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

ACCORDANCE SYSTEMS INC.

ACCORDANCE®

araid *M500 / M500T*
User's Manual V1.0

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.

	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 SMART 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 SMART 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.
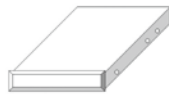
Product Content
and Accessories

✱ **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.
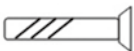
① ARAID M500 x 1   ② 2.5" Hard Disk Tray x 2   ③ User's Manual x 1

④ M3*5mm Screw   ⑤ Key for Tray x 4   ⑥ RS232 Internal Cable x 1
(for ARAID) x 8
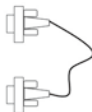
⑦ RS232 to USB Cable   ⑧ RS232 External Cable   ⑨ Management Programs CD x 1:
(black) x 1   (white) x 1
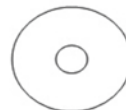
· **Monitoring Program**:
ARAID SMART, ARAID Manager

· **Network Management**:
SNMP Agent for Windows

· **Firmware Upgrade Software**:
ARAID Utility

· **Drivers**:
USB to Virtual Serial port (Windows & Linux)

✱ **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) A 4cm Japan-made silent and powerful 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. 0.5kg
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

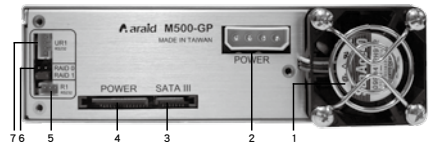Fig. 3: Front View of ARAID M500

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.

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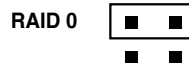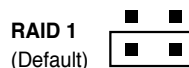3. SATA III data connector:
   Connects to the SATA port of the computer.
4. SATA power connector
   Connects to the computer's SATA power supply.
5. R1: RS232 port (for COM Port)
6. Jumper settings

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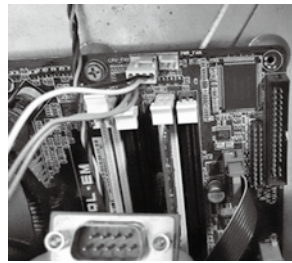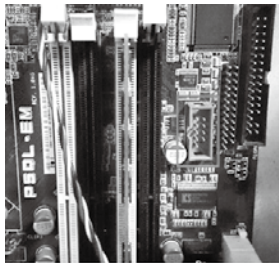
　＊ **Connect the simulated RS-232 through a USB port**

　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)

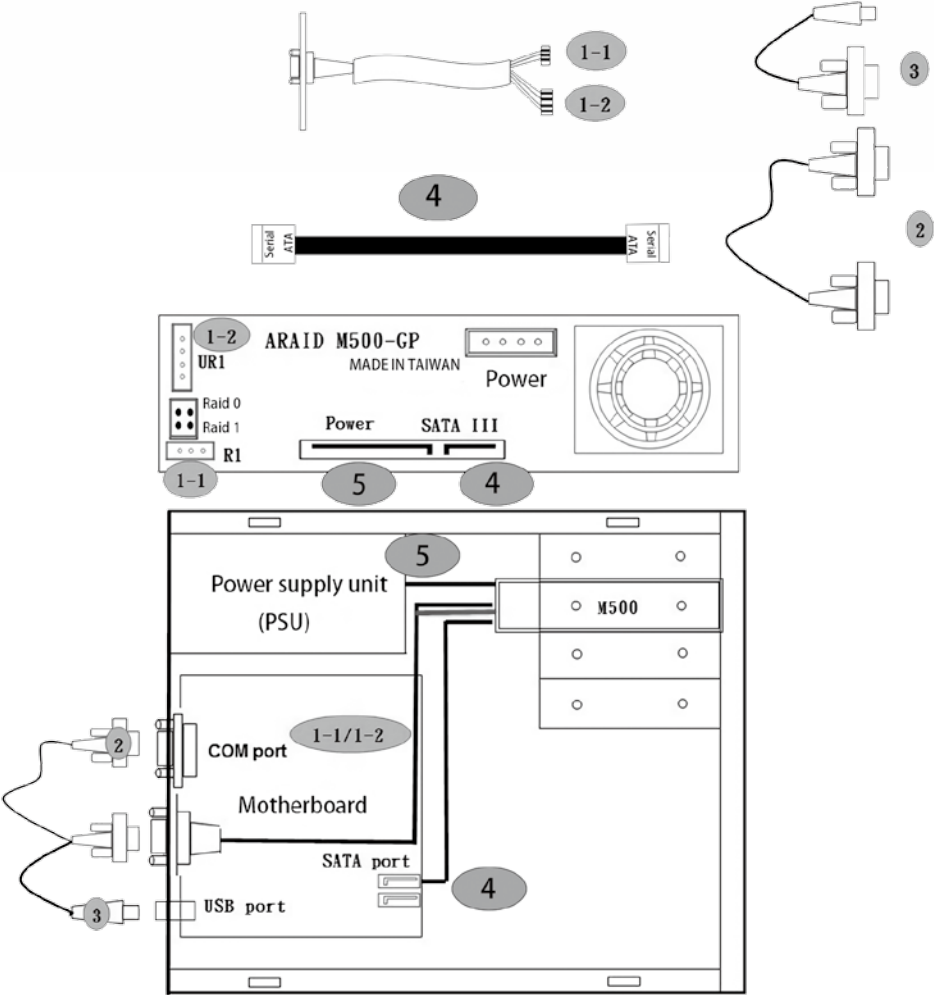| Hard Disk(s)	ARAID M500

One HDD	`Pri HDD : OK`
	`Sec HDD : OFF`
	If the hard disk is inserted into the upper bay, the reading and writing can be executed on the first disk only.
	
	`Pri HDD : OFF`
	`Sec HDD : OK`
	If the hard disk is inserted into the lower bay, the reading and writing can be executed on the 2nd disk only.
	
	⚠ **Warning** Only use one disk and insert it either on the upper or lower bay, which can be power-on. But we strongly recommend to insert the only one disk on the upper bay as "Pri" position to use.

Two HDDs (Brand New)	Insert 2 brand new HDDs which never been used by ARAID.
	
	ARAID would automatic set two HDDs as synchronized mode, there's no need to do rebuilding again. Then user is able to use two HDDs for installing new O.S. or as data drives (ARAID has to do the disk partition and formatting before becoming as data drives)
	
	`Pri HDD : OK`
	`Sec HDD : OK`
	
	`Pri HDD : OK`
	`Sec HDD : OFF`

Two HDDs (includes O.S. & Data)	If the two HDDs already have O.S. and data inside, please follow below instructions to be used with ARAID.
	
	1. Upper Bay for Power-on (Recommend)
	
	(1) Insert the upper bay HDD, and power-on ARAID.
	`Pri HDD : OK`
	`Sec HDD : OFF`
	
	(2) After power-on process is completed, then insert the lower bay HDD into ARAID.
	`Rebuilding ...`
	`Pri ─▶ Sec  02%`

Hard Disk(s)	ARAID M500

Two HDDs (includes O.S. & Data)	(3) Rebuilding is completed.
	
	`Pri HDD : OK`
	`Sec HDD : OK`
	
	2. Lower bay for Power-on
	  (1) Insert the lower bay hdd, and power-on ARAID.
	
	`Pri HDD : OFF`
	`Sec HDD : OK`
	
	  (2) After power-on process is completed, then insert the upper bay HDD into ARAID.
	
	`Rebuilding ...`
	`Sec ➡ Pri   02%`
	
	  (3) Rebuilding is completed.
	
	`Pri HDD : OK`
	`Sec HDD : OK`
	
	⚠️ **Warning** Before the HDDs finish the rebuilding process, do not pull out the source drive, which may cause system hang, data lost, or system disorder, even the worst may result in HDDs failure.

Two HDDs (already use at ARAID)	The HDDs which have been used with ARAID and also as an pair, user can insert these two HDDs into ARAID and power-on ARAID to use right away.

Table 5: Starting and Operation

✱ Local Monitoring

The "ARAID SMART" is the monitoring and management program which integrate the local managing feature of AraidEye, allowing the user to monitor the current health status of 2 hard disks (bad sectors) and to control the real-time status of ARAID (rebuild is finish or in progress) as well as to learn about the hard disk and temperature related information. If an error warning is displayed, it can also send out a notification through e-mail.
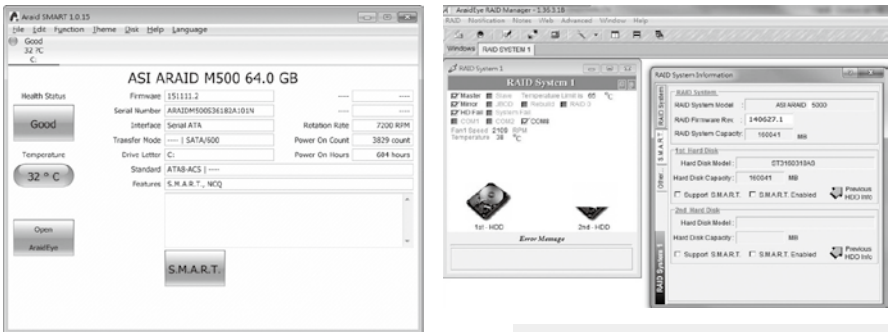
Fig. 6: ARAID SMART

✱ 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.
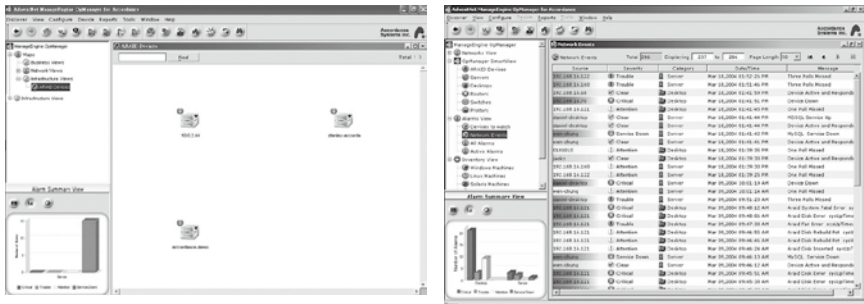
Fig. 7: Network Management System

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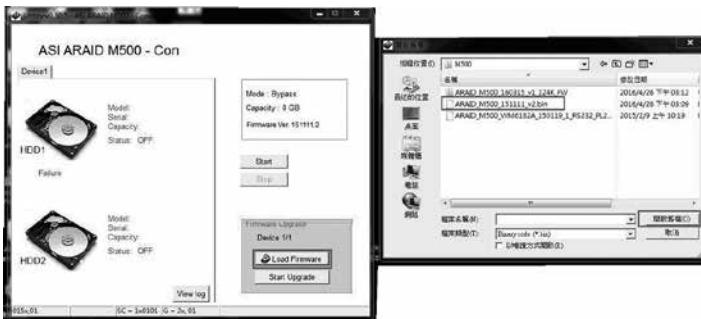
(6) Click "Start Upgrade". The upgrade process will appear

(7) Complete the upgrade and shut down

Table 6: Upgrading the firmware

(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

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✴ Checking for ARAID M500 Compatible Drives

To inquire the suitable hard disks for ARAID, please visit our website as follows:
Go to http://www.accordance.com.tw/, click SUPPORT (under "News" section) and the applicable table will appear.

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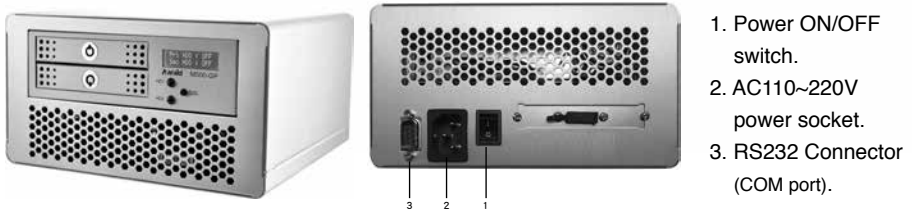
1. Power ON/OFF switch.
2. AC110~220V power socket.
3. RS232 Connector (COM port).

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. 1.65kg
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. USB 3.0 connector 2. e-SATA connector (choose either interface to use)

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).
`Rebuild Flag ERR` `Pri:S Sec:S`	Both hard disks are used as Source HDD in ARAID.	Insert the designated Primary HDD to start the computer. If starting is succeed, insert Secondary HDD.

Status	Description	Action
Rebuild Flag ERR Pri:T Sec:T	Both hard disks are used as Target HDD in ARAID.	Insert the designated Primary HDD to start the computer. If starting is succeed, insert Secondary HDD.
UDMA Mode Err Please Reboot	Hard drives are using different UDMA modes.	Restart the computer.
Multi-sector Err Please Reboot	Both hard disks are different in efficiency.	Restart the computer.
Src HDD:BAD BLK Pri => Sec n1n2%	Upper bay hard disk has bad sectors (upper bay to lower bay rebuilding is in process).	After rebuilding, replace the upper bay hard disk immediately.
Pri HDD : ERR Sec HDD : OK	Upper bay hard disk failed (upper bay to lower bay rebuilding is completed).	Replace the upper bay hard disk.
Src HDD:BAD BLK Sec => Pri n1n2%	Lower bay hard disk has bad sectors (lower bay to upper bay rebuilding is in process).	After rebuilding, replace the lower bay hard disk immediately.
Pri HDD : OK Sec HDD : ERR	Lower bay hard disk is failed (lower bay to upper bay rebuilding is completed).	Replace the lower bay hard disk.

※ If the hard disk fails during the rebuilding, ARAID M500 will skip the bad sectors and then complete the rebuild.

※ 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 (in this case, the Panel Switch should be continue to be set at "Dual Mode").

✳ **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, shift the Panel Switch from "Single" to "Dual" and 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

   (1) ARAID: One year warranty starting from the purchase date.

   (2) Fan: Five years warranty starting from the purchase day.

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.17).

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: 2F, No. 31, Sec. 6, Hsin Yi Road, Taipei 11085, Taiwan

SATA III RAID 1 Disk Array Subsystem

▶ User's Manual
▶ マニュアル
▶ 中 文 使 用 手 冊

ACCORDANCE SYSTEMS INC.