board VME P2 Connector SB2801–SB2832 Configuration [a]

VME P2 Connector Row A[b]				VME P2 Connector Row C[b]			
Pin	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**	**Pin**	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**
A1	PMC1_IO2	Ground	PMC2_IO34	C1	PMC1_IO1	Ground	PMC2_IO33
A2	PMC1_IO4	USR_SW1_8	PMC2_IO36	C2	PMC1_IO3	I2C_CON_SDA	PMC2_IO35
A3	PMC1_IO6	USR_SW1_4	PMC2_IO38	C3	PMC1_IO5	I2C_CON_SCL	PMC2_IO37
A4	PMC1_IO8	USR_SW1_2	PMC2_IO40	C4	PMC1_IO7	Ground	PMC2_IO39
A5	PMC1_IO10	USR_SW1_1	PMC2_IO42	C5	PMC1_IO9	I2C_BUF_VCC	PMC2_IO41
A6	PMC1_IO12	Ground	PMC2_IO44	C6	PMC1_IO11	—	PMC2_IO43
A7	PMC1_IO14	—	PMC2_IO46	C7	PMC1_IO13	—	PMC2_IO45
A8	PMC1_IO16	—	PMC2_IO48	C8	PMC1_IO15	—	PMC2_IO47
A9	PMC1_IO18	SSER_E_TXD	PMC2_IO50	C9	PMC1_IO17	SSER_F_TXD	PMC2_IO49
A10	PMC1_IO20	SSER_E_RXD	PMC2_IO52	C10	PMC1_IO19	SSER_F_RXD	PMC2_IO51
A11	PMC1_IO22	SSER_E_CTS	PMC2_IO54	C11	PMC1_IO21	SSER_F_CTS	PMC2_IO53
A12	PMC1_IO24	SSER_E_RTS	PMC2_IO56	C12	PMC1_IO23	SSER_F_RTS	PMC2_IO55
A13	PMC1_IO26	SSER_E_DTR	PMC2_IO58	C13	PMC1_IO25	SSER_F_DTR	PMC2_IO57
A14	PMC1_IO28	SSER_E_DCD	PMC2_IO60	C14	PMC1_IO27	SSER_F_DCD	PMC2_IO59
A15	PMC1_IO30	SSER_E_DSR	PMC2_IO62	C15	PMC1_IO29	SSER_F_DSR	PMC2_IO61
A16	PMC1_IO32	SSER_E_RI	PMC2_IO64	C16	PMC1_IO31	SSER_F_RI	PMC2_IO63
A17	PMC1_IO34			C17	PMC1_IO33		
A18	PMC1_IO36			C18	PMC1_IO35		
A19	PMC1_IO38			C19	PMC1_IO37		
A20	PMC1_IO40			C20	PMC1_IO39		
A21	PMC1_IO42			C21	PMC1_IO41		
A22	PMC1_IO44			C22	PMC1_IO43		
A23	PMC1_IO46			C23	PMC1_IO45		
A24	PMC1_IO48			C24	PMC1_IO47		
A25	PMC1_IO50			C25	PMC1_IO49		
A26	PMC1_IO52			C26	PMC1_IO51		
A27	PMC1_IO54			C27	PMC1_IO53		
A28	PMC1_IO56			C28	PMC1_IO55		
A29	PMC1_IO58			C29	PMC1_IO57		

Note: Footnotes are described at the end of *Table 1-15* on page 1-24.

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Table 1-15. PMC Carrier Board VME P2 Connector SB2801–SB2832 Configuration (Continued)[a]

VME P2 Connector Row A[b]				VME P2 Connector Row C[b]			
Pin	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**	**Pin**	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**
A30	PMC1_IO60			C30	PMC1_IO59		
A31	PMC1_IO62			C31	PMC1_IO61		
A32	PMC1_IO64			C32	PMC1_IO63		

a—Bold lines outline the various functions available from the VME P2 connector, as defined on page 1-21.

b—See *Table 1-2* on page 1-7.

1.4 Jumper Pins

There are no jumper pins on the 2P2 PMC Carrier Board.

1.5 2P2 PMC Front Panel and Board Diagrams

This section's front panel and board diagrams provide component and connector information at a glance.

Figure 1-10 on page 1-25 shows the 2P2 PMC front panel.

Figure 1-11 on page 1-26 shows the 2P2 PMC components and connectors.

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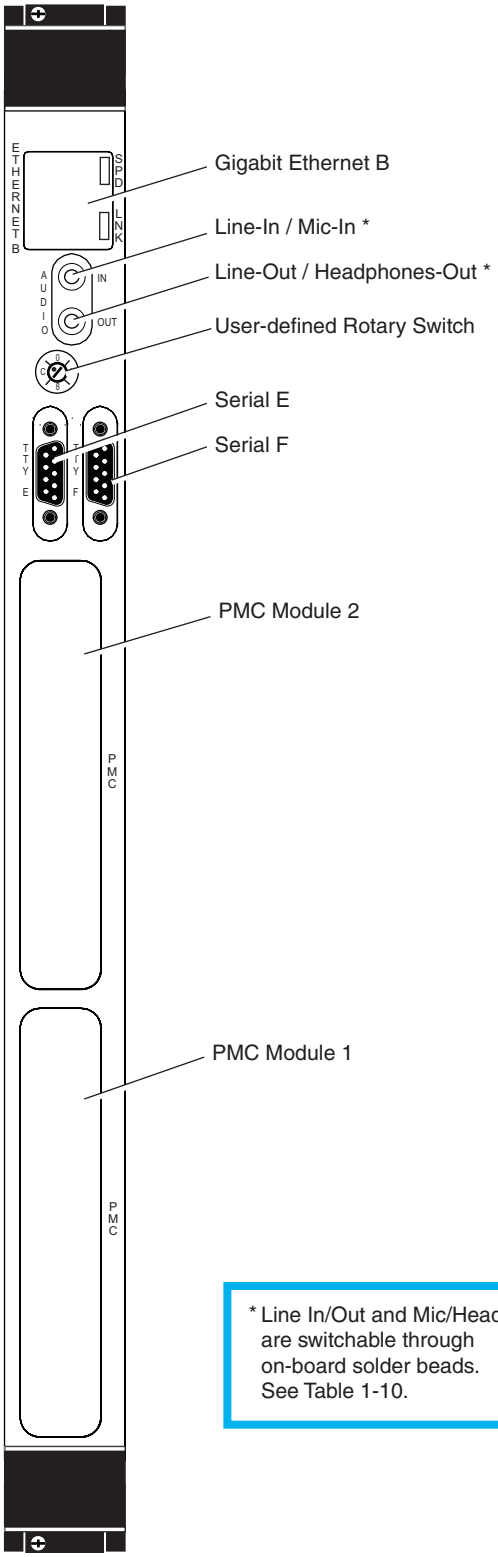


Figure 1-10. 2P2 PMC Carrier Board Front Panel

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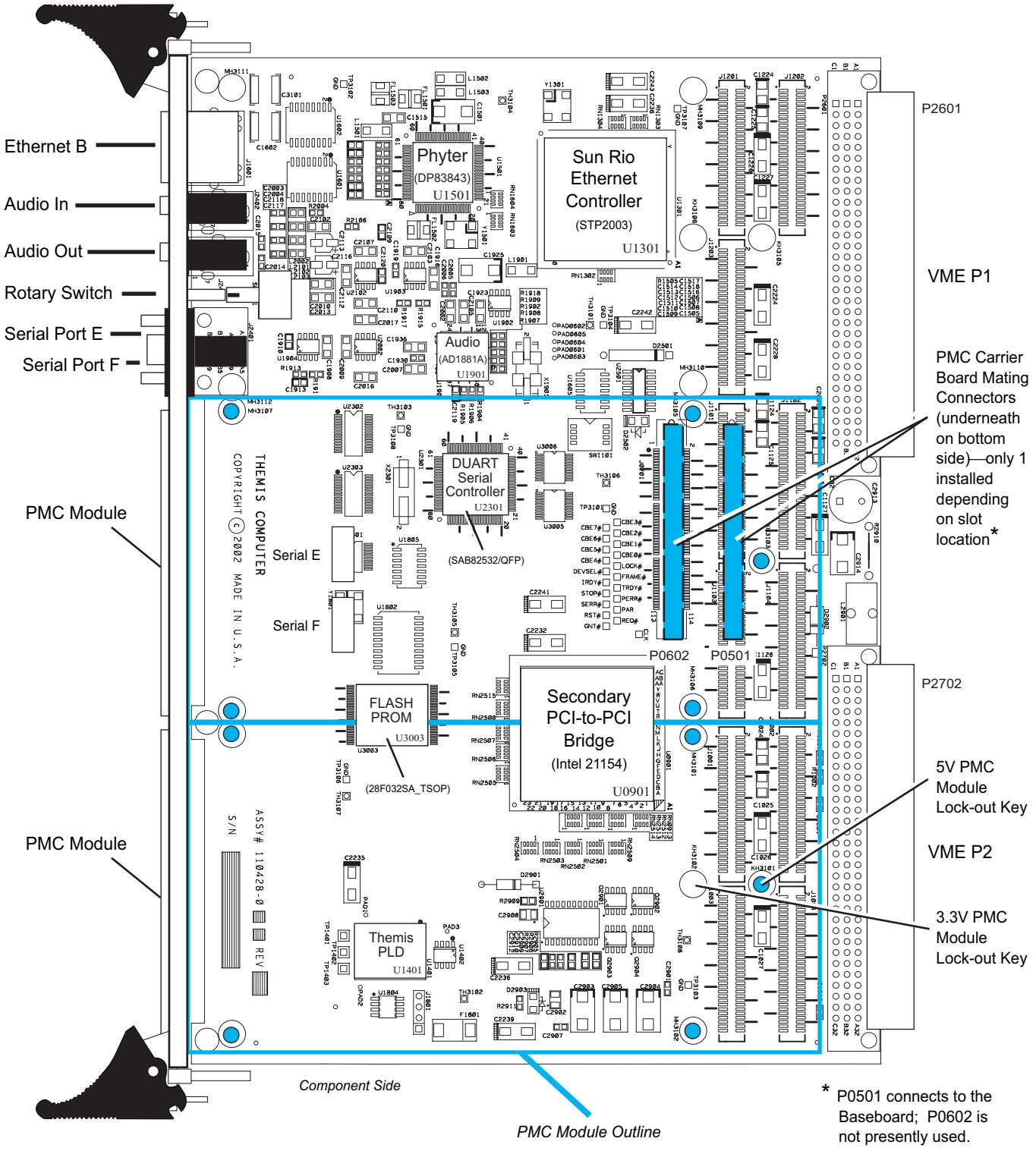


Figure 1-11. 2P2 PMC Carrier Board Component and Connector Diagram (Top Side)

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1.6 2P2 PMC Carrier Board Specifications

1.6.1 Environmental and Compliance Requirements

The 2P2 PMC Carrier Board meets the environmental and compliance regulatory requirements defined in *Tables 1-16* and *1-17*.

Table 1-16. Environmental Requirements

Parameter	Operating	Non-Operating
Weight	0.70 pounds	*NA*
Temperature	0–55° C	0–80° C
Humidity	0–95%	N/A
Altitude	0–10,000’	0–30,000’
Shock	30G	30G
Vibration	10Hz–2kHz	10Hz–2kHz
Airflow	300 LFM min.	N/A

Table 1-17. Compliance Requirements

Parameter	Specifications
Radiated and Conducted Emissions	FCC Class A
PCB FAB Material	FR-408 or equivalent
PCB FAB Thickness	0.062”

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Operation Section

Chapter 2

2P2 PMC/XMC Carrier Board

2.1 2P2 PMC/XMC Carrier Board Overview

The 2P2 PMC/Switched Mezzanine Card (XMC) Carrier Board (*Figure 2-1*) supports a combination of two PMC Module slots (to support user-specified, 32/64-bit, 66-MHz and/or PCI Express XMC/PMC expansion Modules) and two XMC Module slots (see *Figure 2-3* on page 2-3), on-board Audio/Ethernet/Serial-I/O features, as well as x4 PCI Express per PMC/XMC module. (See *Table 1* on page xii for a list of processor boards that support XMC modules.)

Figure 2-2 on page 2-2 diagrams the functions of the 2P2 PMC/XMC Carrier Board.

The 2P2 PMC/XMC Carrier Board works in conjunction with the following Themis systems: TC2D64, TA64, TPPC64, and TP32. Please note that the TA64 and TPPC64 do not support PCI Express (XMC) signaling.



Figure 2-1. 2P2 PMC/XMC Carrier Board

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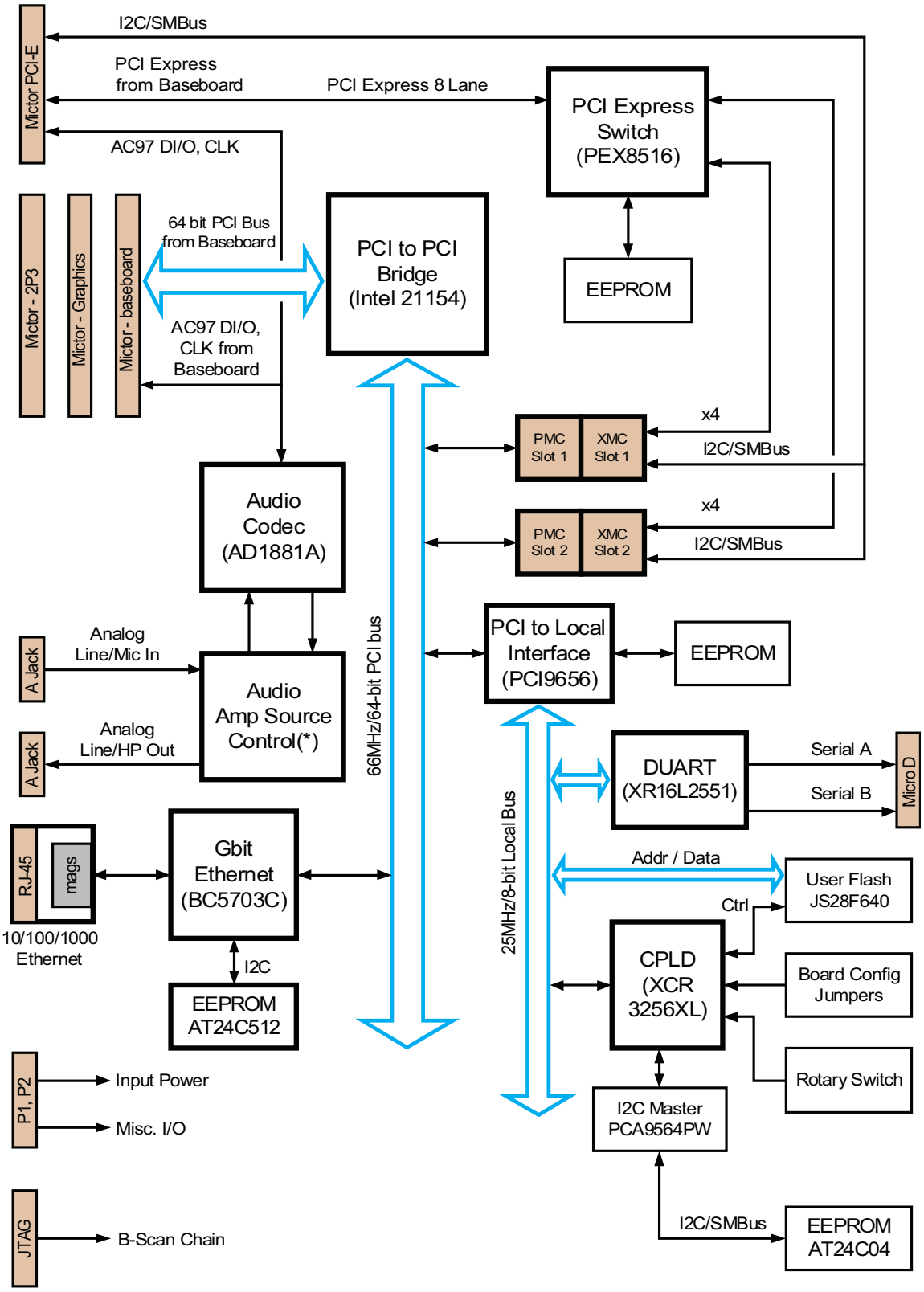


Figure 2-2. 2P2 PMC/XMC Carrier Board Block Diagram

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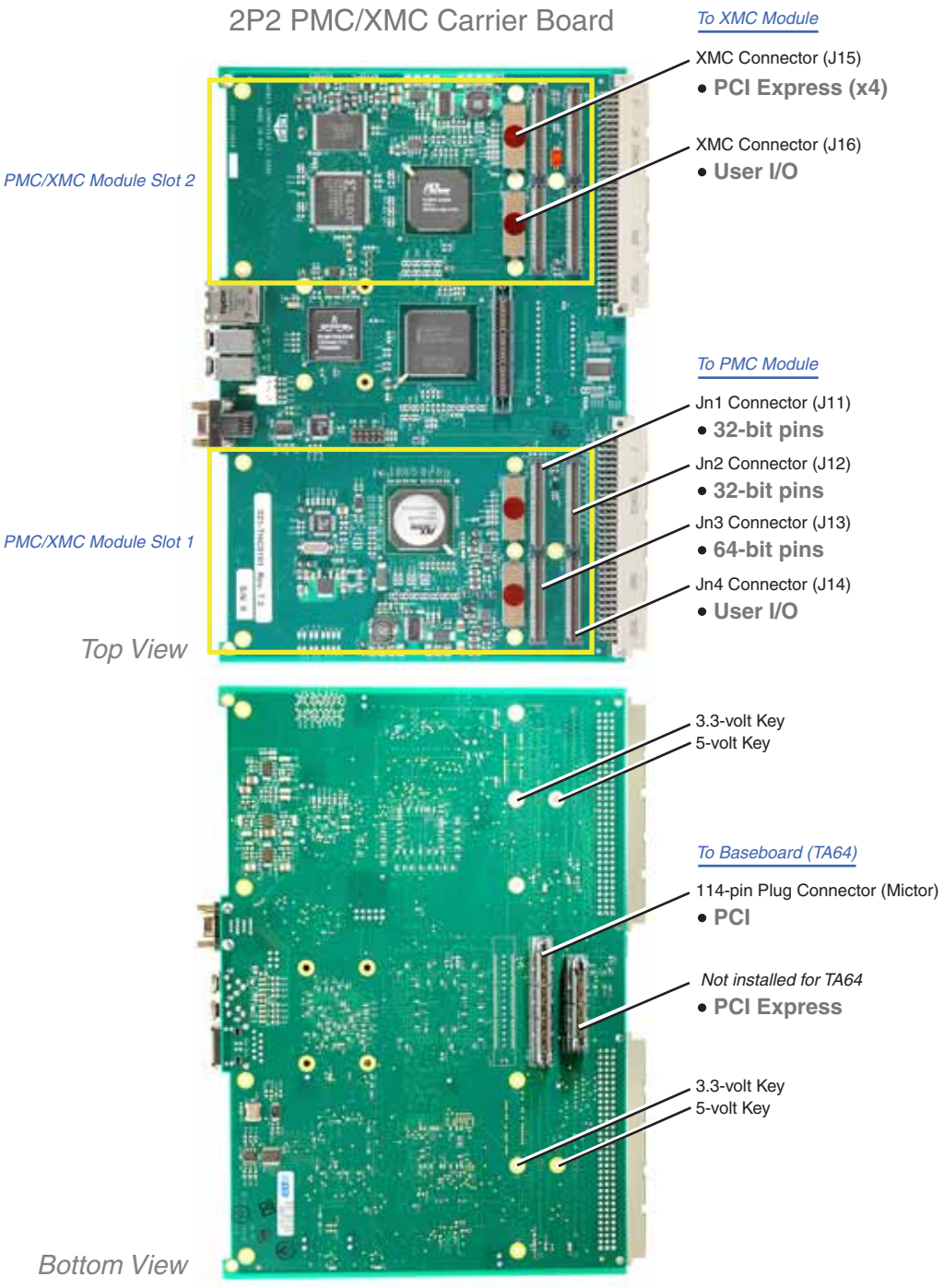


Figure 2-3. The 2P2 PMC/XMC Module Slot Connectors (Top and Bottom Views)

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User I/O on the 2P2 PMC/XMC Carrier Board can be accessed from both the front-panel and paddle-board connectors. In some instances, accessing a signal from one of these access sources prevents the signal from being accessed from the second source. For example, if TTYE is routed to the VME P2 backplane, then TTYE cannot be accessed from the front panel.

For information regarding paddle boards, refer to your system's hardware manual (for example, the TA64, TP32, et al.).



Note: Some VME P2 I/O signals cannot be accessed using the available paddle boards. You will need to provide your own connectivity, or call Themis Customer Support for a cost estimate on building a *custom* Paddle Board.



Note: User I/O signals can be brought from PMC Modules in **slot 1** and **slot 2** to the VME P2 connector of the 2P2 PMC/XMC Carrier Board.

As explained further in Section 2.2.3.1 on page 2-10, user I/O on the PMC/XMC Carrier Board can be reconfigured. For example, 64 bits of user I/O can be made available on PMC Module slot 1, presuming the user I/O on PMC Module slot 2 is not used. On the other hand, 32 bits of user I/O can be made available on both PMC Module slot 1 and PMC Module slot 2.



Caution: It is important to make sure that a solder-bead configuration does not result in an **unwanted change** of system operational parameters. READ ALL SOLDER-BEAD CONFIGURATION DESCRIPTIONS CAREFULLY. (See *Table 2-9* on page 2-20.)

2.1.1 PCI to PCI Bridge

The 2P2 PMC/XMC Carrier Board employs a PCI-to-PCI Bridge to interface PCI from the baseboard to the PMC Slots, the Local interface device, and the Intel 82545GM Ethernet.

The device used to implement the PCI-to PCI-interface is an Intel 21154 PCI-to-PCI Bridge (P/N FW21154BE). The Intel 21154 complies with *PCI Local Bus Specification*, Revision 2.2, and has a 66-MHz/64-bit primary bus interface and a 66-MHz/64-bit secondary interface.

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The 2P2 PMC/XMC allows you to configure both the primary and secondary bus interfaces for one of four possible modes: 5V/33MHz, 3.3V/33MHz, 5V/66MHz, or 3.3V/66MHz. You configure the mode by setting solder beads SB87 and SB88 (voltage setting) and SB69 and SB70 (frequency setting) (see *Table 2-9* on page 2-20). Note that the default mode for both interfaces is 5V/66MHz.

The 21154 provides full support for delayed transactions, which enables the buffering of memory read, I/O, and configuration transactions. The 21154 has separate posted write, read data, and delayed transaction queues with significant buffering capability. In addition, the 21154 supports buffering of simultaneous, multiple, posted write, and delayed transactions in both directions.

For more information about the PCI-to-PCI interface refer to the hardware and software manuals for your particular Themis system (for example, the TA64, TP32, et al.).

2.1.2 The PCI Express Switch

The 2P2 PMC/XMC Carrier Board offers PCI Express technology for PCI Express aggregation, employing a PEX8516 device from PLX Technology (P/N 8516AA-25BI G). The device has four ports that can be configured for x1, x2, x4 or x8 bus widths.

As shown in *Figure 2-4*, the PEX8516 Switch aggregates two 4-lane PCI Express buses from the PMC/XMC slots into one PCI Express 8-lane bus to the baseboard.

Configuration data for the PCI Express Switch is stored in an on-board EEPROM. Upon initialization, information will be transferred from the EEPROM to the PCI Switch in order to initialize all of the registers on the PEX8516.

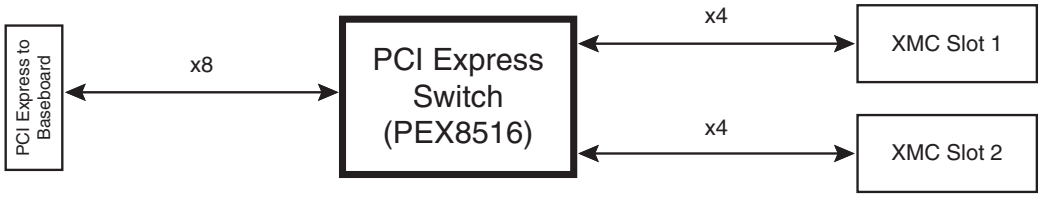


Figure 2-4. PCI Express Aggregation using a PCI Express Switch

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2.2 Connectors

The 2P2 PMC/XMC provides a combination of two PMC module slots and two XMC Module slots (x4 PCI Express per module), and the following input/output from its front panel:

- Gigabit Ethernet port B (10/100/1000 Base-T)
- Audio Line-in or Mic-in
- Audio Line-out or Headphone Out
- User-defined 16-position Rotary Switch
- Serial (TTY) port E *RS232*
- Serial (TTY) port F *RS232*
- 2 PMC Module slots
- 2 XMC Module slots

(See *Table 1* on page xii for a list of processor boards that support XMC modules.)

Attach adapter cables to the appropriate front panel and VME P2 Paddle Board connectors on the 2P2 PMC/XMC Carrier Board. The following sections provide detailed information about the Carrier Board connectors.

2.2.1 2P2 PMC/XMC Carrier Board VME P1 Connector

The VME P1 connector provides daisy-chaining of IACK and BG signals. There is no need to jumper those signals manually for the position occupied by the 2P2 PMC/XMC Carrier Board. See *Table 2-1* on page 2-7 for the VME P1 connector pinouts.

The VME P1 interface employs a standard 3-row VME connector. *Figure 2-5* shows the pin orientation for the VME P1 connector.

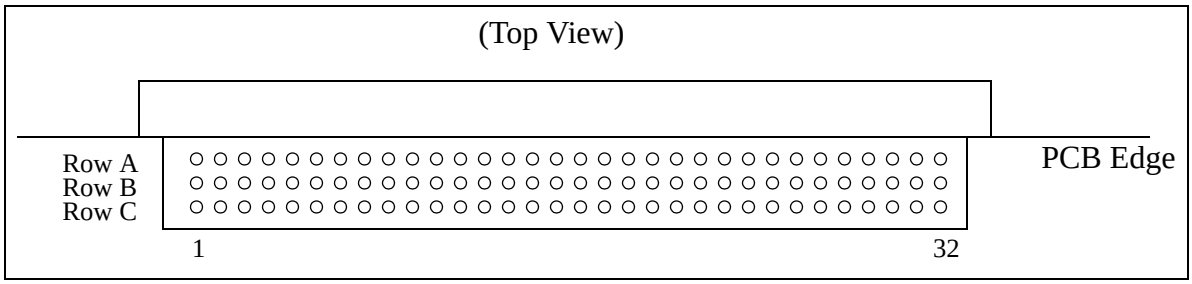


Figure 2-5. 2P2 PMC/XMC Carrier Board VME P1 Connector Pin Orientation

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Table 2-1. 2P2 PMC/XMC Carrier Board VME P1 Pinouts

Pin	Row A Signal Name	Row B Signal Name	Row C Signal Name
1	NC	NC	NC
2	NC	NC	NC
3	NC	NC	NC
4	NC	DAISY_CHAIN_BGIN_L<0>	NC
5	NC	DAISY_CHAIN_BGOUT_L<0>	NC
6	NC	DAISY_CHAIN_BGIN_L<1>	NC
7	NC	DAISY_CHAIN_BGOUT_L<1>	NC
8	NC	DAISY_CHAIN_BGIN_L<2>	NC
9	GND	DAISY_CHAIN_BGOUT_L<2>	GND
10	NC	DAISY_CHAIN_BGIN_L<3>	NC
11	GND	DAISY_CHAIN_BGOUT_L<3>	NC
12	NC	NC	NC
13	NC	NC	NC
14	NC	NC	NC
15	GND	NC	NC
16	NC	NC	NC
17	GND	NC	NC
18	NC	NC	NC
19	GND	NC	NC
20	NC	GND	NC
21	DAISY_CHAIN_IACKIN_L	NC	NC
22	DAISY_CHAIN_IACKOUT_L	NC	NC
23	NC	GND	NC
24	NC	NC	NC
25	NC	NC	NC
26	NC	NC	NC
27	NC	NC	NC
28	NC	NC	NC
29	NC	NC	NC
30	NC	NC	NC
31	-12V	NC	+12V
32	VCC	VCC	VCC

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2.2.2 2P2 PMC/XMC Carrier Board VME P2 Connector

The VME P2 connector of the 2P2 PMC/XMC Carrier Board transmits 64 user-defined signals through rows **A** and **C**, all from a combination of signals (solder-bead switchable) from PMC Module slots 1 and 2, Serial Ports E (TTY E) and F (TTY F), the front-panel User Rotary Switch, and the I^2C bus (see *Table 2-13* on page 2-30 for details). See *Table 2-2* on page 2-9 for the VME P2 connector pinouts.

The VME P2 interface employs a standard 3-row VME connector. *Figure 2-6* shows the pin orientation of the VME P2 connector.

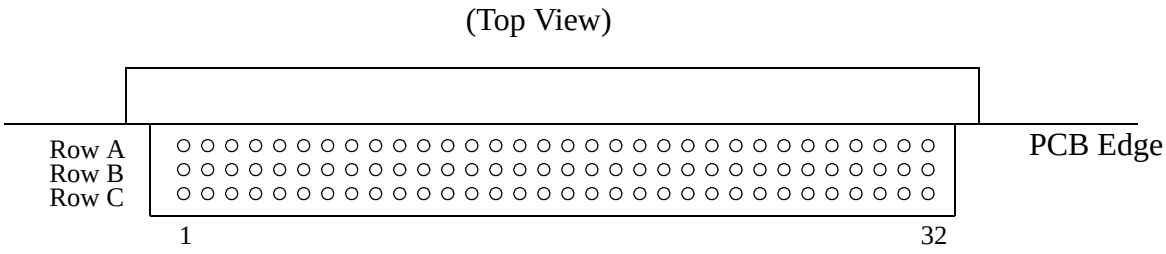


Figure 2-6. 2P2 PMC/XMC Board VME P2 Connector Pin Orientation

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Table 2-2. 2P2 PMC/XMC Carrier Board VME P2 Pinouts

Pin	Row A Signal Name	Row B Signal Name	Row C Signal Name
1	User-switchable[a]	VCC	User-switchable[a]
2	User-switchable[a]	GND	User-switchable[a]
3	User-switchable[a]	NC	User-switchable[a]
4	User-switchable[a]	NC	User-switchable[a]
5	User-switchable[a]	NC	User-switchable[a]
6	User-switchable[a]	NC	User-switchable[a]
7	User-switchable[a]	NC	User-switchable[a]
8	User-switchable[a]	NC	User-switchable[a]
9	User-switchable[a]	NC	User-switchable[a]
10	User-switchable[a]	NC	User-switchable[a]
11	User-switchable[a]	NC	User-switchable[a]
12	User-switchable[a]	NC	User-switchable[a]
13	User-switchable[a]	NC	User-switchable[a]
14	User-switchable[a]	NC	User-switchable[a]
15	User-switchable[a]	NC	User-switchable[a]
16	User-switchable[a]	NC	User-switchable[a]
17	PMC1_IO34	NC	PMC1_IO33
18	PMC1_IO36	NC	PMC1_IO35
19	PMC1_IO38	NC	PMC1_IO37
20	PMC1_IO40	NC	PMC1_IO39
21	PMC1_IO42	NC	PMC1_IO41
22	PMC1_IO44	GND	PMC1_IO43
23	PMC1_IO46	NC	PMC1_IO45
24	PMC1_IO48	NC	PMC1_IO47
25	PMC1_IO50	NC	PMC1_IO49
26	PMC1_IO52	NC	PMC1_IO51
27	PMC1_IO54	NC	PMC1_IO53
28	PMC1_IO56	NC	PMC1_IO55
29	PMC1_IO58	NC	PMC1_IO57
30	PMC1_IO60	NC	PMC1_IO59
31	PMC1_IO62	GND	PMC1_IO61
32	PMC1_IO64	VCC	PMC1_IO63

a—See *Table 2-13* on page 2-30.

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2.2.3 2P2 PMC/XMC Module Slots

The 2P2 PMC/XMC Carrier Board supports a combination of two PMC Module slots (to support vendor-specific, 32/64-bit, 66-MHz, PMC expansion Modules) and two XMC Module slots. Each XMC module slot provides x4 PCI Express. (See *Table 1* on page xii for a list of processor boards that support XMC modules.)

2.2.3.1 PMC Module Slots

In addition to the standard I/O, 64 bits of configurable user I/O are provided from the VME P2 connector directly to the PMC 1 and PMC 2 Module slot positions. All 64 bits can be routed to PMC 1, leaving 0 bits of user I/O for PMC 2. Alternatively, 32 bits can be routed to PMC 1 and 32 bits to PMC 2. In the latter case, PMC 1 will utilize the upper VME P2 signals—VME P2 A[32..17] and VME P2 C[32..17]—while PMC 2 will utilize the lower VME P2 signals—VME P2 A[16..1] and VME P2 C[16..1]. The signals are available on the J14_PMC1 connector of PMC slot 1 and the J14_PMC2 connector of PMC slot 2. If all 64 bits of user I/O are routed to PMC slot 1, it utilizes all 64 signals of the VME P2 connector. In this case, all 64 signals are available on the J14_PMC1 connector of PMC slot 1.



Note: User I/O is directed to PMC 1 and PMC 2 Modules through solder-bead configurations (see *Table 2-11* on page 2-26).

This section provides the pinouts of the PMC user I/O signals that can be brought from PMC Module **Slot 1** and **Slot 2** to the VME P2 connector of the 2P2 PMC/XMC Carrier Board.

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Figure 2-7 shows the pin orientation of the PMC Module Slot connector used to install 2P2 PMC/XMC Modules onto the top side of the circuit board (TA64, TPPC64, or TP32).

- *Connector Type:* 64-Pin, Female, 10mm, Dual Row
- *Connector Manufacturer:* Tyco
- *Manufacturer's Part Number:* 120521-1

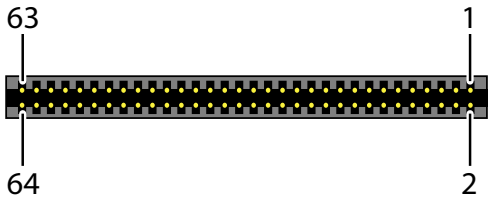


Figure 2-7. PMC Module Slot Connector Pin Orientation

As seen in *Table 2-11* on page 2-26, three solder-bead-selectable configurations are possible:

- 64 user signals from PMC Slot 1 (through J4_PMC1; see *Table 2-3*, page 2-12), and none from PMC Module Slot 2.
- 32 user signals from PMC Module Slot 1 (through J14_PMC1; see *Table 2-4*, page 2-13), and the following I/O signals: Serial Ports E and F, I^2C, and User-Programmable Rotary Switch (see *Table 2-13*, page 2-30). *This is the default configuration.*
- 32 user signals from PMC Module Slot 1 (through J14_PMC1; see *Table 2-4*, page 2-13) and 32 user signals from PMC Module Slot 2 (through J14_PMC2; see *Table 2-5*, page 2-14).

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Table 2-3. PMC Carrier Slot 1 with 64 Bits of User I/O

PMC Pin (J14_PMC1)	VME P2 Signal	PMC Pin (J14_PMC1)	VME P2 Signal
1	VME_P2 C1	2	VME_P2 A1
3	VME_P2 C2	4	VME_P2 A2
5	VME_P2 C3	6	VME_P2 A3
7	VME_P2 C4	8	VME_P2 A4
9	VME_P2 C5	10	VME_P2 A5
11	VME_P2 C6	12	VME_P2 A6
13	VME_P2 C7	14	VME_P2 A7
15	VME_P2 C8	16	VME_P2 A8
17	VME_P2 C9	18	VME_P2 A9
19	VME_P2 C10	20	VME_P2 A10
21	VME_P2 C11	22	VME_P2 A11
23	VME_P2 C12	24	VME_P2 A12
25	VME_P2 C13	26	VME_P2 A13
27	VME_P2 C14	28	VME_P2 A14
29	VME_P2 C15	30	VME_P2 A15
31	VME_P2 C16	32	VME_P2 A16
33	VME_P2 C17	34	VME_P2 A17
35	VME_P2 C18	36	VME_P2 A18
37	VME_P2 C19	38	VME_P2 A19
39	VME_P2 C20	40	VME_P2 A20
41	VME_P2 C21	42	VME_P2 A21
43	VME_P2 C22	44	VME_P2 A22
45	VME_P2 C23	46	VME_P2 A23
47	VME_P2 C24	48	VME_P2 A24
49	VME_P2 C25	50	VME_P2 A25
51	VME_P2 C26	52	VME_P2 A26
53	VME_P2 C27	54	VME_P2 A27
55	VME_P2 C28	56	VME_P2 A28
57	VME_P2 C29	58	VME_P2 A29
59	VME_P2 C30	60	VME_P2 A30
61	VME_P2 C31	62	VME_P2 A31
63	VME_P2 C32	64	VME_P2 A32

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Table 2-4. PMC Carrier Slot 1 with 32 Bits of User I/O

PMC Pin (J14_PMC1)	VME P2 Signal	PMC Pin (J14_PMC1)	VME P2 Signal
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	NC
33	VME_P2 C17	34	VME_P2 A17
35	VME_P2 C18	36	VME_P2 A18
37	VME_P2 C19	38	VME_P2 A19
39	VME_P2 C20	40	VME_P2 A20
41	VME_P2 C21	42	VME_P2 A21
43	VME_P2 C22	44	VME_P2 A22
45	VME_P2 C23	46	VME_P2 A23
47	VME_P2 C24	48	VME_P2 A24
49	VME_P2 C25	50	VME_P2 A25
51	VME_P2 C26	52	VME_P2 A26
53	VME_P2 C27	54	VME_P2 A27
55	VME_P2 C28	56	VME_P2 A28
57	VME_P2 C29	58	VME_P2 A29
59	VME_P2 C30	60	VME_P2 A30
61	VME_P2 C31	62	VME_P2 A31
63	VME_P2 C32	64	VME_P2 A32

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Table 2-5. PMC Carrier Slot 2 with 32 Bits of User I/O

PMC Pin (J14_PMC2)	VME P2 Signal	PMC Pin (J14_PMC2)	VME P2 Signal
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	NC
33	VME_P2 C1	34	VME_P2 A1
35	VME_P2 C2	36	VME_P2 A2
37	VME_P2 C3	38	VME_P2 A3
39	VME_P2 C4	40	VME_P2 A4
41	VME_P2 C5	42	VME_P2 A5
43	VME_P2 C6	44	VME_P2 A6
45	VME_P2 C7	46	VME_P2 A7
47	VME_P2 C8	48	VME_P2 A8
49	VME_P2 C9	50	VME_P2 A9
51	VME_P2 C10	52	VME_P2 A10
53	VME_P2 C11	54	VME_P2 A11
55	VME_P2 C12	56	VME_P2 A12
57	VME_P2 C13	58	VME_P2 A13
59	VME_P2 C14	60	VME_P2 A14
61	VME_P2 C15	62	VME_P2 A15
63	VME_P2 C16	64	VME_P2 A16

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2.2.3.2 XMC Connectors

Each PMC/XMC Module Slot on the 2P2 PMC/XMC Carrier Board provides a single XMC connector. The XMC connector provide the interface from the baseboard to the PMC slots (see Section 2.1.2 on page 2-5 for more information). The XMC connector supports up to 8 PCI Express links; however, only 4 PCI Express links are needed.

Table 2-6 on page 2-16 provides pinouts for the XMC J15/P15 connector.

Figure 2-8 shows the pin orientation of the XMC connector used to install PMC/XMC Modules onto the top side of the circuit board.

- *Connector Type:* XMC
- *Manufacturer:* Samtec
- *Part Number:* ASP-105884-01

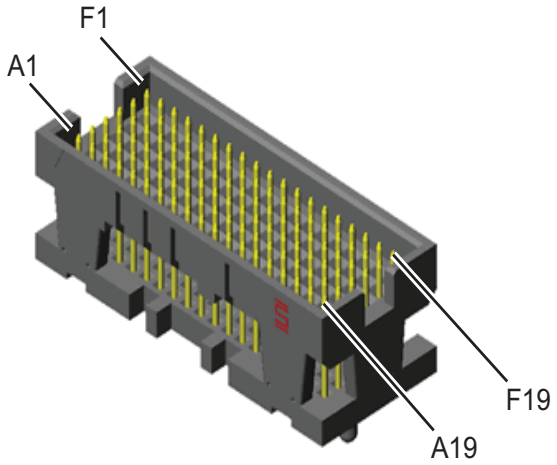


Figure 2-8. XMC Connector Pin Orientation

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Table 2-6. XMC P15 Connector Pinouts

Pin	Row A Signal	Row B Signal	Row C Signal	Row D Signal	Row E Signal	Row F Signal
1	PET0p0	PET0n0	3.3V	PET0p1	PET0n1	VPWR
2	GND	GND	TRST#	GND	GND	MRSTI#
3	PET0p2	PET0n2	3.3V	PET0p3	PET0n3	VPWR
4	GND	GND	TCK	GND	GND	MRSTO#
5	PET0p4[a]	PET0n4[a]	3.3V	PET0p5[a]	PET0n5[a]	VPWR
6	GND	GND	TMS	GND	GND	+12V
7	PET0p6[a]	PET0n6[a]	3.3V	PET0p7[a]	PET0n7[a]	VPWR
8	GND	GND	TDI	GND	GND	-12V
9	RFU	RFU	UD	RFU	RFU	VPWR
10	GND	GND	TDO	GND	GND	GA0
11	PER0p0	PER0n0	MBIST#	PER0p1	PER0n1	VPWR
12	GND	GND	GA1	GND	GND	MPRESENT#
13	PER0p2	PER0n2	3.3V AUX	PER0p3	PER0n3	VPWR
14	GND	GND	GA2	GND	GND	MSDA
15	PER0p4[a]	PER0n4[a]	UD	PER0p5[a]	PER0n5[a]	VPWR
16	GND	GND	MVMRO	GND	GND	MSCL‘
17	PER0p6[a]	PER0n6[a]	RFU	PER0p7[a]	PER0n7[a]	RFU
18	GND	GND	UD	GND	GND	UD
19	REFCLK+0	REFCLK-0	UD	WAKE#	ROOT0#	UD

a—Non-operational on the 2P2 PMC/XMC Carrier Board.

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2.2.4 Serial Ports E and F (RS232)

There are two serial ports available on the 2P2 PMC/XMC Carrier board that may be routed to the front panel or the VME P2 connector—Serial Port E (TTYE—RS232) and Serial Port F (TTYF—RS232). These serial ports are supported by the Siemens EXAR XR16L2551 DUART serial controller, located on the 2P2 PMC/XMC Carrier Board. *Figure 2-9* shows the pin orientation of the serial port connectors.

Use the following connector and cable to connect to the 2P2 PMC/XMC serial ports:

- *Connector Type:* Dual-stacked 9-pin Micro-D
- *Part Number:* ITT Cannon MDSM-18PE-Z10-VR25
- *Themis Cable (optional):* 108113 (one per serial port)

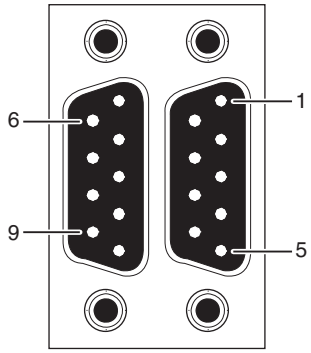


Figure 2-9. Front-Panel Serial Ports Pin Orientation

Table 2-7. Serial Ports E and F Connector Pinouts

Carrier Board is marked:	Port E Pin[a]	Signal Name: TTY E Signal	Signal Name: Description	Signal Name: TTY F Signal	Port F Pin[a]	*Carrier Board is marked:*
B1	1	DCD	Data Carrier Detect	DCD	1	**A1**
	2	RD	Receive Data	RD	2	
	3	TD	Transmit Data	TD	3	
	4	DTR	Data Terminal Ready	DTR	4	
B5	5	SIG GND	Signal Ground	SIG GND	5	**A5**
B6	6	DSR	Data Set Ready	DSR	6	**A6**
	7	RTS	Request to Send	RTS	7	
	8	CTS	Clear to Send	CTS	8	
B9	9	RI	Ring indicator	RI	9	**A9**

a—***Important:*** The A and B associated with Serial Port connector pins on PC boards (Rev **Y** and Rev **B**) are interpreted as follows: Port E pins are marked with a B. Port F pins are marked with an A.

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2.2.5 Gigabit Ethernet Port B

The 2P2 PMC/XMC Carrier Board features a Gigabit Ethernet connection on its front panel. The Ethernet port is an RJ45 (10-pin; 8-pin external) GBE connector with two embedded LEDs (see *Figure 2-10* and *Table 2-8*) supporting 10/100/1000 Base-T transmission. This connector has an embedded transformer for signal conversion. In units where only the Baseboard is present, a single network connection (Ethernet A) is available through the RJ45 connector. With the addition of a 2P2 PMC/XMC Carrier Board, a second Gigabit network connection (Ethernet B) is available through the Carrier Board front panel. Both Ethernet A and B can be active simultaneously.

Use the following connector to attach to the 2P2 PMC/XMC Ethernet port:

- *Connector Type:* RJ45 GBE Connector with Transformer, 8 Pin, 2 LEDs
- *Manufacturer; Part Number:* AMP/Tyco; 6605814-5

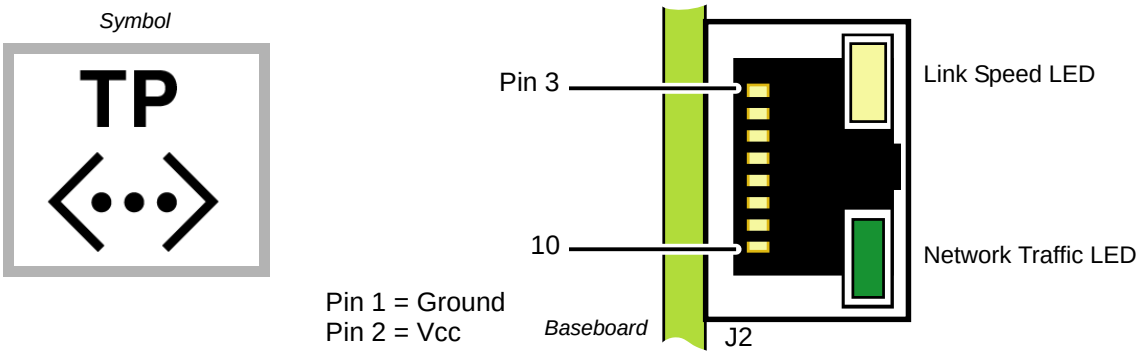


Figure 2-10. Gigabit Ethernet B Connector Pinout

Table 2-8. Gigabit Ethernet Connector-Pin Signals and LED Interpretation

Pin	Signal	Description
1	GND	Chassis ground
2	Vcc	Voltage supply
3	MX3+	Transmit/Receive MX3+
4	MX3–	Transmit/Receive MX3–
5	MX2+	Transmit/Receive MX2+
6	MX2–	Transmit/Receive MX2–
7	MX1+	Transmit/Receive MX1+
8	MX1–	Transmit/Receive MX1–
9	MX0+	Transmit/Receive MX0+
10	MX0–	Transmit/Receive MX0–

LED	Flash Rate[a]	Interpretation
Yellow (*Top*) = Link Speed	ON-ON-ON-ON-OFF-ON-OFF	10 Mb/s
	ON-ON-ON-ON-OFF-ON-OFF-ON-OFF	100 Mb/s
	ON-ON-ON-ON-OFF-ON-OFF-ON-OFF-ON-OFF	1000 Mb/s
Green (*Bottom*) = Network Traffic	Flashing rate is 300 ms for each transmission/receive activity.	

a. "ON" means the LED is on for 300 ms. "OFF" means the LED is off for 300 ms.

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2.2.6 Rotary Switch

The 2P2 PMC/XMC Carrier Board provides a 16-position Rotary Switch that is connected to the Coolrunner Complex Programmable Logic Device (CPLD). This switch allows you to change the switch position from the PMC Carrier Board front panel. The 16 positions correspond to 16 user-defined meanings. Depending on the solder bead settings, the rotary switch position may also be presented as a binary value on VME P2 connector pins A2 through A5. Refer to *Table 2-13* on page 2-30 for details.

2.2.7 Stereo Audio Connectors

The 2P2 PMC/XMC Carrier Board provides audio input and output via two Audio jacks on the board's front panel.

The audio jacks (shown in *Figure 2-11*, page 2-19) can be configured to provide one of two I/O options, depending on the setting of particular solder beads on the 2P2 PMC/XMC board (see *Table 2-10* on page 2-26 for Audio I/O solder bead settings). You specify solder-bead preferences when you order your unit. You may chose to have the 2P2 PMC/XMC board configured with one of the following options:

- Line In / Line Out
- MIC In / Headphone Out



Warning: Solder beads are set by Themis at the factory. DO NOT ATTEMPT TO ALTER SOLDER-BEAD CONFIGURATIONS! Attempting to alter a solder-bead configuration could seriously damage the carrier boards. If you encounter a problem, contact Themis Customer Support.

Use the following connector type to attach to the 2P2 PMC/XMC Audio ports:

- *Connector Type:* Industry-standard 1/8″ Mini Stereo Jack
- *Connector Manufacturer:* Connect-Tech
- *Part Number:* CTP-354W-S1

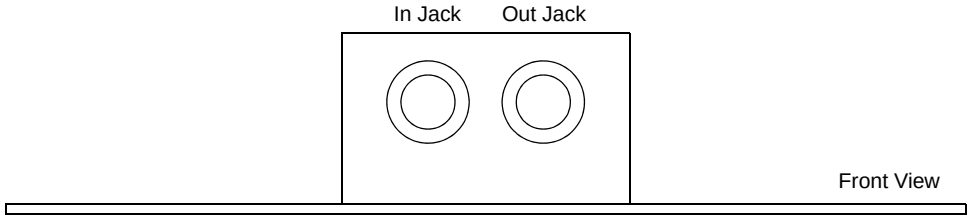


Figure 2-11. Dual Stereo Audio Connector

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2.3 2P2 PMC/XMC Carrier Board Solder Beads

Solder beads are found on both the *top side* and *bottom side* of the 2P2 PMC/XMC Carrier Board and are described in *Table 2-9*.

In *Table 2-9*, if no pad number is given, only **2** solder pads exist. If there are **3 or more** solder pads, the two pads listed are shorted together. **Short** means a solder bead *is* installed, creating an electrical path between contacts. **Open** means a solder bead *is not* installed, hence the path between the contacts is open.

Figure 2-12 on page 2-27, provides the location of the 2P2 PMC/XMC Carrier Board solder beads, jumper pins, and switches on the *top side* of the board; those on the *bottom side* are shown in *Figure 2-13* on page 2-28. Remember that pad 4 is always the long vertical pad to the right of pads 1, 2, and 3, as can be seen in *Figure 2-12*, page 2-27 and *Figure 2-13*, page 2-28.



Caution: When dealing with a **3- or 4-pad** solder-bead switch, a solder bead will short only one set of pads.
If a solder bead shorts more than 2 pads, call Themis Customer Support.

Table 2-9. 2P2 PMC/XMC Carrier Board Solder-Bead Settings

Solder Bead[a]	Setting[b]	Description
SB1 to SB32	Short 1–4	VME P2 connector pinout configuration (see *Table 2-11*, page 2-26)
	Short 2–4	
	Short 3–4	
SB33 and SB34	Short 1–2	Audio interface configuration (see *Table 2-10*, page 2-26) *Default:* Line In/Line Out
	Short 2–3	
SB35 and SB36	Short 1–2	
	Short 2–3	

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Table 2-9. 2P2 PMC/XMC Carrier Board Solder-Bead Settings (Continued)

Solder Bead[a]	Setting[b]	Description
SB41	**Short 1–2**	Audio source selection *Note:* Short 1–2 = Route audio to Baseboard PCI connector. Short 2–3 = Route audio to Baseboard PCI-Express connector. **Important**–All solder beads must be set at the same time.
	Short 2–3	
SB42	**Short 1–2**	
	Short 2–3	
SB43	**Short 1–2**	
	Short 2–3	
SB44	**Short 1–2**	
	Short 2–3	
SB45	**Short 1–2**	
	Short 2–3	
SB64	**Short 1–2**	JTAG power = 3.3V for CPLD programming
	Short 2–3	Ground
SB65	**Open**	GbE Controller PCI LOCK signal = Not connected
	Short	
SB66	Open	Audio select indicator = Microphone In/Headphones Out
	Short	Audio select indicator = Line In/Line Out
SB67	**Open**	CPLD mode (*Internal use only*)
	Short	
SB68	Short 1–2	PCI bridge primary (66 MHz) clock source = Graphics Board
	Short 2–3	PCI bridge primary (66 MHz) clock source = Baseboard
SB69	**Open**	PCI bridge secondary M66EN = Not forced by Carrier
	Short	
SB70	**Open**	PCI bridge primary M66EN = Not forced by Carrier
	Short	
SB71	Open	Write-enable for XMC2 NV memory = Disabled
	Short	Write-enable for XMC2 NV memory = Enabled

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Table 2-9. 2P2 PMC/XMC Carrier Board Solder-Bead Settings (Continued)

Solder Bead[a]	Setting[b]	Description
SB72	Open	XMC2 global address (I2C channel)—GA[2:0] = 110 (open/open/short)
	Short	
SB73	**Open**	
	Short	
SB74	**Open**	
	Short	
SB75	Short 1–2	XMC2 JTAG = Bypass
	Short 2–3	
SB76	Short 1–2	
	Short 2–3	
SB77	Open	Write-enable for XMC1 NV memory = Disabled
	Short	Write-enable for XMC1 NV memory = Enabled
SB78	**Open**	XMC1 global address (I2C channel)—GA[2:0] = 111 (open/open/open)
	Short	
SB79	**Open**	
	Short	
SB80	**Open**	
	Short	
SB81	Short 1–2	XMC1 JTAG = Bypass
	Short 2–3	
SB82	Short 1–2	
	Short 2–3	
SB83	**Open**	Host control of JTAG = Disabled
	Short	
SB84	**Open**	GbE Controller SMBus = Not connected
	Short	
SB85	**Open**	
	Short	
SB86	**Open**	
	Short	

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Table 2-9. 2P2 PMC/XMC Carrier Board Solder-Bead Settings (Continued)

Solder Bead[a]	Setting[b]	Description
SB87	**Short 1–2**	PCI bridge primary and secondary VIO = 5.0V (not 3.3V)
	Short 2–3	
SB88	**Short 1–2**	
	Short 2–3	
SB90	Open	PCI-Express switch JTAG not bypassed
	Short	PCI-Express switch JTAG bypassed
SB91	Short 1–4	PMC I/O routing indicator = Local I/O signalled to CPLD
	Short 2–4	
	Short 3–4	
SB92	Short 1–2	CPLD JTAG = Only CPLD is in JTAG chain
	Short 2–3	
SB93	Short 1–2	
	Short 2–3	
SB94	Open	PCI-Express switch NT port select—NSTREAM_PSEL[3:0] = 0011 (Port 3)
	Short	
SB95	Open	
	Short	
SB96	**Open**	
	Short	
SB97	**Open**	
	Short	
SB98	**Open**	PCI-Express Switch Mode—STRAP_MSEL[1:0] = 11 (Transparent Mode)
	Short	
SB99	**Open**	
	Short	
SB100	**Open**	XMC2 root is not root complex
	Short	XMC2 root is root complex
SB101	**Open**	XMC1 is not root complex
	Short	XMC1 is root complex

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Table 2-9. 2P2 PMC/XMC Carrier Board Solder-Bead Settings (Continued)

Solder Bead[a]	Setting[b]	Description
SB102	**Open**	PCI-Express present signal = Signal not present
	Short	
SB103	**Open**	Local bus I2C access to VME = Not connected
	Short	
SB104	Open	Local bus I2C access to P2 connector = Not connected
	Short	
SB105	Open	PCI bridge secondary clock disable in Power-Down Mode = Not Disabled
	Short	
SB106	Short 1–2	Local bus bridge EEPROM CS PU/PD enabled
	Short 2–3	Local bus bridge EEPROM CS PU/PD disabled
SB107	**Open**	PCI bridge—GPIO[3:2] = 11
	Short	
SB108	**Open**	
	Short	
SB109	Open	Differential clock generator (PLL) BW selection = Low BW
	Short	Differential clock generator (PLL) BW selection = High BW
SB110	Open	Primary bridge M66EN to BB host connector = Connected
	Short	
SB111	**Open**	Primary bridge M66EN to graphics connector = Not connected
	Short	
SB112	Short 1–2	PCI bridge secondary resister VIO = pulled to 3.3V
	Short 2–3	
SB113	Open	Prevents 2P2 PMC/XMC Carrier Board from powering up until chassis power is valid
	Short	
SB114	Open	
	Short	
SB115	Open	Use crystal for audio circuit
	Short	Use oscillator for audio circuit
SB116	**Short 1–2**	RS232 enable source = PG 3p3v
	Short 2–3	

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Table 2-9. 2P2 PMC/XMC Carrier Board Solder-Bead Settings (Continued)

Solder Bead[a]	Setting[b]	Description
SB117	Open	XMC2 VPWR selection = +5V
	Short	
SB118	**Open**	
	Short	
SB119	Open	
	Short	
SB120	**Open**	
	Short	
SB121	Open	
	Short	
SB122	**Open**	
	Short	
SB123	Open	
	Short	
SB124	**Open**	
	Short	
SB125	Open	XMC1 VPWR selection = +5V
	Short	
SB126	**Open**	
	Short	
SB127	Open	
	Short	
SB128	**Open**	
	Short	
SB129	Open	
	Short	
SB130	**Open**	
	Short	
SB131	Open	
	Short	
SB132	**Open**	
	Short	

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Table 2-9. 2P2 PMC/XMC Carrier Board Solder-Bead Settings (Continued)

Solder Bead[a]	Setting[b]	Description
SB133	**Open**	Factory use only
	Short	

a—Shading indicates the solder bead is located on the bottom side of the board; no shading indicates the top side of the board.

b—Boldface = the default solder-bead position.

Table 2-10. 2P2 PMC/XMC Audio Input/Output Settings

Solder Bead	Line In	Line Out	Microphone In	Head-phones
SB33 and SB34	**Short 2–3[a]**		Short 1–2	
SB35 and SB36		**Short 2–3**		Short 1–2

a—Boldface = the default solder-bead position.

Table 2-11. VME P2 Connector Configuration[a]

Definition (32 Pins)	SB1 to SB32
PMC 1 (Pins 1 through 32)	Short 1–4
2P2 XMC I/O—See *Table 2-14*, page 2-29	**Short 2–4**
PMC 2 (Pins 33 through 64)	Short 3–4

a—See *Table 2-12*, page 2-26 and *Table 2-13*, page 2-30, for details. Dark shaded area indicates no preference.

In *Table 2-13* on page 2-30, VME P2 pin signals are interpreted as follows:

Table 2-12. VME P2 Pin Signal Interpretation

Signal	Interpretation
XMC1_IO*n*	The *n*th pin of XMC Module Slot 1
XMC2_IO*n*	The *n*th pin of XMC Module Slot 2
USR_SW1_*n*	The User Switch is equal to the value *n* (1, 2, 4, or 8)
SSER_E_*xyz*	The *xyz* signal of Serial Port E
SSER_F_*xyz*	The *xyz* signal of Serial Port F
I2C_*abc*_*xyz*	An I^2C bus signal (1.5A, Vcc Polyswitch fuse)

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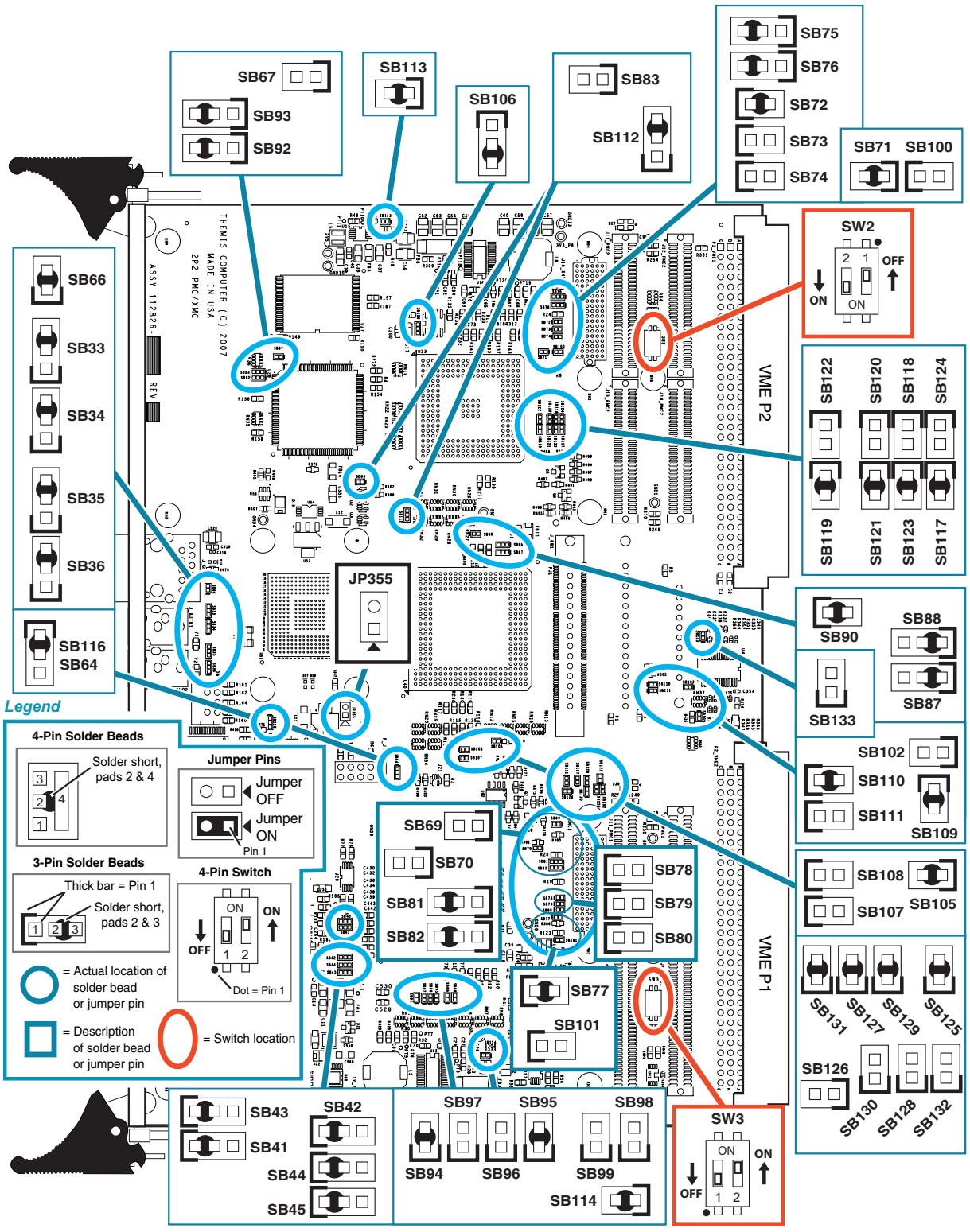


Figure 2-12. 2P2 PMC/XMC Carrier Board Solder-Bead, Jumper-Pin, and Switch Locations (Top Side)

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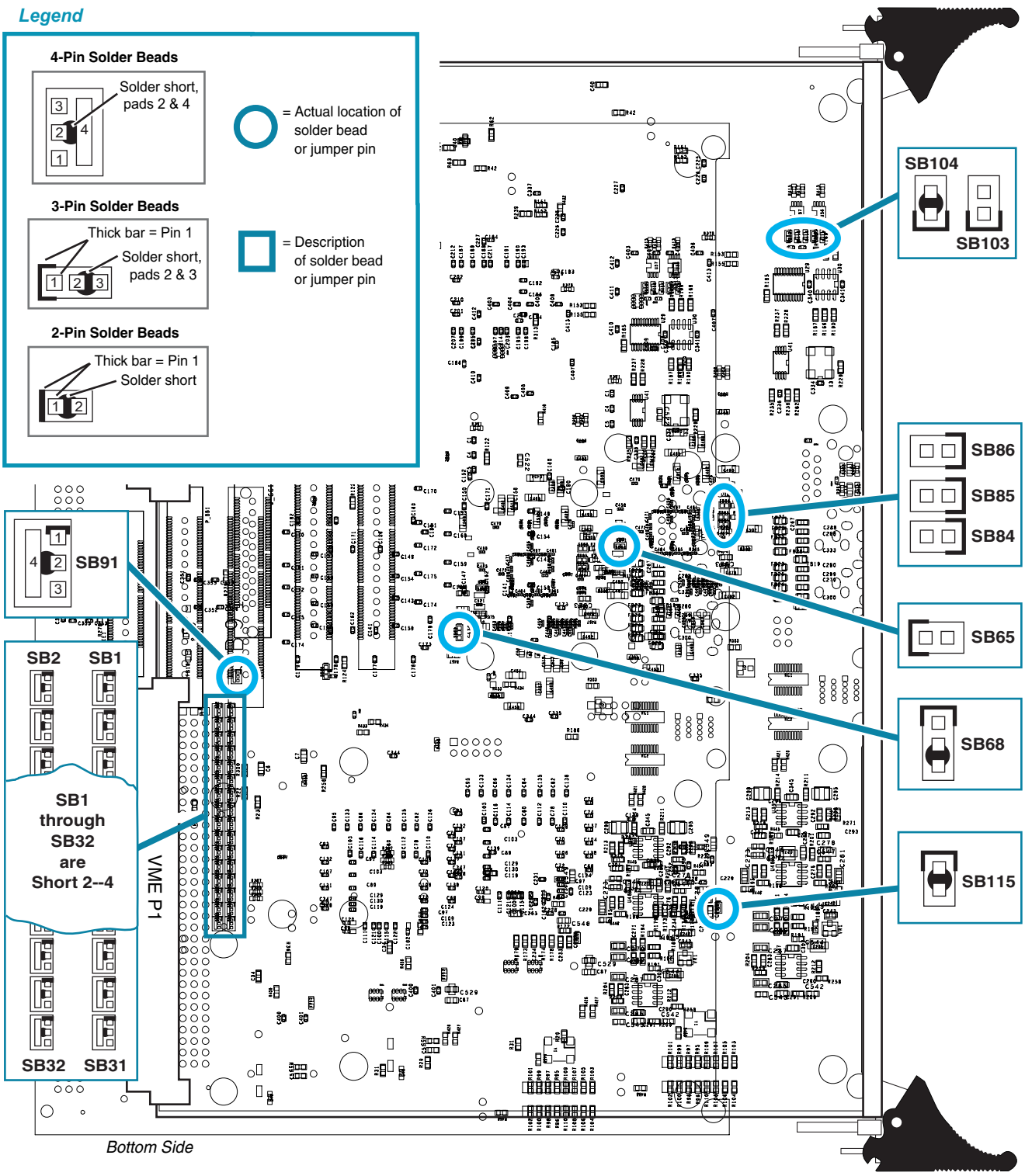


Figure 2-13. 2P2 PMC/XMC Carrier Board Solder-Bead Locations (Bottom Side)

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Table 2-14. 2P2 PMC/XMC Solder-Bead Configurations

Carrier Board Solder Bead	P2 Connector Pins	PMC1 Jn4 I/O	2P2 Carrier I/O[a]	PMC2 Jn4 I/O
	Pin 4	Pin 1	Pin 2	Pin 3
1	A1	PMC1_IO2	GND	PMC2_IO34
2	C1	PMC1_IO1	GND	PMC2_IO33
3	A9	PMC1_IO18	RS232_B_TXD	PMC2_IO50
4	C9	PMC1_IO17	RS232_A_TXD	PMC2_IO49
5	A2	PMC1_IO4	USER_SW3	PMC2_IO36
6	C2	PMC1_IO3	I2C_CON_SDA	PMC2_IO35
7	A10	PMC1_IO20	RS232_B_RXD	PMC2_IO52
8	C10	PMC1_IO19	RS232_A_RXD	PMC2_IO51
9	A3	PMC1_IO6	USER_SW2	PMC2_IO38
10	C3	PMC1_IO5	I2C_CON_SCL	PMC2_IO37
11	A11	PMC1_IO22	RS232_B_CTS	PMC2_IO54
12	C11	PMC1_IO21	RS232_A_CTS	PMC2_IO53
13	A4	PMC1_IO8	USER_SW1	PMC2_IO40
14	C4	PMC1_IO7	GND	PMC2_IO39
15	A12	PMC1_IO24	RS232_B_RTS	PMC2_IO56
16	C12	PMC1_IO23	RS232_A_RTS	PMC2_IO55
17	A5	PMC1_IO10	USER_SW0	PMC2_IO42
18	C5	PMC1_IO9	+3.3V	PMC2_IO41
19	A13	PMC1_IO26	RS232_B_DTR	PMC2_IO58
20	C13	PMC1_IO25	RS232_A_DTR	PMC2_IO57
21	A6	PMC1_IO12	GND	PMC2_IO44
22	C6	PMC1_IO11	I2C_INT_L	PMC2_IO43
23	A14	PMC1_IO28	RS232_B_DCD	PMC2_IO60
24	C14	PMC1_IO27	RS232_A_DCD	PMC2_IO59
25	A7	PMC1_IO14	NC	PMC2_IO46
26	C7	PMC1_IO13	NC	PMC2_IO45
27	A15	PMC1_IO30	RS232_B_DSR	PMC2_IO62
28	C15	PMC1_IO29	RS232_A_DSR	PMC2_IO61
29	A8	PMC1_IO16	NC	PMC2_IO48
30	C8	PMC1_IO15	NC	PMC2_IO47
31	A16	PMC1_IO32	RS232_B_RI	PMC2_IO64
32	C16	PMC1_IO31	RS232_A_RI	PMC2_IO63

a—NC = No Connection.

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Table 2-13. 2P2 PMC/XMC VME P2 Connector SB2801–SB2832 Configuration [a]

VME P2 Connector Row A[b]				VME P2 Connector Row C[b]			
Pin	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**	**Pin**	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**
A1	XMC1_IO2	Ground	XMC2_IO34	C1	XMC1_IO1	Ground	XMC2_IO33
A2	XMC1_IO4	USR_SW1_8	XMC2_IO36	C2	XMC1_IO3	I2C_CON_SDA	XMC2_IO35
A3	XMC1_IO6	USR_SW1_4	XMC2_IO38	C3	XMC1_IO5	I2C_CON_SCL	XMC2_IO37
A4	XMC1_IO8	USR_SW1_2	XMC2_IO40	C4	XMC1_IO7	Ground	XMC2_IO39
A5	XMC1_IO10	USR_SW1_1	XMC2_IO42	C5	XMC1_IO9	I2C_BUF_VCC	XMC2_IO41
A6	XMC1_IO12	Ground	XMC2_IO44	C6	XMC1_IO11	—	XMC2_IO43
A7	XMC1_IO14	—	XMC2_IO46	C7	XMC1_IO13	—	XMC2_IO45
A8	XMC1_IO16	—	XMC2_IO48	C8	XMC1_IO15	—	XMC2_IO47
A9	XMC1_IO18	SSER_E_TXD	XMC2_IO50	C9	XMC1_IO17	SSER_F_TXD	XMC2_IO49
A10	XMC1_IO20	SSER_E_RXD	XMC2_IO52	C10	XMC1_IO19	SSER_F_RXD	XMC2_IO51
A11	XMC1_IO22	SSER_E_CTS	XMC2_IO54	C11	XMC1_IO21	SSER_F_CTS	XMC2_IO53
A12	XMC1_IO24	SSER_E_RTS	XMC2_IO56	C12	XMC1_IO23	SSER_F_RTS	XMC2_IO55
A13	XMC1_IO26	SSER_E_DTR	XMC2_IO58	C13	XMC1_IO25	SSER_F_DTR	XMC2_IO57
A14	XMC1_IO28	SSER_E_DCD	XMC2_IO60	C14	XMC1_IO27	SSER_F_DCD	XMC2_IO59
A15	XMC1_IO30	SSER_E_DSR	XMC2_IO62	C15	XMC1_IO29	SSER_F_DSR	XMC2_IO61
A16	XMC1_IO32	SSER_E_RI	XMC2_IO64	C16	XMC1_IO31	SSER_F_RI	XMC2_IO63
A17	XMC1_IO34			C17	XMC1_IO33		
A18	XMC1_IO36			C18	XMC1_IO35		
A19	XMC1_IO38			C19	XMC1_IO37		
A20	XMC1_IO40			C20	XMC1_IO39		
A21	XMC1_IO42			C21	XMC1_IO41		
A22	XMC1_IO44			C22	XMC1_IO43		
A23	XMC1_IO46			C23	XMC1_IO45		
A24	XMC1_IO48			C24	XMC1_IO47		
A25	XMC1_IO50			C25	XMC1_IO49		
A26	XMC1_IO52			C26	XMC1_IO51		
A27	XMC1_IO54			C27	XMC1_IO53		
A28	XMC1_IO56			C28	XMC1_IO55		
A29	XMC1_IO58			C29	XMC1_IO57		
A30	XMC1_IO60			C30	XMC1_IO59		
A31	XMC1_IO62			C31	XMC1_IO61		
A32	XMC1_IO64			C32	XMC1_IO63		

a—Bold lines outline the various functions available from the VME P2 connector, as defined on page 2-26.

b—See *Table 2-2* on page 2-9.

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The bold lines in *Table 2-13* outline the various functions available from the VME P2 connector according to the 2P2 PMC/XMC Carrier Board solder-bead configuration, namely:

- 2P2 PMC/XMC Module slot 1
- 2P2 PMC/XMC Module slot 2
- Serial Port E
- Serial Port F
- User Switch
- I^2C-bus signals

2.4 Switches

The 2P2 PMC/XMC Carrier Board has two multiple switches—SW2 and SW3—installed on the top side of the PCB (see *Figure 2-12* on page 2-27). Each switch is comprised of two sub-switches—1 and 2—that are configured according to *Figure 2-14*; switch setting definitions are given in *Table 2-15*.

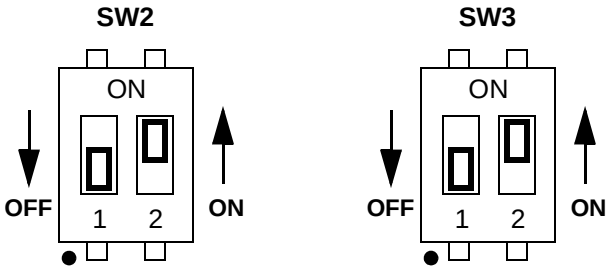


Figure 2-14. 2P2 PMC/XMC Carrier Board Switch Default Configurations

Table 2-15. SW2 and SW3 Setting Definitions

Sub-Switch	1	2	Definition
	OFF	OFF	*Unused*
Default	**OFF**	**ON**	Normal operation
	ON	OFF	*Unused*
	ON	ON	*Unused*

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2.5 Jumper Pins

The 2P2 PMC/XMC Carrier Board has a single jumper-pin setting—the 2-pin JP355—on the top side of the board that is used for Themis testing purposes only (see *Figure 2-12*, page 2-27).



Caution: Make sure that the JP355 jumper pin is set to jumper **OFF** (open). Not setting the JP355 correctly will result in improper operation of the board.

2.6 Resistor Pads

Resistor pads have been removed from both the *top* and *bottom* sides of the original 2P2 PMC/XMC Carrier Board and mostly replaced by the solder beads defined in the section “2P2 PMC/XMC Carrier Board Solder Beads” on page 2-20.

2.7 2P2 PMC/XMC Front Panel and Board Diagrams

This section’s front panel and board diagrams provide component and connector information at a glance.

Figure 2-15 on page 2-33 shows the 2P2 PMC/XMC front panel.

Figure 2-16 on page 2-34 shows the 2P2 PMC/XMC components and connectors.

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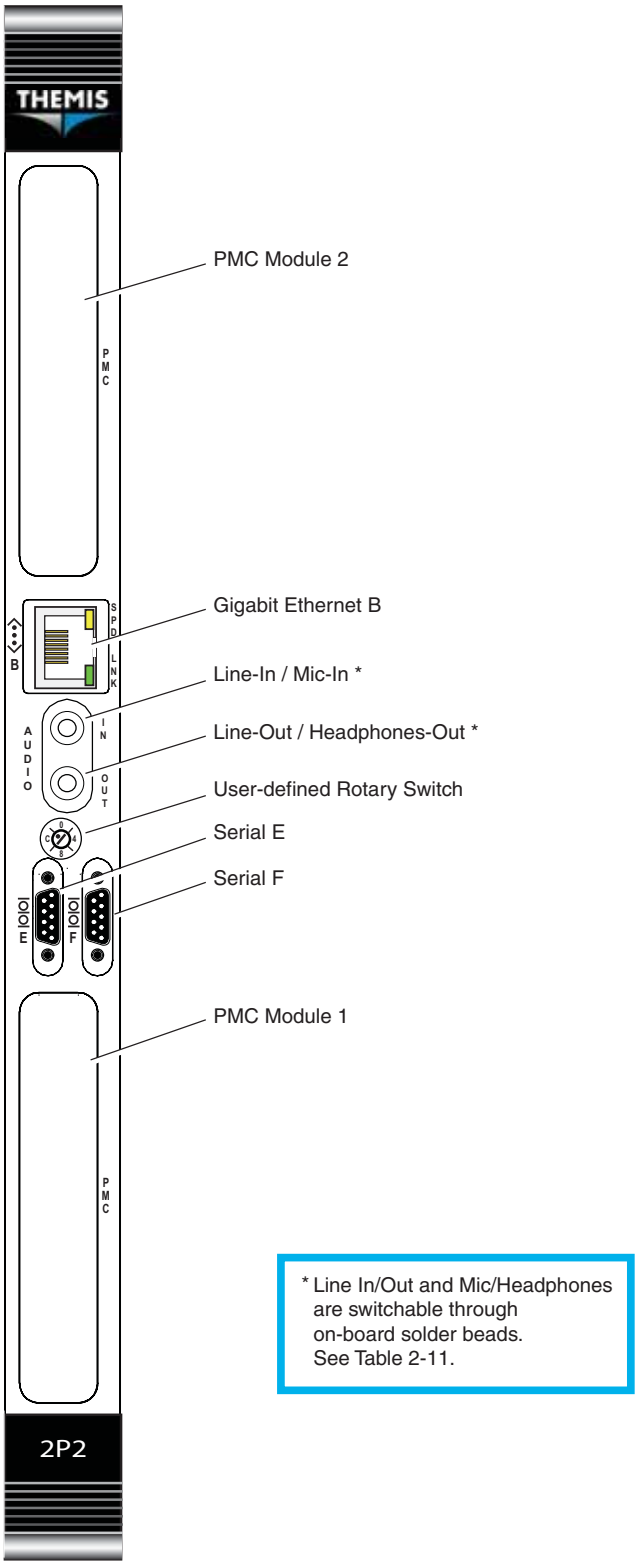


Figure 2-15. 2P2 PMC/XMC Carrier Board Front Panel

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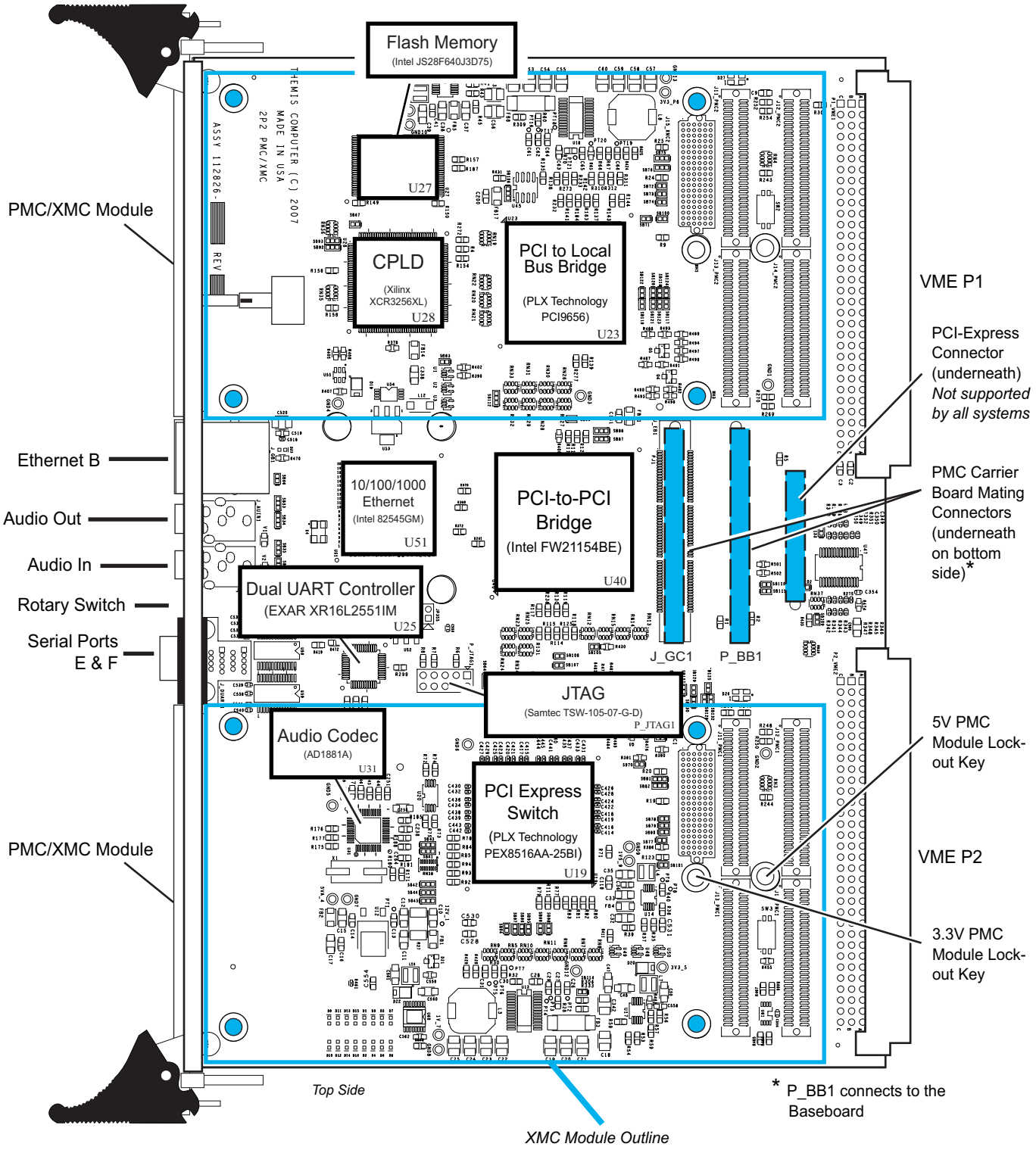


Figure 2-16. 2P2 PMC/XMC Carrier Board Component and Connector Diagram

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2.8 2P2 PMC/XMC Carrier Board Specifications

2.8.1 Environmental and Compliance Requirements

The 2P2 PMC/XMC Carrier Board meets the environmental and compliance regulatory requirements defined in *Tables 2-16* and *2-17*.

Table 2-16. Environmental Requirements

Parameter	Operating	Non-Operating
Weight	0.70 pounds	*NA*
Temperature	0–55° C	0–80° C
Humidity	0–95%	N/A
Altitude	0–10,000’	0–30,000’
Shock	30G	30G
Vibration	10Hz–2kHz	10Hz–2kHz
Airflow	300 LFM min.	N/A

Table 2-17. Compliance Requirements

Parameter	Specifications
Radiated and Conducted Emissions	FCC Class A
PCB FAB Material	FR-408 or equivalent
PCB FAB Thickness	0.062”

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2.9 Estimated Power Requirements

Table 2-18 gives the estimated power requirements for the 2P2 PMC/XMC Carrier Board.

Table 2-18. Estimated Power Requirements

Description	Specification
Digital Logic Voltage (nominally 3.3V)	Configurable to 3.0V, 3.3V and 3.6V, using resistors to test low, nominal and high voltage characteristics
Power Zones	12V, 5.0V, 3.3V, 2.5V, 1.5V, 1.2V and 1.0V
2P2 PMC/XMC Slots 5V Supply +12V Supply -12V Supply 3.3V Supply	*Totals for both slots combined:* 35.3W Maximum 1.2W 0W 20W Maximum

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Operation Section

Chapter 3

2P3 PMC Carrier Board

3.1 2P3 PMC Carrier Board Overview

The 2P3 PCI Mezzanine Card (PMC) Carrier Board (*Figure 3-1*) supports three PMC Module slots (to support vendor-specific, 32/64-bit, 33-MHz, PMC expansion Modules). The 2P3 supports front panel I/O from the *PMC modules* only. *Figure 3-2* on page 3-2 diagrams the functions of the 2P3 PMC Carrier Board.

The 2P3 PMC Carrier Board works in conjunction with the following Themis systems: USPIIe, USPIIe-USB, USPIIe-Gb, USPIIIi, USPIIIi-OPT, TC2D64, TA64, TPPC64, and TP32.



Figure 3-1. 2P3 PMC Carrier Board

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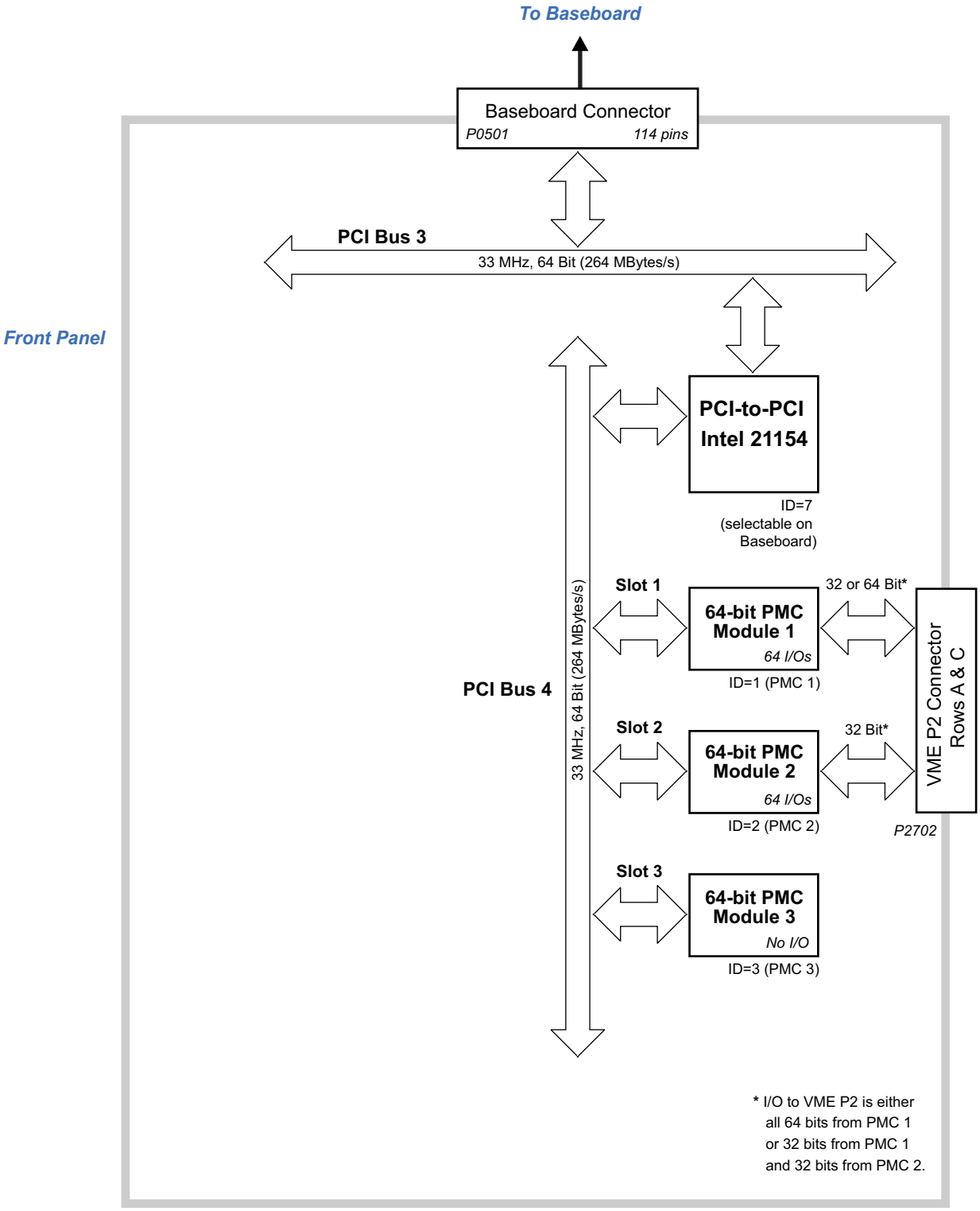


Figure 3-2. 2P3 PMC Carrier Board Block Diagram

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User I/O on the 2P3 PMC Carrier Board can be accessed from the VME P2 connector.

Note: The available paddle boards cannot be used for VME P2 connection. You will need to provide your own connectivity, or call Themis Customer Support for a cost estimate on building a *custom* Paddle Board.

Note: User I/O signals can be brought from PMC Modules in **slot 1** and **slot 2** to the VME P2 connector of the 2P3 PMC Carrier Board.

A PMC Module in **slot 3** has ***no*** I/O-signal access through the VME P2 connector of the 2P3 PMC Carrier Board.

As explained in Section 3.2.3.1 on page 3-8, user I/O on the 2P3 PMC Carrier Board can be reconfigured. For example, 64 bits of user I/O can be made available on PMC Module slot 1, presuming the user I/O on PMC Module slot 2 is not used. On the other hand, 32 bits of user I/O can be made available on both PMC Module slot 1 and PMC Module slot 2.

Caution: It is important to make sure that a solder-bead configuration does not result in an **unwanted change** of system operational parameters. READ ALL SOLDER-BEAN CONFIGURATION DESCRIPTIONS CAREFULLY. (See *Table 3-7* on page 3-15.)

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3.2 Connectors

The 2P3 provides three PMC module slots:

- PMC Module slot 1
- PMC Module slot 2
- PMC Module slot 3

The following sections provide detailed information about the 2P3 PMC Carrier Board connectors.

3.2.1 2P3 PMC Carrier Board VME P1 Connector

The VME P1 connector provides daisy-chaining of IACK and BG signals. There is no need to jumper those signals manually for the position occupied by the 2P3 PMC Carrier Board. See *Table 3-1* on page 3-5 for the VME P1 connector pinouts.

The VME P1 interface employs a standard 3-row VME connector. *Figure 3-3* shows the pin orientation for the VME P1 connector.

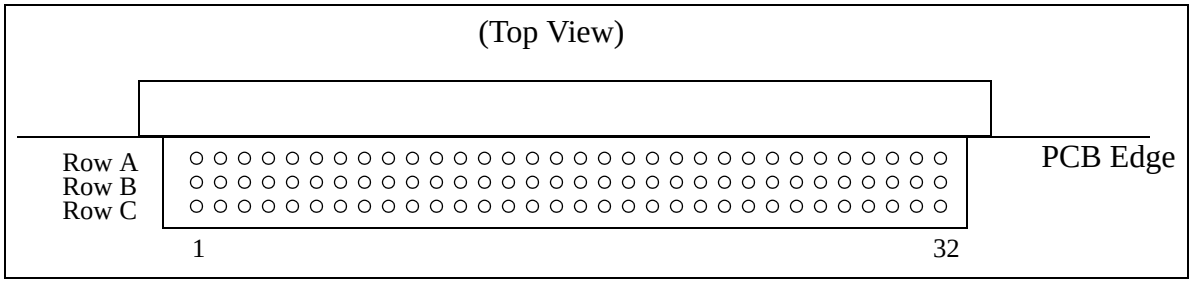


Figure 3-3. 2P3 PMC Carrier Board VME P1 Connector Orientation

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Table 3-1. 2P3 PMC Carrier Board VME P1 Pinouts

Pin	Row A Signal Name	Row B Signal Name	Row C Signal Name
1	NC	NC	NC
2	NC	NC	NC
3	NC	NC	NC
4	NC	DAISY_CHAIN_BGIN_L<0>	NC
5	NC	DAISY_CHAIN_BGOUT_L<0>	NC
6	NC	DAISY_CHAIN_BGIN_L<1>	NC
7	NC	DAISY_CHAIN_BGOUT_L<1>	NC
8	NC	DAISY_CHAIN_BGIN_L<2>	NC
9	GND	DAISY_CHAIN_BGOUT_L<2>	GND
10	NC	DAISY_CHAIN_BGIN_L<3>	NC
11	GND	DAISY_CHAIN_BGOUT_L<3>	NC
12	NC	NC	NC
13	NC	NC	NC
14	NC	NC	NC
15	GND	NC	NC
16	NC	NC	NC
17	GND	NC	NC
18	NC	NC	NC
19	GND	NC	NC
20	NC	GND	NC
21	DAISY_CHAIN_IACKIN_L	NC	NC
22	DAISY_CHAIN_IACKOUT_L	NC	NC
23	NC	GND	NC
24	NC	NC	NC
25	NC	NC	NC
26	NC	NC	NC
27	NC	NC	NC
28	NC	NC	NC
29	NC	NC	NC
30	NC	NC	NC
31	-12V	NC	+12V
32	VCC	VCC	VCC

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3.2.2 2P3 PMC Carrier Board VME P2 Connector

The VME P2 connector of the 2P3 PMC Carrier Board transmits 64 user-defined signals through rows **A** and **C**, all from a combination of signals (solder-bead switchable) from PMC Module slots 1 and 2 (see *Table 3-12* on page 3-20 for details). See *Table 3-2* on page 3-7 for the VME P2 connector pinouts.

The VME P2 interface employs a standard 3-row VME connector. *Figure 3-4* shows the pin orientation of the VME P2 connector.

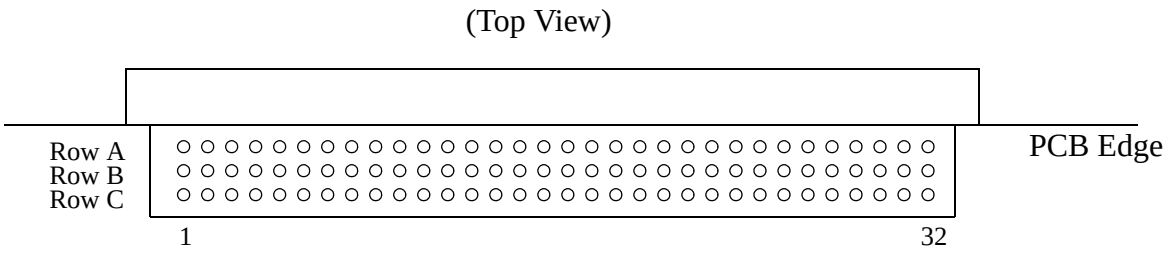


Figure 3-4. 2P3 PMC Board VME P2 Connector Pin Orientation

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Table 3-2. 2P3 PMC Carrier Board VME P2 Pinout

Pin	Row A Signal Name	Row B Signal Name	Row C Signal Name
1	User-switchable[a]	VCC	User-switchable[a]
2	User-switchable[a]	GND	User-switchable[a]
3	User-switchable[a]	NC	User-switchable[a]
4	User-switchable[a]	NC	User-switchable[a]
5	User-switchable[a]	NC	User-switchable[a]
6	User-switchable[a]	NC	User-switchable[a]
7	User-switchable[a]	NC	User-switchable[a]
8	User-switchable[a]	NC	User-switchable[a]
9	User-switchable[a]	NC	User-switchable[a]
10	User-switchable[a]	NC	User-switchable[a]
11	User-switchable[a]	NC	User-switchable[a]
12	User-switchable[a]	GND	User-switchable[a]
13	User-switchable[a]	VCC	User-switchable[a]
14	User-switchable[a]	NC	User-switchable[a]
15	User-switchable[a]	NC	User-switchable[a]
16	User-switchable[a]	NC	User-switchable[a]
17	PMC1_IO34	NC	PMC1_IO33
18	PMC1_IO36	NC	PMC1_IO35
19	PMC1_IO38	NC	PMC1_IO37
20	PMC1_IO40	NC	PMC1_IO39
21	PMC1_IO42	NC	PMC1_IO41
22	PMC1_IO44	GND	PMC1_IO43
23	PMC1_IO46	NC	PMC1_IO45
24	PMC1_IO48	NC	PMC1_IO47
25	PMC1_IO50	NC	PMC1_IO49
26	PMC1_IO52	NC	PMC1_IO51
27	PMC1_IO54	NC	PMC1_IO53
28	PMC1_IO56	NC	PMC1_IO55
29	PMC1_IO58	NC	PMC1_IO57
30	PMC1_IO60	NC	PMC1_IO59
31	PMC1_IO62	GND	PMC1_IO61
32	PMC1_IO64	VCC	PMC1_IO63

a—See *Table 3-12* on page 3-20.

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3.2.3 2P3 PMC Module Slot User I/O

64 bits of configurable user I/O are provided from the VME P2 connector directly to the PMC 1 and PMC 2 Module slot positions. All 64 bits may be routed to PMC 1, leaving 0 bits of user I/O for PMC 2. Alternatively, 32 bits may be routed to PMC 1 and 32 bits to PMC 2. In the latter case, PMC 1 will utilize the upper VME P2 signals—VME P2 A[32..17] and VME P2 C[32..17]—while PMC 2 will utilize the lower VME P2 signals—VME P2 A[16..1] and VME P2 C[16..1]. The signals are available on the J1004 connector of PMC slot 1 and the J1104 connector of PMC slot 2. If all 64 bits of user I/O are routed to PMC slot 1, it utilizes all 64 signals of the VME P2 connector. In this case, all 64 signals are available on the J1004 connector of PMC slot 1.

Note: User I/O is directed to PMC 1 and PMC 2 Modules through solder-bead configurations (see *Table 3-7* on page 3-15).

3.2.3.1 2P3 PMC Module Slot Pinouts

This section provides the pinouts of the 64 PMC User I/O signals that can be brought from PMC Module **Slot 1** and **Slot 2** to the VME P2 connector of the 2P3 PMC Carrier Board.

Note: PMC Module **Slot 3** transmits no I/O through the VME P2 connector of the 2P3 PMC Carrier Board. (See *Figure 3-2* on page 3-2).

Figure 3-5 shows the pin orientation of the PMC Module Slot connector used to install PMC Modules onto the top side of the circuit board (USPIIe, USPIIe-USB, USPIIe-Gb, USPIIIi, or USPIIIi-OPT).

- *Connector Type:* 64 Pin, Female, 10mm, Dual Row
- *Manufacturer; Part Number:* AMP; 120528-1



Figure 3-5. 2P3 PMC Module Slot Connector Pin Orientation

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As seen in *Table 3-8* on page 3-16, two solder-bead-selectable configurations are possible:

- 64 user signals from PMC Slot 1 (through J1004; see *Table 3-3*, page 3-10), and none from PMC Module Slot 2.
- 32 user signals from PMC Module Slot 1 (through J1004; see *Table 3-4*, page 3-11) and 32 user signals from PMC Module Slot 2 (through J1104; see *Table 3-5*, page 3-12).
  This is the default configuration.

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Table 3-3. 2P3 PMC Carrier Slot 1 with 64 Bits of User I/O

PMC Pin (J1004)	VME P2 Signal	PMC Pin (J1004)	VME P2 Signal
1	PMC IO C1	2	PMC IO A1
3	PMC IO C2	4	PMC IO A2
5	PMC IO C3	6	PMC IO A3
7	PMC IO C4	8	PMC IO A4
9	PMC IO C5	10	PMC IO A5
11	PMC IO C6	12	PMC IO A6
13	PMC IO C7	14	PMC IO A7
15	PMC IO C8	16	PMC IO A8
17	PMC IO C9	18	PMC IO A9
19	PMC IO C10	20	PMC IO A10
21	PMC IO C11	22	PMC IO A11
23	PMC IO C12	24	PMC IO A12
25	PMC IO C13	26	PMC IO A13
27	PMC IO C14	28	PMC IO A14
29	PMC IO C15	30	PMC IO A15
31	PMC IO C16	32	PMC IO A16
33	PMC IO C17	34	PMC IO A17
35	PMC IO C18	36	PMC IO A18
37	PMC IO C19	38	PMC IO A19
39	PMC IO C20	40	PMC IO A20
41	PMC IO C21	42	PMC IO A21
43	PMC IO C22	44	PMC IO A22
45	PMC IO C23	46	PMC IO A23
47	PMC IO C24	48	PMC IO A24
49	PMC IO C25	50	PMC IO A25
51	PMC IO C26	52	PMC IO A26
53	PMC IO C27	54	PMC IO A27
55	PMC IO C28	56	PMC IO A28
57	PMC IO C29	58	PMC IO A29
59	PMC IO C30	60	PMC IO A30
61	PMC IO C31	62	PMC IO A31
63	PMC IO C32	64	PMC IO A32

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Table 3-4. 2P3 PMC Carrier Slot 1 with 32 Bits of User I/O

PMC Pin (J1004)	VME P2 Signal	PMC Pin (J1004)	VME P2 Signal
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	NC
33	PMC IO C17	34	PMC IO A17
35	PMC IO C18	36	PMC IO A18
37	PMC IO C19	38	PMC IO A19
39	PMC IO C20	40	PMC IO A20
41	PMC IO C21	42	PMC IO A21
43	PMC IO C22	44	PMC IO A22
45	PMC IO C23	46	PMC IO A23
47	PMC IO C24	48	PMC IO A24
49	PMC IO C25	50	PMC IO A25
51	PMC IO C26	52	PMC IO A26
53	PMC IO C27	54	PMC IO A27
55	PMC IO C28	56	PMC IO A28
57	PMC IO C29	58	PMC IO A29
59	PMC IO C30	60	PMC IO A30
61	PMC IO C31	62	PMC IO A31
63	PMC IO C32	64	PMC IO A32

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Table 3-5. 2P3 PMC Carrier Slot 2 with 32 Bits of User I/O

PMC Pin (J1104)	VME P2 Signal	PMC Pin (J1104)	VME P2 Signal
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	NC
33	PMC IO C1	34	PMC IO A1
35	PMC IO C2	36	PMC IO A2
37	PMC IO C3	38	PMC IO A3
39	PMC IO C4	40	PMC IO A4
41	PMC IO C5	42	PMC IO A5
43	PMC IO C6	44	PMC IO A6
45	PMC IO C7	46	PMC IO A7
47	PMC IO C8	48	PMC IO A8
49	PMC IO C9	50	PMC IO A9
51	PMC IO C10	52	PMC IO A10
53	PMC IO C11	54	PMC IO A11
55	PMC IO C12	56	PMC IO A12
57	PMC IO C13	58	PMC IO A13
59	PMC IO C14	60	PMC IO A14
61	PMC IO C15	62	PMC IO A15
63	PMC IO C16	64	PMC IO A16

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Table 3-6. 2P3 PMC Carrier Slot 3 with 0 Bits of User I/O

PMC Pin (J1204)	VME P2 Signal	PMC Pin (J1204)	VME P2 Signal
1	*Not available*	2	*Not available*
3	*Not available*	4	*Not available*
5	*Not available*	6	*Not available*
7	*Not available*	8	*Not available*
9	*Not available*	10	*Not available*
11	*Not available*	12	*Not available*
13	*Not available*	14	*Not available*
15	*Not available*	16	*Not available*
17	*Not available*	18	*Not available*
19	*Not available*	20	*Not available*
21	*Not available*	22	*Not available*
23	*Not available*	24	*Not available*
25	*Not available*	26	*Not available*
27	*Not available*	28	*Not available*
29	*Not available*	30	*Not available*
31	*Not available*	32	*Not available*
33	*Not available*	34	*Not available*
35	*Not available*	36	*Not available*
37	*Not available*	38	*Not available*
39	*Not available*	40	*Not available*
41	*Not available*	42	*Not available*
43	*Not available*	44	*Not available*
45	*Not available*	46	*Not available*
47	*Not available*	48	*Not available*
49	*Not available*	50	*Not available*
51	*Not available*	52	*Not available*
53	*Not available*	54	*Not available*
55	*Not available*	56	*Not available*
57	*Not available*	58	*Not available*
59	*Not available*	60	*Not available*
61	*Not available*	62	*Not available*
63	*Not available*	64	*Not available*

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3.3 2P3 PMC Carrier Board Solder Beads

Solder beads are found only on *the bottom side* of the 2P3 PMC Carrier Board and are described in *Table 3-7* on page 3-15.

In *Table 3-7*, if no pin number is given, only **2** solder pins exist. If there are **3 or more** solder pins, the two pins listed are shorted together. **Short** means a solder bead *is* installed, creating an electrical path between contacts. **Open** means a solder bead *is not* installed, hence the path between the contacts is open.

Figure 3-6 on page 3-19, provides the location of the 2P3 PMC Carrier Board solder beads. Remember that **pin 1** is indicated on the board by a **dot** and/or a **thick bar line**.



Caution: When dealing with a **3- or 4-pin** solder-bead switch, a solder bead will short only one set of pins.
If a solder bead shorts more than 2 pins, call Themis Customer Support.

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Table 3-7. 2P3 PMC Carrier Board Solder-Bead Settings (Both Sides)

Solder Bead	Setting[a]	Description
SB0901	**Short 1–2**	Required when the 2P3 PMC Carrier Board (in the *second* VME slot) is directly connected to the Baseboard
	Short 2–3	Required when the 2P3 PMC Carrier Board (in the *third* VME slot) is directly connected to the Graphics Board or the PMC Carrier Board in the *second* VME slot
SB0902	**Short 1–2**	Normal operation
	Short 2–3	*For engineering use only*
SB0903	**Short 1–2**	Required when the 2P3 PMC Carrier Board supports 5V VIO PMC modules
	Short 2–3	Required when the 2P3 PMC Carrier Board supports 3.3V VIO PMC modules
SB1301	**Short 1–2**	Set Rio to Motherboard mode (2P3 PMC Carrier Board must be set to this mode)
	Short 2–3	Set Rio to Add-In mode *(factory use only)*
SB1302	**Short**	Assign Ethernet interrupt to PCI interrupt
	Open	Block Ethernet interrupt *(factory use only)*
SB1801	Short	Disable 5-MHz I^2C clock
	Open	Enable 5-MHz I^2C clock
SB1804	*Not used*	
SB2801 to SB2832	Short 1–4	VME P2 connector pinout configuration (see *Table 3-8*, page 3-16)
	Short 2–4	
	Short 3–4	
SB2833	Short	Board type selection (see *Table 3-9*, page 3-17)
	Open	
SB2834	Short	PCB Revision settings indicator (see *Table 3-10*, page 3-17)
	Open	
SB2835	Short	VME P2 connector pinout configuration (see *Table 3-8*, page 3-16)
	Open	
SB2836	Short	VME P2 connector pinout configuration (see *Table 3-8*, page 3-16)
	Open	
SB2837	Short	PCB Revision settings indicator (see *Table 3-10*, page 3-17)
	Open	

Note: Footnotes are described at the end of *Table 3-7* on page 3-16.

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Table 3-7. 2P3 PMC Carrier Board Solder-Bead Settings (Both Sides) (Continued)

Solder Bead	Setting[a]	Description
SB2838	Short	PCB Revision settings indicator (see *Table 3-10*, page 3-17)
	Open	
SB2839	Short	Board type selection (see *Table 3-9*, page 3-17)
	Open	
SB2840	Short	Board type selection (see *Table 3-9*, page 3-17)
	Open	
SB3002	**Short**	Flash PROM selected is writable
	Open	Flash PROM selected is not writable
SB3003	**Short 1–2**	Enable 5V Flash programming voltage (Vpp)
	Short 2–3	Enable 12V Flash programming voltage (Vpp)

a—Boldface = the default solder-bead position. No boldface indicates there is no default.

Table 3-8. VME P2 Connector Configuration[a]

Definition (32 Pins)	SB2801 to SB2832	SB2835	SB2836
All PMC 1	Short 1–4	Short	Short
PMC 1 (16 pins) and PMC 2 (16 pins)	**Short 3–4**	**Open**	Short

a—See *Table 3-11*, page 3-18, and *Table 3-12*, page 3-20 for details.

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Table 3-9. 2P3 PMC Carrier Board Selection Settings

	SB2839	SB2840	SB2833
2 PMCs in first I/O slot (VME card *n*)[a]	Reserved for 2P2 PMC Carrier Board.		
3 PMCs in first I/O slot (VME card *n*)	Short	Short	*Open*
2 PMCs in second I/O slot (VME card *n+1*)	Reserved for 2P2 PMC Carrier Board.		
3 PMCs in second I/O slot (VME card *n+1*)	Short	*Open*	*Open*
Reserved	*Open*	Short	Short
Reserved	*Open*	Short	*Open*
Reserved	*Open*	*Open*	Short
Reserved	*Open*	*Open*	*Open*

a—For the USPIIe family of computers, *n* = 2
For single-CPU USPIIIi, *n* = 3
For dual-CPU USPIIIi, *n* = 4

Table 3-10. PCB Revision Settings

Revision	SB2834	SB2837	SB2838
A	Short	Short	Short
B	Short	Short	*Open*
C	Short	*Open*	Short
D	Short	*Open*	*Open*
E	*Open*	Short	Short
F	*Open*	Short	*Open*
Y	*Open*	*Open*	Short
X	*Open*	*Open*	*Open*

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In *Table 3-12* on page 3-20, VME P2 pin signals are interpreted as follows:

Table 3-11. VME P2 Pin Signal Interpretation

Signal	Interpretation
PMC1_IO*n*	The *n*th pin of PMC Module slot 1
PMC2_IO*n*	The *n*th pin of PMC Module slot 2

The bold lines in *Table 3-12*, outline the various functions available from the VME P2 connector according to the 2P3 PMC Carrier Board solder-bead configuration, namely:

- PMC Module slot 1
- PMC Module slot 2
- Serial Port E (Not applicable to 2P3 PMC Carrier Board)
- Serial Port F (Not applicable to 2P3 PMC Carrier Board)
- User Switch (Not applicable to 2P3 PMC Carrier Board)
- I^2C-bus signals (Not applicable to 2P3 PMC Carrier Board)

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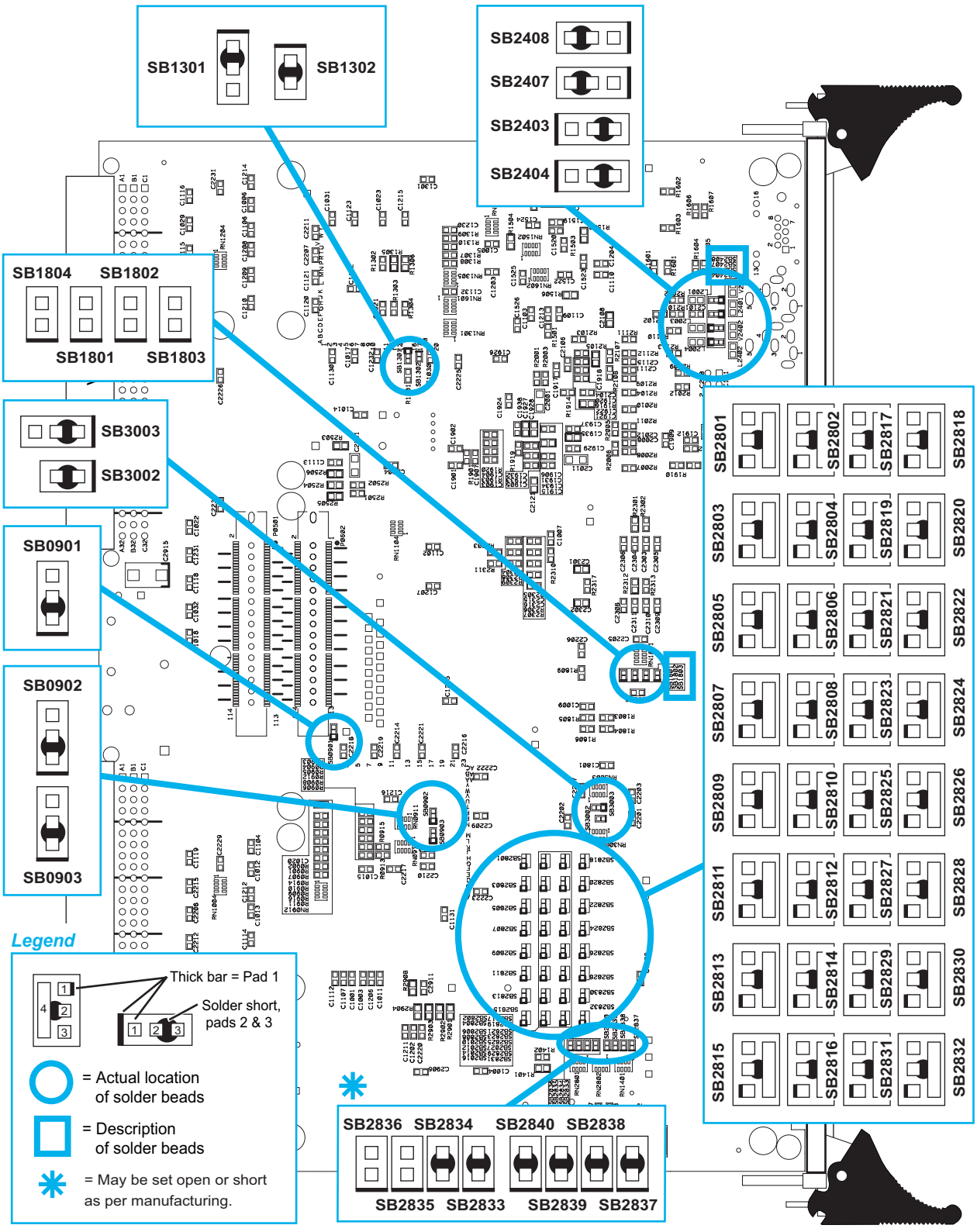


Figure 3-6. 2P3 PMC Carrier Board Solder-Bead Locations (Bottom Side)

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Table 3-12. 2P3 PMC Carrier Board VME P2 Connector SB2801–SB2832 Configuration [a]

VME P2 Connector Row A[b]				VME P2 Connector Row C[b]			
Pin	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**	**Pin**	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**
A1	PMC1_IO2	N/A for 2P3 PMC Carrier Board	PMC2_IO34	C1	PMC1_IO1	N/A for 2P3 PMC Carrier Board	PMC2_IO33
A2	PMC1_IO4		PMC2_IO36	C2	PMC1_IO3		PMC2_IO35
A3	PMC1_IO6		PMC2_IO38	C3	PMC1_IO5		PMC2_IO37
A4	PMC1_IO8		PMC2_IO40	C4	PMC1_IO7		PMC2_IO39
A5	PMC1_IO10		PMC2_IO42	C5	PMC1_IO9		PMC2_IO41
A6	PMC1_IO12		PMC2_IO44	C6	PMC1_IO11		PMC2_IO43
A7	PMC1_IO14		PMC2_IO46	C7	PMC1_IO13		PMC2_IO45
A8	PMC1_IO16		PMC2_IO48	C8	PMC1_IO15		PMC2_IO47
A9	PMC1_IO18		PMC2_IO50	C9	PMC1_IO17		PMC2_IO49
A10	PMC1_IO20		PMC2_IO52	C10	PMC1_IO19		PMC2_IO51
A11	PMC1_IO22		PMC2_IO54	C11	PMC1_IO21		PMC2_IO53
A12	PMC1_IO24		PMC2_IO56	C12	PMC1_IO23		PMC2_IO55
A13	PMC1_IO26		PMC2_IO58	C13	PMC1_IO25		PMC2_IO57
A14	PMC1_IO28		PMC2_IO60	C14	PMC1_IO27		PMC2_IO59
A15	PMC1_IO30		PMC2_IO62	C15	PMC1_IO29		PMC2_IO61
A16	PMC1_IO32		PMC2_IO64	C16	PMC1_IO31		PMC2_IO63
A17	PMC1_IO34			C17	PMC1_IO33		
A18	PMC1_IO36			C18	PMC1_IO35		
A19	PMC1_IO38			C19	PMC1_IO37		
A20	PMC1_IO40			C20	PMC1_IO39		
A21	PMC1_IO42			C21	PMC1_IO41		
A22	PMC1_IO44			C22	PMC1_IO43		
A23	PMC1_IO46			C23	PMC1_IO45		
A24	PMC1_IO48			C24	PMC1_IO47		
A25	PMC1_IO50			C25	PMC1_IO49		
A26	PMC1_IO52			C26	PMC1_IO51		
A27	PMC1_IO54			C27	PMC1_IO53		
A28	PMC1_IO56			C28	PMC1_IO55		
A29	PMC1_IO58			C29	PMC1_IO57		

Note: Footnotes are described at the end of *Table 3-12* on page 3-21.

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Table 3-12. 2P3 PMC Carrier Board VME P2 Connector SB2801–SB2832 Configuration (Continued)[a]

VME P2 Connector Row A[b]				VME P2 Connector Row C[b]			
Pin	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**	**Pin**	**Pin Signal with SB 1–4 Shorted**	**Pin Signal with SB 2–4 Shorted**	**Pin Signal with SB 3–4 Shorted**
A30	PMC1_IO60			C30	PMC1_IO59		
A31	PMC1_IO62			C31	PMC1_IO61		
A32	PMC1_IO64			C32	PMC1_IO63		

a—Bold lines outline the various functions available from the VME P2 connector, as defined on page 3-18.

b—See *Table 3-2*, page 3-7.

3.4 Jumper Pins

There are no jumper pins on the 2P3 PMC Carrier Board.

3.5 2P3 PMC Front Panel and Board Diagrams

This section's front panel and board diagrams provide component and connector information at a glance.

Figure 3-7 on page 3-22 shows the 2P3 PMC front panel.

Figure 3-8 on page 3-23 shows the 2P3 PMC components and connectors.

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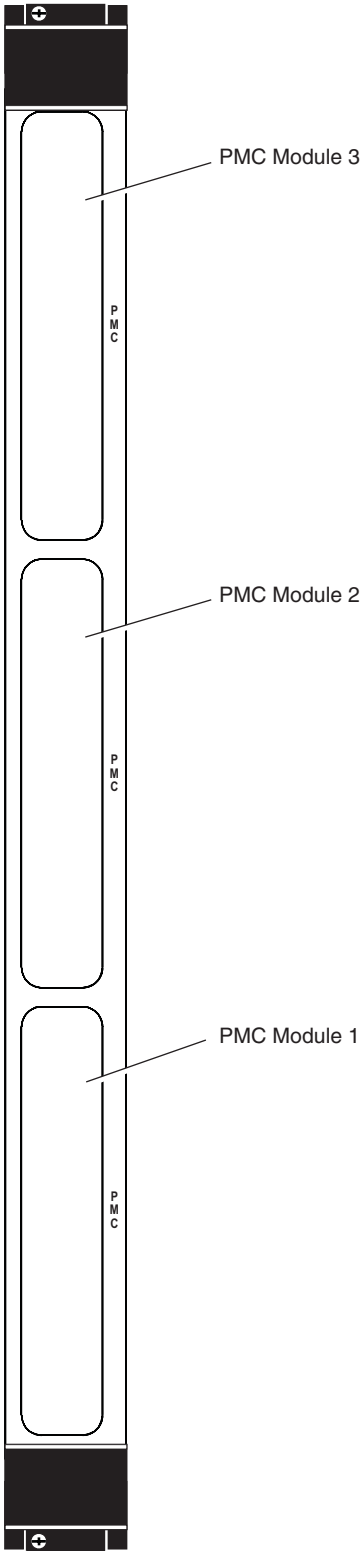


Figure 3-7. 2P3 PMC Carrier Board Front Panel

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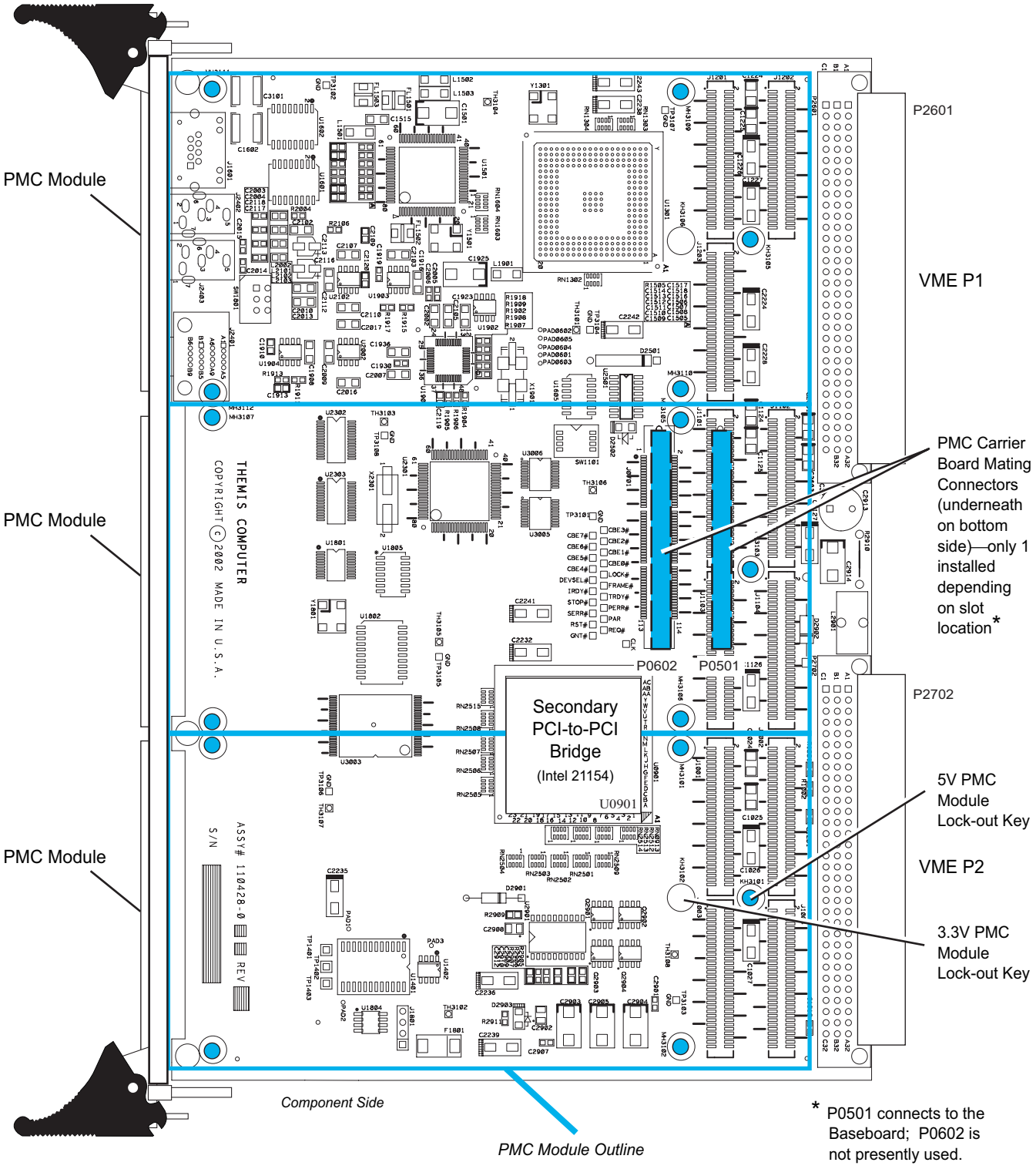


Figure 3-8. 2P3 PMC Carrier Board Component and Connector Diagram

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3.6 2P3 PMC Carrier Board Specifications

3.6.1 Environmental and Compliance Requirements

The 2P3 PMC Carrier Board meets the environmental and compliance regulatory requirements defined in *Tables 3-13* and *3-14*.

Table 3-13. Environmental Requirements

Parameter	Operating	Non-Operating
Weight	0.65 pounds	*NA*
Temperature	0–55° C	0–80° C
Humidity	0–95%	N/A
Altitude	0–10,000’	0–30,000’
Shock	30G	30G
Vibration	10Hz–2kHz	10Hz–2kHz
Airflow	300 LFM min.	N/A

Table 3-14. Compliance Requirements

Parameter	Specifications
Radiated and Conducted Emissions	FCC Class A
PCB FAB Material	FR-408 or equivalent
PCB FAB Thickness	0.062”

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Appendix A

Disassembling and Reassembling Boards (Themis USPIIe Family of Computers)

This appendix provides instructions for disassembling and reassembling Themis Multi-Slot VME Computers for the purposes of accessing a PMC module or replacing a particular board's battery.

Note: This procedure applies to Themis's USPIIe Family of Computers only: USPIIe, USPIIe-USB, and USPIIe-Gb.

The procedure will be similar for others boards; for example, the 2P2 PMC/XMC Carrier Board.

Before you can begin these procedures, you will need the following:

- a static-safe work area that conforms to industry-standard practices.
- a high quality precision Phillips screwdriver (for example - Wiha 261 series, [http://www.wihatools.com/261serie.htm], or similar), tip size #1.

Caution: It it necessary to observe industry-standard ESD precautions at all times when handling boards; work on a static-safe mat and wear a wrist-strap. Failure to do so could cause damage to the board.

Caution: Themis Computer is not responsible for any damage to boards or equipment caused by customer repairs. Any such damage invalidates the customer warranty.

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A.1 Disassembling the Boards

The USPIIe family includes a Baseboard, an optional PMC Carrier Board, and an optional TGA3D+ video card. These instructions depict the disassembly of a dual-slot Baseboard plus PMC Carrier Board, but also apply to a dual-slot Baseboard plus TGA3D assembly, and to a triple-slot Baseboard with a PMC Carrier Board and TGA3D assembly.

1. Remove the 3 faceplate screws, and the 4 VME connector screws at the locations shown in *Figure A-1*.

   (If possible, measure the torque needed to remove these screws, as equal torque should be applied during reassembly).

   Once these screws have been removed, the only mechanism holding the boards together is a high-density connector which routes PCI bus signals between the boards.



Figure A-1. Seven Screw Locations

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Note: The USPIIe-USB family of boards is available with standard VME ejector handles or VME64 injector/ejector handles. The handles shown in *Figure A-1* (Step #1) are standard VME ejector handles, which pose no problem to screw-removal. However, the shape of the VME64 injector/ejector-type handles prohibit straight-on screwdriver access to the upper and lower faceplate screws. If the faceplate screws on your board assembly are obstructed by the handles, then it will be necessary to remove the handles first. Remove the three screws that secure the lower injector/ejector handles (*Figure A-2*). The handles should easily slide off the faceplate assembly.

Repeat for the upper injector/ejector handles.

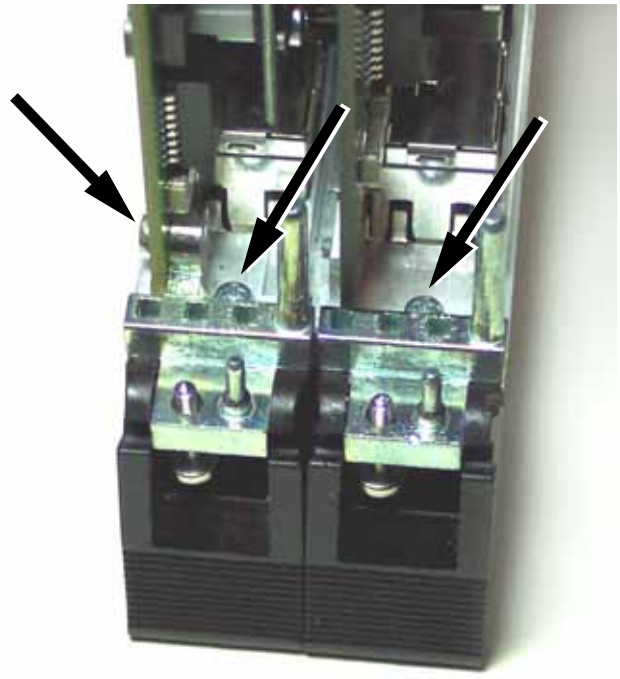


Figure A-2. Remove 3 Screws Securing Injector/Ejector Handles

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2. Separate the Baseboard from the PMC Carrier Board.

   The best method to accomplish this is to hold the Baseboard down against the work surface using the tips of your thumbs (*Figure A-3*).

   Then use your index fingers to apply alternating upward pressure, first on the left side then on the right side, creating a gentle rocking motion that separates the boards with minimal flexing (*Figure A-4*).

   Note that only the left thumb and index finger are shown in the photos, but the same applies to the right thumb and index finger on the right side of the board assembly.

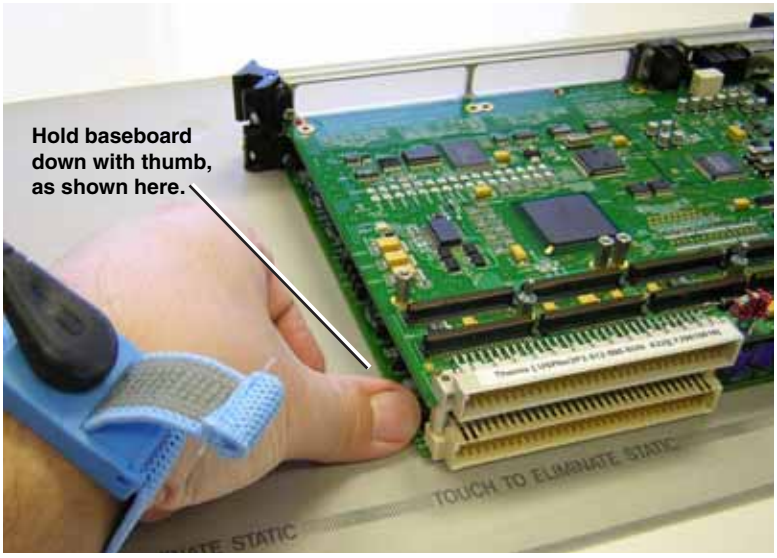


Figure A-3. Hold the Baseboard Down Against Work Surface

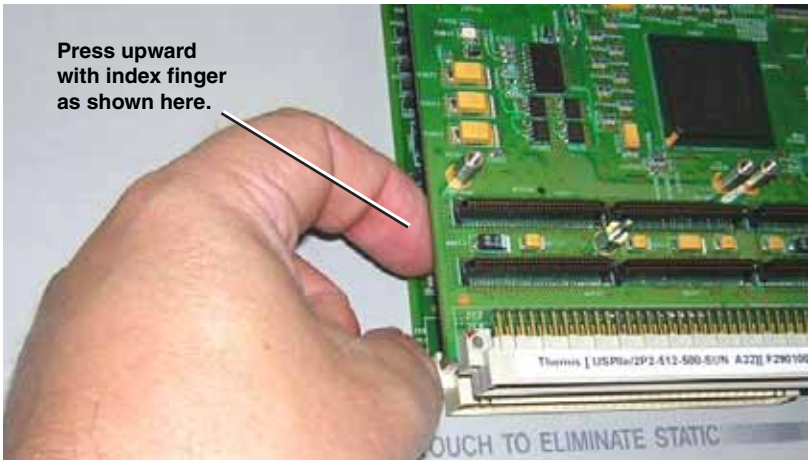


Figure A-4. Use Fingers to Apply Upward Pressure

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3. After separation, carefully lay the PMC Carrier Board aside.

   You now have access to replace the battery (the yellow rectangular component adjacent to the heatsink) or install/remove a PMC Module from the baseboard (*Figure A-5*).



Figure A-5. Separated Baseboard and PMC Carrier Board

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A.2 Reassembling the Boards

These instructions depict how to reassemble a Themis Multi-Slot VME Computer, after having disassembled it for the purpose of accessing a PMC module or replacing a battery.

1. Place the USPIIe Baseboard on the work surface, component side up, with the metal faceplate closest to you (VME P1 and P2 connectors pointed away from you), as shown in *Figure A-6*.
2. Locate the mating connector and socket on the Baseboard and Carrier Board. They are the black plastic connectors near the VME P1 and P2 connectors. Gently lay the PMC Carrier Board on top of the Baseboard, making sure the mating connector and socket align properly. Use the faceplates as alignment guides; there are 3 small tabs on the side of the PMC Carrier Board faceplate that fit into 3 corresponding slots on the Baseboard faceplate (*Figure A-6*).



Figure A-6. Align Three Tabs to Slots

3. The mating connector and socket should slip together about halfway, due to gravity alone, before any insertion force is applied. Verify that the gap between the Baseboard standoff nuts and the PMC Carrier Board is about 1/8” (*Figure A-7*).

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Caution: Proper mating of the connectors is critical to avoid permanent damage to the assembly. If the connector and socket do not slip together halfway, from gravity alone, go back to Step 2 and re-check the alignment.

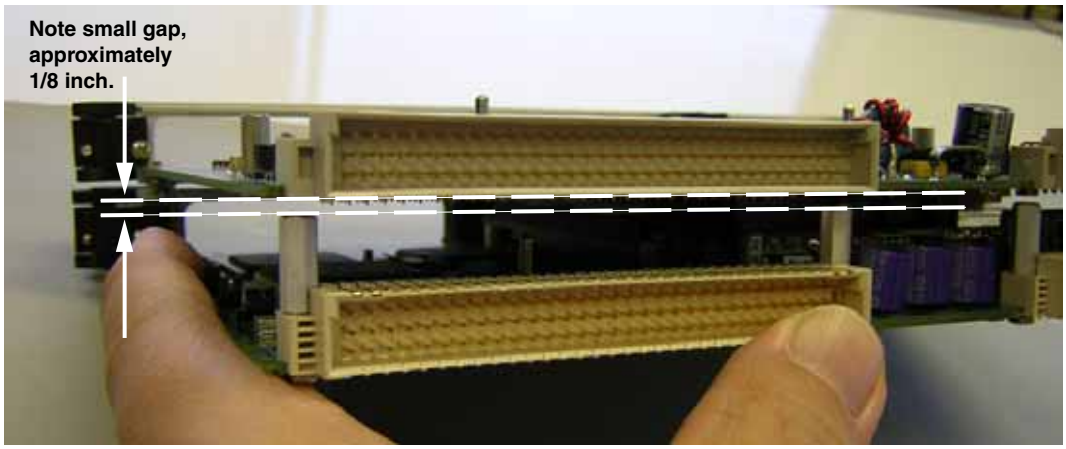


Figure A-7. Expected Gap is Approximately 1/8”

4. Apply gentle downward pressure on the PMC Carrier Board at the PMC interface standoffs (if they exist) as shown in *Figure A-8*. If there are no PMC interface standoffs (or if you are working with a TGA3D Graphics Board), then use an interposer (i.e., an anti-static bag) between the printed circuit board and your fingertips, as shown in *Figure A-9*. This will prevent the deposit of body oils or tiny bits of debris on the circuit board components.

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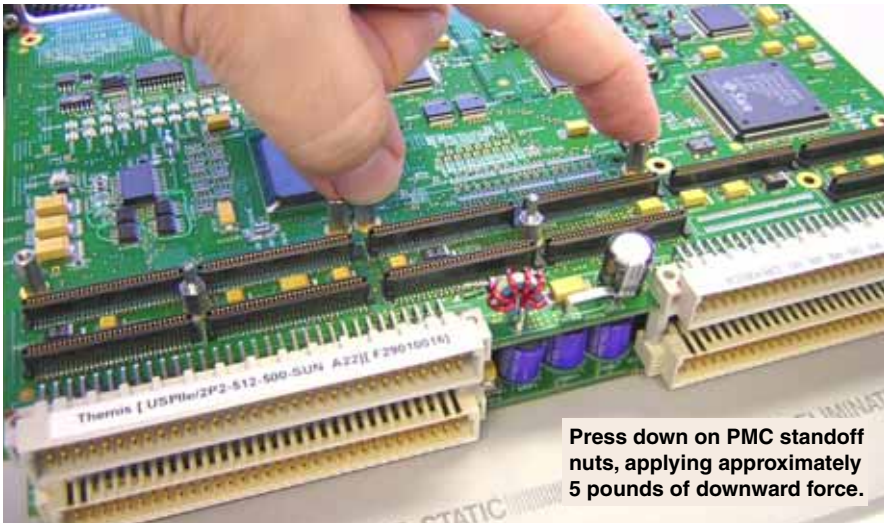


Figure A-8. Press Down on the PMC Interface Standoffs

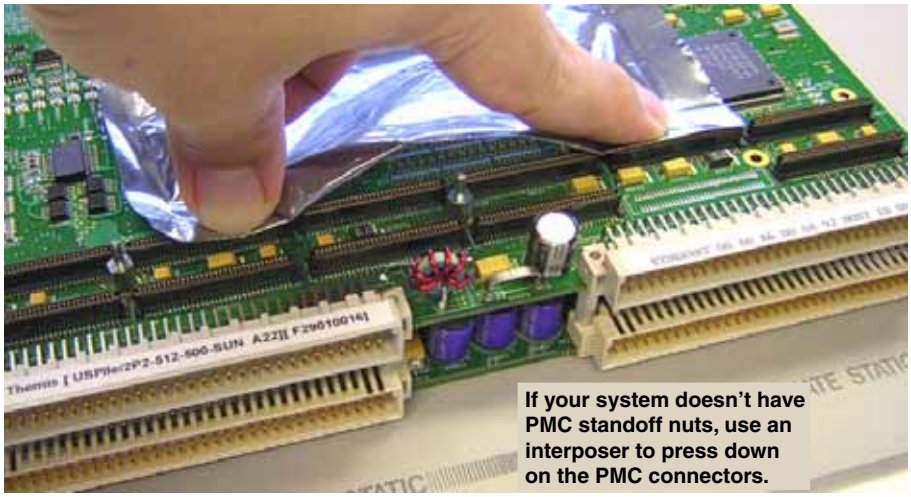


Figure A-9. Use Interposer Material if PMC Interface Standoffs Don't Exist

5. Verify complete seating of the mating connectors by observing that the PMC Carrier Board is resting against the Baseboard standoff nuts. (The 1/8" gap in *Figure A-7* should be gone.)
6. Apply a *small amount* of Loctite 222 MS (shown in *Figure A-10*) or a similar low-strength thread locker to the last few threads of all the screws. Refer to *Figure A-11* and *Figure A-12*.

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7. Install the faceplate screws and VME connector screws (refer to *Figure A-1*), but do not tighten until all the screws have been started. Applying the same amount of torque that was needed to loosen the screws, tighten all the screws.



Figure A-10. Loctite 222MS



Figure A-11. Apply Loctite to End of Screw



Figure A-12. Only the Last Few Threads Need Loctite

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