# AX61120

## 1U Industrial Computer Chassis

## With IDE to IDE RAID

## User's Manual

## Disclaimers

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# Safety Approvals

- CE Marking

## CE Compliance

This equipment has been tested and complies with the limits for a Class A digital device, These limits are designed to provide reasonable protection against harmful interference in a residential installation. If not installed and used in accordance with proper instructions, this equipment might generate or radiate radio frequency energy and cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measurers:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

Shielded interface cables must be used in order to comply with emission limits.

# Safety Precautions

Before getting started, read the following important cautions.

1. The **AX61120** does not come equipped with an operating system. An operating system must be loaded first before installing any software into the computer.
2. Be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the **AX61120** before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the **AX61120** is properly grounded.
4. Do not open the system's top cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:

   ✓ Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help to discharge any static electricity on your body.

   ✓ When handling boards and components, wear a wrist-grounding strap, available from most electronic component stores.

## Trademarks Acknowledgments

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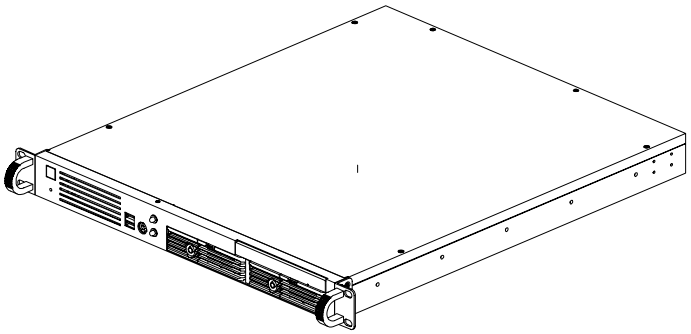
# Chapter 1
# Introduction

This chapter contains the general information and the detailed specifications of the **AX61120**. Chapter 1 includes the following sections:

- **General Description**
- **Features**
- **Specifications**
- **Dimensions**
- **Rear panel**
- **Front Panel Features**

## 1.1 General Description



The **AX61120** is a reliable and affordable solution for 1U rack mount server requirements. With its innovative mechanical and electrical design, the **AX61120** provides high-density, scalability and reliability in space-sensitive environments. Boosting a 1U height construction, the **AX61120** is for users electing on saving space in the data center and plan to scale their environment by adding servers to a maximum number of units. Its remarkably slim profile and sophisticated storage capacity make this a superb front-end server.

**AX61120** features a PICMG CPU card with 2 free PCI slots for system expansion. Special system ventilate designed with cross cooling fan and required ATX 250W power supply can support Intel® Pentium® 4 processor operating stability.

With a cost effective IDEmirror 2000 approach, the **AX61120** can provide mirror data to two 3.5 HDD disk drive bays. Complementing the rampage of the Internet technology of today, the **AX61120** is the practical and effective solution to Internet Service Providers (ISPs), Application Service Providers (ASPs), as well as Hosting and Total Service Providers (TSPs).

## 1.2 Features

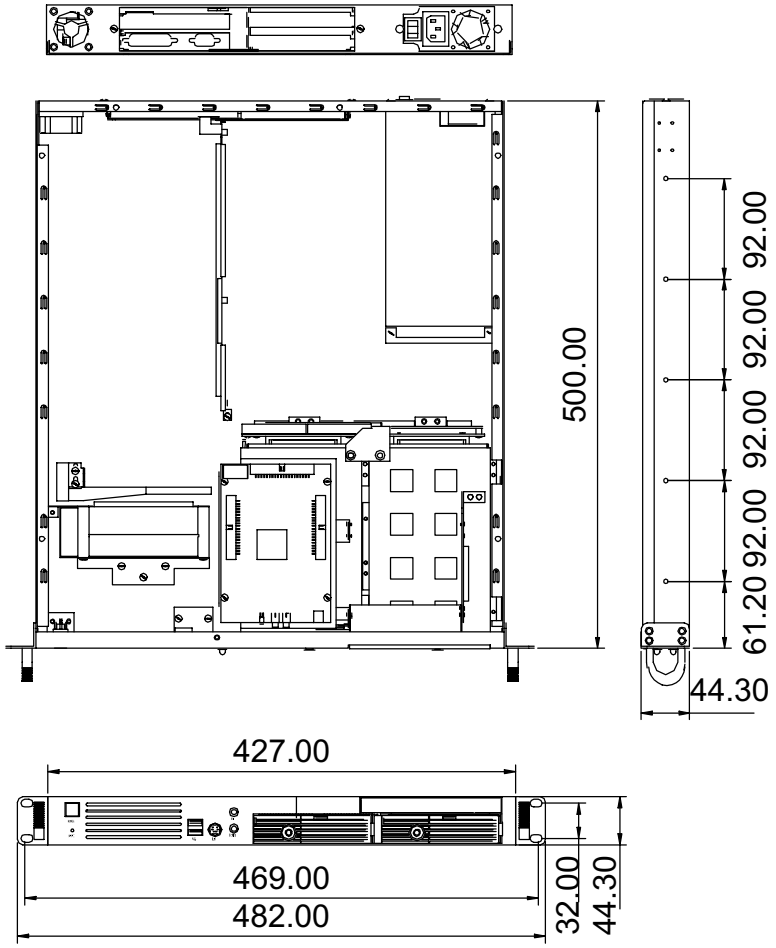
- 1U rack-mount design
- Built-in level 0, 1 disk data mirroring IDE-IDE RAID
- Integrated two 1"-height hot-swap drive bays
- Support slim-line CD-ROM disk bay
- PICMG SBC structure with 2 free PCI slots
- Designed for optimal cooling system

## 1.3 Specifications

- **System Board:**
  - Full-size CPU Card
- **Backplane:**
  - Butterfly designed support 2 free PCI slots
- **Power Supply:**
  - Required 1U compact designed
- **Disk Drive Bay:**
  - Exposed 1x 5.25" for slim CD-ROM
  - Two hot-swappable mobile tray for 3.5" HDD.
- **RAID:**
  - IDE-IDE RAID level 1 disk data mirroring
  - Auto-rebuilding
  - OS independent
  - Hot swap
- **Cooling System:**
  - One 4cm ball-bearing fan
  - One cross cooling fan
- **Controls:**
  - One power ON/OFF
  - One system reset
- **Connectors:**
  - Two USB ports
  - PS2 keyboard and mouse port
- **Indicators:**
  - One LED for power
  - One LED for HDD activity
  - Two LED for system status of HDD
- **Pre-punched:**
  - One 25-pin
  - One 9-pin

- **Standard Color:**
  - Black (PANTONE 414C 2X)
- **System Form Factor:**
  - 1U rack-mount chassis
- **Miscellaneous:**
  - General Device C-300 series support
- **Operating Temperature:**
  - 0℃(32℉) to 40℃(104℉)
- **Humidity:**
  - 10 ~ 95%, non-condensing
- **Vibration:**
  - 5 ~ 17Hz, 0.1" double amplitude displacement
  - 17 ~ 500Hz, 1.5G acceleration peak to peak
- **Dimensions:**
  - 19"(482.6mm)(W) x 19.7"(500mm)(D) x 1.75"(44mm)(H)
- **CE Compliance**

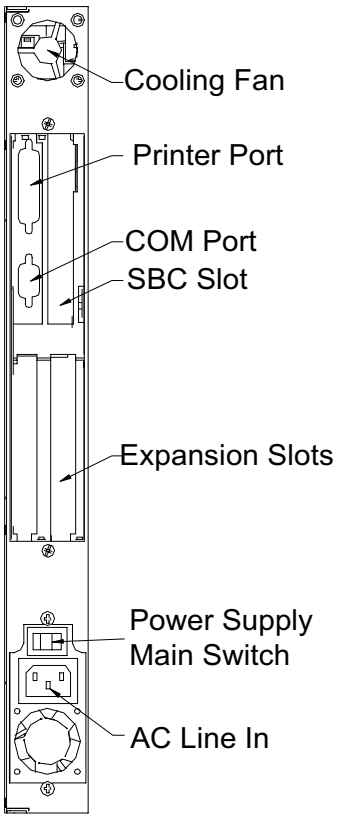
## 1.4 Dimensions



## 1.5 Rear Panel

Located at the rear panel of the **AX61120** are the I/O outlets for connection of serial/parallel interface-supported devices. You will also find the main power switch, and voltage selector for the ATX power supply along the rear panel.

### AX61120 Rear Panel




**a. Cooling Fan:** A 4 cm cooling fan for system operating stabilization

**b. Printer Port:** This is a 25-pin parallel port connector for installation of a printer device

**c. COM Port:** A DB-9 connector for serial port connection

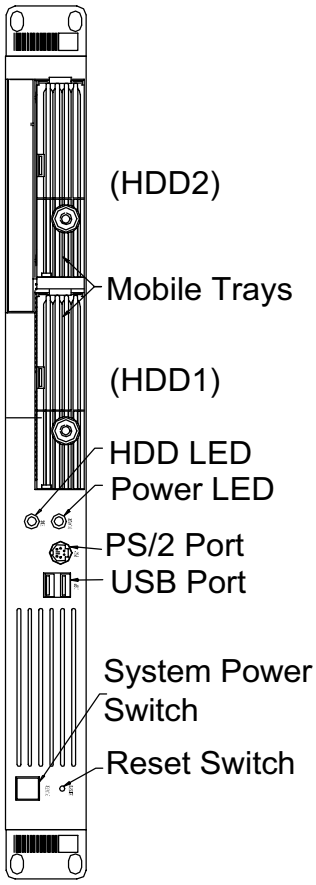
**d. SBC Slot:** This is the provisions on the rear panel for mounting the SBC card

**e. Expansion Slots:** Provides two add-on card I/O slots for system expansion

**f. Power Supply Main Switch:** The switch that controls the AC power input to the power supply unit

**g. AC Line In:** Connects the AC plug of the power cable to provide electrical power to the power supply unit

## 1.6 Front Panel Features




a. **Mobile Trays:** Two hot-swap mobile trays for 3.5" HDD installed

b. **HDD LED:** During HDD NORMAL (Active) operation, this LED constantly stays RED. This LED also blinks when the HDD is reading/writing.

c. **Power LED:** LED indicator for the status of the system power

d. **PS/2 Port:** PS/2 connectors devoted for PS/2 keyboard devices

e. **USB Port:** USB connectors with Port 0 below and Port 1 on top.

f. **System Power Switch:** Main power switch controlling the ON/OFF status of the system power

g. **Reset Switch:** The button that resets and reboots the system control board when pressed.

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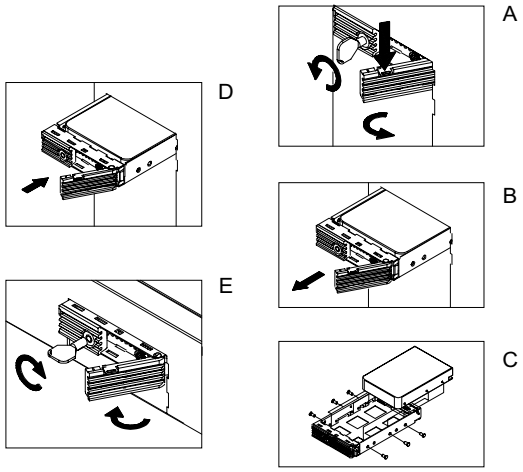
# Chapter 2
# Installation

## 2.1 HDD & Mobile Tray




**AX61120** contains two hidden hard drive in the enclosure. When installing a new hard drive into the enclosure, please follow the instructions below.

1.Turn off the system power and remove all electrical cables from the rear panel.

2.Using the key to insert to door-lock device and turn it to left to open the door on the mobile tray.

3.Press down the hook slightly and pull the mobile tray out of the chassis and mount the new HDD drive(s) into the empty slot.

4.Affix the HDD drive by mounting 3 screws on each side of the drive bay.

5.Return the mobile tray drive bracket to its original place.

6.Attach the proper power and connector cables onto the HDD disk drive(s).

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# Chapter 3
# IDEmirror 2000

***IDEmirror 2000*** 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.

## 3.1 Functions and Features

- **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, ***IDEmirror 2000*** will auto rebuild data to the new hard disk drive.
- **Hot Swap:** When one hard disk drive crashes, ***IDEmirror 2000*** 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 ***IDEmirror 2000*** 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, no 8.4G Bytes limitation.
- **Convenience:** Convenient for you to change the hard disk drive by using our mobile rack.
- **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.

## 3.2 How to Install

***IDEmirror 2000*** 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.

### 3.2.1 Before Installation *(Important!)*

When you use ***IDEmirror 2000***, 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 ***IDEmirror 2000*** 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 boot your system on this HDD(Source HDD) .

. *Note* You must install your system with only one HDD(HDD1) to XDRV port, this is called Source HDD. Power off and then connect HDD2(Target HDD) to *IDEmirror 2000*'s YDRV port . Power on, ***IDEmirror 2000*** start the duplication process and you can copy data to another one by using "Auto Rebuild function " (Please reference Section 3.3.2) or "Manual Backup Function" (Please reference Section 3.3.3) .

- **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.

### 3.2.2 Installation

- **Step 1** Remove your computer cover
- **Step 2** Install ***IDEmirror 2000*** to host
- **Step 3** Connect **Host IDE** to host's onboard IDE slot by an IDE ribbon cable
- **Step 4** Connect **XDRV IDE** to one hard disk drive, HDD1, by an IDE ribbon cable
- **Step 5** Connect **YDRV IDE** to another hard disk drive, HDD2, by an IDE ribbon cable
- **Step 6** Connect HDD1 and HDD2 to AT/ATX power supply's 4P connectors
- **Step 7** Coat your computer cover

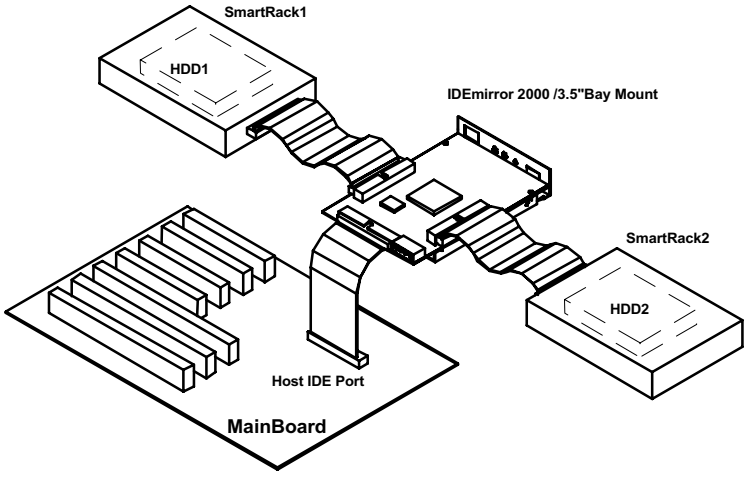



Figure 3.2.1 System Installation of ***IDEmirror 2000 / 3.5" Bay Mount***

## 3.3 How to Use

After the installation of ***IDEmirror 2000*** is completed, users may select the function conveniently just by altering **Dip Switch** setting.

### 3.3.1 Dip Switch Setting

Dip Switch setting and functions:

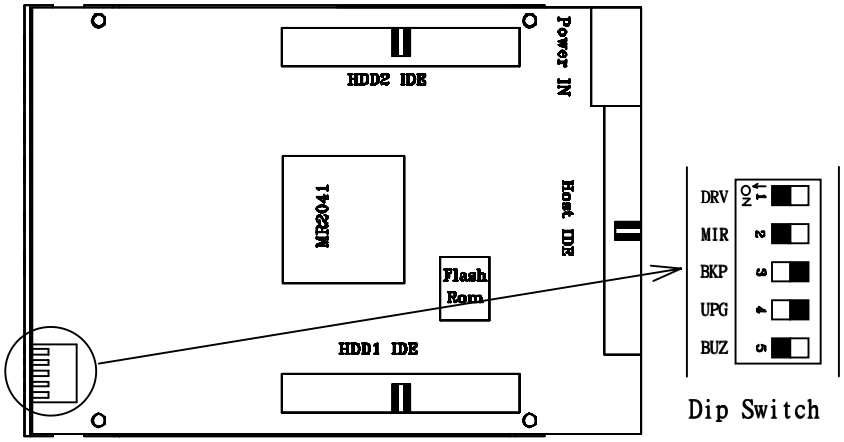



Figure 3.3.1 ***IDEmirror 2000*** **Dip Switch** setting

| Pos | Switch | Function Description |
|---|---|---|
| 1 | DRV | Master / Slave<br>ON= Master [Default]<br>OFF = Slave |
| 2 | M/R | Mirror / JBOD<br>ON= Mirror ( RAID 1) [Default]<br>OFF = JBOD |
| 3 | BKP | Backup (Duplicate)<br>ON= Backup (Duplicate)<br>OFF = Non-Backup (Normal Usage) [Default] |
| 4 | BUZ | Buzzer<br>ON = Enable Buzzer<br>OFF = Disable Buzzer [Default] |

Table 3.3.1 ***IDEmirror 2000*** **Dip Switch** functions

## Switch Combination Description:

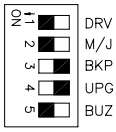
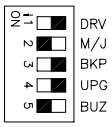
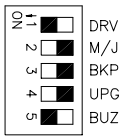
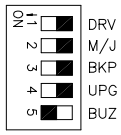
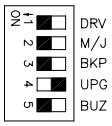
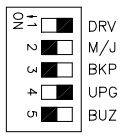
| Item | 3.5" Bay Mount | Description |
|---|---|---|
| 1 |  | Disk Array, Mirror Mode, Master<br>DRV: ON<br>M / J : ON<br>BKP : OFF |
| 2 |  | Disk Array, Mirror Mode, Slave<br>DRV: OFF<br>M / J : ON<br>BKP : OFF |
| 3 |  | Disk Array, JBOD Mode, Master<br>DRV: ON<br>M / J : OFF<br>BKP : OFF |
| 4 |  | Disk Array, JBOD Mode, Slave<br>DRV: OFF<br>M / J : OFF<br>BKP : OFF |
| 5 |  | Duplicator, Copy by Sector<br>DRV: ON<br>M / J : ON<br>BKP : ON |
| 6 |  | Duplicator, Copy by File<br>DRV: OFF<br>M / J : ON<br>BKP : ON |

Table3.3.2 ***IDEmirror 2000*** Combination Description

- **Dip Switch Priority** Jumper **BKP** has higher priority than **MIR** and **DRV**
- **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

### 3.3.2 Auto-Rebuild Function

You may install software into one hard disk drive first, and then use "Auto-Rebuild Function" described in this section or "Manual Backup Function" in the next section, to copy the content of the first hard disk drive into the other one.

How to use Auto-Rebuild function:

**Step 1** Please reference Section 3.2.2 "Installation" to install your system

**Step 2** Please reference Section 3.3.1 "Dip Switch Setting" to select the "**Disk Array, Mirror**" mode

**Step 3** Open the door lock of some mobile tray (for example, the one with HDD2 inside), and slide out the mobile tray from the enclosure dock.

**Step 4** Install new softwares to one hard disk drive (HDD1), this is called Source HDD.

**Step 5** Hot-plug in mobile tray (including HDD2) to the enclosure dock, and close the door lock

By the mean while, Auto-Rebuilding function will be acted and you can still continue your original operations.

### 3.3.3 Manual Backup Function

***IDEmirror 2000*** also could be used as a **HDD Duplicator**, which is used for copying data from one hard disk drive to another one. When the duplication is completed, data in these two hard disk drives are synchronous, then you may set ***IDEmirror 2000*** to be "**Disk Array, Mirror**" mode to protect your important data on time.

How to use Manual Backup function:

**Step 1** Install new softwares to one hard disk drive (HDD1) if necessary, this is called Source HDD.

**Step 2** Reference Section 3.2.2 to install your system. *Note* Source HDD must be connected to ***IDEmirror 2000*** 's **XDRV** port, another hard disk drive (HDD2) is called Target HDD, which is connected to ***IDEmirror 2000*** 's **YDRV** port . *Note* You must install your system with only one HDD(HDD1) on XDRV port, this is called Source HDD. Power off and then connect HDD2(Target HDD) to *IDEmirror 2000*'s YDRV port.

**Step 3** Reference Section 3.3.1 to choose "**Duplicator, Copy By Sector**" mode or "**Duplicator, Copy By File**"(Only Supports Microsoft Windows Series) mode

**Step 4** Power on, ***IDEmirror 2000*** start the duplication process

**Step 5** Power off, when duplication process is completed

**Step 6** If you want to use **Mirror** function, please reference Section 3.3.1 after duplication, set the system to be "**Disk Array, Mirror**" mode

## 3.4 Auto-Rebuild

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

Reference Section 3.3.1 **"**Dip Switch Setting" to select "**Disk Array**, **Mirror"** mode. You may check system status by **1st** and **2nd LED** indicators and **Buzzer** (Please reference Figure3.2.1 to check **1st** and **2nd LED** indicators and **Buzzer ON/OFF Dip Switch**). The meaning of LED indicators and Buzzer are as follows.

### 3.4.1 LED Indicator & Buzzer

**For LED Indicator, please reference Chapter 3.6 "LED Indicator Table"**

- **When Booting**, **1st** and **2nd** LEDs will blink once and Buzzer will alert once (**Buzzer ON/OFF Dip Switch** is ON), 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 (**Buzzer ON/OFF Dip Switch** is ON), 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. Use mobile tray, you can remove the broken hard disk drive on-line and don't need to shut down the system, all the operations are still going on properly.
- **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 (Please reference Section 3.3.2). 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.

### 3.4.2 Notes

- **Buzzer ON/OFF Switch** Setting is ON to make sure the buzzer alarm to be workable
- 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

## 3.5 Hard Disk Duplication

Please reference Section 3.3.1 "Dip Switch Setting", set the system to be "**Hard Disk Duplicator**, **Copy by File"** or **"Hard Disk Duplicator, Copy by Sector**" mode to duplicate your hard disk easily. You may check system status by **1st**, **2nd LED** indicators and Buzzer (Please reference Figure3.2.1 to check **1st**, **2nd LED** indicators and **Buzzer ON/OFF Dip Switch**). The meaning of LED indicators and Buzzer are as follows.

### 3.5.1 LED Indicator & Buzzer

**For LED Indicator, please reference Chapter 3.6 "LED Indicator Table"**

- **When Booting, 1st** and **2nd** will blink once and Buzzer will alert once. (**Buzzer ON/OFF Dip Switch** setting is ON.
- **When one hard disk drive is broken-down,** The Buzzer will alert (**Buzzer ON/OFF Dip Switch** setting is **ON**), you may know which hard disk drive is broken down by 1st or 2nd LED indicator. 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. If HDD1 is broken, we can't copy it to another hard disk drive. If HDD2 is broken, please replace it with another normal hard disk drive to continue the duplication function.

- **In Duplication,** The LED indicators of hard disk drives will blink. When the duplication is finished, the LED will return to normal status.

### 3.5.2 Copy by File

- Please reference Sector 3.3.1 "Dip Switch Setting" and set your card to be at "**Hard Disk Duplicator, Copy by File"** mode
- This mode means the duplication is to copy all the files that source hard disk contains, not the whole image of the source HDD. The duplication speed is fast and is only suitable for Microsoft series operating systems, including DOS, Windows98, Window NT 3.51/4.0, Windows2000

### 3.5.3 Copy by Sector

- Please reference Sector 3.3.1 "Dip Switch Setting" and set the system to be at "**Hard Disk Duplicator, Copy by Sector"** mode.
- This mode is used to completely duplicate the whole Source HDD, it takes longer time than the "Copy by File" mode. It is suitable for all PC operating systems, including Microsoft series, Novell Netware series, Linux OS, Unix OS, OS/2, and MacOS…etc.

### 3.5.4 Notes

- **Buzzer ON/OFF Dip Switch** Keep to be ON to make sure the buzzer alarm is workable.
- 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-down.
- Make sure your HDD1 and HDD2 are set at Master mode.
- After duplication is completed, please reference Sector 3.3.1 "Dip Switch Setting" to alter the system back to be at "**Disk Array, Mirror"** mode if necessary.

## 3.6 LED Indicator Table

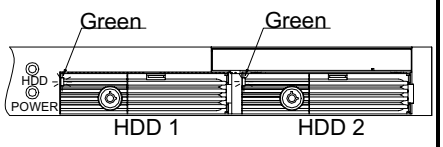
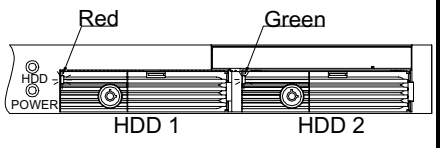
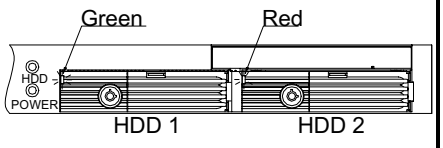
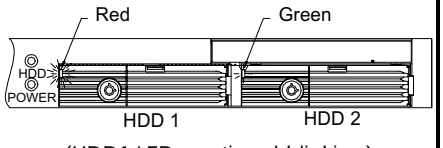
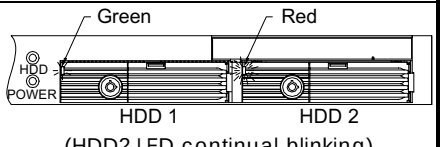
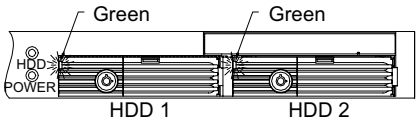
| Status \ Model | 3.5" Bay Mount |
|---|---|
| Normal State |  |
| HDD 1 Failed |  |
| HDD 2 Failed |  |
| HDD 1 under Rebuilding |  <br>(HDD1 LED continual blinking) |
| HDD 2 under Rebuilding / Duplicating |  <br>(HDD2 LED continual blinking) |
| HDD2 Duplicating is completed |  <br>(HDD1,.HDD2 LED continual blinking) |

Figure 3.6.1 ***IDEmirror 2000*** LED Indicator Table