

Highly Reliable Systems

High-Rely FirstRAID G3 Backup System



Documentation V1.4

READ THIS FIRST

Important Quick Start Information for your High-Rely drive

- DO NOT ATTEMPT TO REMOVE High-Rely media from their drive bays without “unlocking” the drive with the key first! Forced removal of the drive will void your warranty. The key has a mechanical interlock that blocks the drive from being removed.
- High-Rely media will not “power up” until the key lock, on the front of the drive, is turned to the locked and on position. This is by design and prevents accidental media removal. Refer to page 8 and 9 of your manual.
- The latest Service Packs are important! Microsoft has continued to Debug removable drives on the Windows 2000, XP, 2003 and Vista product lines. If you do not have Service Pack 4 on Windows 2000 or Service Pack 4 on XP you may have problems. For example, XP machines without Service Pack 4 cannot properly recognize drives above 137GB. While it may appear to work, the drive will corrupt data when it fills above that level. Read the manual or our web site for more details.
- Not all eSATA ports are created equal. For maximum compatibility, we recommend that only controllers based on the Silicon Image chip set be used. Other eSATA ports may only recognize the first drive in a multi-drive system or may not function at all.
- If you are using multiple trays in the single bay of your High-Rely, you WILL have a drive letter problem as you change your media. Windows will assign drive letters randomly, which will cause your backup software to fail. **You can use the High-Rely Drive Manager utility HRDM2.MSI to solve this problem.** To do this, install HRDM2 on the machine that the High-Rely system will be connected to. See “Understanding the High-Rely Drive Manager” in this manual for more information.
- We only support Veritas Backup Exec version 9.0 or higher. Always choose the “Backup to Removable Disk” folder. Never use the “Backup to Disk folder” since Backup Exec may become confused when restoring data from removable drives.
- Particular photos in this manual may not be your exact unit.

The information in this manual primarily documents Windows 2000, 2003, 2008 or XP systems with some coverage of Vista. Although the High-Rely may work with Windows NT, Linux, Mac OS X and other operating systems, at this time, our tech support can assist with Windows platforms only.

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1. Introduction

FirstRAID G3 is a bridge external RAID product which provides your backup strategy with a reliable, redundant means of near-line storage and a quicker, removable means of storing data for off-site backups. With FirstRAID G3, you can rest assured that your first image will be protected on a reliable, redundant RAID system. Plus you will have the insurance of an off-site image without the hassles and expense of tape.

The FirstRAID G3 system has two integrated RAID controllers which, among other functions, allows its multiple drives to look like a single volume to any connected host and manage data duplication for offsite backups automatically. Therefore, no RAID software or additional RAID drivers are necessary, and no load is placed on the host to perform RAID functions. The G3 can do everything with its own hardware, if you prefer.

2. FirstRAID G3 Hardware Description

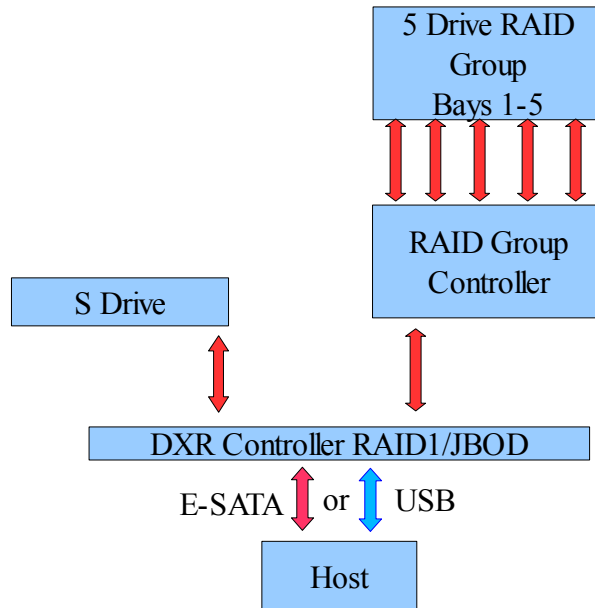
The top block of five drives (bays 1, 2, 3, 4 and 5) are grouped together and under the control of the main built-in hardware RAID controller (called the RAID group controller). These five drive bays are in a physically different configuration and mounting system than the bottom bay (bay S). As far as your host computer is concerned, these 5 drives will function as a single drive. By default, any data written to this group of drives will be broken up and stored in such a way that any one of the drives may fail and your data is still protected, on-line and available. A drive can even fail in the middle of a backup or restore, and your host system will not know the difference or show any sign of failure other than a slowdown. In the event of a failure, the faulty drive can be removed and replaced, and FirstRAID G3 will reconstruct the data onto the new drive without interruption – the host computer will know no difference. No further action is required on the host computer. By default the RAID group controller is set to RAID 5, which functions as just described, but it is also capable of RAID 0, RAID 10 and RAID 5 3+1. This controller displays its activity and status on the top front panel (see Figure “G3 Front Indicators”).

The bottom bay of the FirstRAID G3 system (bay S) is a stand-alone High-Rely drive bay. It is not controlled by the RAID group controller, and to your host computer, it can appear as a separate drive (DXR JBOD 2 Drive setting) or can be part of the aggregate volume (when DXR is set to SAFE mirror). See Figures “JBOD 2 Drive” mode and “SAFE Mirror” mode on page 8. Your backup software can backup data to the RAID group using an efficient incremental method because the integrity and reliability of the RAID storage is much higher than tape or a single drive. Then your backup software can image off the same or different data to the stand-alone drive separately (Bay S). If configured in the SAFE mirror setting, the G3 will copy the RAID group to the S Bay for off site removal by itself.

The RAID group controller and the drive bay (bay S) are hooked to the DXR controller which is also capable of performing a few RAID functions including Mirroring (see Figure “G3 Functional Block Design”) on page 6. The DXR controller's status and settings are on the panel on the back of the FirstRAID G3 (see Figure “Back of G3 DXR”) on page 7.

Of course, this is just one recommended method to be used for FirstRAID G3. Through various other configurations, many other possibilities exist which may be better suited to your needs. These settings maybe enumerated in this document, however, our Technical support staff will not provide support for anything other than our standard configurations which are the RAID group set to RAID 5 and the DXR set to either JBOD 2 Drive or SAFE Mirror.

Figure "G3 Functional Block Design".



FirstRAID G3's S bay media is compatible with other High-Rely backup systems, so other sites can possess standard High-Rely multi or single bay drives and still easily access the data written from the "S" bay of your FirstRAID G3 (off-site copies).

Of course, the drives inside the media trays are standard SATA drives which are the best today's technology has to offer in terms of speed, reliability and economy.



Figure "G3 Front indicators".

3. Connections, Indicators and Configuration of FirstRAID G3.

The rear of your FirstRAID G3 will have a panel like the one below. The Mode Selector is the primary way to select the function of your G3. If this is set to “SAFE” mirror, the G3 will present itself to your host computer as a single volume. That volume will be a mirrored aggregate of the S Bay and the 4 drive RAID array (see figure 2 below). If this is set to “JBOD” 2 drive, the G3 will present itself to your host as two separate volumes (see figure 2 below). Those volumes will be the RAID array of the 4 drives as one volume and the S Bay as another volume. Your G3 will come set from the factory as either of these based on how you ordered the product. You may switch between the two modes, but you should not attempt this until you read this manual in order to understand the method, requirements and ramifications of doing so.

G3 DXR Configuration and Status

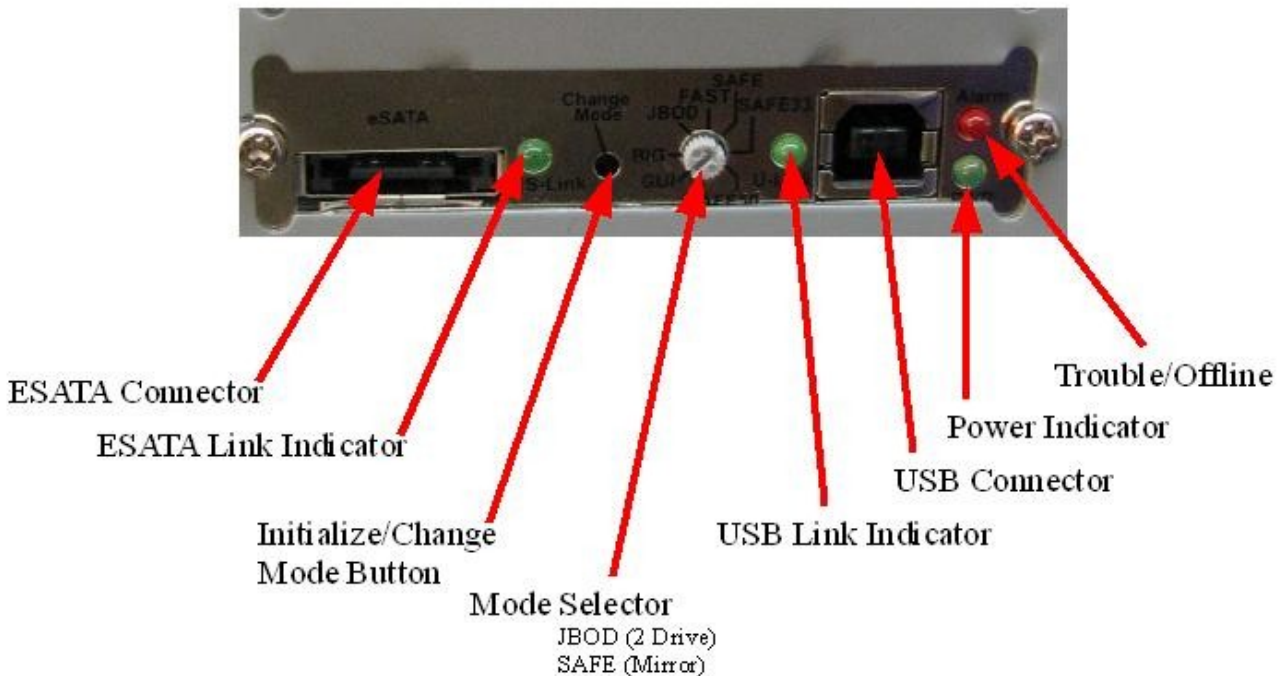


Figure “Back of G3 DXR”.

JBOD 2 Drive setting

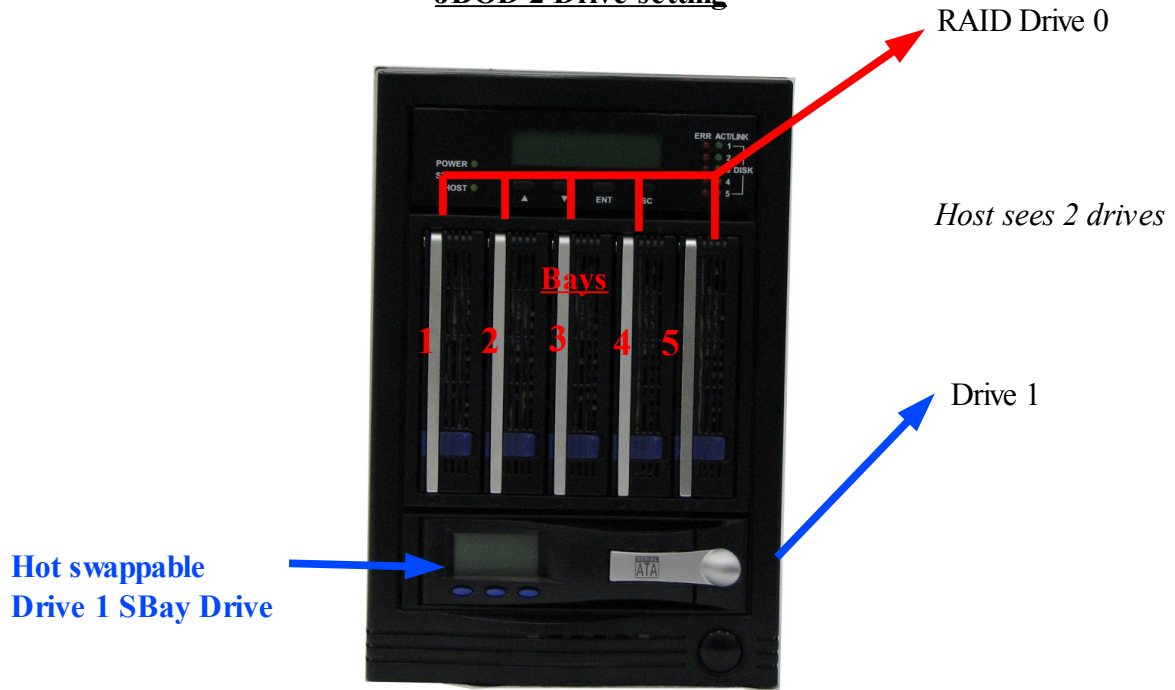


Figure "JBOD 2 Drive mode".

SAFE Mirror setting

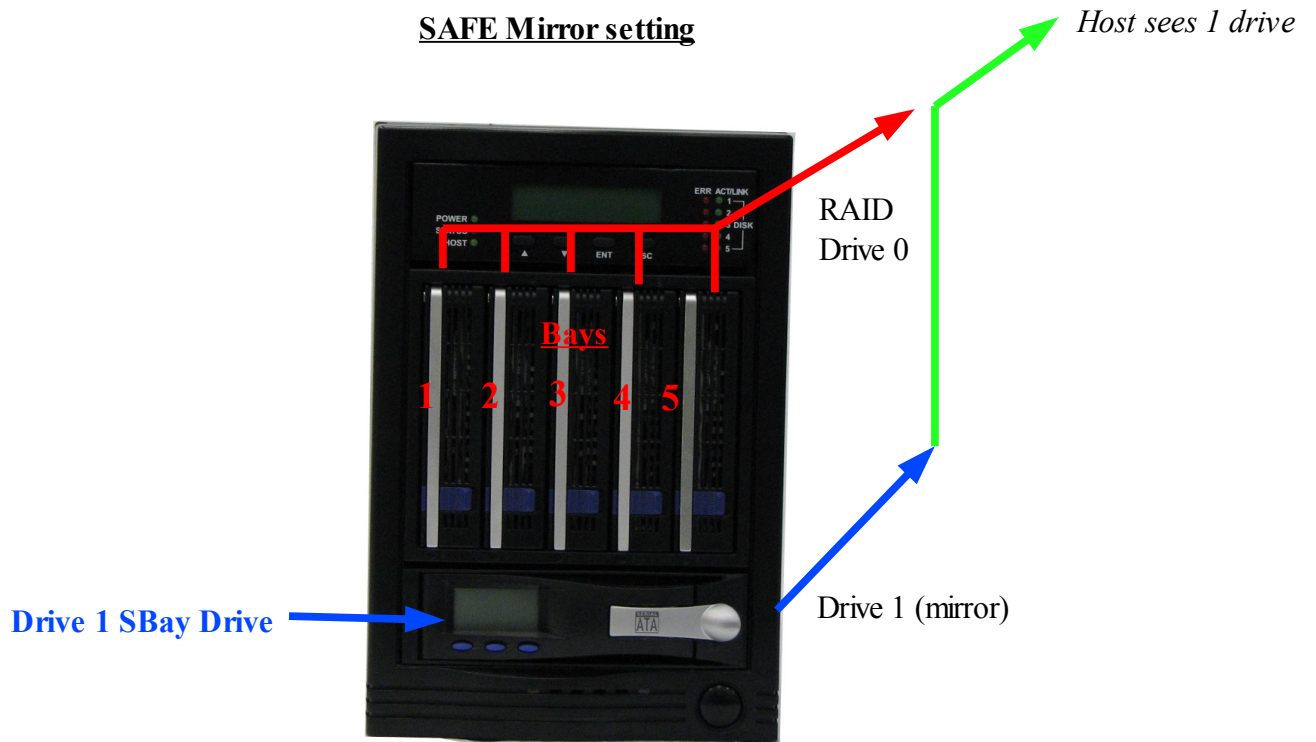
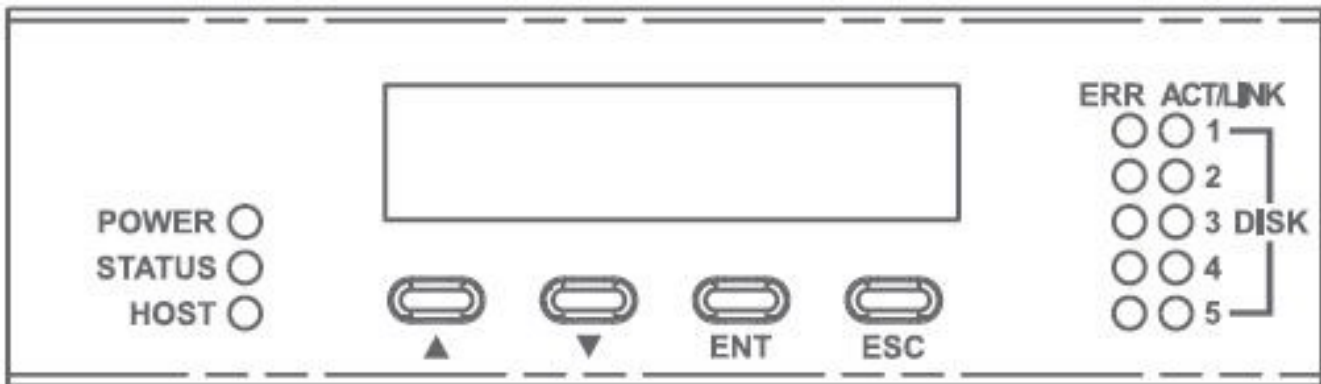


Figure "SAFE Mirror mode".

When you combine the convenience of High-Rely's media and drive storage systems with the benefits of RAID 5 data protection and of our DXR controller, FirstRAID G3 is a unique and superior proposition in the set of tools used by today's businesses for data storage and backup.

4. FirstRAID G3 RAID Group Controller Technical Information and Operations

1. Operating the screen.



*Screen located at the top of your FirstRAID G3 machine above bay 1.

- **Scroll up button:** to scroll up message.
- **Scroll down button:** to scroll down message.
- **Enter button:** to confirm or enter your selection.
- **ESC button:** to go back to the top level of options.
- **Power LED:** shows status of FirstRAID G3 machine (on/off).
- **Status LED:** shows when computer is reading or writing to a drive.
- **Host LED:** shows connection to host
- **Err LEDs:** shows when a RAID group drive is in trouble.
- **ACT/LINK LEDs:** shows a link and activity with of the RAID group drive with the RAID group controller.

2. Status and Errors

FirstRAID G3's RAID group status can be viewed through the LCD display. By using the scroll buttons to scroll through the messages, the following information is available:

- RAID Group level and capacity
- RAID Group disk drive models
- RAID Group controller firmware version
- RAID Group controller serial number
- RAID Group disk capacity
- RAID Group controller temperature

1. FirstRAID G3 RAID group controller Error Messages

Keep in mind these messages only apply to drives in the RAID group and not the S Bay or the DXR controller. Check status indicators on the front and rear of the machine for other errors. In most cases, an audible alarm will sound in addition to the display of an error message. This alarm can be silenced by pressing the ESC button.

“DISK NOT ENOUGH CANNOT CREATE!” - No drives were discovered. This means a RAID is not possible because there are not enough drives working properly. Check to see that the media is installed correctly (bays 1-5) and the key locks are switched to the ON position (see “Inserting and Removing Media” on page 16 for more details). If not, power off the FirstRAID G3 machine, install the media in the proper place and turn the key lock to the ON position for all drives in the RAID group before restoring power. Also, this can happen if you are trying to create a RAID, but have not deleted the previous RAID group

“RAID SET 0 IS IN DEGRADE MODE!”- This can happen when a drive is suddenly removed from the RAID array, or if a drive fails. If you replace the drive with a working drive, or simply reinsert the removed drive, the RAID array will rebuild itself.

“RAID SET 0 IS IN BROKEN MODE!”- This error presents itself in the event of multi-drive failure. If more than one drive failure occurs concurrently in the RAID set, irreparable data loss will occur. Note that at this point, data recovery is usually not a possibility.

2. FirstRAID G3 RAID group controller Status Messages

In most modes, the Up or Down buttons can be pressed to see status information. To access the menu, simply press up or down on the controller while the LCD is at the main screen.

System Manager → Hardware Monitor → Temp. Monitor

This will display the current temperature inside of the unit.

Temperature :

XX degrees

System Manager → System Info → Firmware Version (1st screen)

This will display the current firmware information.

Firmware

Version: x.xx

System Manager → System Info → Firmware Version (2nd screen)

This is the second screen of the above. It will display the controller number.

Controller Number:

1

Disk Manager → Show Disk Info (2nd screen) → Select Disk → Scroll (In scrolling order)

This screen will display information about the various disks in the RAID array.

Model #:

Serial #:

Firmware Version:

Total Capacity:

Free Capacity:

Disk State:

Raid Manager → Raid Information → Select Raid → Scroll (In scrolling order)

This screen displays information about the RAID array currently in use.

Raid Name:

Raid Level: (e.g. RAID 1, RAID 0, etc...)

Raid Capacity:

Member Count:

Raid State: (Broken, rebuilding, etc...)

3. Reinitializing the FirstRAID RAID array

At some point, it may be that you need to reinitialize the RAID array. (Out of the box, multiple drive failure, etc...). To do this, scroll to the quickstart menu, press Ent, and then scroll to the option DELETE ALL RAID, and select the option. Repeat the process, except this time select CREATE NEW RAID. Now, if you intend to use the G3 as a mirrored set to the Safe drive, you will need to follow these additional steps. Go around to the back of the machine, turn the dial to JBOD, and press the change modes button for 5 seconds. From the attached computer, open “Disk Management”, by right clicking on “My Computer” and clicking “Manage”. It should be in the panel on the left. Navigate to disk management. In the disk management pane, you should see an uninitialized drive. You must Initialize this drive before switching back into SAFE mode. If this drive is not initialized, the host will not be able to see the device! Proceed to switch the device back into SAFE mode by switching the dial on the back, and holding down the change mode button. Turn off the device and remove the SAFE drive. Power the device back on, and hold the change modes button again for 5 seconds. This will configure the RAID array as the master. Re-insert the SAFE drive.

4. Basic RAID Group Controller Operations

Creating a new RAID:

Scroll down → Quick Setup → Create One RAID

(Note that it is not possible to create a RAID if one already exists!)

Deleting the RAID:

Scroll down → Quick Setup → Delete all RAID

5. Changing RAID group controller RAID types

This information is provided for the benefit of professionals with computer experience. It is not supported nor recommended for end users.

FirstRAID G3's RAID group controller can perform a 5 drive RAID 5 (default), a 4 drive RAID 5, 4 drive RAID 0 or 4 drive RAID 10. All of these RAID types can be selected from the front panel.

1. To change to RAID 0

Enter the menu by pressing any of the scrolling buttons. Select “create Raid” and scroll to Raid 0

2. To change to RAID 10 (2 striped, 2 mirrored, 1 extra)

Repeat the steps for RAID 0 and select RAID 10.

3. To change back to RAID 5 (5 drive) DEFAULT

Repeat the steps from the previous and select RAID 5. If you would like to use a 3 or 4 drive RAID 5 or a 2 drive RAID 1, select the option you would like with the number of drives you would like in the bay.

5.Addendum: General High-Rely Operation

- 1. Removal of High-Rely Media (S Bay), please see page 11 of HR Documentation SATAV2-2**
- 2. Operation of the S Bay High-Rely media LCD display, please see pages 12-13 of HR Documentation SATAV2-2**
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