araid® M500 / M500T

A Non-Stop SATA III RAID Subsystem For 2.5” Hard Drives

- User’s Manual
- マニュアル
- 中文使用手冊
- 사용설명서

ACCORDANCE SYSTEMS INC.

ACCORDANCE®

araid M500 / M500T

User's Manual V1.2

Thank you for purchasing our product.

- **Before using, please read this user's manual carefully in order to set up correct and safe operation.**
- **Keep this user's manual at an accessible location for easy reference whenever required.**
- **The specifications and the appearance of this product may change subject to improvements without prior notice.**

Safety and Cautions

✻ Introduction of RAID 1 and RAID 0

(1) RAID 1: Using two hard disks, the usable capacity is one hard disk with backup mechanism, which emphasize the safety of system and data. If one of the hard disks is failed, then the other one immediately takes over operation.

(2) RAID 0: Need to use two hard disks at the same time, the usable capacity is twice of the single hard disk, which emphasize the enhancement of performance.

Difference between RAID 1 and RAID 0	RAID 1	RAID 0
Purpose	Emphasize the safety of system & data	Emphasize the enhancement of data access performance
Available Capacity	2TB	4TB
Safety	Better	Disregard
Access Performance	Normal	Enhance

Table 1: RAID 1 vs RAID 0 (2TB as example)

✻ Directions for Use

(1) It is suggested that same type of new hard disk (same brand, same model, same capacity, same origin and same firmware version) should be used for working with this product. You may use the ARAID EYE PLUS program included on the CD to examine the quality of the hard disks. However, it is suggested that you should prepare several of the same and new hard disks for backup. If the same hard disk is not available, you may use a larger-capacity hard disk of the same brand.

Fig. 1:
Identifying the Hard Disk Quality with ARAID EYE PLUS program

(2) When using the ARAID, you are not required to process the new hard disk (Target disk) with FDISK and FORMAT steps in advance, and you will be able to execute the backup of hard disk directly with the automatic rebuilding function.

(3) Before using, be sure to confirm that the power equipment is properly connected and stabilized to ensure the product will operate smoothly.

(4) If smoke or abnormal odor is emitted from ARAID, disconnect the power immediately.

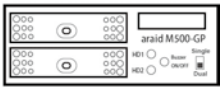
(5) Do not place the ARAID on an uneven surface.

(6) If in RAID 0 mode, it is forbidden to remove any hard disk while ARAID is in operation, as this may lead to a permanent loss of the data stored in the hard disk.

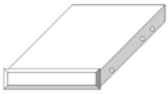
Product Content and Accessories

✻ Please check

Upon receiving, please check the items contained in the box. If any loss or damage is found, contact your dealer or sales representative immediately.



① ARAID M500 x 1

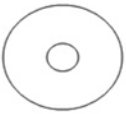


② 2.5” Hard Disk Tray x 2

③ RS232 Internal Cable x 1

④ M3*5mm Screw (for ARAID) x 8

⑤ Key for Tray x 4



⑧ Management Programs CD x 1:

- **Monitoring Program**: ARAID SMART, ARAID EYE PLUS
- **Network Management**: SNMP Agent for Windows
- **Firmware Upgrade Software**: ARAID Utility
- **Drivers**: USB to Virtual Serial port (Windows & Linux)

⑥ RS232 to USB Cable (black) x 1

⑦ RS232 External Cable (white) x 1

✻ Tray with 2.5” drive.

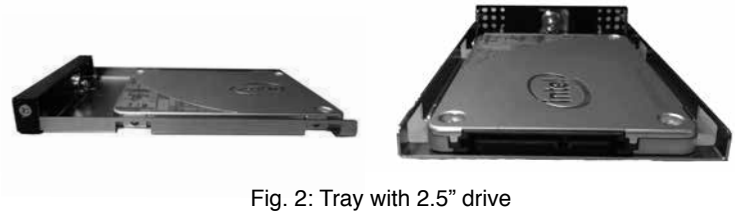


Fig. 2: Tray with 2.5” drive

Caution

1. **Step 1-1, 2-1 - The lock direction of Tray**

   When insert the tray into M500, please pay attention where the cavity position is. For the upper bay, the cavity is towards to “up” position. When it’s lower bay, the cavity is toward to “down” position.

2. **Step 1-2, 1-3, 2-2, 2-3**

   When rotating the lock, please aim the bulge of key at the cavity position of lock. Inserting the key and press it slightly with turning it clockwise of 90 degree, then the lock is able to be turned and the tray can be pull out. If turning the key with counterclockwise position, it may cause the lock damaged and unable to use.

✻ Upper Bay

Step 1-1 Step 1-2 Step 1-3

✻ Lower Bay

Step 2-1 Step 2-2 Step 2-3

Introduction of the Product

✻ Product Features

- **Safety**：
  (1) When using RAID 1 mode, the content of both hard disks will maintain synchronous status.
  (2) 4cm silent and cooling fan.
  (3) Safety lock and key for the drive trays
- **Convenience**：
  (1) When setting at RAID 0 Mode, it provides maximum drive performance.
  (2) Supports most of the PC operating systems without the need of installing additional drivers.
  (3) Connects with SATA port of PC directly without going through a converter card.
  (4) Support AHCI Mode and S.M.A.R.T.
  (5) Works with most hard disk brands.
  (6) Supports hard disk Hot-Swap and Hot-Plug.
  (7) Support GPT format hard disk.
- **Man-Machine Interface**：
  (1) The LCD displays system, hard disk, fan, and temperature status.
  (2) The LED displays read/write activity.
  (3) Includes an audible alarm (buzzer) to alert of hard disk failure and abnormal status of the fan and temperature.
- **Monitoring Interface**：
  (1) Provides real-time or simulated RS-232 port and dedicated communication protocol through a connection with a COM or USB port.
  (2) Provides SNMP function for standard network management support.

✻ Product Specifications

Dimensions	165mm (D) x 146mm (W) x 43mm (H)
Weight (w/o hard drives)	Approx. 0.6kg
Temperature	Operating temperature: 0°C~65°C Storage temperature: -20°C~70°C
Power Required	+5V, +12V
Power Consumption (w/o hard disk)	Approx. 2.84W

Table 3: ARAID M500 Specifications

System Requirements

(1) Computer Interface: Connect the ARAID to a SATA III (6Gbps) port for maximum performance.
(2) Hard Disk Interface: The 2.5" SATA III (6Gbps) hard disk or SSD is suggested to demonstrate the optimal efficiency.
(3) Supported operating system (requires no additional drivers): Windows, DOS, Linux, SCO UNIX, FreeBSD, NetWare, Solaris, MAC OS, IBM OS/2, and QNX, etc.

Description of Components

Fig. 3: Front View of ARAID M500

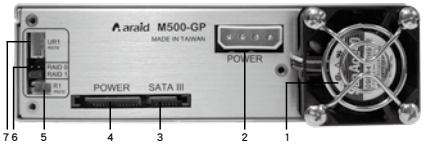


Fig. 4: Rear View and Jumper Setting of ARAID M500

1. LCD Display:
   Displays the information relating to hard disk, fan and temperature status.
2. Audible alarm (Buzzer On/Off):
   Press this switch to temporarily disable the buzzer, press again to re-enable the buzzer.
3. HD1 LED Read/Write indicator:
   LED flashes when upper hard disk is reading or writing the information.
4. HD2 LED Read/Write indicator:
   LED flashes when lower hard disk is reading or writing the information.
5. Mode Selector Switch (Single/Dual):
   Select Single or Dual mode.

1. 4cm silent and cooling fan.
2. Power connector (4-pin power connector):
   Connects to computer's 4-pin power supply.
3. SATA III data connector:
   Connects to the SATA port of the computer.
4. SATA power connector
   Connects to the computer's SATA power supply.
5. R1: RS232 port (for COM Port)
6. Jumper settings

RAID 1
(Default)

RAID 0

7. UR1: RS232 port (for USB).

ARAID Setup

✻ Hardware Installation

(1) Disconnect the computer power source and take off the cover of computer case.

(2) Setup RAID 1 / RAID 0 mode (Jumper).

(3) Install ARAID M500 into computer case where for 5.25” bay position and fix it with screws.

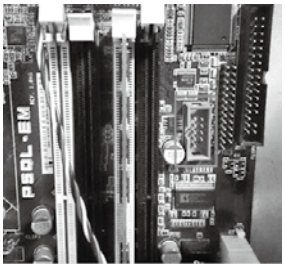
(4) ✻ **Connect with COM Port**

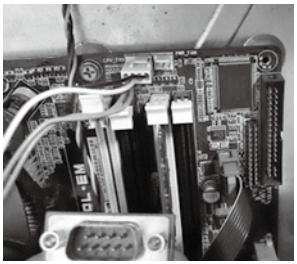
1. Connect the 3-pin of RS232 Internal Cable to R1 port of ARAID M500’s rear panel, and connect the 4-pin of RS232 Internal Cable to UR1 port of ARAID M500’s rear panel.
2. Screw the other head of RS232 Internal Cable at the rear panel of computer case.
3. For the COM Port, which can connect with either physical RS-232 port or USB port.

✻ **Connect with physical RS-232 Port**

Connect the RS232 External Cable (white) with (1) the physical RS232 port of computer and (2) the RS232 port of RS232 Internal Cable.

Caution If your computer’s physical COM port is built-in to the motherboard, please purchase your own COM port cable or use USB port for simulated RS-232.





✻ **Connect the simulated RS-232 through a USB port**

Connect the RS232 to USB Cable (black) with (1) the USB port of computer and (2) the RS232 port of RS232 Internal Cable.

Caution Install the driver of Windows/Linux which includes in the CD.

(5) Connecting SATA cable, and power cable.

(6) Put the computer case back to its position.

Table 4: Hardware Installation Steps

Hardware Installation Steps

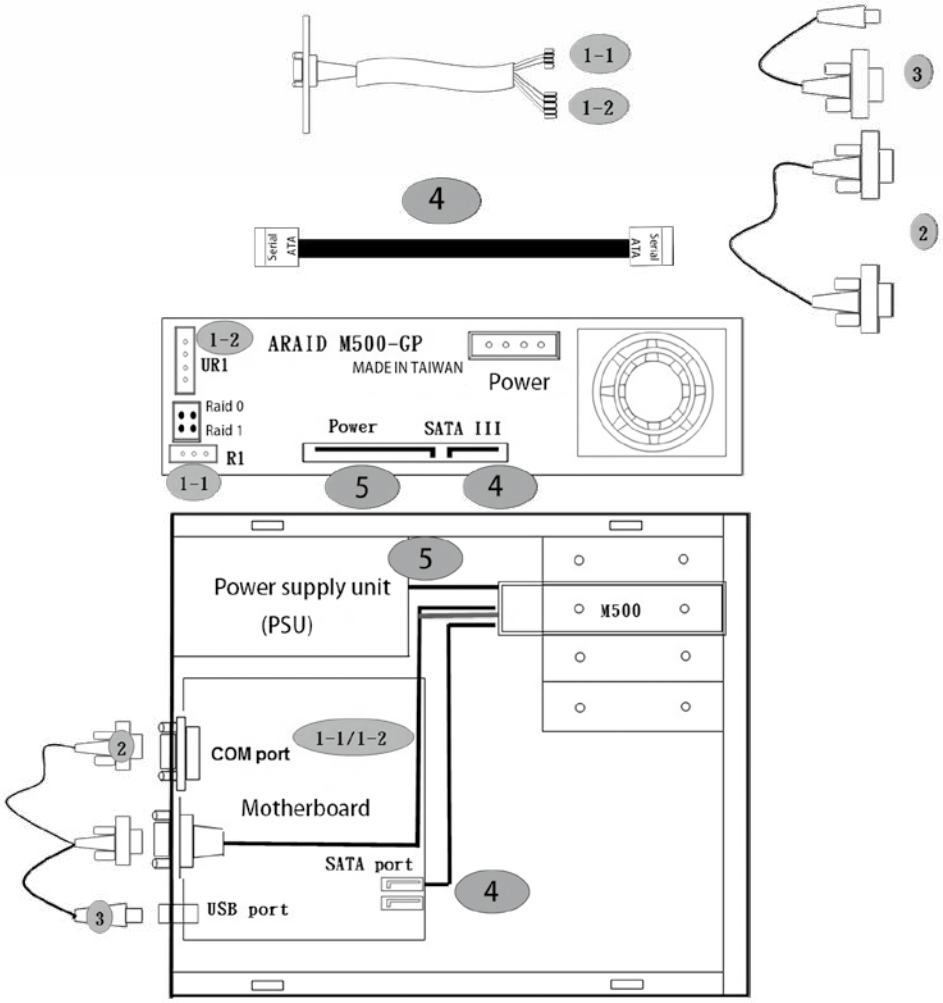
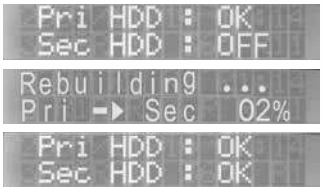


Fig. 5: Hardware Installation Steps

✻ Starting and Operation (for RAID 1 Mode only)

Switch Mode	Hard Disk	ARAID M500
Single	Single	 If the hard disk is inserted into the upper bay, the reading and writing can be executed on the first disk only.
		 If the hard disk is inserted into the lower bay, the computer cannot be started
	Dual	 Even if the upper or lower bay are inserted with hard disk, the reading and writing will be allowed on the upper bay only; at this time, the power of the lower bay is disconnected
Single→Dual	Dual	 If the upper and lower bays are inserted with a hard disk, the computer will execute the rebuilding function when shifting the switch of the panel to Dual Mode. **Warning** Do not remove the Primary disk before completing the rebuilding of the hard disk to avoid system failure, information loss or system garbling that the computer cannot be restarted and even leading to hard disk failure.
Dual	Single	 If using one hard disk, the system can be started whether the hard disk is inserted in upper bay or lower bay; however, it is strongly suggested that you should set the hard disk at “Pri” position of upper bay for using.
	Dual	 Placing two new hard disks that have never been used by ARAID **Caution** When operating under RAID 1 Mode and the switch is set at “Dual” position, where two new hard disks never been used by ARAID are inserted, it is required to run the Partition or the Format of the hard disk in order to synchronize the content of these two hard disks. After that, it can be used as the system disk or the data disk. **Caution** When using two hard disk, ARAID 500 would start from the Primary HDD as preset and the system would start with the Secondary HDD unless the Primary HDD cannot be started.

<table>
<tr><th>Switch Mode</th><th>Hard Disk</th><th>ARAID M500</th></tr>
<tr><td rowspan="2">Dual</td><td rowspan="2">Dual</td><td>
Rebuilding process (from upper bay to lower bay)


(1) Insert the hard disk into the upper bay to start the computer.
(2) The rebuilding function will be started after inserting the Secondary HDD.
(3) Rebuilding completed.
Rebuilding process (from lower bay to upper bay)


(1) Insert the hard disk into the lower bay to start the computer.
(2) The rebuilding function will be started after inserting the Secondary HDD.
(3) Rebuilding completed
Warning
When the switch is at “Dual” mode position and two hard disks are processing rebuilding function, do not switch to Single position. Otherwise, the power of Secondary HDD will be disconnected and cannot execute the rebuilding in time. In this case, the system will execute the reading and writing action on Primary HDD only.
</td></tr>
</table>

Table 5: Starting and Operation

Local Monitoring

The management program ARAID EYE PLUS allows the user to monitor the current health status of the hard disks (bad sectors), the real-time status of ARAID (rebuilding is complete or in progress), and information about hard disks, fan speed, and temperature. If there is an error alert, it can also send out a notification through e-mail.

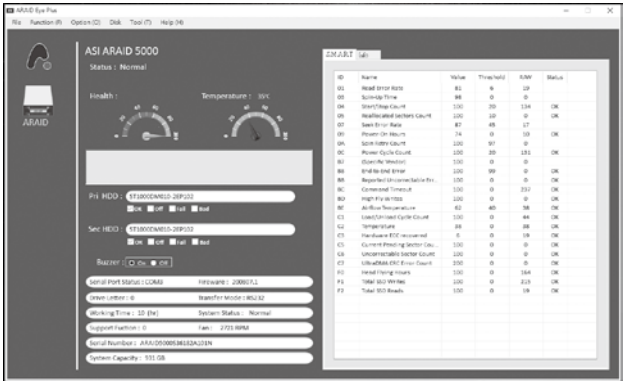


Fig. 6: ARAID EYE PLUS

Network Management (Linux version is for optional purchase)

The “SNMP Agent” provides the enterprise-specific MIB, MIB II and Traps and it can be run under Windows 2000 / Server 2003 / XP Pro. / Win 7 or later, or Redhat / SUSE Linux. It allows the medium-large sized network administrator to manage dozens or even thousands of ARAID disk arrays. It can also be used with HP OpenView, IBM NetView and OpManager network software to do the central management in order to control the hard disk, fan and temperature status for all arrays.

Fig. 7: Network Management System

✻ Upgrading the Firmware For RAID 1 User

Warning

When doing the firmware upgrade, please do not insert any HDD inside of ARAID M500, you need to remove all HDDs from upper and lower bays of ARAID M500. Then follow below steps for the firmware upgrade. If you do not remove any HDD from ARAID M500 before doing the upgrade, which may cause ARAID M500 failure and unable to use it.

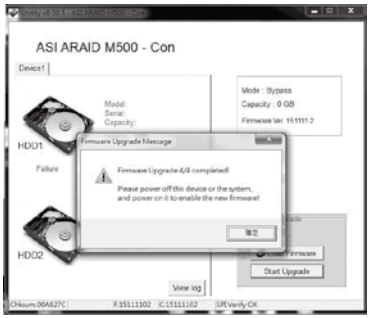
* ARAID Utility (firmware upgrade program) is only suitable for Windows O.S.

(1) Turn off the PC
(2) Pull out all the HDDs inside of ARAID M500
(3) If the HDDs inside of ARAID M500 as system drive, please use any system drive to connect with the SATA port of PC's motherboard, then use this HDD for power-on.
(4) Execute ARAID Utility program (inside of CD) click "Load Firmware" locates at the right-hand corner to start the upgrade process (please refer right-hand side image)

(5) Select the firmware version to be upgraded and then click the "Open File" at the lower right corner

(6) Click "Start Upgrade". The upgrade process will appear

(7) Complete the upgrade and shut down



(8) Restart both the computer and ARAID M500, the new upgrade firmware version can be seen at the first 3 seconds when ARAID M500 restarts

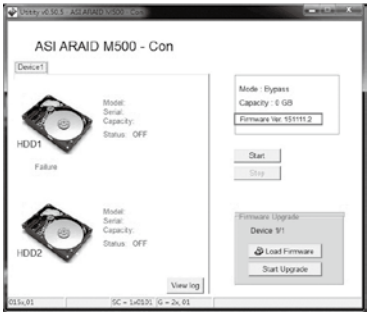


Table 6: Upgrading the firmware

✻ Checking for ARAID M500 Compatible Drives

Please visit the following page on our website to see a list of hard disks compatible with ARAID: https://systems.accordance.com.tw/en/web_search2/cus/index.php

※ Compatibility with Western Digital hard disk:

- If selecting Western Digital drives, we suggest that the customer should use the WD NAS HDD (WD Red, WD Red Pro or WD Re).
- Western Digital warns against using Caviar series drives (Blue/Green/Black label) in a RAID array.

ARAID M500T
(External model)

Description of Components

1. Power ON/OFF switch.
2. AC110~220V power socket.
3. RS232 Connector (COM port).

Fig. 8: Front View and Rear View of ARAID M500T

Dimensions	180mm (D) x 183mm (W) x 100mm (H)
Weight (w/o hard disk)	Approx. 1.8kg
Power Supply Unit	63W Standalone PSU
Power Consumption (w/o hard disk)	Approx. 5.14W~7.32W (varied depending on the model)
Power Consumption (w/o hard disk)	Approx. 2.84W

Table 7: Specifications of ARAID M500T

Types (Host Interface) of ARAID M500T

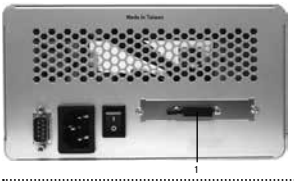
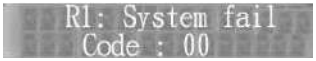
Type of Interface	Cable	Description
		1. SATA connector
		1. e-SATA connector

Table 8: Types of ARAID M500T External Model

ARAID LCD Message

Comparison Table (for RAID 1 User)

Status	Description	Action
Pri HDD : OK Sec HDD : OK	Both hard disks are running normally.	
Pri HDD : OK Sec HDD : Fail	Upper bay hard disk is normal, but lower bay hard disk is failed or abnormal.	Replace lower bay hard disk.
Pri HDD : Fail Sec HDD : OK	Lower bay hard disk is normal, but upper bay hard disk is failed or abnormal.	Replace upper bay hard disk.
Pri HDD : Fail Sec HDD : Fail	Upper bay and lower bay hard disks are faulty or abnormal.	Replace both hard disks.
Pri HDD : OK F Sec HDD : OK	Fan is abnormal	Check if the fan power plug is loose.
Pri HDD : OK Sec HDD : OK T	Overheat warning (preset value is 65°C / 149°F)	Check if the fan is working normally and if the storage temperature is over 65°C.
Wrong Capecity Pri > Sec	The capacity of the Secondary HDD (lower bay) is less than the Primary HDD (upper bay)	Replace the Secondary HDD (lower bay) and its capacity shall not be less than Primary HDD.
Wrong Capecity Sec > Pri	The capacity of the Secondary HDD (upper bay) is less than the Primary HDD (lower bay)	Replace the Secondary HDD (upper bay) and its capacity shall not be less than Primary HDD.
Source Fail Pri > Sec	Primary HDD (upper bay) failed during automatic rebuilding.	Replace it with a healthy Primary HDD (upper bay).
Source Fail Sec > Pri	Primary HDD (lower bay) failed during automatic rebuilding.	Replace it with a healthy Primary HDD (lower bay).
RI: System fail Pri:S Sec:S	Both hard disks are used as Source HDD in ARAID.	Insert the designated Source HDD and start the computer. Once the startup is successfully completed, insert the Target HDD.

Status	Description	Action
	Both hard disks are used as Target HDD in ARAID.	Insert the designated Source HDD and start the computer. Once the startup is successfully completed, insert the Target HDD.
	RAID configuration of the two hard disks do not match.	Insert the designated Source HDD and start the computer. Once the startup is successfully completed, insert the Target HDD.
	Hard disks undetected.	Check if the inserted hard disks are functioning normally. Then, re-insert the designated Source HDD and start the computer. Once the startup is successfully completed, insert the Target HDD.
	Unable to find RAID configuration information in hard disks.	Insert the designated Source HDD and start the computer. Once the startup is successfully completed, insert the Target HDD.

※ Do not use the hard disk which has been determined failed by ARAID M500, otherwise it may lead to system damage.

Table 9: ARAID LCD Message Comparison Table

FAQ
(for RAID 1 User)

✻ Power failure while hard disk rebuilding is in progress

Q: What should I do if the power fails while auto-rebuild is in progress and I don't have UPS equipment?

A. Simply turn on the computer again and the Automatic Reset Function (ARF) will continue the rebuilding progress from the interrupted point by itself. Whether rebuilding progress was from Pri. to Sec. (upper bay to lower bay) or from Sec. to Pri. (lower bay to upper bay), when resuming the power, the computer will boot from the source drive by itself and continue the rebuilding automatically.

✻ Using ARAID-specific Mirror-On-Demand anti-virus function

Q: How to prevent the hard disk from getting infected by a virus?

A. (1) If one of the hard disks in the ARAID is infected, both of them will be infected at the same time. Therefore, ARAID has been specially designed to set single disk operation directly on the front panel in order to the limit reading and writing on the computer to a single hard disk. After confirming the input data is accurate, the user can proceed the rebuilding steps for achieving synchronized content of both hard disks.

(2) Through our experiences in dealing business with customers in Japan, Taiwan Power Plant Company, Chunghwa Telecom and Taiwan Philips as well as that possessed by our MIS personnel, to accomplish the optimal anti-virus effect, it is strongly suggested that the user should purchase one to several trays and several hard disks for doing the off-line backup regularly. In the event the hard disk is infected, the user may select a suitable backup hard disk and restart the uninfected system and information within the shortest period of time (i.e. executing the father-son-grandson multi-generation rebuilding function described in our catalogue).

✻ Replacement or upgrading of hard disks

Q: What is the procedure when a hard drive fails?

A. (1) If you need to replace the hard disk or pull out the disk for other reasons, to protect the completeness of the data, please pull out the hard disk after shutting down the equipment as much as possible. If it is not allowed to shut down the equipment, execute such work during the period when the ARAID reading and writing is least frequent (when the LED indicator is not flashing). Because if you pull out the hard disk without shutting down the equipment, the correction message may appear under Windows when using such hard disk later on; further, there's a risk that the data contains in the hard disk may get lost once you decide to execute the correction.

(2) If the hard disk to be replaced is the same series and brand but with bigger capacity, please insert the original disk into the upper bay and then use it to start the computer. After power-on is completed, insert the new disk into the lower bay and the hard disk

automatic rebuilding function will begin (if the rebuilding isn't executed, check the HDD TYPE under BIOS should still set at "AUTO").

Caution Be sure to insert the smaller capacity hard disk into the upper bay and the bigger capacity hard disk into the lower bay, and they should not be wrongly inserted.

Caution Do not mix SATA I (1.5 Gbps), SATA II (3 Gbps) and SATA III (6.0 Gbps) hard disks in the ARAID to avoid affecting the efficiency.

Caution We recommend tag a sticker on the panel of the tray for ease of identifying the brand, capacity and model number of the hard disk.

Incompatibility of the ARAID with my existing equipment/operating system:

Q: What is the procedure if an incompatibility exists with my equipment or operating system when using an ARAID product?

A. If the customer encounters any incompatible scenario, please contact us and we will help you solve the problem.

Buzzer Alarm

Q: When turn off the buzzer of M500, why it can't be stop(close) immediately?

A. This is firmware design purpose, so it's a normal condition.

Product Warranty
and After-Service

1. Duration of product warranty

   One year warranty starting from the purchase date.

2. In the event the ARAID does not operate as expected, please refer to the ARAID LCD Message Comparison Table and solution (p.15) as well as FAQ (p.16).

3. If the product has failed under normal operation status, where the error has been diagnosed by Accordance as not having been caused by unauthorized action and the product is still within its warranty period, then Accordance shall provide the maintenance services as free of charge.

4. If any of the followings happens during the warranty period, Accordance shall charge reasonable maintenance fees:

   (1) Where the warranty label has been destroyed or becomes incomplete or where the unauthorized disassembly is obvious.

   (2) Where the failure is caused due to improper storage location, falling, moving or transportation.

   (3) Where the damage is caused by unstable voltage such as fire, earthquake, flood, lightning strike or other natural disasters.

   (4) Where the failure or the damage is due to use under the conditions beyond that stated in the User's Manual.

5. The maintenance services will be available if over its warranty period, however, Accordance will charge reasonable maintenance fees and parts cost.

Contact Us

Should you have any questions or other suggestions on the use of the product, please fill out the following PQR Table and then send it to us. Your feedback will be valuable for us.

No. _____ Date: ____/____/____

Name of Company or Unit: _____ Name: _____

Equipment & Environment (**) Required	
Accordance Product Name & Model	
Serial No.	
Firmware Revision	
Manufactured Date or Purchase Date	

Equipment & Environment (**) Required	
PC or Motherboard Brand & Model (**)	
BIOS (**) Phoenix or Award or AMI	
Chipset (**)	
HDD 1(**) Brand/Model/Series number	
HDD 2(**) Brand/Model/Series number	
CPU	
RAM	
OS (**) Version of Windows or Linux or…	
Benchmark / Application if available	

Test Procedure & Notification	
1	
2	
3	

Symptom (please outline the content)	
1	
2	
3	

Service Line: +886-2-2726-3239 (service time: Monday-Friday, 9:00AM-6:00PM Taiwan Time)
Fax: +886-2-2728-1322 E-mail: sales@accordance.com.tw
Contact Address: 10F., No. 258, Nanyang Street, Xizhi District, New Taipei City 22154, Taiwan

MEMO

SATA III RAID 1 Disk Array Subsystem

- User's Manual
- マニュアル
- 中文使用手冊
- 사용설명서

ACCORDANCE SYSTEMS INC.