PCM-3900
USER MANUAL

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This manual is for the PCM-3291.

Part No. 2006390000

1st Edition Printed in Taiwan October 2001

Chapter 1 Introduction.

PC/104 IDE RAID Module is an IDE to IDE Disk Array Controller. A "Real-Time-Backup" device designed for Enterprises, Schools, and Personal Using. It provides a solution for low cost, high performance and redundant Disk Array function.

1.1 Functions and Features

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- **Data Mirroring:** RAID Level 1 data mirror function. Backup data from one hard disk drive to another automatically, ensure your OS and important data to be safe.
- **Plug and Play:** No need to install any device driver.
- **OS Independence:** Supports all PC operating systems.
- **Auto Rebuild:** Under system execution, if one hard disk drive is replaced, ***PC/104 IDE RAID Module*** will auto rebuild data to the new hard disk drive.
- **Hot Swap:** When one hard disk drive crashes, ***PC/104 IDE RAID Module*** allows you to remove it at once without power off. And by the mean while, your system can work as usual.
- **Firmware Upgradable:** On-line WWW service, you can get newest firmware version via Internet.
- **High Performance:** System with ***PC/104 IDE RAID Module*** provides similar performance as with one single hard disk drive and provides high data security for users.
- **High Capacity:** Hard disk drive capacity is no limitation.
- **Easy Maintenance:** Special DIY design. End-user can handle normal errors, and reduce MIS loading.
- **System Indicators:** Show system status by LEDs and the Buzzer.
- **Host Compatibility:** Supports IBM PCs, and compatible with most mainboards and chipsets.
- **Hard Disk Compatibility:** Supports all major brands' IDE hard disk drives.
- **Support Multi-boot System:** Such as System Commander, IBM OS/2 Boot Manager, …….etc.
- **RAID Manager:** A software that operates with RAID system and allow user to Monitor and Remote Monitor the status of RAID systems.

1.2 System Requirements

- **System:** IBM PC Compatible Computer.
- **CPU:** Support Intel, AMD, Cyrix.
- **Hard disk drive:** Support most famous IDE hard disk drives, the capacity can be more than 30 Gbytes; Please make sure your device support LBA Mode if it is smaller than 1 Gbytes.

1.3 Specification

Host Interface	EIDE, IBM PC Compatible
HDD Interface	EIDE, Supports UDMA 33/66/100 HDD (Only UDMA33 for Maxtor HDD)
Card Interface	PC/104 Standard
RAID	● RAID 1 (Mirror)
Transfer Rate	● 16.67MB/S (PIO mode 4) and 33.3MB/S (UDMA2)
Hot-Swap	● Taking off HDD without shutdown the system
Auto-Rebuild	● Automatically doing HDD's data reconstruction
LED	● 1st HDD and 2nd HDD activity ● Re-built ● HDD Fail
Manual Rebuild	● FAT Copy or Sector Copy (FAT Copy Include FAT16, FAT32, NTFS)
HDD Connector	● 3 * 90degree 2.54mm 40pin BOX header for 1 Host IDE and 2 Driver IDE ● 2 * 180 degree 2.00mm 44pin header for 2 Driver IDE
Power Connector	● 90 degree small 4 pin
Speaker	● 1* Alarm Speaker
EXT connector	● EXT 1st HDD and 2nd HDD activity LED ● EXT Re-built LED ● EXT HDD Fail LED ● EXT Speaker ● Hot swap button
Supply Voltages	● +5V

Operating Temperature	● 0℃ ~ 70℃
Cable	● Host IDE × 1, Driver IDE × 2
Supports Operation Systems	● Windows NT Server and Workstation, DOS6.22, Windows 98/95/3.1x ● NetWare 3.12/4.11/5.0, ● SCO UNIX System V ● OS/2 ● Linux (RedHat, Slack Ware, Debian, SuSe, OpenLinux, Turbo Linux) ● Free BSD3.1 ● Solaris 2.x
Reliability	● MTBF > 250,000 hours

Chapter 2 How to Install

PC/104 IDE RAID Module is very easy to install. All you need is to install it the way just like what you may have done with a hard disk drive. Please read the descriptions bellow in detail.

2.1 Before Installation *(Important!)*

When you use ***PC/104 IDE RAID Module***, please keep the follwing descriptions in mind. *Must* means you have to follow the instruction; and *Note* means please read it carefully:

- **Using 2 New Hard Disks** *Note* It is better for ***PC/104 IDE RAID Module*** to use two hard disk drives with the same brand and model.
- **System Installation** *Note* The user may install OS on one hard disk drive first, and then copy to another one by using "Auto Rebuild"
- **Install a New Hard Disk Drive** *Must* If you buy a new hard disk drive and want to use it with the original hard disk drive, the new hard disk's capacity must be equal or larger than the original one's.
- **Hard Disk Setup** *Must* Please setup both of two hard disk drives in **master mode**, which is the default factory-setting mode.

2.2 Device Description

PC/104 IDE RAID Module Layout and Parts:

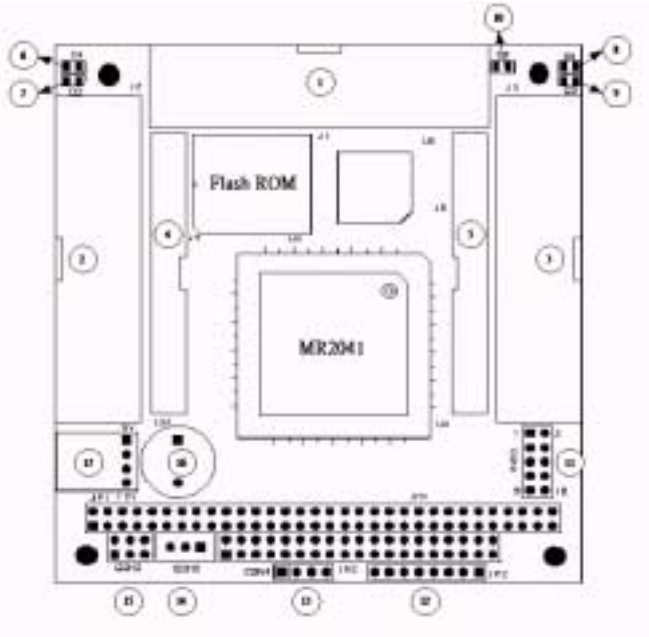


Figure 2.1 PC/104 IDE RAID Module

1. **Host IDE** Use an IDE ribbon cable to connect host onboard IDE slot
2. **HDD1 IDE** Use one IDE ribbon cable to connect the hard disk drive **HDD1**
3. **HDD2 IDE** Use one IDE ribbon cable to connect the hard disk drive **HDD2**
4. **2.5"** true HDD form factor
5. **2.5"** true HDD form factor
6. **1st LED** status indicator, shows HDD1's status(Failed or Normal)
7. **HDD1** access LED
8. **2nd LED** status indicator, shows HDD2's status(Failed or Normal)
9. **HDD2** access LED
10. **Rebuild** LED
11. **External** LED connector
12. **Jumper Setting**
13. **Buzzer setting** External Buzzer：Pin 1 ＋, pin 3 － ; Internal Buzzer：Pin 3 , 4 On
14. **RS-232** Connector
15. **IDE and Buzzer Switch** (See Table 2.2)
16. **Buzzer** Indicate warning or other message

17. **Power In** Connect to power supply

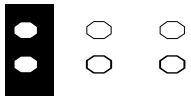
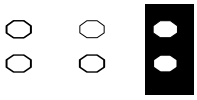
Item	Figure	Description
1		**HDD1 IDE Switch** ON = HDD1 Insert OFF =HDD1 Move
2		**HDD2 IDE Switch** ON = HDD2 Insert OFF =HDD2 Move
3		**Buzzer Switch** ON = Power On OFF =Power Off

Table2.2 ***PC/104 IDE RAID Module*** Jumper Setting description

Chapter 3 How to Use

After the installation of ***PC/104 IDE RAID Module*** is completed, users may select the function conveniently just by altering **Jumper** setting.

3.1 Jumper Setting

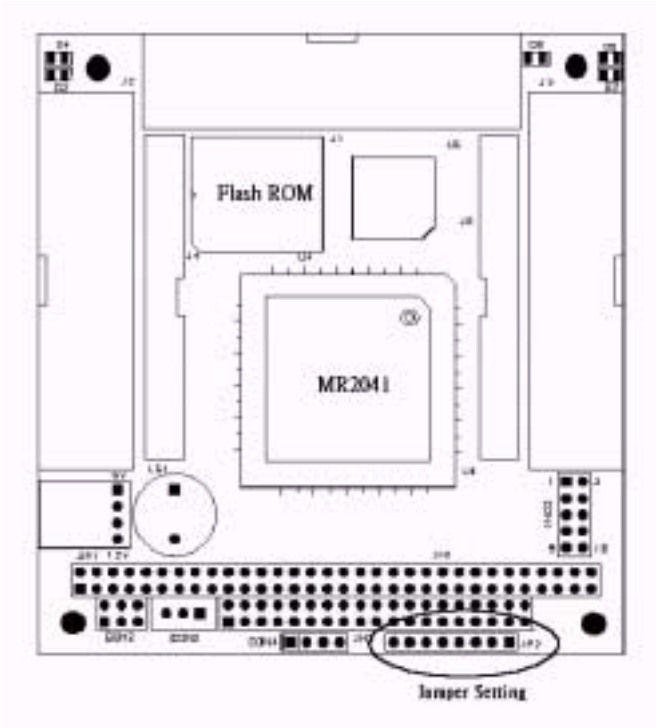


Figure3.1 ***PC/104 IDE RAID Module*** **Jupmer** setting

- **Jumper Setting Description:**

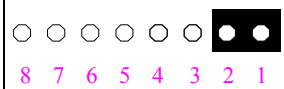
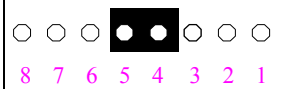
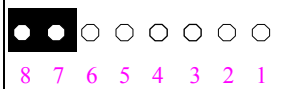
Item	Figure	Description
1		**Master / Slave** ON = Master OFF =Slave
2		**Mirror / JBOD** ON = JBOD OFF =Mirror
3		**Upgrade Firmware** ON = Upgrade Mode OFF =Normal Mode

Table3.1 ***PC/104 IDE RAID Module*** Jumper Setting description

- ***Using FDISK*** *Note If you want to reinstall OS in two used hard disk drives synchronously, please first use* ***FDISK*** *to delete partitions of the two hard disk drives respectively*

Chapter 4 Auto-Rebuild

You may install software into one hard disk drive first, and then use "Auto-Rebuild Function" described in this chapter, to copy the content of the first hard disk drive into another one.

Reference Section 3.1 **"**Jumper Setting" to select "**Mirror"** mode. You may check system status by **1st** and **2nd LED** indicators and **Buzzer** (Please reference Figure2.1 to check **1st** and **2nd LED** indicators). The meaning of LED indicators and Buzzer are as follows.

4.1 LED Indicator & Buzzer

- **When Booting ,** 1 st and 2nd LEDs will blink once and Buzzer will alert once, and RAID Level 1 data mirror function already operates. This will synchronize the two hard disk drives, and protect your operating system and important data on time.
- **When one hard disk drive is broken-down** The Buzzer will alert, you may know which hard disk drive is broken down by **1st** and **2nd** LED indicators. If **1st** LED indicator is red, it implies that HDD1 is broken down. If **2nd** LED indicator is red, it implies that HDD2 is broken down. We suggest to change the broken one to a normal one, to make sure your operating system and data to be safe.
- **Auto-Rebuild** When one hard disk drive is broken-down, user may replace it with a new one, our system will go into "Auto-Rebuild" mode. At this time, the LED indicator of the hard disk drive that you just changed will blink. When "Auto-Rebuild" function is completed, the LED indicator will return to the normal status.

4.2 Notes

- If one hard disk LED indicator doesn't work, please check your LED firstly, you may reboot the system to check if it's broken
- Make sure your HDD1 and HDD2 are set at **Master** mode。

Chapter 5 Firmware Upgrade

PC/104 IDE RAID Module provides easy firmware upgrade function, user can easily download new version firmware and upgrade utility from internet.

5.1 Firmware Upgrade Procedure

Note 1. *Please make a DOS or Windows' "Bootable Floppy Diskette" (The "Firmware Upgrade Disk"), and then copy the downloaded Firmware Upgrade Utility (such as FLASH03.EXE) and NEW Firmware Code (such as FIRMWARE.BIN) to Firmware Upgrade Disk.*

Note 2. Please set your **F/W Upgrade Jumper or Switch => ON** as following,

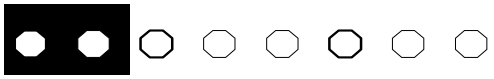


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Figure 5.1 Firmware Upgrade Jumper setting

■ **Please upgrade your F/W as steps as following,**

Step 1. Insert your *Firmware Upgrade Disk* and boot your system from Floppy Drive.

Step 2. Execute the DOS command as following,

A:\> **(1)** **(2)** **(3)** (For example: FLASH103.EXE 0 FIRMWARE.BIN)

(1) <= **FLASH XXX.EXE** (File name of Firmware Upgrade Utility)

(2) <= Parameter description : 0,1,2,3 present PC/104 IDE RAID Module position

0 : IDE Channel 1, Master;

1 : IDE Channel 1, Slave;

2 : IDE Channel 2, Master;

3 : IDE Channel 2, Slave

(3) <= **XX-XX-XX.BIN** (File name of New Firmware Code)

Step 3. Follow the steps show on the PC screen.

Step 4. After completion, set the Jumper or Switch back to original setting respectively

Step5. Restart your system

5.2 Where To Get New Firmware & Upgrade Utility

You may download New Firmware Code and Firmware Upgrade Utility via Internet at http://www.Advantech.com.tw or contact ADVANTECH's agents.

Chapter 6 Hardware Compatibility List (HCL)

PC/104 IDE RAID Module can be compatible with most of IBM PCs' chipsets, and hard disk drives. All of the lists on below are part of our data which are just for reference only. For more updated information, please check out from our web site: http://www.Advantech.com.tw.

6.1 Compatibility List of Chipsets

Item	Chipset	Mainboard
1	ALi M5229	ASUS P5A
2	Intel 440BX	ASUS P3B-F ASUS P3B-1394 Iwill DBL100 GA-6BXC
3	Intel 810	ASUS MEW
4	Intel 820	ASUS P3C2000
5	Intel 815E	Iwill WO2
6		ASUS CUSL2
7	SIS 530	WinFast 5300MA
8	SIS 620	ASUS MES-VM
9	SIS 630	ASUS CUSI
10	VIA694X	Iwill VT133+
11		GA-6VX7-4x
12	VIA 694Z	ASUS CUV4X
13	AMD751	ASUS K7M
14	AMD761	ASUS A7M266
15	KT133	DFI AK74--EC
16	Serverworks ServerSet III LE	TYAN LES2510

6.2 Compatibility List of IDE Hard Disk Drives

Quantum					
Model		Size (GB)	Model		Size (GB)
(1)	LM20500AT	20.5	(6)	KA9100A	9.1
(2)	AS20000AT	20.0	(7)	CR8400A	8.4
(3)	LM15000AT	15.0	(8)	CX6400A	6.4
(4)	CX10200A	10.2	(9)	CR6400A	6.4
(5)	EL10A013	10.0			

Seagate					
Model		Size (GB)	Model		Size (GB)
(1)	ST340824A	40.0	(4)	ST328040A	28.0
(2)	ST330620A	30.0	(5)	ST320414A	20.0
(3)	ST330631A	30.0	(6)	ST315320A	15.0

Fujitsu					
	Model	**Size (GB)**		**Model**	**Size (GB)**
(1)	**MPG3307AT**	**30.7**	**(3)**	**MPD3064AT**	**6.4**
(2)	**MPD3091AH**	**9.1**	**(4)**	**MPD3043AT**	**4.3**

IBM					
	Model	**Size (GB)**		**Model**	**Size (GB)**
(1)	**DTLA-307075**	**76.8**	**(7)**	**DJNA-371800**	**18.0**
(2)	**DTLA-307045**	**46.0**	**(8)**	**DJNA-371350**	**13.5**
(3)	**DPTA-353750**	**37.5**	**(9)**	**DJNA-371010**	**10.1**
(4)	**DTLA-307030**	**30.0**	**(10)**	**DJNA-351010**	**10.1**
(5)	**DJNA-372200**	**22.0**	**(11)**	**DJNA-370910**	**9.1**
(6)	**DTLA-307020**	**20.0**	**(12)**	**DJNA-350640**	**6.4**

Maxtor					
	Model	**Size (GB)**		**Model**	**Size (GB)**
(1)	**98196H8**	**81.0**	**(6)**	**52049H4**	**20.0**
(2)	**94098U8**	**40.0**	**(7)**	**90841U2**	**8.0**
(3)	**94098U6**	**40.0**	**(8)**	**90648D3**	**6.4**
(4)	**53073H6**	**30.0**	**(9)**	**90432D2**	**4.3**
(5)	**32049H2**	**20.0**			

Western Digital					
	Model	**Size (GB)**		**Model**	**Size (GB)**
(1)	**153BA**	**15.0**	**(2)**	**WDAC28400**	**8.4**

Samsung				
	Model	**Size (GB)**		
(1)	**SV2042N**	**20.0**		