Motorola TM-PIMC-0101

Transition Module

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TM-PIMC-0x01
Transition Module
Installation and Use

TMPIMCA/IH1

July 2000 Edition

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Preface

This manual provides general information, hardware preparation and installation instructions, operating instructions, and a functional description of the TM-PIMC-0x01 family of Transition Modules.

Currently, the boards are provided in the following configurations:

Part Number	Description
TM-PIMC-0001	MCPN750 Transition Module/PIM Carrier: one RJ-45 Ethernet connector, two RJ-45 async serial port connectors, two headers for async serial ports, one CompactFlash socket, and two PIM slots
TM-PIMC-0101	MCPN765 Transition Module/PIM Carrier: two RJ-45 Ethernet connectors, two RJ-45 async serial port connectors, two headers for async serial ports, one CompactFlash socket, two PIM slots

*The TM-PIMC-0001 is a PIM-style transition module, similar to the -0101 version. The only difference between the two is ethernet access. The existing version (0001), provides for one rear panel ethernet port, while the 0101 version provides for dual rear ethernet port access.

Conventions Used in This Manual

The following typographical conventions are used in this document:

bold

is used for user input that you type just as it appears; it is also used for commands, options and arguments to commands, and names of programs, directories and files.

italic

is used for names of variables to which you assign values. Italic is also used for comments in screen displays and examples, and to introduce new terms.

`courier`

is used for system output (for example, screen displays, reports), examples, and system prompts.

<Enter>, <Return> or <CR>

represents the carriage return or Enter key.

CTRL

represents the Control key. Execute control characters by pressing the Ctrl key and the letter simultaneously, for example, **Ctrl-d**.

Flammability

All Motorola PWBs (printed wiring boards) are manufactured with a flammability rating of 94V-0 by UL-recognized manufacturers.

EMI Caution

Caution

This equipment generates, uses and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used with adequate EMI protection.

CE Notice (European Community)

Motorola Computer Group products with the CE marking comply with the EMC Directive (89/336/EEC). Compliance with this directive implies conformity to the following European Norms:

> EN55022 “Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment”; this product tested to Equipment Class B
>
> EN50082-1:1997 “Electromagnetic Compatibility—Generic Immunity Standard, Part 1. Residential, Commercial and Light Industry”

System products also fulfill EN60950 (product safety) which is essentially the requirement for the Low Voltage Directive (73/23/EEC).

Board products are tested in a representative system to show compliance with the above mentioned requirements. A proper installation in a CE-marked system will maintain the required EMC/safety performance.

In accordance with European Community directives, a “Declaration of Conformity” has been made and is on file within the European Union. The “Declaration of Conformity” is available on request. Please contact your sales representative.

Changes or modifications not expressly approved by Motorola Computer Group could void the user’s authority to operate the equipment.

Use only shielded cables when connecting peripherals to assure that appropriate radio frequency emissions compliance is maintained

Printed in the United States of America

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Motorola, Inc. assumes no liability for the customer's failure to comply with these requirements.

The safety precautions listed below represent warnings of certain dangers of which Motorola is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ground the Instrument.

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. If the equipment is supplied with a three-conductor AC power cable, the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green/yellow) reliably connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards and local electrical regulatory codes.

Do Not Operate in an Explosive Atmosphere.

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

Keep Away From Live Circuits.

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified maintenance personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

Use Caution When Exposing or Handling a CRT.

Breakage of a Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, avoid rough handling or jarring of the equipment. Handling of a CRT should be done only by qualified maintenance personnel using approved safety mask and gloves.

Do Not Substitute Parts or Modify Equipment.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the equipment. Contact your local Motorola representative for service and repair to ensure that safety features are maintained.

Observe Dangerous Procedure Warnings.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions which you deem necessary for the operation of the equipment in your operating environment.

Warning

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

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Hardware Preparation and Installation

1

Introduction

This chapter provides a brief product description, some preliminary startup information, hardware preparation information, and installation instructions for the TM-PIMC-0001 and the TM-PIMC-0101 transition modules. Be sure to review the preliminary and hardware preparation information thoroughly before attempting to install either transition module in a CompactPCI backplane.

Product Description

The TM-PIMC-0001 and TM-PIMC-0101 transition modules are designed to provide rear I/O for the MCPN750 and MCPN765 series of CompactPCI non-system slot single-board computers.

Note The TM-PIMC-0001 can be used with either the MCPN750 or MCPN765 SBC; however, the TM-PIMC-0101 should be used in conjunction with the MCPN765 only.

The transition modules supply four COM ports and one or two 10/100BaseTx Ethernet ports. They are also equipped with a CompactFlash socket for user-supplied IDE flash modules.

Both transition modules also function as a PMC Interface Module (PIM) carrier, supporting the flexible PIM scheme for PMC rear I/O. Two PIM sites are provided that interface with each of the PMC sites on the MCPN750 or MCPN765 SBC.

The TM-PIMC-0001 and TM-PIMC-0101 module are 6U high, 80mm deep, and IEEE 1101.11 compliant. They are also hot-swappable, when used with either the MCPN750 or MCPN765.

Block Diagrams

The block diagram in Figure 1-1 illustrates the architecture of the TM-PIMC-0001. The block diagram in Figure 1-2 illustrates the architecture of the TM-PIMC-0101.

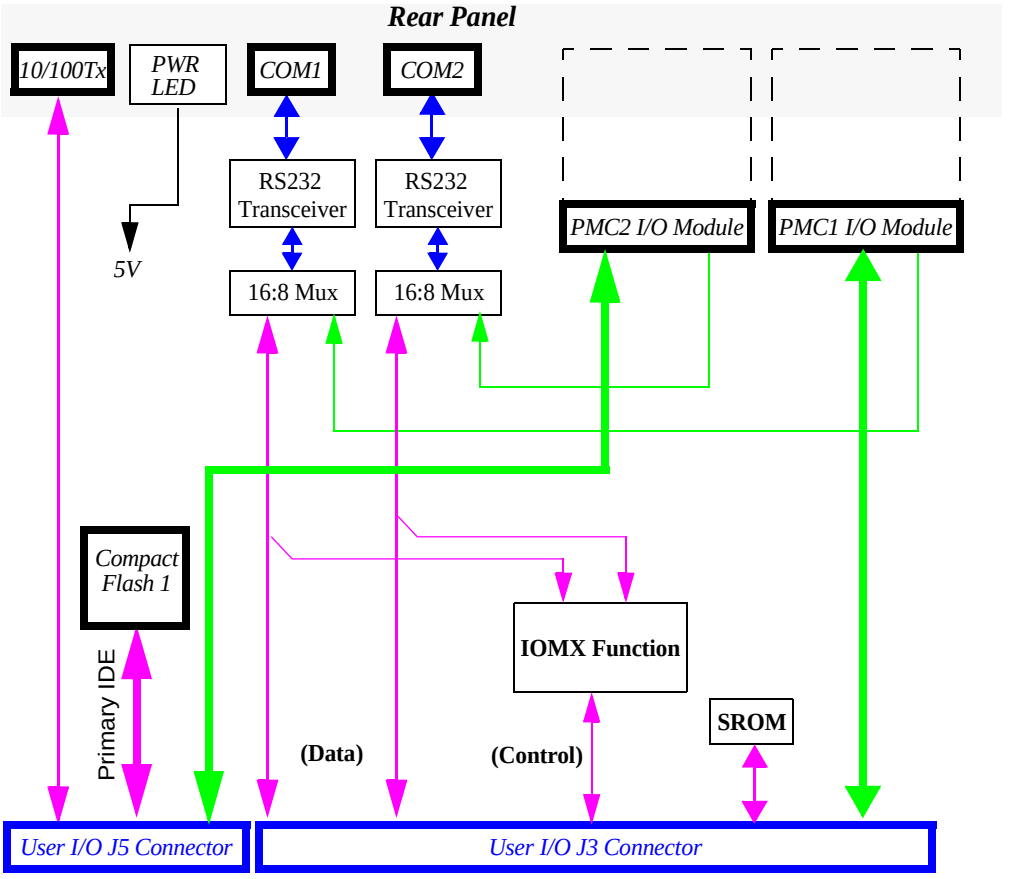


Figure 1-1. TM-PIMC-0001 Transition Module Block Diagram

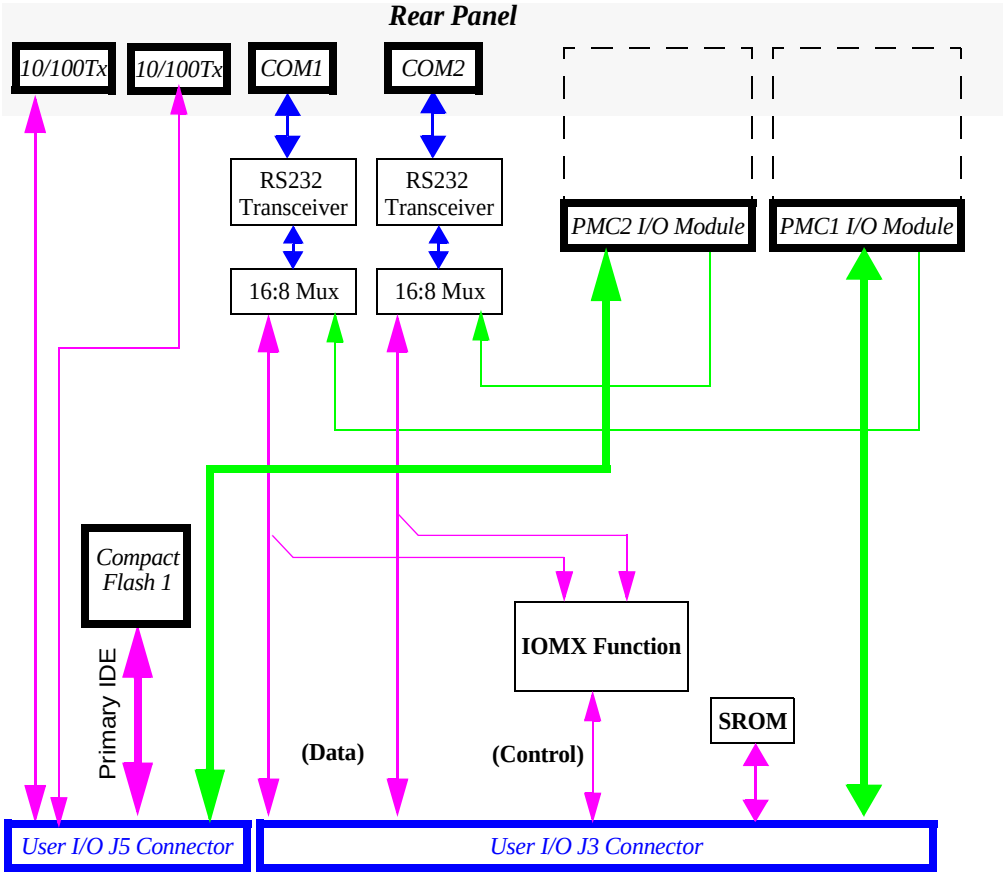


Figure 1-2. TM-PIMC-0101 Transition Module Block Diagram

Getting Started

Before attempting to configure or install either transition module, review the startup procedures, as well as the equipment requirements and precautions.

As indicated by the table below, several steps can be omitted if your board is shipped with PIMs and Flash cards installed.

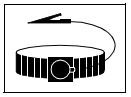
Equipment Requirements

The following equipment is required to operate the TM-PIMC-0001 or TM-PIMC-0101 transition module:

- MCPN750 or MCPN765 CompactPCI Single Board Computer
- CompactPCI system enclosure
- Operating system (and/or application software)
- Disk drives (and/or other I/O) and controllers
- Connecting cables

ESD Precautions

Use ESD



Wrist Strap

Motorola strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading a system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to electrostatic discharge (ESD). After removing the component from the system, or its protective wrapper, place the component flat on a grounded, static-free surface (and in the case of a board, component side up). Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an active electrical ground. Note that a system chassis may not be grounded if it is unplugged.

Caution

Inserting or removing modules with power applied may result in damage to module components.

Warning

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

Preparation

This section discusses certain hardware and software tasks that may need to be performed prior to installing the board in a CompactPCI chassis.

Hardware Configuration

To produce the desired configuration and ensure proper operation of the TM-PIMC-0001 (Figure 1-3) or TM-PIMC-0101 (Figure 1-4), you may need to perform certain hardware modifications before installing the transition module in the backplane. The following paragraphs explain these options.

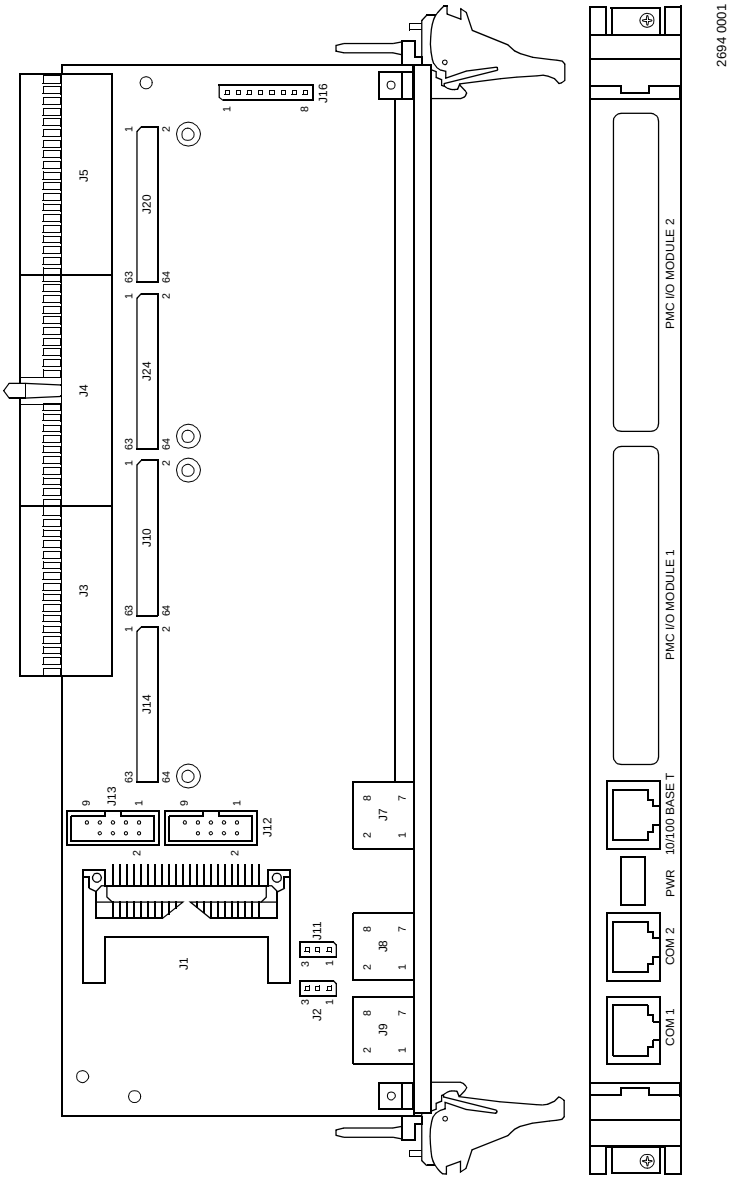


Figure 1-3. TM-PIMC-0001 Connector and Header Locations

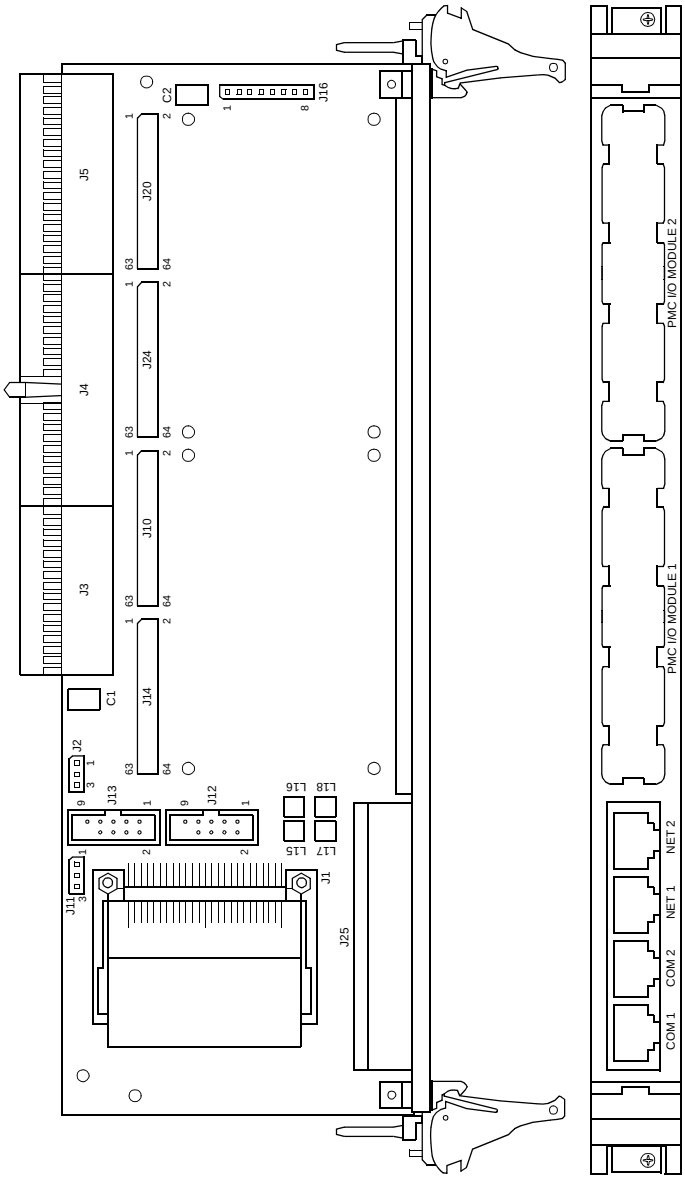
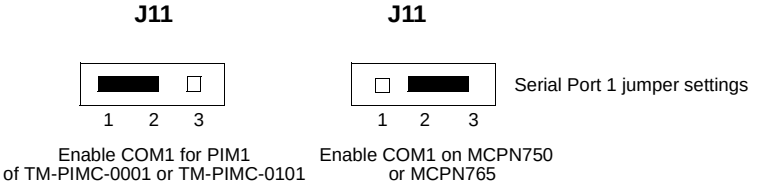


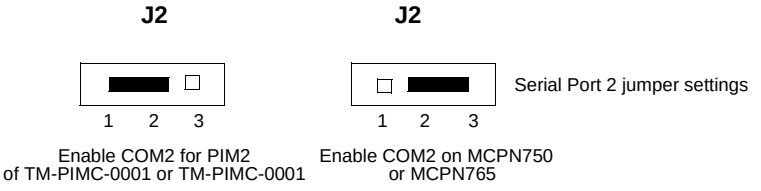
Figure 1-4. TM-PIMC-0101 Connector and Header Locations

COM 1 and COM 2 Asynchronous Serial Ports

On the TM-PIMC-0001 and the TM-PIMC-0101, the asynchronous serial ports (COM 1 and COM 2) are configured permanently as data circuit-terminating (Figure 1-5) equipment (DTE). The COM1 port is also routed to an RJ45 connector on the front panel of the processor board. A terminal for COM1 may be connected to either the processor board or the transition module, but not both. If it is configured for the transition module, front panel access to COM1 is disabled.

Jumper J11 on the transition module must be configured to enable COM1 on the processor board. If J11 is not configured, COM1 is automatically routed to PIM 1 on the transition module. Jumper J2 on the transition module must be configured in the same way for the COM2 port.





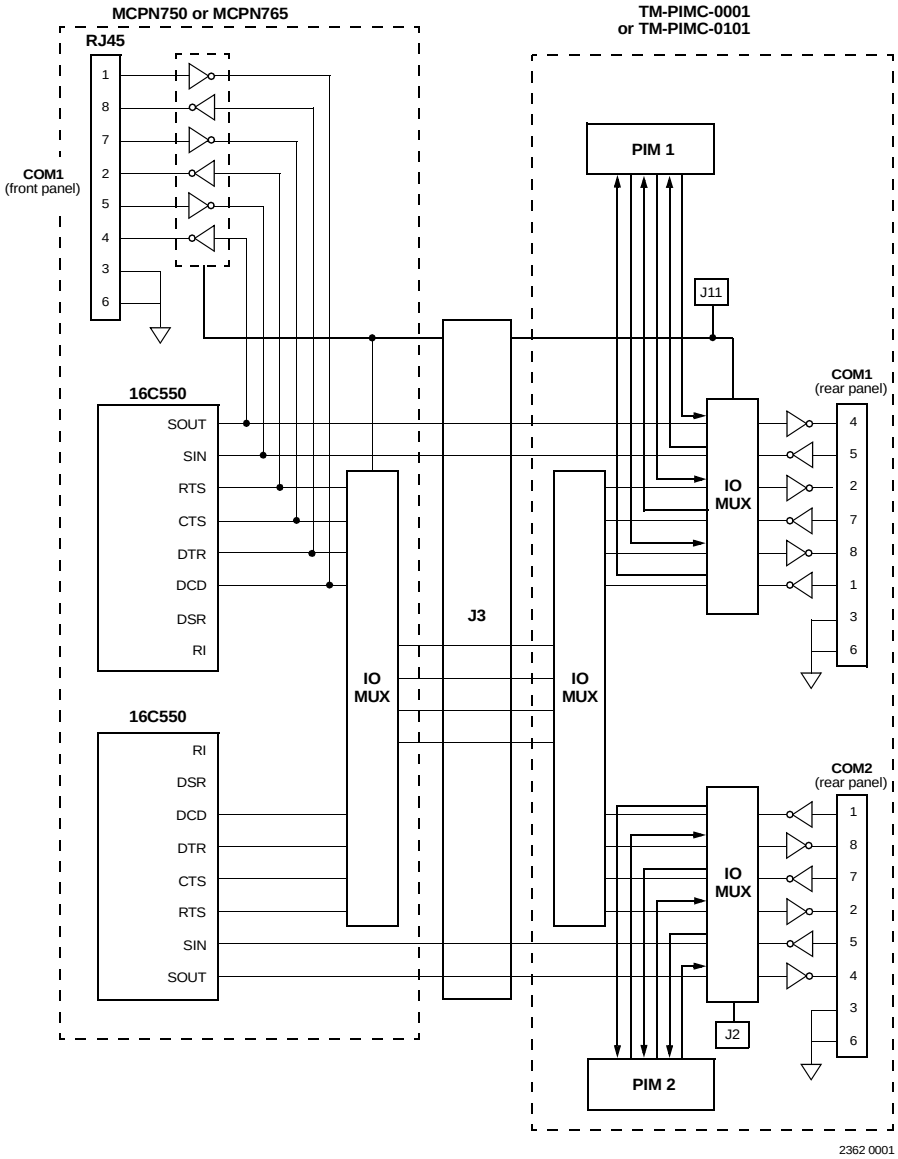


Figure 1-5. MCPN750/TM-PIMC-0001 and MCPN765/TM-PIMC-0101 Serial Ports 1 and 2

COM3 and COM4 Asynchronous Serial Ports

The signals for COM3 and COM4 serial ports are routed to 10-pin headers on the TM-PIMC-0001 and -0101 Transition Module (J12 and J13). These headers function as I/O connectors for the MCPN750 and are permanently configured as DTE. Figure 1-6 depicts this configuration.

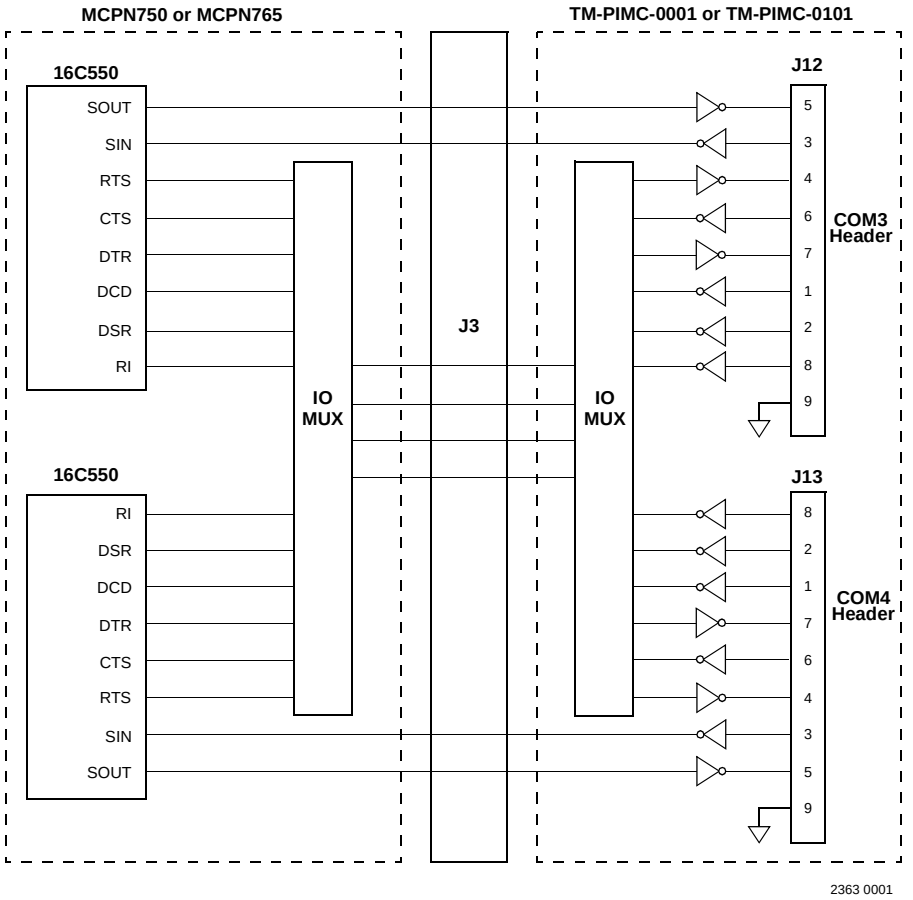


Figure 1-6. MCPN750/TM-PIMC-0001 and MCPN765/TM-PIMC-0101 Serial Ports 3 and 4

PMC I/O Module (PIM)

The TM-PIMC-0x01 series of transition modules provide additional I/O capabilities for the CPU board (MCPN750 or MCP765). There are three distinct groups of I/O passed from the CPU board through the CompactPCI J3 and J5 connectors: CPU host I/O, PMC1 I/O and PMC2 I/O. The CPU host I/O functions are designed into the CPU board, and their presence or absence is determined when that board is built. This I/O cannot be configured at the system integration level. PMC I/O depends entirely upon which, if any, PMC is installed in one or both of the CPU board's PMC sites.

The PMC I/O module (PIM) form factor resembles a single-wide PMC form factor with the following differences:

- shorter by 80mm
- no 5V or 3.3V keys
- no Pin 1 or Pin 3

Note The 80mm difference is "cut out of the middle" of the PMC I/O module. This approach allows features on the front half of the module to maintain their position relative to the front edge of the board, while features in the back half of the board maintain their position relative to the back edge of the board.

PMC I/O Connectors

The TM-PIMC-0x01 reverses the signals that are sent from the CPU board's PMC I/O connectors through the CompactPCI user I/O connectors, so the transition module and PIMs are not dependent upon a specific CPU board's mapping configuration.

The PIMs supplied with the TM-PIMC-0x01 series of transition modules are populated with a second I/O connector which is used primarily to provide power and grounding to the module.

Hardware Installation

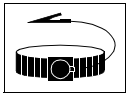
The following sections discuss the placement of PIMs on either the TM-PIMC-0001 or TM-PIMC-0101, plus the installation of the transition module into the CompactPCI backplane.

Note If you are installing a CompactFlash disk, install it now, because the CompactFlash socket is not accessible after the board is in the chassis. Also, the TM-PIMC-0101 transition modules use a 50-pin Type II CompactFlash connector, which also accepts Type 1 CompactFlash disks; however, Type 1 connectors (those on the TM-PIMC-0001 boards) do not accept Type II CompactFlash disks.

Installing PIMs on the Transition Module

If PIMs have already been installed on the TM-PIMC-0001 or TM-PIMC-0101, or you are installing a transition module as it has been shipped from the factory, disregard this section, and proceed to the main installation section titled “Installing the Transition Module in the Chassis.” For PIM installation perform the following steps:

Use ESD



Wrist Strap

1. Attach an ESD strap to your wrist. Attach the other end of the ESD strap to the chassis as a ground. The ESD strap must be secured to your wrist and to ground throughout the procedure.
2. Perform an operating system shutdown. Turn the AC or DC power off and remove the AC cord or DC power lines from the system.
3. Remove chassis or system cover(s) as necessary for access to the CompactPCI.

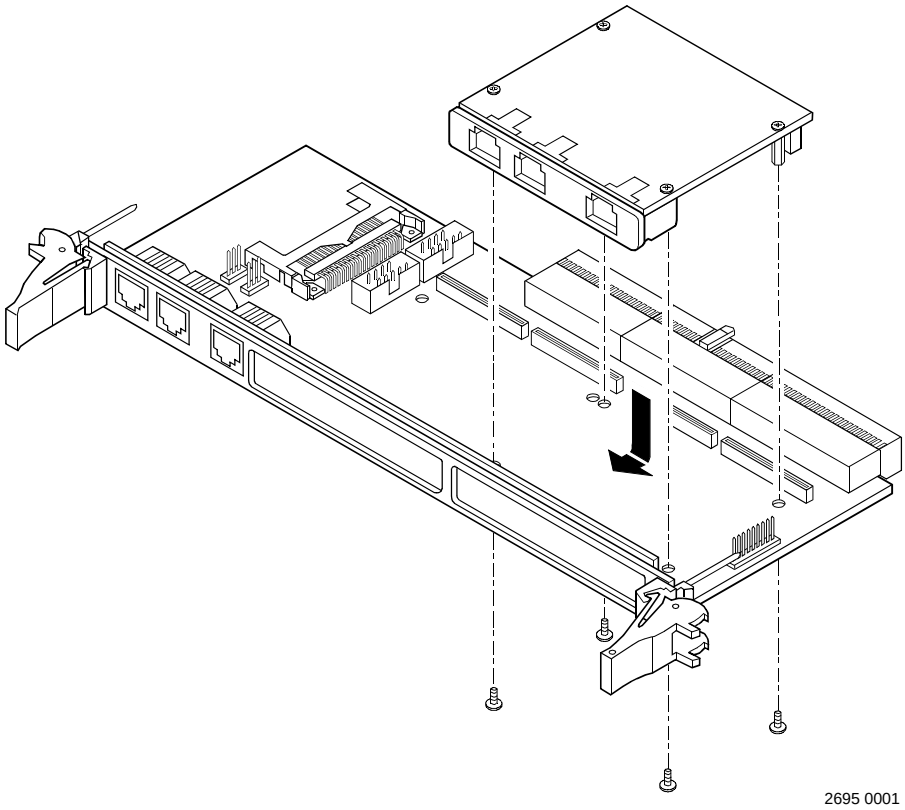


Figure 1-7. Installing a PIM on the TM-PIMC-0x01 Transition Module

Caution

Inserting or removing modules in a non-hot swap chassis with the power applied may result in damage to the module components. The TM-PIMC-0x01 is not a hot swap board, but it may be installed in a hot swap chassis with power applied, if the corresponding MCPN750 or MCP765 is removed before the TM-PIMC-0001 board is installed.

Warning

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

4. Carefully remove the transition module from its CompactPCI card slot and lay it flat on a stable surface.
5. Remove the PIM filler from the front panel of the transition module.
6. Slide the face plate (front bezel) of the PIM module into the front panel opening from behind and place the PIM module on top of the transition module, aligned with the appropriate two PIM connectors. The two connectors on the underside of the PIM module should then connect smoothly with the corresponding connectors (J10/J14 or J20/J24) on the transition module.
7. Insert the four short Phillips screws, provided with the PIM, through the holes on the bottom side of the transition module into the PIM front bezel and rear standoffs. Tighten the screws.
8. With the TM-PIMC-0101 or TM-PIMC-0001 in the correct vertical position that matches the pin positioning of the backplane, carefully slide the transition module into the appropriate slot and seat tightly into the backplane. Refer to Figure 1-8 for the correct board/connector orientation.
9. Secure in place with the screws provided, making good contact with the transverse mounting rails to minimize RF emissions.
10. Replace the chassis or system cover(s), reconnect the system to the AC or DC power source, and turn the equipment power on, or if hot swapping, you may now install the MCPN750 or MCPN765.

Installing the Transition Module in the Chassis

1. Attach an ESD strap to your wrist. Attach the other end of the strap to the chassis as a ground. The ESD strap must be secured to your wrist and to ground throughout the procedure.

2. Perform an operating system shutdown. Turn the AC or DC power off and remove the AC cord or DC power lines from the system. Remove chassis or system cover(s) as necessary for access to the chassis backplane.

Warning

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

Caution

Avoid touching areas of integrated circuitry; static discharge can damage these circuits.

3. With the TM-PIMC-0101 or TM-PIMC-0001 in the correct vertical position that matches the pin positioning of the backplane, carefully slide the transition module into the appropriate slot and seat tightly into the backplane. Refer to Figure 1-8 for the correct board/connector orientation.
4. Secure in place with the screws provided, making good contact with the transverse mounting rails to minimize RF emissions.
5. Replace the chassis or system cover(s), reconnect the system to the AC or DC power source, and turn the equipment power on, or if hot swapping, you may now install the MCPN750 or MCPN765.

Removing the Transition Module in a Hot Swap Chassis

Caution

Although the MCPN750 and the MCP765 Single Board Computer can be removed and inserted while power is applied, the TM-PIMC-0x01 Transition Module is not hot swap capable. Inserting or removing the transition module while the CPU board is active may affect the normal operation of the CPU board. Even in a hot swap capable chassis, the CPU back end power should be switched off (or the chassis power shut down) prior to inserting or removing its corresponding transition module.

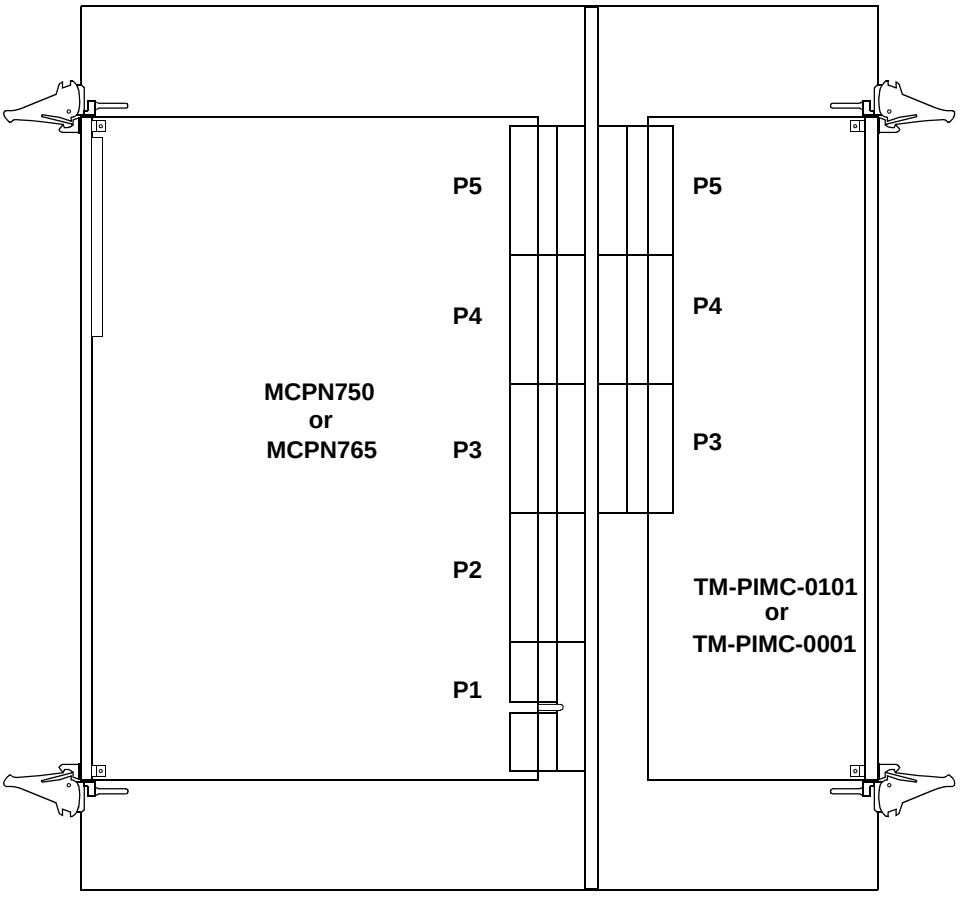


Figure 1-8. TM-PIMC-0101 or TM-PIMC-0001 to MCPN750 or MCPN765 Mating Configuration

Functional Description 2

Introduction

This chapter describes the TM-PIMC-0001 and TM-PIMC-0101 family of transition modules on a block diagram level. The Features table provides an overview of the transition module capabilities, followed by a detailed description of several blocks of circuitry and major components.

Features

The following table summarizes the features of the TM-PIMC-0001 and TM-PIMC-0101.

Form Factor	IEEE 1101.11 Compliant
Peripheral Support	One 50-pin Type II (Type I on -0001 boards) connector for IDE CompactFlash cards or micro-drives
Non-Volatile Memory	512 Byte Serial EEPROM (AT24C04) for Vital Product Data
Rear Panel Connectors	Two RJ45 connectors for COM1 and COM2 Two (one for -0001 boards) RJ45 connectors for optional routing of 10BaseT/100BaseTX Ethernet interface Two PMC I/O modules for MCPN765 or MCPN750 PMC1 and PMC2 I/O
Miscellaneous	CompactPCI Hot Swap compatible (base board must be removed first) Rear Panel Power LED (on TM-PIMC-0001 models only)

The TM-PIMC-0101 and TM-PIMC-0001 provide additional I/O capabilities to the MCPN765 and MCPN750 SBC. The transition module is installed directly in the CompactPCI backplane in the rear transition board bay of the chassis and interfaces with the CPU board through the J3 and J5 connectors.

Rear panel connectors on the transition module include two (one in the case of the TM-PIMC-0001) RJ45 connectors for 10 BaseT/100 BaseTx ethernet and two RJ45 connectors for the asynchronous serial debug ports, COM1 and COM2. An additional two serial ports, two USB ports, and the one EIDE channel are available on J3 and J5 from the CPU board.

Both transition modules support two single-wide (74mm wide by 69mm long) PMC I/O modules. PMC I/O pins 1 through 64 of each PMC slot on the MCPN765 or MCPN750 SBC are routed from the J3 and J5 connectors to the PMC I/O modules. For a detailed description of the pin assignments on the PMC I/O modules, see Chapter 3.

The block diagram for both transition modules are shown in Chapter 1.

IDE Flash

The TM-PIMC-0101 and TM-PIMC-0001 support IDE and the primary IDE channel is routed to the J5 User I/O connector. The transition module contains one 50-pin Type II connector (Type 1 for TM-PIMC-0001) which supports a removable IDE CompactFlash memory card on the primary IDE channel. Refer to Chapter 3 for pin descriptions of this connector. The CompactFlash connector is not accessible through the rear panel, so the transition module must be removed in order to install a CompactFlash memory card.

Currently, CompactFlash memory cards are available in sizes from 2 to over 100 Mbytes. Once configured, this memory appears as a standard ATA (IDE) disk drive.

Ethernet Interface

The TM-PIMC-0101 provides two 10BaseT/100BaseTx autoselect Ethernet interfaces. The TM-PIMC-0001 provides one. One Ethernet interface is routed either to an RJ45 connector located at the front panel of the MCPN750 or MCPN765 board or to the J5 connector for Ethernet connection on the transition module. The front panel or transition board option is determined by the model of 750/765 installed in the system. The second Ethernet interface (on 765 configurations only) is routed only to the J5 connector for Ethernet connection on the transition module.

The Ethernet Station Addresses are determined by the base board and are not affected by the transition module.

Hot Swap Support

The TM-PIMC-0101 or TM-PIMC-0001 is considered to be part of the MCPN765 or MCPN750 SBC. Therefore, the transition module cannot be replaced or removed in a hot swap environment without first removing or powering down the base board. All power for the transition module is supplied by the based board through pins on the J3/J5 I/O connectors.

Serial EEPROM

The TM-PIMC-0101 and the TM-PIMC-0001 contain a 512 x 8 Serial EEPROM. The Serial EEPROM provides for storage of the board configuration information (VPD and SPD).

PMC I/O Modules (PIMS)

The MPCN750A and MPC765 support two single-wide PMC sites. Each site provides four 64-pin EIA-E700 AAAB connectors to interface to a 32/64-bit IEEE P1386.1 PMC. One of the four connectors is dedicated to user I/O. Two PMC I/O modules are supported on the TM-PIMC-0x01 transition module boards: one per PMC site on the MPC750 or MPC765. The MPC750 or MPC765 maps the PMC user I/O pins onto the CompactPCI J3 and J5 connectors. The transition module reverses the mapping and brings the signals to a 64-pin EIA-E700 AAAB connector to interface with the PMC I/O module. This causes a one-to-one correspondence in the pinout between the PMC on the CPU board and the PMC I/O module on the transition module.

Connector Pin Assignments

3

Transition Module Connectors

This chapter summarizes the pin assignments for the following connectors on the TM-PIMC-0x01 (note: the pin assignments apply to both types of transition modules):

- CompactPCI User I/O Connector (J3)
- CompactPCI User I/O Connector (J5)
- COM1 Connector (J9)/(J25-A)
- COM2 Connector (J8)/(J25-B)
- COM3 & COM4 Connector (J12/J13)
- 10BaseT/100 BaseTx Connector (J7)/(J25-C)/(J25-D)
- IDE CompactFLASH Connector (J1)
- PMC I/O Connectors (J10, J20 and J14/J24)

TM-PIMC-0x01 CompactPCI User I/O Connector (J3)

Connector J3 is a 95-pin Z-pack 2mm hard metric type B connector. This connector routes I/O signals for PMC I/O and serial ports, and USB ports. The pin assignments for J3 on the processor board and on the transition module are as follows:

Table 3-1. J3 User I/O Connector Pinout

	ROW A	ROW B	ROW C	ROW D	ROW E	
19	COM3TD	+12V	-12V	COM4RD	UDATA1P	19
18	COM3RD	GND	USBV1_OK	COM4TD	UDATA1N	18
17	TMCOM1_L	MXCLK	MXDI	MXSYNC_L	MXDO	17
16	COM1TD	GND	I2CSCL	I2CSDA	UDATA0P	16
15	COM1RD	COM2RD	COM2TD	USBV0_OK	UDATA0N	15
14	+3.3V	+3.3V	+3.3V	+5V	+5V	14
13	PMC1IO5	PMC1IO4	PMC1IO3	PMC1IO2	PMC1IO1	13

Table 3-1. J3 User I/O Connector Pinout (Continued)

	ROW A	ROW B	ROW C	ROW D	ROW E	
12	PMC1IO10	PMC1IO9	PMC1IO8	PMC1IO7	PMC1IO6	12
11	PMC1IO15	PMC1IO14	PMC1IO13	PMC1IO12	PMC1IO11	11
10	PMC1IO20	PMC1IO19	PMC1IO18	PMC1IO17	PMC1IO16	10
9	PMC1IO25	PMC1IO24	PMC1IO23	PMC1IO22	PMC1IO21	9
8	PMC1IO30	PMC1IO29	PMC1IO28	PMC1IO27	PMC1IO26	8
7	PMC1IO35	PMC1IO34	PMC1IO33	PMC1IO32	PMC1IO31	7
6	PMC1IO40	PMC1IO39	PMC1IO38	PMC1IO37	PMC1IO36	6
5	PMC1IO45	PMC1IO44	PMC1IO43	PMC1IO42	PMC1IO41	5
4	PMC1IO50	PMC1IO49	PMC1IO48	PMC1IO47	PMC1IO46	4
3	PMC1IO55	PMC1IO54	PMC1IO53	PMC1IO52	PMC1IO51	3
2	PMC1IO60	PMC1IO59	PMC1IO58	PMC1IO57	PMC1IO56	2
1	VIO (+5V)	PMC1IO64	PMC1IO63	PMC1IO62	PMC1IO61	1

Signal Descriptions

PMCIO:

PMC1IO(1:64) - PMC1 I/O signals 1 through 64

Universal Serial Bus (USB 0 & 1). USB levels:

UDATAn + - high signal of differential data for USB channel

UDATAn - - low signal of differential data for USB channel

Serial COM Ports 1-4:

COMnTD- COM Port n Transmit Data Output

COMnRD - COM Port n Receive Data Input

Miscellaneous:

TMCOM1_L - Used to select COM1 active on processor board or on Transition Module

MXCLK - multiplexed I/O signal clock, 10 MHz

MXSYNC_L - multiplexed I/O sync signal

MXDI - multiplexed I/O data in signal from transition module

MXDO - multiplexed I/O data out signal to transition module

I2CSCL - I^2C Serial Clock for Transition Module SROM

I2CSDA - I^2C Serial Data for Transition Module SROM

USBV0_OK - USB Port 0 Voltage Monitor

USBV1_OK - USB Port 1 Voltage Monitor

TM-PIMC-0x01 CompactPCI User I/O Connector (J4)

Connector J4 is not used to carry signals, but is installed on the transition module for alignment purposes. The keying tabs in the Type A connector assist with alignment of pins in the backplane connector during insertion of the boards. No signals are connected to the J4 pins except the ground pins F1, F3, F5, F7, F9 and F11 in the Row F outer shield are connected to the board logic ground.

TM-PIMC-0x01 CompactPCI User I/O Connector (J5)

Connector J5 is a 110-pin AMP Z-pack 2mm hard metric type B connector. This connector routes the PMC2 I/O signals, the IDE port, and the optional ethernet port. The pin assignments for J5 on the processor board and the transition module are as follows (note that outer row F is assigned and used as ground pins but is not shown in the table).

Table 3-2. J5 User I/O Connector Pinout

	ROW A	ROW B	ROW C	ROW D	ROW E	
22	DRESET_L	TXP	RXP	No Connect	No Connect	22
21	INTRQA	TXN	RXN	No Connect	No Connect	21
20	CS1FXA_L	CS3FXA_L	DA2	No Connect	No Connect	20
19	DMACKA_L	DIORDYA	DA1	No Connect	No Connect	19
18	DIOWA_L	DA0	GND	No Connect	No Connect	18

Table 3-2. J5 User I/O Connector Pinout (Continued)

	ROW A	ROW B	ROW C	ROW D	ROW E	
17	GND	DD14	DD15	DIORA_L	DMARQA	17
16	DD9	DD10	DD11	DD12	DD13	16
15	DD5	DD6	GND	DD7	DD8	15
14	DD0	DD1	DD2	DD3	DD4	14
13	PMC2IO5	PMC2IO4	PMC2IO3	PMC2IO2	PMC2IO1	13
12	PMC2IO10	PMC2IO9	PMC2IO8	PMC2IO7	PMC2IO6	12
11	PMC2IO15	PMC2IO14	PMC2IO13	PMC2IO12	PMC2IO11	11
10	PMC2IO20	PMC2IO19	PMC2IO18	PMC2IO17	PMC2IO16	10
9	PMC2IO25	PMC2IO24	PMC2IO23	PMC2IO22	PMC2IO21	9
8	PMC2IO30	PMC2IO29	PMC2IO28	PMC2IO27	PMC2IO26	8
7	PMC2IO35	PMC2IO34	PMC2IO33	PMC2IO32	PMC2IO31	7
6	PMC2IO40	PMC2IO39	PMC2IO38	PMC2IO37	PMC2IO36	6
5	PMC2IO45	PMC2IO44	PMC2IO43	PMC2IO42	PMC2IO41	5
4	PMC2IO50	PMC2IO49	PMC2IO48	PMC2IO47	PMC2IO46	4
3	PMC2IO55	PMC2IO54	PMC2IO53	PMC2IO52	PMC2IO51	3
2	PMC2IO60	PMC2IO59	PMC2IO58	PMC2IO57	PMC2IO56	2
1	TMPRSNT_L	PMC2IO64	PMC2IO63	PMC2IO62	PMC2IO61	1

Signal Descriptions

PMCIO:

PMC2IO(1:64) - PMC 2 I/O signals 1 through 64

EIDE Primary Port (ATA-2):

DMARQA - DMA request

DMACKA_L - DMA acknowledge

DIORA_L - I/O read

DIOWA_L - I/O write

DIORDYA - indicates drive ready for I/O

DD(15:0) - IDE data lines

CS1FXA_L - chip select drive 0 or command register block select

CS3FXA_L - chip select drive 1 or command register block select

DA(2:0) - drive register and data port address lines

DRESET_L - drive reset

Ethernet:

TDP - high side of differential transmit data

TDN - low side of differential transmit data

RDP - high side of differential receive data

RDN - low side of differential receive data

Miscellaneous:

TMPRSNT_L - indicates that the transition module is installed

TM-PIMC-0x01 COM1 Connector (J9)/(J25-A)

An RJ45 connector is located on the rear panel of the TM-PIMC-0x01 Transition Module to provide the interface to the COM1 serial port (for TM-PIMC-0101 this is one part of a quad-connector labeled J25 (J25-A). The COM1DIR jumper (J11) is a two position (three pin) jumper that controls the origin of the serial port. With pins 2-3 jumpered, COM1 from the MCPN765 SBC is enabled (and thereby disables it on the MCPN765 front panel connector). With pins 1-2 jumpered, the connector is redirected to the PMC I/O module 1 (PIM1). Refer to Chapter 1 for specific jumper placement information. The pin assignments for this connector are as follows:

Table 3-3. TM-PIMC-0x01 COM1 Connector (J9)/(J25-A)

1	DCD
2	RTS
3	GND
4	TXD
5	RXD
6	GND
7	CTS
8	DTR

TM-PIMC-0x01 COM2 Connector (J8)/(J25-B)

An RJ45 connector is located on the rear panel of the TM-PIMC-0x01 Transition Module to provide the interface to the COM2 serial port. The COM2DIR jumper (J2) is a two position (three pin) jumper that controls the origin of the serial port. With pins 2-3 jumpered, COM2 from the MCPN765 is enabled. With pins 1-2 jumpered, the connector is redirected to the PMC I/O module 2 (PIM2). Refer to the TM-PIMC-0x01 Installation Preparation section of Chapter 1 for specific jumper placement information. The pin assignments for this connector are as follows:

Table 3-4. TM-PIMC-0x01 COM2 Connector (J8)/(J25-B)

1	DCD
2	RTS
3	GND
4	TXD
5	RXD
6	GND
7	CTS
8	DTR

TM-PIMC-0x01 COM3 and COM4 Connectors (J12 & J13)

The signals for the COM3 port and the COM4 port are routed to identical 10-pin headers, which are designated as J12 and J13 respectively on the board. These connections provide rear I/O for the MCPN765. The pin assignments for these headers are as follows:

Table 3-5. TM-PIMC-0x01 COM3 and COM4 Headers

1	DCD	DSR	**2**
3	RXD	RTS	**4**
5	TXD	CTS	**6**
7	DTR	RI	**8**
9	GND		

TM-PIMC-0x01 10BaseT/100BaseTx Connector (J7)/(J25-C)

The 10BaseT/100BaseTx Connector is an RJ45 connector located on the rear panel of the TM-PIMC-0x01 Transition Module to support optional Ethernet I/O from the MCPN750 or MCPN765 SBC. Note: the -0101 version has a second connector, which is used as a secondary Ethernet connection. This secondary Ethernet connection is always present on the MCPN765. Appropriate zero ohm resistors must be installed on the processor board to enable this option. The pin assignments for this connector are as follows:

Table 3-6. TM-PIMC-0x01 10BaseT/100BaseTx Connector (J7)/(J25-C)

1	TD+
2	TD-
3	RD+
4	AC Terminated
5	AC Terminated
6	RD-
7	AC Terminated
8	AC Terminated

TM-PIMC-0x01 IDE Compact FLASH Connector (J1)

One 50-pin Type 1 (Type II for -0101) Compact FLASH card header connector located on the TM-PIMC-0x01 Transition Module provides the EIDE interface to one Compact FLASH plug-in module. The Compact

FLASH interface is connected to the Primary IDE channel. Connector J1 is configured as the Master EIDE interface. The pin assignments for these connectors are as follows:

Table 3-7. TM-PIMC-0x01 CompactFLASH IDE Connector (J1)

	J1		
1	GND	DD3	**2**
3	DD4	DD5	**4**
5	DD6	DD7	**6**
7	CS1FX1_L	GND	**8**
9	GND	GND	**10**
11	GND	GND	**12**
13	+5V	GND	**14**
15	GND	GND	**16**
17	GND	DA2	**18**
19	DA1	DA0	**20**
21	DD0	DD1	**22**
23	DD2	No Connect	**24**
25	CD2_L	CD1_L	**26**
27	DD11	DD12	**28**
29	DD13	DD14	**30**
31	DD15	CS3FX1_L	**32**
33	No Connect	DIORA_L	**34**
35	DIOWA_L	No Connect	**36**
37	INTRQ1	+5V	**38**
39	MASTER/SLAVE	No Connect	**40**
41	DRESET_L	IORDY	**42**
43	No Connect	No Connect	**44**
45	DASP	PDIAG	**46**
47	DD8	DD9	**48**
49	DD10	GND	**50**

TM-PIMC-0x01 PMC I/O Connectors (J10, J20, and J14/J24)

There are two pairs of 64-pin SMT connectors on the TM-PIMC-0x01 to provide an interface for two optional plug-in PMC I/O modules (PIMs). Each module has an identical PMC I/O connector (J14 and J24) and a unique host I/O connector (J10 for PIM1 and J20 for PIM2). The pin assignments are as follows:

Table 3-8. TM-PIMC-0x01 PMC I/O Module 1 (PIM1) - Host I/O Connector Pin Assignments

	J10		
1	IN1_DCD	+12V	**2**
3	IN1_RXD	IN1_TXD	**4**
5	+5V	IN1_DTR	**6**
7	IN1_DSR	IN1_RTS	**8**
9	IN1_CTS	+3.3V	**10**
11	IN1_RI	IN2_DCD	**12**
13	GND	IN2_RXD	**14**
15	IN2_TXD	IN2_DTR	**16**
17	IN2_DSR	GND	**18**
19	IN2_RTS	IN2_CTS	**20**
21	+5V	IN2_RI	**22**
23	Reserved	Reserved	**24**
25	Reserved	+3.3V	**26**
27	Reserved	Reserved	**28**
29	GND	Reserved	**30**
31	Reserved	Reserved	**32**
33	Reserved	GND	**34**
35	Reserved	Reserved	**36**
37	+5V	Reserved	**38**
39	Reserved	Reserved	**40**
41	Reserved	+3.3V	**42**
43	Reserved	USB0_DATAN	**44**

Table 3-8. TM-PIMC-0x01 PMC I/O Module 1 (PIM1) - Host I/O Connector Pin Assignments (Continued)

	J10		
45	GND	USB0_DATAP	**46**
47	USB1_VOK	USB0_VOK	**48**
49	USB1_DATAP	GND	**50**
51	USB1_DATAN	OUT_RI	**52**
53	+5V	OUT_DCD	**54**
55	OUT_DTR	OUT_DSR	**56**
57	OUT_CTS	+3.3V	**58**
59	OUT_RTS	OUT_RXD	**60**
61	-12V	OUT_TXD	**62**
63	I2C_CLK	I2C_DAT	**64**

Table 3-9. TM-PIMC-0x01 PMC I/O Module 2 (PIM2) - Host I/O Connector Pin Assignments

	J20		
1	CD1_L	+12V	**2**
3	DD3	DD11	**4**
5	+5V	DD4	**6**
7	DD12	DD5	**8**
9	DD13	+3.3V	**10**
11	DD6	DD14	**12**
13	GND	DD7	**14**
15	DD15	CS1FX1_L	**16**
17	CS3FX1_L	GND	**18**
19	DIOR_L	DIOW_L	**20**
21	+5V	INTRQ1	**22**
23	MASTER/SLAVE	DRESET_L	**24**
25	IORDY	+3.3V	**26**

Table 3-9. TM-PIMC-0x01 PMC I/O Module 2 (PIM2) - Host I/O Connector Pin Assignments (Continued)

	J20		
27	DA2	DA1	**28**
29	GND	DA0	**30**
31	DASP	DD0	**32**
33	PDIAG	GND	**34**
35	DD1	DD8	**36**
37	+5V	DD2	**38**
39	DD9	DD10	**40**
41	CD2_L	+3.3V	**42**
43	RESERVED	RESERVED	**44**
45	GND	RESERVED	**46**
47	RESERVED	RESERVED	**48**
49	RESERVED	GND	**50**
51	RESERVED	OUT_RI	**52**
53	+5V	OUT_DCD	**54**
55	OUT_DTR	OUT_DSR	**56**
57	OUT_CTS	+3.3V	**58**
59	OUT_RTS	OUT_RXD	**60**
61	-12V	OUT_TXD	**62**
63	I2C_CLK	I2C_DAT	**64**

Note PMC I/O modules only use power, ground and the OUT-going serial port pins on the Host I/O connectors. With certain modifications, it is possible for a host I/O module to use all pins except the OUT-going serial port.

Table 3-10. PMC I/O Modules 1 and 2 (PIM1 and PIM2) - PMC I/O Connector Pin Assignments

	J14/J24		
1	PMC IO1	PMC IO2	**2**
3	PMC IO3	PMC IO4	**4**
5	PMC IO5	PMC IO6	**6**
7	PMC IO7	PMC IO8	**8**
9	PMC IO9	PMC IO10	**10**
11	PMC IO11	PMC IO12	**12**
13	PMC IO13	PMC IO14	**14**
15	PMC IO15	PMC IO16	**16**
17	PMC IO17	PMC IO18	**18**
19	PMC IO19	PMC IO20	**20**
21	PMC IO21	PMC IO22	**22**
23	PMC IO23	PMC IO24	**24**
25	PMC IO25	PMC IO26	**26**
27	PMC IO27	PMC IO28	**28**
29	PMC IO29	PMC IO30	**30**
31	PMC IO31	PMC IO32	**32**
33	PMC IO33	PMC IO34	**34**
35	PMC IO35	PMC IO36	**36**
37	PMC IO37	PMC IO38	**38**
39	PMC IO39	PMC IO40	**40**
41	PMC IO41	PMC IO42	**42**
43	PMC IO43	PMC IO44	**44**
45	PMC IO45	PMC IO46	**46**
47	PMC IO47	PMC IO48	**48**
49	PMC IO49	PMC IO50	**50**
51	PMC IO51	PMC IO52	**52**
53	PMC IO53	PMC IO54	**54**

Table 3-10. PMC I/O Modules 1 and 2 (PIM1 and PIM2) - PMC I/O Connector Pin Assignments (Continued)

	J14/J24		
55	PMC IO55	PMC IO56	**56**
57	PMC IO57	PMC IO58	**58**
59	PMC IO59	PMC IO60	**60**
61	PMC IO61	PMC IO62	**62**
63	PMC IO63	PMC IO64	**64**

Note Pin meaning for the PMC I/O connector is defined entirely by the PMC residing on the host. A host I/O module does not use any pins on this connector.

Specifications

Table A-1 lists the general specifications for the TM-PIMC-0x01 transition module. Subsequent sections detail cooling requirements and FCC compliance.

A complete functional description of the TM-PIMC-0x01 transition module appears in Chapter 2. Specifications for the optional PIM mezzanines can be found in the documentation for those modules.

Table A-1. TM-PIMC-0x01 Specifications

Characteristics	Specifications
Power requirements	+5Vdc (±5%), 200mA typical, 400mA max. +3.3Vdc (±5%), +12V (±5%), and -12V (±5%) voltages are not used by the transition module, but may be used by PIMs.
PIM Signal Impedance	44 to 65 ohms (nominal impedance)
Operating temperature	-0°C to +55°C
Storage temperature	–40°C to +65° C
Relative humidity	10% to 80% (non-condensing) operating 10% to 90% (non-condensing) storage
Physical dimensions Height Depth Front Panel Height Front Panel Width	 9.2 in. (233 mm) 3.1 in. (80 mm) 10.3 in. (261.8 mm) 0.8 in. (19.8 mm)

Cooling Requirements

The Motorola TM-PIMC-0x01 transition module is specified, designed, and tested to operate reliably with an incoming air temperature range from 0° to +55° C (0° to 131° F) with forced air cooling of the entire assembly

(transition module and base board) at a velocity typically achievable by using a 100 CFM axial fan. Specific air flow ratings are not available for transition modules only.

While the exact amount of airflow required for cooling depends on the ambient air temperature and the type, number, and location of boards and other heat sources, adequate cooling can usually be achieved with 450 LFM flowing over the module. Less airflow is required to cool the module in environments having lower maximum ambients. Under more favorable thermal conditions, it may be possible to operate the module reliably at higher than 55° C with increased airflow. It is important to note that there are several factors, in addition to the rated CFM of the air mover, which determine the actual volume and speed of air flowing over a module.

EMC Compliance

The TM-PIMC-0x01 was tested in an EMC-compliant chassis and meets the requirements for EN55022 Class B equipment. Compliance was achieved under the following conditions:

- ❏ Shielded cables on all external I/O ports.
- ❏ Cable shields connected to earth ground via metal shell connectors bonded to a conductive module front panel.
- ❏ Conductive chassis rails connected to earth ground. This provides the path for connecting shields to earth ground.
- ❏ Front panel screws properly tightened.

For minimum RF emissions, it is essential that the conditions above be implemented. Failure to do so could compromise the EMC compliance of the equipment containing the module.

Related Documentation B

Motorola Computer Group Documents

The Motorola publications listed below are referenced in this manual. You can obtain paper or electronic copies of Motorola Computer Group publications by:

- Contacting your local Motorola sales office
- Visiting Motorola Computer Group's World Wide Web literature site, http://www.motorola.com/computer/literature

Table B-1. Motorola Computer Group Documents

Document Title	Publication Number
MCPN765 CompactPCI Single Board Computer Installation and Use	MCPN765A/IH
MCPN765 CompactPCI Single Board Computer Programmer's Reference Guide	MCPN765A/PG
MCPN750 CompactPCI Single Board Computer Installation and Use	MCPN750A/IH
MCPN750 CompactPCI Single Board Computer Programmer's Reference Guide	MCPN750A/PG
PPCBug Firmware Package User's Manual (Parts 1 and 2)	PPCBUGA1/UM PPCBUGA2/UM
PPC1Bug Diagnostics Manual	PPCDIAA/UM

To obtain the most up-to-date product information in PDF or HTML format, visit http://www.motorola.com/computer/literature

Manufacturers' Documents

For specific component or software information, refer to the following table for manufacturers' data sheets or user's manuals. As an additional help, a source for the listed document is also provided. Please note that in many cases, the information is preliminary and the revision levels of the documents are subject to change without notice.

B

To further assist your development effort, Motorola has collected some of the non-Motorola documents in this list from the suppliers. These are listed in Table B-2.

Table B-2. Manufacturers' Documents

Document Title and Source	Publication Number
Intel 21143 PCI Fast Ethernet LAN Controller Hardware Reference Manual Using the 21143 with External Flash ROM, Serial ROM, and Extreranl Register Application Note Intel 21554 PCI-to-PCI Bridge for Embedded Applications Data Sheet Intel 21554 PCI-to-PCI Bridge for Embedded Applications Hardware Reference Manual Intel Corporation 2200 Mission College Blvd. Santa Clara, CA 95052-8119 Literature Center Telephone (United States and Canada): 1-800-332-2717 Literature Center Telephone (Outside United States): 1-303-675-2148 Electronic Mail Address: techdoc@intel.com Website: http://developer.intel.com/design/litcentr	278074-001, Rev. 1.0 October 1998 278077-001 September 1998 278089-001 December 1998 278091-001 September 1998
VT82C586B PIPC PCI Integrated Peripheral Controller VIA Technologies, Inc. 5020 Brandin Court Fremont, CA 94538 Telephone: (510) 683-3300 FAX: (510) 683-3301 Website: http://www.viatech.com/pdf/productinfo/586b.pdf	VT82C586B May 13, 1997
Texas Instruments TI16C550C Asynchronous Communications Element (ACE) - Data Sheet Texas Instruments P.O. Box 655303 Dallas, TX 75265 Website: http://www.ti.com/sc.docs/products/analog/ti16c550c.html	SLLS177E March 1994, Revised April 1998

Related Specifications

For additional information, refer to the following table for related specifications. As an additional help, a source for the listed document is also provided. Please note that in many cases, the information is preliminary and the revision levels of the documents are subject to change without notice.

Table B-3. Related Specifications

Document Title and Source	Publication Number
IEEE - Common Mezzanine Card Specification (CMC) Institute of Electrical and Electronics Engineers, Inc. Publication and Sales Department 345 East 47th Street New York, New York 10017-21633 Telephone: 1-800-678-4333	P1386
IEEE - PCI Mezzanine Card Specification (PMC) Institute of Electrical and Electronics Engineers, Inc. Publication and Sales Department 345 East 47th Street New York, New York 10017-21633 Telephone: 1-800-678-4333	P1386.1
Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange (EIA-232-D) Electronic Industries Association Engineering Department 2001 Eye Street, N.W. Washington, D.C. 20006	ANSI/EIA-232-D Standard
VITA 36, PMC I/O Module Draft Standard VMEbus International Trade Association 7825 E. Gelding Dr., Suite 104 Scottsdale, AZ 85260 PH: 480-951-8866 FX: 480-951-0720 email: info@vita.com web: www.vita.com	VITA 36-199x Draft 0.1

Table B-3. Related Specifications (Continued)

Document Title and Source	Publication Number
Compact PCI Specification	CPCI Rev. 2.1 Dated 9/2/97
PCI-to-PCI Bridge Specification	Rev. 1.02
PCI-ISA Specification	Rev. 2.0
CompactPCI Hot Swap Specification (Draft) PCI Industrial Manufacturers Group (PICMG) 401 Edgewater Pl, Suite 500 Wakefield, MA 01880 Telephone: 781-246-9318 Fax: 781-224-1239	PICMG 2.1 DO.91 Dated 2/5/98

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