User's Guide

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Welcome

Congratulations on your selection of the 7500. The 7500 are a reliable and affordable solution for RAID 1 disk mirroring. With a cost effective IDE approach, the 7500 mirrors data to two disk drives simultaneously, and delivers optimized performance, comparable to more costly SCSI based solutions. If one drive fails, data is secured by the other drive and alarm sounds to alert you.

Featuring intelligent online recovery, the 7500 lets you hot swap a failed drive and the 7500 automatically rebuild the data to the new drive without any system down time. The 7500 Controller Box features a user-friendly rack design that lets you easily install a backup drive, or replace a drive that fails. Each hard drive carrier supports a one-inch high 3.5-inch form factor disk drive. Additional data security is provided by a key-locking system, that prevents unauthorized access to each disk drive.

7500 supports all hard disk manufacturer IDE hard drives that confirm to the industry hard disk standard as IBM, Quantum, Maxtor, Seagate, Samsung, and Fujitsu. 7500 also supports Western Digital hard drive but please contact your 7500 supplier for necessary component. The location and distance between IDE and Power connector in 7500 drive carriers follow the specification in AT Attachment (ATAPI spec). The IDE connector of the Western Digital disk drive has a 1-2 mm alignment difference compared to drives of other brands. Therefore, please specify before you ordering 7500 or contact

your 7500 supplier for necessary component.

Item Checklist

The 7500 package contains the following items. Check that all
items listed here are present and in good condition. If anything
is missing or damaged, contact your vendor.

- 7500 Controller Box
- Two disk drive carriers with key locks
- Disk drive mounting screws
- User's manual
- Two keys (identical)

Features and Benefits

- RAID level 1, disk mirroring
- Fits into two 5 ¼' half-height drive bay
- Automatic online rebuilding
- IDE drives are hot swappable
- Requires no software driver or add-in card
- Supports Ultra ATA host interface
- Supports 2 IDE hard drives
- Can be configured as Master or Slave
- Writes simultaneously to both drives
- Host transparent and OS independent
- Front panel operation indicators
- Fan cooler (ball bearing type)
- Audible alarm that works in conjunction with the
  indicators alerting the user of failures
- Battery backup memory for disk array status
- Key locking to prevent unauthorized access to the disk
  drives

System Requirements

The 7500 can be installed inside a computer that meets the following hardware specifications:
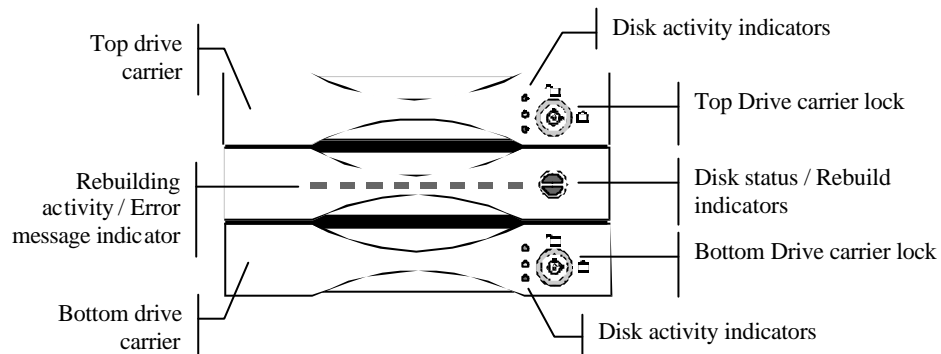
System with IDE/AT interface

Case with two half-height 5 ¼' drive bays with front bezel access

One IDE channel cable connector

One free power supply connector

Front Panel Components

Top drive carrier — Disk activity indicators — Top Drive carrier lock — Rebuilding activity / Error message indicator — Disk status / Rebuild indicators — Bottom Drive carrier lock — Bottom drive carrier — Disk activity indicators

About Drive Carriers:

Each drive carrier can hold a one-inch high 3.5-inch form factor IDE disk drive. This makes it easy to hot swap a drive in the event of a failure, without affecting the status of the remaining drive.

Indicators

Disk Activity Indicators

These indicators show the status of each individual disk drive.

Indicator	Disk Activity
Green	Disk drive is properly installed and locked
Amber	Disk drive is being accessed
Red	Disk drive is not present, is not properly installed, is unlocked, or disk has failed

Note: Sometimes you can see the red disk activity LED showing the 7500 is booting,

This is because the 7500 is searching for a disk, as soon as it has found one, the red LED will turn off.

Disk Status / Rebuild Indicators

The upper indicator represents the top drive carrier, the lower indicator represents the bottom drive carrier. If a drive fails, the appropriate indicator turns on and an audible alarm sounds. You can turn off the audible alarm by unlocking the drive carrier.

The Indicator of the target disk will light up and blink while rebuilding.

Rebuilding Activity / Error Message Indicator

Rebuilding Activity:

This row of eight indicators shows disks rebuilding activity. In normal operation, a green light scans across the bank of indicators. If you are using the online recovery feature to rebuild a drive, all the indicators will turn on at the same time. The left-side indicator blinks and then turns off when 12.5% of the data has been mirrored. Then the next indicator blinks and turns off when 25% of the data has been mirrored, and so on.

Drive Carrier Locks
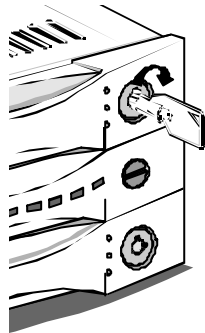
The driver carrier lock acts as an On/Off switch for the drives and provides security by preventing non-key holders from accessing the drives. **When you lock the drives, the first drive to get locked is designated as the source drive and the other drive becomes the backup drive.**

Two identical keys are provided with the system. To lock each carrier, insert the key and turn it in a clockwise direction. To unlock a carrier, turn the key in a counterclockwise direction.
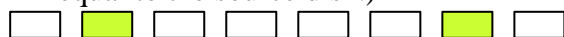
Error Message:

The chart offers the all-possible error messages, and can help you to identify certain problems.

Drive Carriers LED Error Status Display

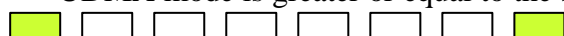Disk Fail (Replace the failed disk with another disk)

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Target Disk Size small than Source Disk (Replace the failed target disk with a disk that's size is greater or equal to the source disk.)
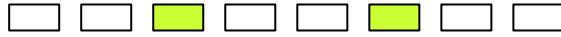
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Target Disk UDMA Mode small than Source Disk (Replace the failed target disk with a disk that's UDMA mode is greater or equal to the source disk.)

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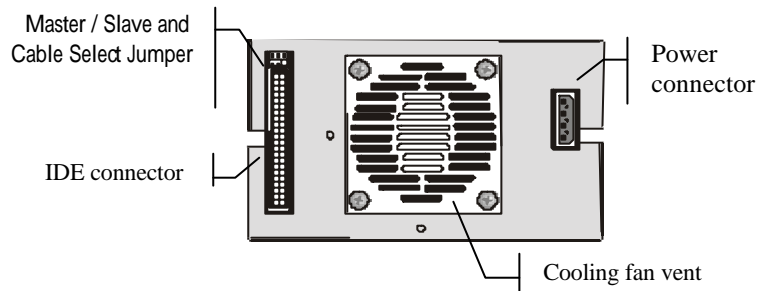Target Disk has bad Sector (Replace the failed disk with another disk)

Power ON Channel 1 Fail (Call or email Accusys product support center)

Power ON Channel 2 Fail (Call or email Accusys product support center)

Rear Panel Components

Master / Slave and Cable Select Jumper

Power connector

IDE connector

Cooling fan vent

Cooling Fan Vent

The cooling fan provides air circulation for the disk drives.

Power Connector

The power connector supplies power to the 7500 Controller Box.
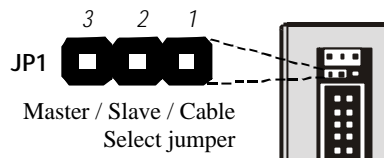
IDE Connector

The IDE connector connects to an IDE 80-pin interface ribbon

cable.

NOTE: *The cable has to meet the specification of UDMA-66 and above.*

Master / Slave / Cable Select Jumper (JP1)

This jumper allows the user to set the 7500 up as either an IDE Master, Slave, or Cable Select device.

JP1

Master / Slave / Cable
Select jumper

If the plastic jumper cap is placed on pins 2-3, the 7500 is set as a Master device. If the jumper cap is completely removed from the pins, the 7500 is set as a Slave device. If the jumper cap is placed on pines 1-2, the 7500 is set as a Cable Detect device, which means the system will automatically try to identify the drive status.

Function	JP1 Jumper Cap	
Master	Short pins 2-3	
Slave	All pins free	
Cable Select	Short pins 1-2	

If there are two devices on a single IDE channel, one device must be designated as Master and one device must be designated as Slave or Cable Detect.

NOTE: *Although the 7500 holds two IDE drives, your computer treats the 7500 assembly as one single drive. The drives inside the 7500 must be* designated

as *Master devices.*

Installation

Mounting Controller Box in System

*CAUTION: Turn off and disconnect all electrical power from the system before beginning any installation procedure.*

1. Determine if you are installing the Controller Box as a Master or Slave device. Remove the jumper cap from the Master/Slave jumper if the Controller Box is a slave device.
2. Remove the cover and front bezel from the system case.
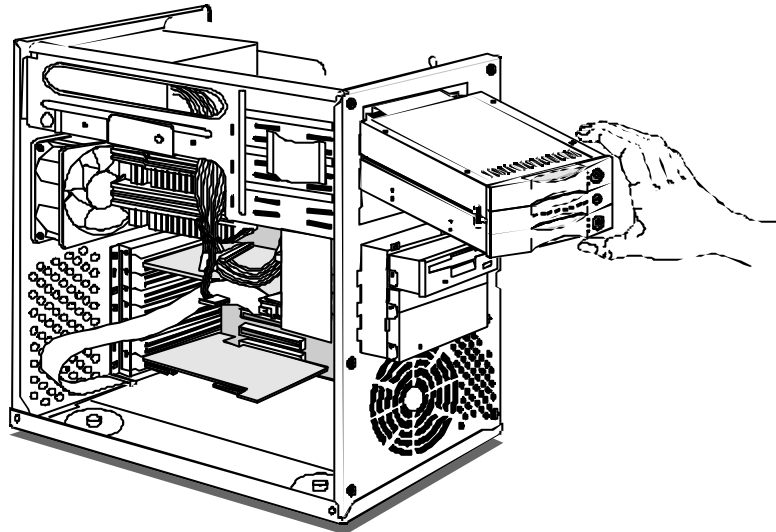
3. Insert the 7500 Controller Box into the space of two half-

height 5 ¼' drive bays, and secure it in place with the screws provided. (If your case uses guide rails to install 5 ¼" devices, you can use them on the Controller Box.)
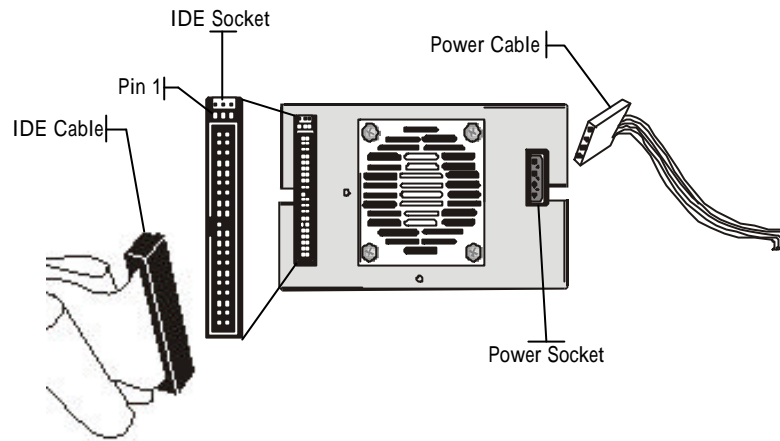
4. Connect a free power cable to the power connector on the rear side of the Controller Box.
5. Connect an IDE 80-pin ribbon cable connector to the IDE connector on the rear side of the Controller Box. Make sure the red stripe on the ribbon cable is aligned with pin 1 of the IDE connector.

NOTE: **According to ATAPI specifications, please do not use an IDE 80-pin ribbon cable longer than 46 cm (18").**

6. Reassemble your computer.

Loading a Drive in the Drive Carrier

NOTE: 1. *We recommend that you use identical disk drives in*

the two drive carriers. The hard disk drives must be
configured as Master devices.
2. 7500 supports the most models of the following
hard disk brands: IBM, Quantum, Maxtor, Seagate,
Samsung, and Fujitsu. 7500 also supports Western
Digital hard drive but please contact your 7500
supplier for necessary component.
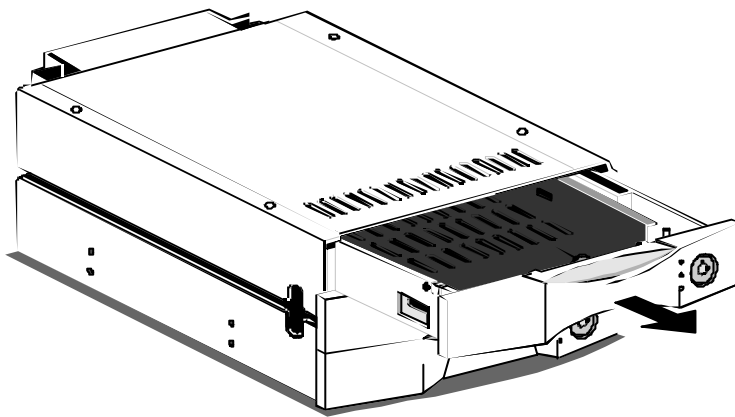
1. Unlock the drive carriers and slide them out of the
    Controller Box.

IDE connector

Drive carrier
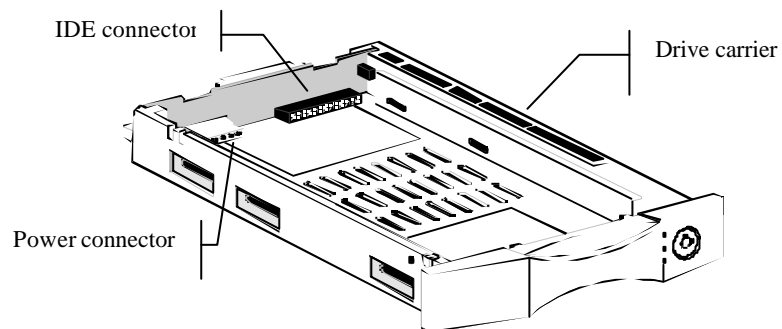
Power connector

2. Place the first disk drive in the drive carrier, so that the power and IDE connectors correspond with the connectors inside the carrier.
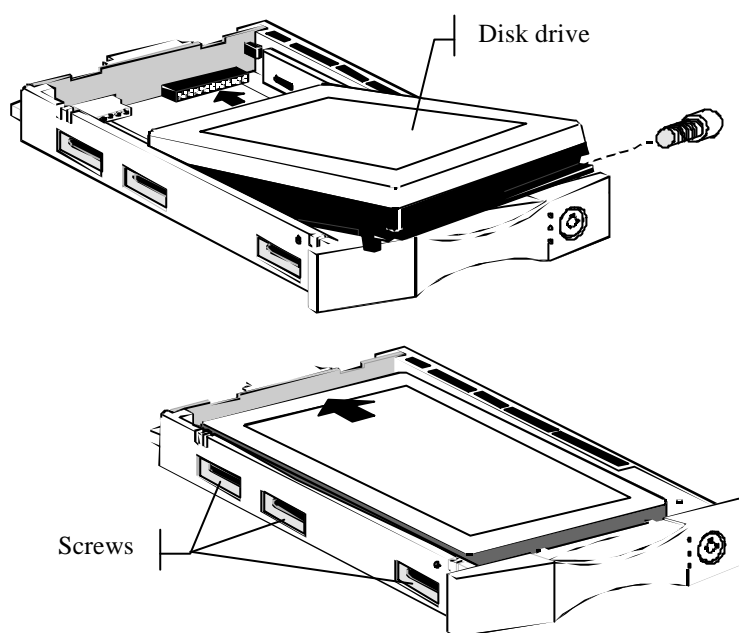
3. Connect the power connector to the disk drive first, then carefully push the disk drive in so that the drive's IDE and power sockets seat into the IDE and power connectors in the disk carrier. Make sure the connectors are firmly seated, secure the disk drive with the screws provided, and then slide the loaded disk drive carrier into the 7500 Controller Box.
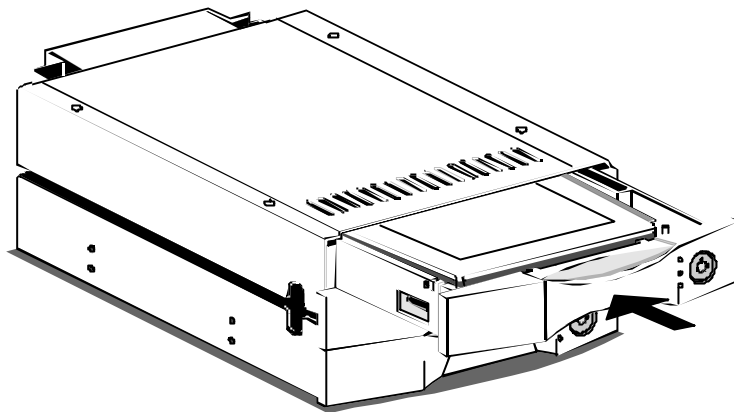
4. Repeat steps 1 to 3 for the second disk drive.
5. If you have installed two new disk drives go to *Application 1*. If you have installed one drive with data and one new disk drive go to *Application 2*.

Application 1: Two new disk drives (identical or non-identical)

1. Lock both drive carriers.
2. Turn on the computer system.
3. When the system prompts you to enter the BIOS setup program shortly after power-on, follow the instructions and enter the BIOS setup program. Set the hard disk drive mode to "Auto".
4. Save your changes to the BIOS setup program and reboot the system. Your system is now ready to start using the 7500 and to automatically mirror all data written to it on two disk drives.
5. If you have installed non-identical hard disk drives, your computer will recognize the 7500 as a single hard disk with a capacity equal to the smaller hard disk drive

installed in the 7500.

The status of all indicators during boot-up

Please be sure to put two hard disks into the two drive carriers
while the 7500 is booting, and lock it on before powering on.
Then you will see the indicators light up as follows:
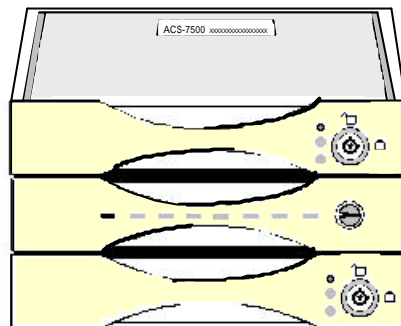
The green Disk Activity LED of the two drive carriers should
light up but the amber and red ones not; both Disk Status and
Rebuild LEDs should not light up; Rebuilding Activity and
Error Message LEDs should light up one by one as if it is
scanning.

**Application 2: Installing one drive with data and one new
backup drive**

1. The new backup drive must have the same capacity or a
   larger capacity than the drive with data.
2. Lock the drive with data and leave the new drive unlocked.
   This identifies the drive with data as the source drive.

NOTE: *When you lock the drives, the first drive to get
locked is designated as the source drive and the
other drive becomes the backup drive.*

3. Turn on the computer system.
4. When the system prompts you to enter the BIOS setup program shortly after power-on, follow the instructions and enter the BIOS setup program. Set the hard disk drive mode to "Auto".
5. Save your changes to the BIOS setup program and reboot the system.
6. After the boot process is complete, lock the new drive. This identifies the new drive as the backup drive.
7. The system will immediately begin mirroring the data from the first drive to the backup drive. Any old data on the backup drive will be lost, and is overwritten with the mirror image of the first drive.

Note: *You need to repeat this procedure twice in order to install a working Controller Box with a new pair of larger drives without losing any data. The first step is to mirror the data from the small hard drive, as source, to a new larger hard drive, as target. The second step is to mirror data from this new large hard drive, as source, to a second large hard drive, as target. In this case, you can omit steps 3, 4 and 5. However, under DOS and Windows 3.1/95/98, you might not be able to access the extra space if the existing data is stored in an extended DOS partition. Under Windows NT, you can use the Disk Administrator to create new partitions in the extra space of larger drives.*

Online Rebuilding feature

The online Rebuilding feature allows you to hot swap a failed disk drive with a new one, automatically recovering all data to the new drive with no system down time. When the Controller Box alerts you that a drive has failed, follow these instructions.

1. Leave the system turned on. Unlock the carrier of the disk drive that has failed and slide it out of the 7500 Controller Box.

NOTE 1: The 7500 will continue to save data to the remaining disk. No current or new data is lost while you are replacing the failed drive.

2. Remove the failed disk drive from the carrier and install a new one according to the instructions given above.
3. Slide the carrier with the new drive into the Controller Box and lock it.
4. The system will immediately begin mirroring the data from the first drive to the new drive. Any data on the new drive is overwritten with the mirror image of the first drive.

NOTE 2: When the 7500 is rebuilding the data and you shut down the power, do not change any hard disks because the 7500 will remember which disk is the source and which is the target while rebuilding. It also keeps track of the extent to which the data has been rebuilt. So if

you change a hard disk in this situation, data error could be the result. For example: If you change the target hard disk in this situation, the 7500 will continue rebuilding the data from where it left off so that the first amount of data will not be stored on this new target disk. That means the new disk will not have the data that was already copied onto the hard disk that was replaced.

NOTE 3: Before powering off while the7500 is rebuilding data, don't unlock the drive carrier that has the source hard disk, and then power on again. This would result in the two hard disks being rejected. If you have already had this happen to you, unlock the both hard disks before you power on the 7500, and wait till you hear the beeper. After that, lock the source hard disk and power on. Then lock in the target disk and the 7500 will begin rebuilding the data from the very start. If you have already finished all these steps, please follow the "Online Rebuilding" to copy the important data to the target disk.

NOTE 4: If your source hard disk is a UDMA 100 disk and it is smaller than the target disk, you can use the 7500 to copy the data on the source disk to the target disk. The function works the same as the "Online rebuding", but the transfer rate remains UDMA 100 instead of UDMA 133.

NOTE 5: When the power disconnected when rebuilding, the 7500 will continue the data rebuilding when the power returns, instead of rebuilding from the beginning.   It is because there is a build-in battery inside 7500; it offers the memory on rebuilding status when the power is interrupted.   Under normal application the battery will work for around 3 years.   If necessary, please replace with the same type of battery and read carefully the use instruction on the battery.   Please follow the original installation when replacing the new battery.

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF BATTERIES ACCORDING TO THE BATTERY' S INSTRUCTION.

Troubleshooting

If you encounter a problem while installing or using 7500, check this section for help.

1. I cannot connect a Western Digital hard drive into the connectors of the drive carrier.

There is a **specially designed drive carrier for the Western Digital disk** drive. Please specify before you ordering.

The location and distance between IDE and Power connector in 7500 drive carriers follow the specification in AT Attachment (ATAPI spec). The IDE connector of the Western Digital disk drive has a 1-2 mm alignment difference compared to drives of other brands.

7500 supports hard disk drives from Fujitsu, IBM, Maxtor, Quantum, Seagate, Samsung and Western Digital.

2. When I lock the *first* drive carrier with a disk drive in place, the red disk activity indicator turns on and an alarm beep sounds.

(a) Make sure you firmly connect the IDE and Power connectors of hard disk to their counterparts inside the drive carrier and try again. If this does not solve the situation, go to (b)

(b) Change the disk drive with a new one and try again.

(c) Exchange the top and bottom drive carriers and try again.

(d) If all of the above steps fail, contact your vendor.

3. When I lock the second drive carrier with a disk drive in place, the red activity indicator turns on and an alarm beep sounds (The first Drive Carrier has already been locked without any problem).

(a) Make sure you firmly connect the IDE and Power connectors of hard disk to their counterparts inside the drive carrier and try again. If this does not solve the situation, go to (b)

(b) Check if the capacity of the second disk drive is equal or bigger than the first one.

(c) Change the disk drive with a new one and try again.

(d) Exchange the top and bottom drive carriers and try again.

(e) If all of the above steps fail, contact your vendor.

4. I locked only one of the two hard disks when powering on the 7500, and then lock the other one while the 7500 is without power. After that, the drive carrier that was locked last can't be used normally. How do I solve this problem?

Lock the both hard disks when powering on the 7500 and wait for the buzzer sound. After that, lock the drive carrier that has source hard disk and power on. If you have already finished all these steps, please follow the "Online rebuilding" to copy the important data to the target disk.

5. I shut down the power while the 7500 was rebuilding, and I also keyed off the drive carrier with the source

disk. I then discover both disks are rejected and I hear the beeper when I power on the 7500 again. How do I solve this problem?

The 7500 can't ascertain user's action without power. But when in operation, it always remembers that status of the work. For example: which disk is source, which one is target, and the extent the data or only has one hard disk. The 7500 will remember this situation while it's rebuilding data or only has one hard disk. (Of course, the 7500 has to be powered up if it is to remember this situation) If the 7500 detects a situation that is different from before, it will reject the hard disk that has created the different situation. If you already had this happen to you, please unlock both hard disks when powering on the 7500, and wait for the beeper. After that, please lock the drive carrier that has the source hard disk, and power on. This allows the 7500 to recognize the new disk as source or target, depending upon which disk as been changed. If you have already completed all steps, please follow the "Online rebuilding" to copy the important data to the target disk.

6. How can I turn off the alarm beep sound when there is a hard disk failure?

Unlock the drive carrier of the failed disk. This will turn off the alarm beep sound.

7. I use a 60 cm IDE cable to connect the 7500, but the system shows some error messages and the hard drive

can't be accessed normally.

The 7500's specifications are based on ATAPI specifications. To ensure good IDE signal quality, the length of your IDE cable cannot be longer than 46 cm (18 inch).

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Specifications are subject to change

without notice!