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0260307-000 / HARD DISK,IAS SBC,PMC MODULE,5XX
MFR PN: PMC233-R40

ramix inc

Hardware Reference Manual

PMC233/4/5 & PMC243/4/5 High Capacity Disk Solutions

DDC No. Rx-URMH 090 Rev A
Issued 7 April 2002

it's all about connexions

Notice

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1 Introduction

This manual describes the operation, configuration and installation instructions for the **PMC23X** and **PMC24X** High Capacity Disk modules. The **PMC23X/PMC24X** family provides a single PMC slot storage solution utilizing industry standard ATA rotating and solid state disks. Designed to be plugged onto a host processor (e.g., Single Board Computer) card, these products provide an extremely compact, flexible and economical high performance storage solution.

The **PMC23X/PMC24X** family of embedded disk modules offers a totally new high performance, low cost option for file system and boot storage. Combining high performance controllers developed for high-end workstations, with disk technology used in laptops, the **PMC23X/PMC24X** embedded disk module delivers very high data rates in a compact form factor implemented with components designed for physically demanding environments. With the **PMC23X/PMC24X** "single slot," computing solutions do not need to compromise in either capacity or performance. In addition, card edge PCI systems can be accommodated using RAMiX's PMC239 adapter for rapid prototype and development.

The **PMC23X/PMC24X** is fully PMC compliant, meeting all mechanical, electrical and protocol specifications. Disk capacities from 10GB to 60GB (rotating media) and from 32MB to 2GB (Flash) are supported.

The PCI controller on the **PMC23X/PMC24X** makes full and efficient use of the PCI bandwidth. FIFO buffers allow effective use of PCI burst modes, critical to achieving low PCI overheads. The **PMC23X/PMC24X** can execute data transfers at full PCI bus speeds. The **PMC23X/PMC24X** will mount on any PMC location (either directly on a processor card or on a PMC carrier board).

On the disk side, the controller can support ATA 66 for the PMC 233/234/235 and ATA 100 on the PMC243/244/245.

1.1 Features

The PMC233 and PMC234 use the CMD Technology CMD646 controller, the PMC235 uses the CMD648 controller. The **PMC243, PMC244** and **PMC245** use the Promise Technology PDC20269 controller (fully PCI 2.1 compliant). The most significant difference between the two sets of products is the performance, both on the PCI (the **PMC233, PMC234** and **PMC235** supports 32bit/33Mhz, the **PMC243, PMC244** and **PMC245** supports 32 bit wide PCI and speeds up to 66Mhz) and on the ATA (to disk) bus.

Within each group, the products are distinguished by mechanical layout and the style of disk they support.

All of these modules comply with the CMC specification for PCI Mezzanine Cards (commonly known as PMC). As such, they will directly connect to any Single Board Computer (SBC) or Expansion Card that supports PMC modules. All initialization, and functional configuration of the module is done automatically by software.

All of the products offer:

- Boot OS (e.g. Windows, NT, RTOS, etc.)
- Runs under the local Operating System File System
- Utilize industry standard storage solutions (e.g., 2.5" and Compact FLASH drives), allowing capacity and performance improvements as they become available.
- Drivers for most popular RTOS, UNIX and Microsoft Window environments

1.2 Model Comparison

Model No.	Drive Types Supported	PCI Specifications	Drive Integration	Number Of Drives Supported
PMC233	2.5" Rotating Media 2.5" Solid State Media	32bit/33Mhz	Integrated into PMC assembly	1
PMC243	2.5" Rotating Media 2.5" Solid State Media	32bit/33Mhz 32bit/66Mhz	Integrated into PMC assembly	1
PMC234FP	CompactFlash MicroDrive	32bit/33Mhz	Inserted via front panel	1
PMC244FP	CompactFlash MicroDrive	32bit/33Mhz 32bit/66Mhz	Inserted via front panel Up to two additional via J4	3
PMC234RG	CompactFlash MicroDrive	32bit/33Mhz	Recessed behind front panel	1
PMC244RG	CompactFlash MicroDrive	32bit/33Mhz 32bit/66Mhz	Recessed behind front panel Up to two additional via J4	2
PMC235	Any ATA/IDE compatible drive.	32bit/33Mhz	External to module via ribbon cable or rear transition	4
PMC245	Any ATA/IDE compatible drive.	32bit/33Mhz 32bit/66Mhz	External to module via ribbon cable or rear transition	4

1.2.1 PMC233/PMC243

These two products offer high capacity, high performance disk solutions. They integrate a 2.5" disk (either rotating or Solid State) directly into the product assembly. As such they provide a small form factor rugged storage solution for embedded systems.

Features include:

- Boot and Runtime file system solution in a single slot
- Rotating Media from 10GB to 60GB
- Flash disk from 32MB to 2GB
- Flash option available in Industrial Temperatures
- Fast read/write performance (rotating media)
- Compact and extremely rugged

1.2.2 PMC234/PMC244

Industry standard CompactFlash/MicroDrive storage devices are accommodated either via front panel (excellent for situations where the storage needs to be easily transportable), or recessed for higher mechanical robustness. (NB: the **PMC234/PMC244** do not have hot swap support, power must be off before removing/inserting the drive).

- Compact Flash/MicroDrive Host Bus Adapter
- Single PMC form factor
- PCI 32/66Mhz (PMC244 only
- PCI Rev. 2.1 compliant (PMC 234 only
- Available with front panel ejector or recessed
- Compact Flash cards up to 512MB
- Magnetic disks up to 1GB

1.2.3 PMC235/PMC245

The **PMC235/PMC245** has an IDE header in the front to attach low cost IDE disks. They also route the IDE signals to the "J4" connector for the rear I/O. The **PMC235/PMC245** has options for both the popular 44 pin as well as the 40 pin headers for its front panel connector. These versions were developed to provide maximum flexibility: supporting the widest range of disk drive solutions and allowing integration to specialized system configurations.

- Two independent IDE/ATA Channels
- Single PMC form factor (PMC235 only)
- PCI 32/66Mhz (PMC245 only)
- Available with front panel IDE
- Supports Ultra and Multiword DMA (PMC235 only)
- Supports Utra ATA 100 (PMC245 only)
- Bus Master DMA at 133 MBytes/sec

1.3 Environmental Data for Micro Drives for PMC234/PMC244

- Ambient temperature 5 to 55° C –40 to 65° C
- Relative humidity (non-condensing) 8% to 90% 5% to 95%
- Maximum wet bulb (non-condensing) 29.4 40
- Shock (half sine wave) 150 G (2 ms) 1000 G (1 ms)
- Vibration (random [RMS]) 0.67 G (5 to 500 Hz) 3.01 G (5 to 500 Hz)
- Vibration (swept sine) 1 G 0-peak (5 to 500 Hz) NA

2 Hardware Installation

This chapter provides unpacking, hardware preparation and installation procedures for the **PMC233/PMC243** modules.

2.1 Unpacking Instructions

RAMiX's boards are protected by an anti-static envelope and/or wrapping. Observe anti-static precautions and work at an approved anti-static workstation when unpacking the board.

> ***Note***: The units are shipped in an individual, reusable shipping box. When the shipping container is received, inspect it for any evidence of physical damage. If the container is damaged, request that the carrier's agent be present during unpacking and inspection of the unit.

Unpack the module from shipping carton. Check and verify that all items are present by referring to the packing list.

2.2 Included Items

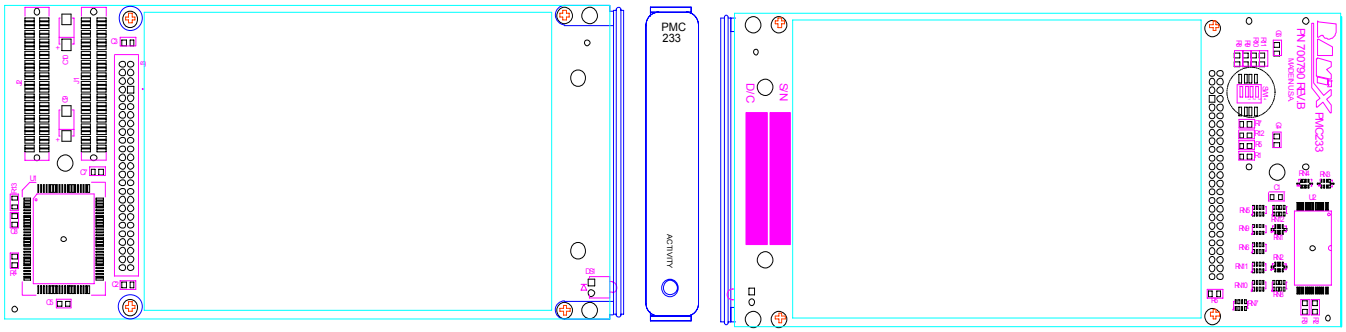
Each **PMC23X/PMC24X** is shipped with a corresponding PMC assembly.

2.3 Handling

Electronic assemblies use devices that are sensitive to static discharge; this applies to both the **PMC23X/PMC24X** and the host board onto which it will be mounted. Observe anti-static procedures when handling these boards. The **PMC23X/PMC24X** should be in an anti-static plastic bag or conductive foam for storage or shipment.

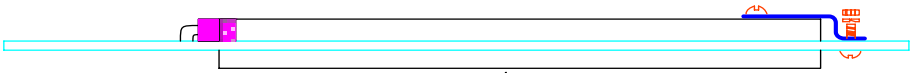
3 Mechanical Information and Front Panel Layout

3.1 PMC233 Top/Bottom Drawings (do not change switch setting)



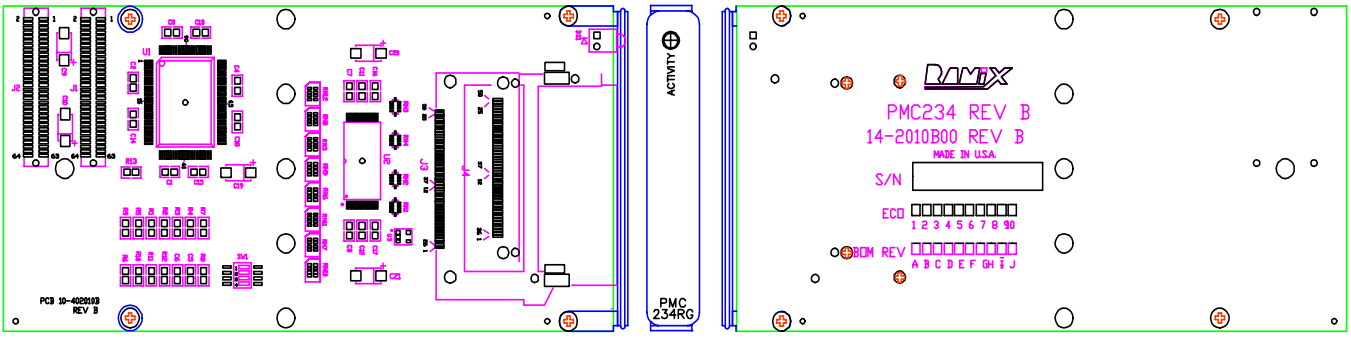
TOP SIDE

BOTTOM SIDE



IBM TRAVELSTAR HARD DRIVE
VARIOUS SIZES AND CONFIGURATIONS

3.2 PMC234 Top/Bottom Drawings

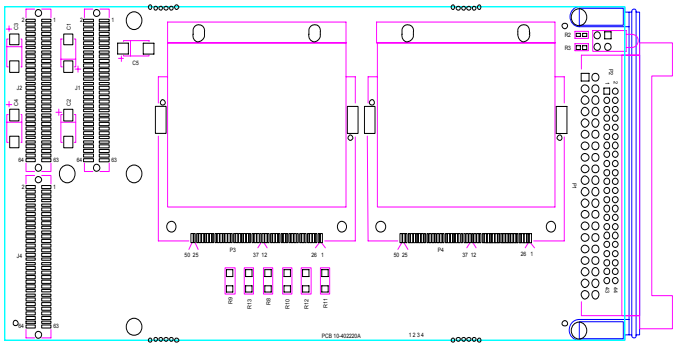


TOP SIDE

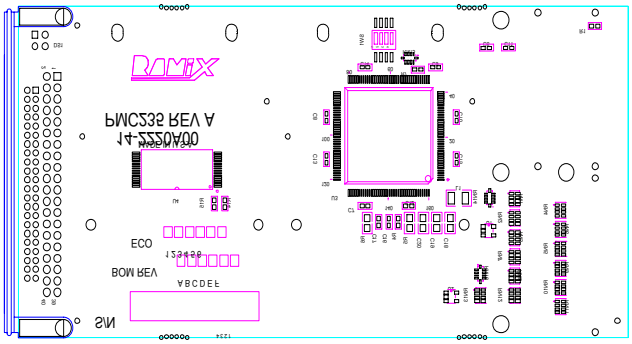
BOTTOM SIDE

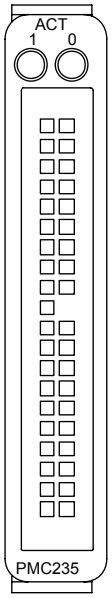
3.3 PMC235 Top/Bottom Drawings

TOP SIDE

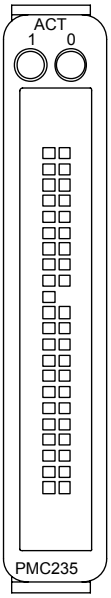


BOTTOM SIDE



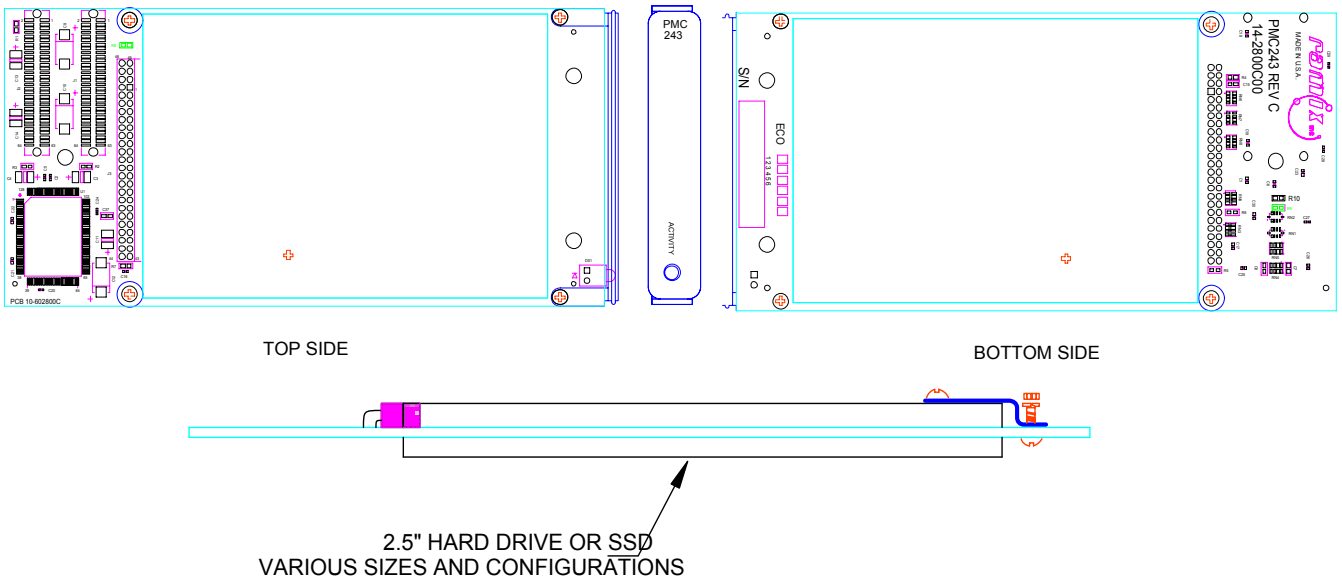


VIEW A
PMC235 & PMC235/
(P1 INSTALLED

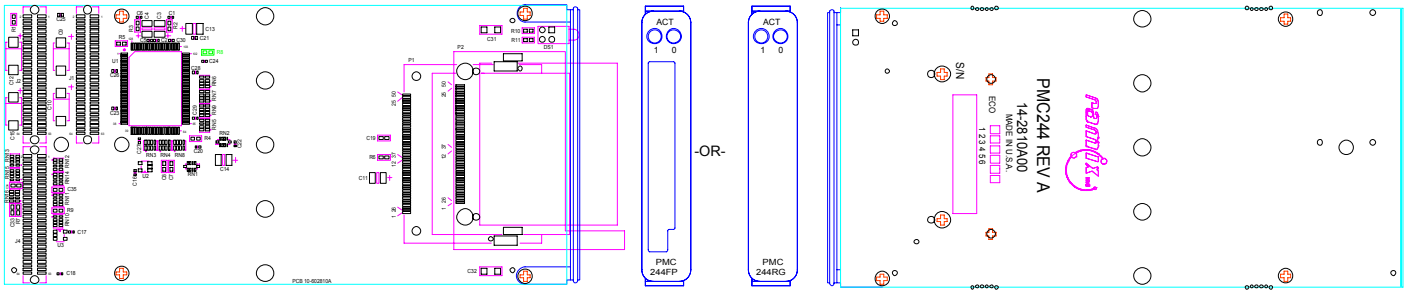


VIEW B
PMC235/44 & PMC235/44/
(P2 INSTALLED)

3.4 PMC243 Top/Bottom Drawings

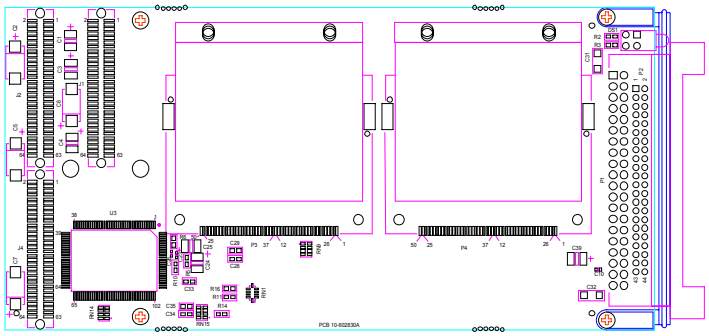


3.5 PMC244 Top/Bottom Drawings

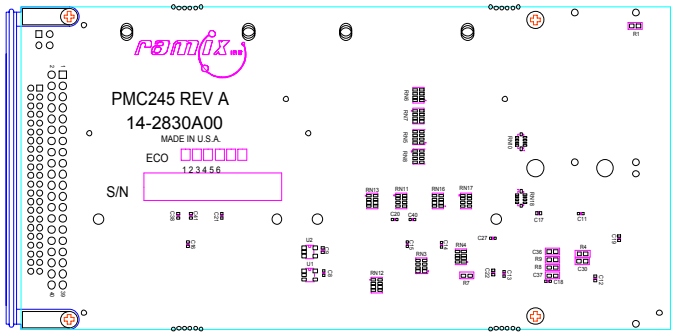


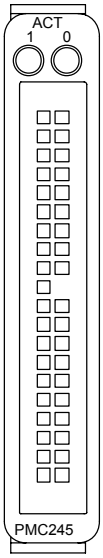
3.6 PMC245 Top/Bottom Drawings

TOP SIDE

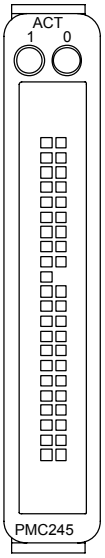


BOTTOM SIDE





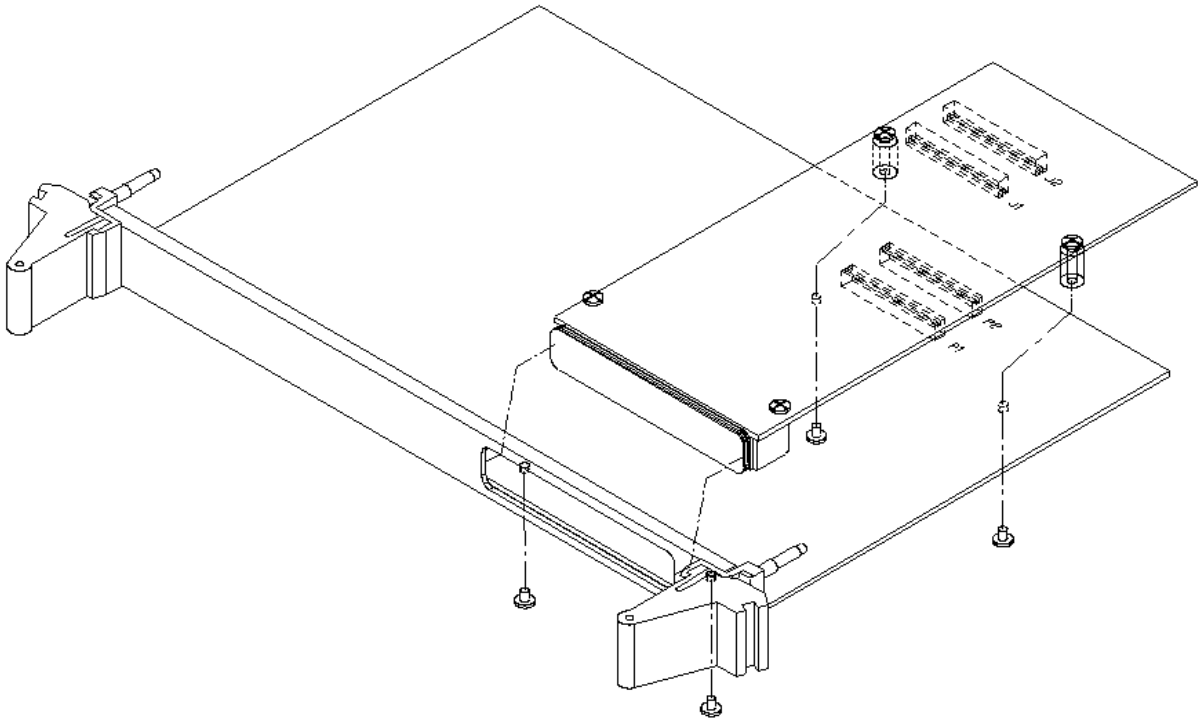
VIEW A
PMC245 & PMC245/CF
(P1 INSTALLED)



VIEW B
PMC245/44 & PMC245/44/
(P2 INSTALLED)

3.7 Assembly Diagram

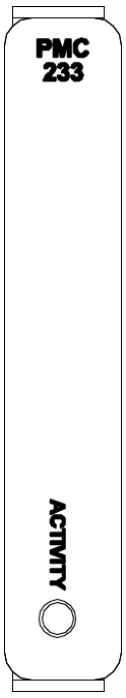
The **PMC23X/PMC24X** module is now ready for installation. Turn all system power off. Remove the host board from the chassis (if currently installed). Locate the PMC connectors on the host board. Carefully plug the **PMC23X** or **PMC24X** into the mating connectors on the host's printed circuit board. Be sure module is seated properly into CMC connectors on the host. Use screws to fasten module into host PCB.



1. Remove the four screws from the bottom of the stand-offs.
2. Line up the J1 and J2 connectors on the host PCB to the **PMC23X/PMC24X** J1 and J2 connectors.
3. Push the **PMC23X/PMC24X** down, making sure all connectors are positioned properly.
4. Use the four screws to connect the **PMC23X/PMC24X** stand-offs to the host PCB.

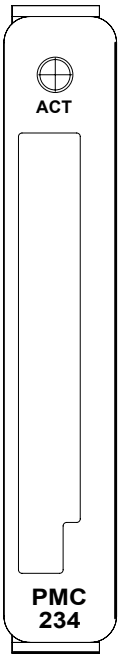
3.8 Front Panel Indicators

The ACTIVITY LED illuminates when activity (Rx or Tx) is present on the port.



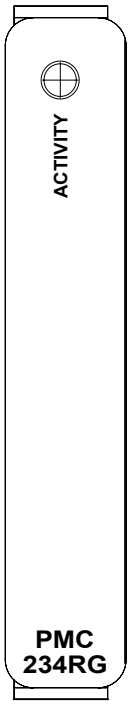
PMC233

Activity LED illuminates on access.



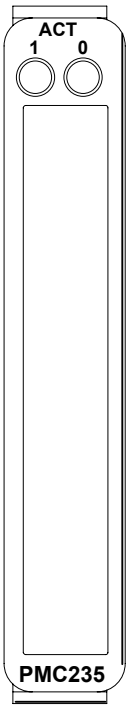
PMC234FP

Activity LED illuminates on access.



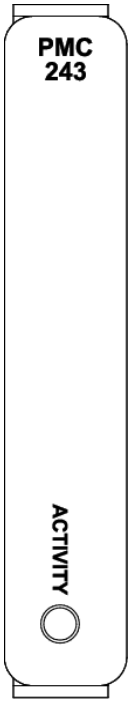
PMC234RG

Activity LED illuminates on access.



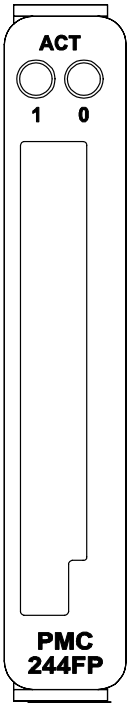
PMC235

Activity LED illuminates on access. Individual LED for each drive.



PMC243

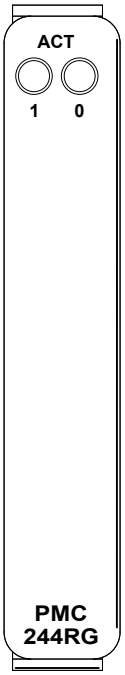
Activity LED illuminates on access.



PMC244FP

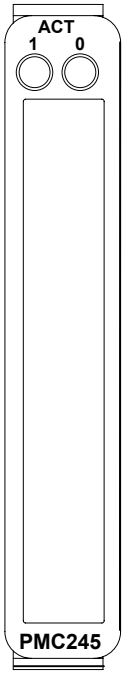
LED0 for the drive mounted on the PCB.

LED1 for the drive attached via the “J4” connector.



PMC244RG

LED0 for the drive mounted on the PCB.
LED1 for the drive attached via the “J4” connector.

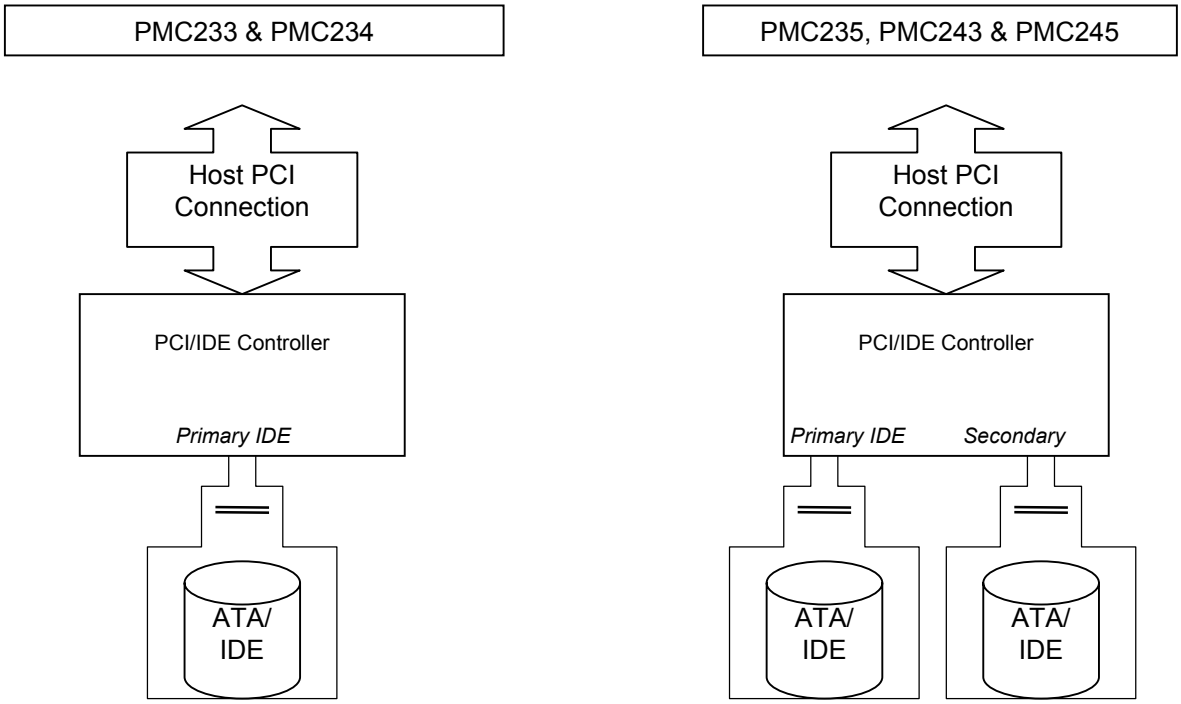


PMC245

Activity LED illuminates on access. Individual LED for each drive.

4 Architecture

The **PMC23X/24X** utilizes a single chip solution that interfaces the PCI to the ATA bus. The **PMC23X** is ATA66, compatible while the **PMC24X** extends the compatibility to ATA100. The **PMC23X** has a 32/33Mhz PCI bus interface. The **PMC24X** has a 32/66Mhz PCI bus interface. Further, the PCI bus signaling of the **PMC23X** is +5V only, while the **PMC24X** is +3.3V as well as +5V.



Each IDE bus (i.e. Primary and Secondary) can have up to two drive units attached. Connecting more than one drive is constrained by mechanical configuration on each product (see table in the Model Comparison section.)

5 Switch Settings

In general switch settings should not be changed from the factory default.

Note: Switches can be labeled On/Off or Close/Open. (On corresponds to Close, Off to Open)

PMC233 & PMC234		
SW1	**Factory Default**	**Description**
1	Off	If On Base Address Registers are disabled. IDE task registers will default to 0x1Fx (Primary) and 0x17x (Secondary)
2	On	Disable Native Mode
3	Off	Must be off for correct operation
4	On	Don't Care

PMC235		
SW1	**Factory Default**	**Description**
1	Off	Must be Off for correct operation
2	Off	Off to disable native mode operation
3	On	Off to force operation as legacy mode device
4	On	I/O control

6 Specifications

6.1 PMC233

Power	**3 Watts**
@ 5 V	**0.6 Amps**
Form Factor	
PMC	**Single slot**
MTBF	
MIL 217-F Nav Shel 25 Deg. C	**380000 Hours (not including the disk)**
Temperature	
Operating	**2 to +55 ° C, using rotary disk 0 to +60 ° C, using flash disk -40 to +85 ° C, using rotary disk (IND)**
Storage	**-40 to +85 ° C**
Humidity	
Operating	**5% to 95% Non-Condensing**
Storage	**5% to 95% Non-Condensing**

PCI Bus Characteristics	
Signaling	**5V**
Specification	**2.1**
Speed	**33MHz**
Width	**32**

6.2 PMC234

Power	1 Total Watt
@ 5 V	0.2 Amps
Form Factor	
PMC	Single slot
MTBF	
MIL 217-F Nav Shel 25 Deg. C	380000 Hours
Temperature	
Operating	5 to +55 ° C, using rotary disk
Storage	-40 to +85 ° C
Humidity	
Operating	5% to 95% Non-Condensing
Storage	5% to 95% Non-Condensing

Conformal Coating	Yes, additional charge

PCMCIA HBA	
Access	Front Panel or Recessed
No. Cards Supported	(1) Compact Flash or (1) Micro drive

PCI Bus Characteristics	
Signaling	5V
Specification	2.1
Speed	33MHz
Width	32

6.3 PMC235

Power	1 Total Watt
@ 3.3 V	0.3 Amp
Form Factor	
PMC	Single Slot
MTBF	
MIL 217-F Nav Shel 25 Deg. C	376000 Hours
Temperature	
Operating	5 to +55° C (Using Rotary disk)
Storage	-40 to +85° C
Humidity	
Operating	5% to 95% Non-Condensing
Storage	5% to 95% Non-Condensing

Conformal Coating	Yes, additional charge

PCMCIA HBA	
Access	Recessed or Front Panel
No. Cards Supported	(2) Compact Flash or (2) Micro Drives

PCI Bus Characteristics	
Signaling	3 & 5V
Specification	2.1
Speed	33MHz
Width	32

6.4 PMC243

Power	**2 Watts**
@ 3 V	**0.6 Amps**
Form Factor	
PMC	**Single slot**
MTBF	
MIL 217-F Nav Shel 25 Deg. C	**380000 Hours (not including the disk)**
Temperature	
Operating	**2 to +55 ° C, using rotary disk 0 to +60 ° C, using flash disk -40 to +85 ° C, using rotary disk (IND)**
Storage	**-40 to +85 ° C**
Humidity	
Operating	**5% to 95% Non-Condensing**
Storage	**5% to 95% Non-Condensing**

PCI Bus Characteristics	
Signaling	**5/3.3V**
Specification	**2.2**
Speed	**33/66MHz**
Width	**32**

6.5 PMC244

Power	1 Total Watt
@ 3.3 V	0.05 Amps
@ 5 V	0.15 Amps
Form Factor	
PMC	Single Slot
MTBF	
MIL 217-F Nav Shel 25 Deg. C	380000 Hours (not including the media)
Temperature	
Operating	2 to +55 ° C, using rotary disk
Storage	-45 to +90 ° C
Humidity	
Operating	5% to 95% non-condensing
Storage	5% to 95% non-condensing

PCMCIA HBA	
Access	Front Panel or Recessed
No. Cards Supported	(1) Compact Flash or (1) Micro drive

PCI Bus Characteristics	
Signaling	5 & 3.3V
Specification	2.2
Speed	33/66 Mhz
Width	32

6.6 PMC245

Power	1 Total Watt
@ 3.3 V	0.1 Amps
@ 5 V	0.2 Amps
Form Factor	
PMC	Single Slot
MTBF	
MIL 217-F Nav Shel 25 Deg. C	376000 Hours (not including the media)
Temperature	
Operating	5 to +55 ° C, using rotary disk
Storage	-45 to +90 ° C
Humidity	
Operating	5% to 95% non-condensing
Storage	5% to 95% non-condensing

PCMCIA HBA	
Access	Front Panel or Recessed
No. Cards Supported	(2) Compact Flash or (2) Micro Drives

PCI Bus Characteristics	
Signaling	5 & 3.3V
Specification	2.2
Speed	33/66 MHz
Width	32

7 Warranty Statement

RAMiX Inc. warrants that each hardware product delivered under this warranty will be free from defects in material or workmanship and will conform to RAMiX Inc.'s applicable specifications. If products sold hereunder are not as warranted, RAMiX Inc. shall, at its option, refund the purchase price or repair or replace the nonconforming products, as set forth below, provided proof of purchase and written notice of nonconformance is received by RAMiX Inc. within the applicable warranty period. This Warranty will cease to apply to system products upon conversion to an applicable On-Site Warranty Program.

All applicable products, excluding internally installed devices, and selected board products carry a warranty term of five (5) years from the date of shipment. The warranty period begins on the date of shipment from RAMiX Inc.'s facility. If a product is repaired or replaced under the warranty, the warranty will continue only for the period remaining on the original warranty.

RAMiX Inc.'s warranty policy states inbound shipping charges to RAMiX Ventura, including associated taxes, duties, tariffs, etc., shall be paid by the customer. Return (outbound) warranty repair shipping charges shall be paid by RAMiX Inc. to the customer's destination. Out-of-warranty shipping charges, including associated taxes, duties, tariffs, etc., shall be paid both ways by the customer.

7.1 Warranty Exclusions

The warranties set forth above does not extend to altered products that are repaired or maintained by other than personnel that RAMiX Inc. has trained and certified. They also do not apply to products that fail or are damaged due to shipment, handling or storage or operation, use or maintenance in a manner or environment that does not conform to RAMiX Inc.'s published instructions and specifications. Batteries and failures due to batteries are excluded. Installed devices such as micro drive, rotary disks, compact flash, etc. are only covered by the manufacturers warranty which is typically one year.

Units found to be defective due to customer mishandling or damage are subject to repair charges. The customer will be notified of such charges. Before repair shall commence, the customer shall provide RAMiX with repair approval via a Purchase Order authorizing said repairs at stated charges.

7.2 Disclaimer Of Other Warranties

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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