Hydra eSATA

4-Bay RAID Storage Enclosure

User Manual

January 16, 2009 - v1.0

EN

Table of Contents

1 Introduction

1.1 System Requirements

1.1.1 PC Requirements
- Minimum Intel Pentium III CPU 500MHz, 128MB RAM
- eSATA equipped PC; Windows XP/Vista
- Your hardware device must have the correct corresponding port (e.g. eSATA host controller or PCI card)
- eSATA Plug & Play support and Port Multiplier for host controller

1.1.2 Mac Requirements
- Minimum Apple G4 processor, 128MB RAM
- eSATA equipped Mac; Mac OS 10.4 or above
- Your hardware device must have the correct corresponding port (e.g. eSATA host controller or PCI card)
- eSATA Plug & Play support and Port Multiplier for host controller

1.1.3 Supported Hard Drives
- Up to four 3.5" SATA-I or SATA-II hard drives (1.5Gb/s or 3.0Gb/s)
- 20GB - 1.5TB per HDD
- Hard drives of identical capacities are recommended
- Supports large volumes in excess of 2TB

Note

In order for the computer to access volumes larger than 2TB, both the hardware and Operating System need to have the capacity to support large volumes (e.g.: WinVista 32bit/64bit or Mac OS 10.4 and above)

1.2 Package Contents

Package content may vary depending on vendor & version.

- Hydra eSATA (no hard drives included)
- Power cord
- eSATA cable
- Manual

1.3 About this Manual

Firmware, images and descriptions can slightly vary between this manual and the actual product you have. Functions and features may change depending on the firmware version. Please read your warranty carefully, as this may vary between different vendors!

1.4 Trademarks

- MS-DOS, Microsoft, Windows XP/Vista are trademarks of Microsoft Corporation.
- Apple Macintosh and Mac are trademarks of Apple Computer.
- All other third party brands and names are the property of their respective owners.

1.5 Detailed View

LED indication and buttons as seen behind the front panel of the Hydra eSATA.
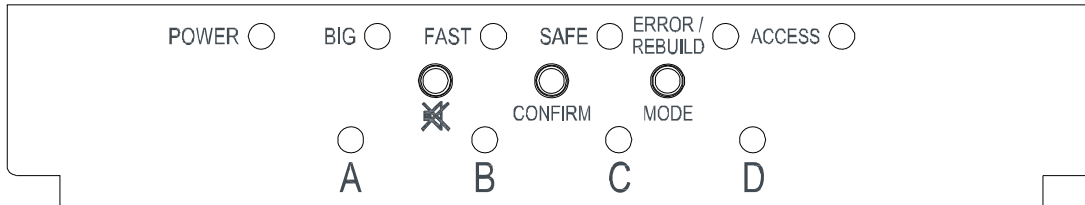
LED or Button	Status or Function
POWER	Blue = Power on
BIG	Yellow = BIG mode active (JBOD spanning)
FAST	Amber = FAST mode active (RAID 0 striping)
SAFE	Green = SAFE mode active (RAID 1 or RAID 10 mirroring)
SAFE & BIG	Green & Yellow = RAID 5
ERROR/ REBUILD	• Red = Error • Green = Rebuilding data
ACCESS	Blinking blue = Accessing data (read/write)
MUTE	Press to temporarily disable the buzzer (mute alarm)
CONFIRM	• Press and hold for 3 seconds to enter the RAID mode setup menu • Press to confirm the new RAID mode settings
MODE	RAID mode selector button (RAID 0 - RAID 1/10 - RAID 5 - Non-RAID - JBOD)
HDD A, B, C, D	• Green = HDD status OK • Blinking green = Accessing data (read/write) • OFF = Error, HDD not installed or power off

1.5.1 Alarm
The alarm will sound when: a. the fan speed is too low or has failed, b. the temperature goes above 65˚C, c. the power supply located above HDD C&D fails or d. one of the drives in the RAID array fails. Pressing the mute button will temporarily disable the alarm until the device is restarted.

1.5.2 Smart Fan
The smart fan automatically regulates the fan speed according to the internal temperature of the device. It will start slowly and incrementally increase the speed starting from 45˚C for every 5˚C until 60˚C. When the temperature rises above 60˚C, the fan will operate at full speed.

1.5.3   Changing the RAID Mode

The RAID mode should be set after installing the drives and before first formatting the drives. Also, when adding more drives at a later point, the RAID mode has to be re-selected and confirmed again in order for the new drives to be added to the RAID array.

1.   Turn on the power and wait for the device to start up.

2.   Press and hold the CONFIRM button for about 3 seconds, until the three RAID mode LEDs start blinking.

3.   Use the MODE button to select the new RAID mode and press the CONFIRM button within 10 seconds of releasing the MODE button to confirm the new setting.

4.   When changing the RAID mode, the LEDs will indicate the selected mode. If all three (BIG/FAST/SAFE) LEDs are off, it indicates Non-RAID. The sequence always starting with the FAST mode is as follows: RAID 0 - RAID 1/10 - RAID 5 - Non-RAID - JBOD.

5.   Format the drives.

Note

Changing the RAID mode requires re-formatting the drives. Make sure to backup all data first!

1.6   RAID Modes

For RAID 0/1/10/5, hard drives of identical capacities are recommended. If the capacities are different, the total amount of the space that can be used will depend on the drive with the smallest capacity.

Note

It is not possible to add more drives to an existing RAID array without re-formatting it. When adding additional drives at a later point, they will be mounted as independent volumes until the corresponding RAID mode has been selected again and the drives have been re-formatted.

1.6.1   Non-RAID (PM)

The drives show up as independent volumes. Each drive can be formatted and accessed separately. If one drive fails, the others are not affected. This setting does not provide any performance or redundancy benefits.

Storage Capacity   Data Safety   Performance   → 1-4 drives

1.6.2   JBOD - Disk Spanning (BIG)

The drives show up as one large single volume, combining the capacities of all drives. Spanning is an array (not RAID) that is written sequentially across the drives. By itself, it does not provide any performance or redundancy benefits. It is ideal for drives with different capacities, making use of the maximum storage capacity. However, if one drive becomes damaged, the whole array can become corrupted.

Storage Capacity   Data Safety   Performance   → 1-4 drives

1.6.3   RAID 0 - Disk Striping (FAST)

The drives are shown as one large single volume but the total size will depend on the drive with the smallest capacity. This setting is used where speed is the primary objective but RAID Level 0 (also called striping) is not redundant. This form of array splits each piece of data across the drives in segments; since data is written without any form of parity data-checking, it allows for the fastest data transfer of all other modes. On the downside, if one drive becomes damaged, the whole array can become corrupted.

Storage Capacity   Data Safety   Performance   → 2 drives
Storage Capacity   Data Safety   Performance   → 4 drives
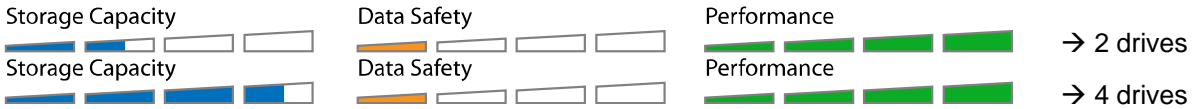
1.6.4   RAID 1 - Disk Mirroring (SAFE)

Two drives show up as one volume but only 50% of the total capacity, depending on the drive with the smallest capacity, can be used. RAID 1 creates an exact copy (or mirror) of a set of data on the second drive. This is useful when reliability and backup take precedence over storage capacity. Should one hard drive fail, it can be replaced and the data rebuilt automatically. When more than two drives are installed, the remaining drives will show up as independent volumes.

Storage Capacity   Data Safety   Performance   → 2 drives

1.6.5   RAID 10 - Disk Mirroring with Striping (SAFE)

The drives are shown as one volume but only 50% of the total capacity, depending on the drive with the smallest capacity, can be used. RAID 1 creates an exact copy (or mirror) of a set of data. This is useful when reliability and backup take precedence over storage capacity. When one hard drive fails, it can be replaced and the data rebuilt automatically.

Storage Capacity   Data Safety   Performance   → 4 drives

1.6.6   RAID 5 - Disk Striping with parity (BIG + SAFE)

The drives are shown as one volume but the total capacity, depending on the drive with the smallest capacity, is the combined size minus the size of one drive. RAID 5 uses block-level striping with parity data distributed across all member disks and therefore provides the perfect balance between high performance and data integrity. When one hard drive fails, it can be replaced and the data rebuilt automatically.

Storage Capacity   Data Safety   Performance   → 3 drives
Storage Capacity   Data Safety   Performance   → 4 drives
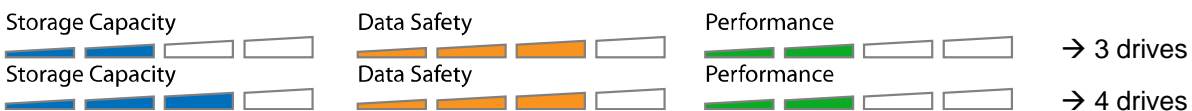
1.7 About Data Backup

To protect your files and help prevent the loss of your data, we strongly recommend that you keep two copies of your data, one copy on your Hydra and a second copy either on your internal drive or another storage media such as CD, DVD, Tape or an additional external drive.

Any loss or corruption of data while using the Hydra is the sole responsibility of the user, and under no circumstances will the manufacturer be held liable for compensation or the recovery of this data.

2 System Setup

2.1 Hard Drive Assembly

The drives can be installed at any position, there is no specific order required.

1. Unlock the switch at the bottom of the case and push the inner chassis from the back until the front panel is out of the housing. Now pull the front panel out and then lift it upward to remove it. Turn the screws on the HDD cassettes counter-clockwise to loosen and pull them out.
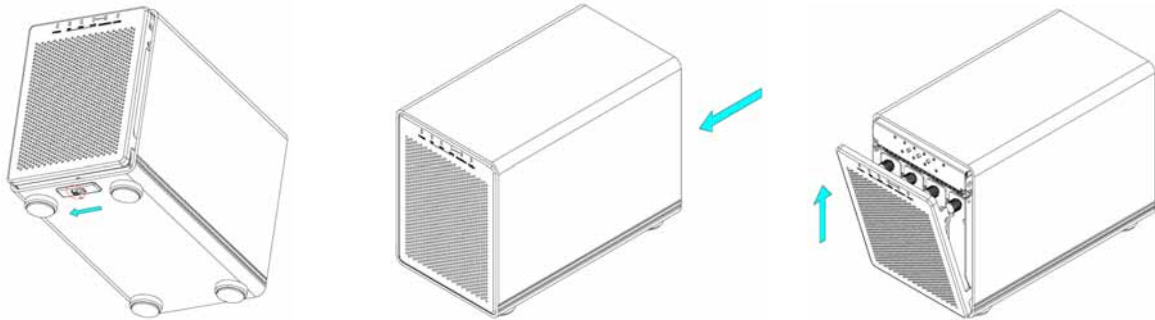
2. Install the hard drive as illustrated below with the SATA connector facing away from the front. Mount the drive with the six screws from the side.
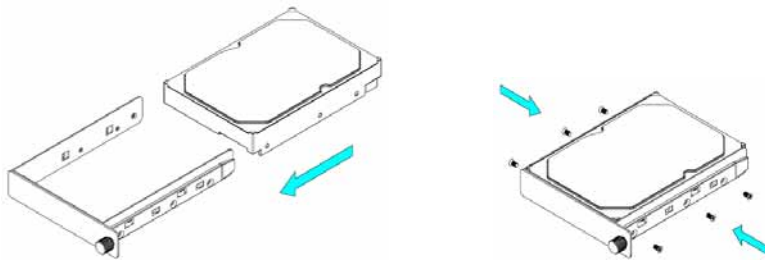
3. Slide the HDD cassette back into the case, push it lightly into place and fasten the screw.

4. Repeat the previous steps for each hard drive cassette you are planning to install.

5. Turn on the power, set the RAID mode and then replace the front panel.

6. Connect the drive to your computer, create a new partition and format the drives.

Note

Be careful not to damage any components, and do not force the drives into place. If they not easily slide into place and fit, make sure the drives have been installed correctly.

Important

It is not possible to add more drives to an existing RAID array without re-formatting it. When adding additional drives at a later point, they will be mounted as independent volumes until the RAID mode has been selected again and the drives have been re-formatted.

2.2 Replacing Hard Drives

When one of the drives fails, the Error LED will light up red, the alarm will go off and the corresponding HDD LED (A-D) will be off instead of the normal green. If only one drive is defective and the RAID mode is set to RAID 1, RAID 5 or RAID 10, the data can still be accessed but we strongly recommend replacing the faulty drive immediately to assure continued proper backup and data safety.

If more than one drive at the same time fails or if the RAID mode is set to RAID 0 or JBOD, the data will be lost and the system can not be accessed again until the drive(s) have been replaced.

In Non-RAID mode, the Error LED will not light up. A faulty hard drive will simply not be detected anymore, so the corresponding HDD LED (A-D) will remain off until the faulty drive has been replaced.

1. Check the HDD LED and replace the faulty drive. The normally green LED will be off, indicating the defective drive. The power does not have to be turned off when replacing the drive(s).

2. A few seconds after installing the new drive(s) the corresponding LED will light up green.

3. For RAID 1, RAID 5 and RAID 10, the RAID array will be rebuilt automatically. During this process, the Rebuild LED will light up green. Rebuilding the RAID array will take several hours, depending on the drive capacity (~60MB/s).

4. For RAID 0 and JBOD, enter the setup menu, go through the RAID mode sequence to select the correct mode, confirm it and then format the drives again.

5. For Non-RAID, simply format the new drive.

> **Note**
> We recommend not turning off the power during the rebuild process but if the process is interrupted, it will continue rebuilding the data as soon as the power is turned back on.

2.3 Connection to Computer

A few precautions and notes when using your external storage drive:

- Do not expose the product to water or humid conditions.
- Do not cover the enclosure's ventilation holes.
- Before connecting the device, install the hard drives and set your preferred RAID mode.
- For the safe removal of your drive and to assure that no data is lost, always follow the correct unplug procedure for external hardware (e.g.: Eject the drive before removal).
- In order for the computer to access volumes larger than 2TB, both the hardware and Operating System need to have the capacity to support large volumes (e.g.: WinVista 32bit/64bit or Mac OS 10.4 and above).
- When the computer goes into stand-by mode, the hard drives in the external enclosure will spin down as well.

3 Appendix

3.1 Precautions

3.1.1   Power on/off precautions
It is highly recommended to switch the unit off when not in use. When re-locating the device or when not in use for an extended period of time, we strongly recommend unplugging the unit.

3.1.2   Location and placing precautions
Avoid positioning your device in the following places:

- Locations with direct sunlight, next to radiators, other sources of heat.
- Locations with very high temperatures (more than 38° C) or humidity (more than 90%).
- Very dusty or sandy locations.
- Locations subject to vibration, shock, or with a sloping base.

3.1.3   Electricity and power plug
Careful attention must be paid to the following points in order to prevent damage, fire, and/or injury:

- When removing the power cable from the socket, pull on the plug fixture and never on the cord.
- Do not connect and remove the power cable with wet hands.
- Keep the power cable away from heaters.
- Never try to repair the power cable yourself or to modify it in any way.
- If the unit is dropped or becomes damaged in any other way, unplug the power cable.

3.1.4   Cables
Use only the cables supplied or recommended by your vendor in order to avoid the risk of malfunction, electric shock, and/or possible interference to the device.

3.2 FAQ

Q: Why do I only see one volume in Non-RAID mode even though 4 drives are installed?
A: To mount and access more than one volume, the eSATA host controller needs to support the Port Multiplier function. Without it, only one volume will be visible.

Q: What file system should I choose to format my drive?
A: This will depend on how you want to use the drive but in general, we recommend:
- Windows XP/Vista → NTFS
- Mac OS X → HFS+ (Mac OS Extended)
- To use it on both PC and Mac → FAT32 (single file size is limited to 4GB)

Q: How many drives can fail before I loose my data?
A: For RAID 0 and JBOD, any drive failure will result in the data being lost. For RAID 1, RAID 5 and RAID 10, more than one drive failure at the same time will mean the data can not be recovered anymore. For Non-RAID, only the data on the defective drive will be lost.