

Owner's Manual

SATA II Aluminum Hot-Swap Systems



1 BAY EXTERNAL SYSTEM



1 BAY INTERNAL 5.25" SYSTEM

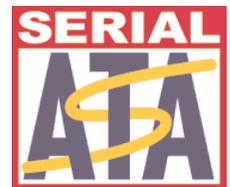


2 BAY EXTERNAL SYSTEM



2 BAY RACK EXTERNAL SYSTEM

Granite
D•I•G•I•T•A•L



Macintosh, Windows, Linux

SATA (Serial ATA) Hot-Swap Drive System / Case Kit

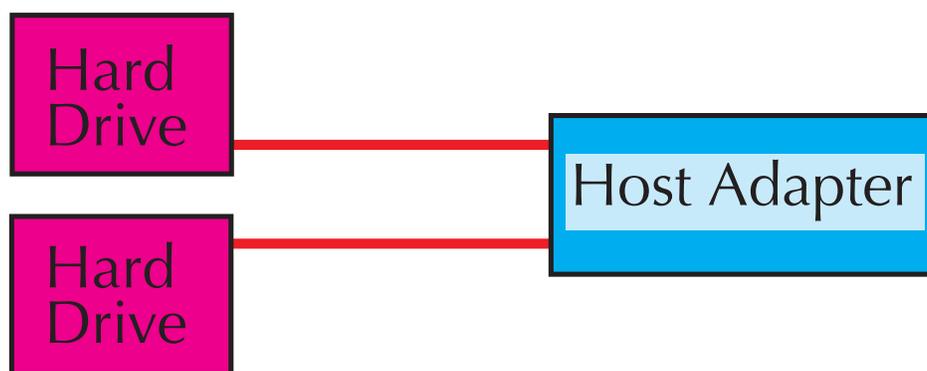
<i>Table of Contents</i>	<i>Page</i>
<i>User Guide</i>	
<i>How SATA (Serial ATA) Works</i>	<i>3-4</i>
<i>Connecting SATA Devices</i>	<i>5</i>
<i>Drive & Host Adapter Installation</i>	
<i>Removing the Hot-Swap Tray</i>	<i>6</i>
<i>Installing the Drive</i>	<i>7-8</i>
<i>Installing the Host Adapter</i>	<i>9-10</i>
<i>Formatting & Partitioning The Drive</i>	<i>11</i>
<i>Troubleshooting</i>	<i>12-13</i>
<i>1 Bay Internal Hot-Swap Specifics</i>	<i>14</i>
<i>1 Bay External Hot-Swap Specifics</i>	<i>15</i>
<i>2 Bay External Hot-Swap Specifics</i>	<i>16</i>
<i>Specifications</i>	<i>17</i>
<i>Warranty & Service</i>	<i>18</i>

How SATA Works

SATA II (Serial ATA) is a High Performance Serial Bus designed to transfer data at up to 300MBytes per second. This ultra-fast data transfer rate is perfect for storage applications where speed is a critical issue. The low cost of the SATA drives also provide affordable backup and archiving solutions.

Granite offers a variety of host adapters that support the Hot-Swap capabilities of SATA. These PCI cards and PCMCIA adapters support multiple drives. Check the Granite website (www.granitedigital.com) for a complete listing all our host adapters.

SATA is simple to configure because each drive operates on a separate channel. The cable goes from the host adapter to the drive and ends there. Installation is only a matter of plugging in the host adapter, plugging in the cable, turning on the drive and booting up the computer.



How SATA Works

In order to get SATA to perform at its maximum speed, the following items should be considered:

- 1)** Pick the controller card that best suits your needs. SATA Host Adapters come in a variety of models from 2 channel to 16 channel RAID cards. Also it is important to note that not all SATA Host Adapters support Hot-Swap and without that ability the drive can only be removed when the computer is turned off.
- 2)** The drive mechanism must go fast. Currently SATA drives are rated at 300MB/s burst rate and most drives can sustain 55MB/s data transfer rates. In order to get SATA to go faster, a Stripped RAID (also known as RAID 0) must be created. RAID is supported by most operating systems so having a knowledge of the operating system is important. The other alternative is to purchase a RAID Host Adapter. The advantage here is that most RAID Host Adapters will perform at higher data transfer rates than their software alternatives.
- 3)** The computer and the speed of its PCI bus will directly affect the performance of the SATA Bus and their drives. Earlier computer models run at a fraction of the speed of the newer models. In order for the drives to transfer at their highest performance levels use of a high performance computer is also a must. Again, the newer computer technologies offer the greatest performance levels.

There are two types of SATA cables (shielded for external use and unshielded for internal use) and two types of connectors. The original SATA connector is known as the “L” type because it’s opening looks like an “L”. The new eSATA connector, known as an “I” type because the connector is similar to the letter “I”. The eSATA “I” connector is almost identical to the SATA “L” with the exception that it is designed to be used as a Hot-Swap type of connection with many more insertions and removals than the original “L” type.

Connecting SATA Devices

Granite cases use the “L” type connector because we Hot-Swap the drive mechanism not the cable. Host adapters use both the “L” or “I” types with the eSATA becoming more popular as the external connection, “I” internal.

Since SATA uses one channel per drive, each SATA drive must be directly connected to a SATA host adapter channel. Cable length can be up to 72” using Granite shielded external cables.

Granite manufactures a variety of cables, brackets, and adapters that allow SATA to be used in a variety of applications. Our website (www.granitedigital.com) lists all of these products. Our cable selection includes internal and external shielded cables.

After installing the hardware some operating systems may require additional drivers. The host adapter may include a CD with these necessary drivers. Make sure the host adapter supports your operating system because different adapters support different systems.

Installing the SATA drive mechanism in our Hot-Swap System is easy. SATA drives do not have terminators or switch settings, so all that is usually necessary is to plug them into the power and data cables.

Temperature is always a consideration with drive mechanisms and our Aluminum Hot-Swap Systems are made so that the drive mechanisms stay cool enough to run without the necessity of fans. This makes for a safer temperature environment, less noise, less dust, and lower power consumption. Advanced cooling design using aluminum heat dissipating properties eliminates the complexity and possible failure associated with fans.

Removing the Hot-Swap Tray

We have designed the Hot-Swap System to be as simple as possible when installing a hard drive mechanism. The tray is easily removed from the frame by pulling on the handle. Removing the tray allows you to swap drives in and out, quickly and easily.

When removing the tray with a drive running, gently pull out the tray about 1" and then pause for about 10 seconds allowing the drive mechanism to stop spinning. Then continue to remove the drive.



The Aluminum Tray is easily removed with little pressure.



The tray is made of aluminum. Aluminum offers great heat dissipating properties, protects the drive circuitry, and isolates the drive from damaging static. The four elongated holes in the sides are used to attach the drive mechanism to the tray.

Four special flat headed screws are included with each tray. Use only these screws to attach the drive mechanism to the tray. SATA drives do not need to be jumpered so installation is very simple.



No jumper changes are necessary. When installing the drive make sure the connectors are facing the rear of the tray.

Page 7 *Drive & Host Adapter Install*

Installing the Drive



Gently slide the SATA Drive Mechanism in from the rear of the tray. Locate the 4 screw holes and line up the drive mechanism. The drive should be flush with the rear of the tray.

The drive connectors should face the rear of the tray.



Using a phillips head screw driver install the 4 mounting screws that hold the drive in place. Use only the flat headed phillips screws that are supplied. Make sure they are tight and that the rear of the drive is flush with the rear of the tray.

Once the drive mechanism has been securely attached to the tray it can be safely moved and stored. Drives can also be transported long distances with the use of our padded carrying cases. These cases protect the tray and surround the mechanism with shock absorbing foam. Packaging a drive to shipment should be done in a box with at least an additional 4" of foam surrounding the padded carrying case.



Installing the Drive



The tray slides back into the Hot-Swap System with very little effort. As the tray reaches the last 1/4 inch, push it in using the handle. The tray will now be flush with the front and has been seated properly. Never force the tray into place and always make sure there is nothing in the opening before inserting it.

The tray slides on two rails and locks into place. Make sure that both sides are even when sliding it in.



When the tray is flush with the front it has been inserted correctly. As the drive slides into the connector in the rear of the case you will be able to feel it lock into place.



There is a power switch that must be turned on in the rear of the external systems. Turn it on before inserting the tray. This switch can be used to power the drive or simply remove the drive from the system to power it down.

Page 9 *Drive & Host Adapter Install*

Installing the Host Adapter

There are two types of PCI Host Adapters on the market and many different variations of these two types. The first type is the PCI-X. As seen in the picture to the right, this PCI bus looks very different than the PCI-E type shown below. Before purchasing a host adapter make sure you know what type of PCI bus your computer has.



SATA I PCI-X type host adapter has 2 Channels with one external and one internal. SATA "L" type connectors are used on both ports.

There are also a variety of cards ranging from 2 SATA Channels to 16 SATA Channels and soon, with the use of Port Multipliers, cards will be able to address even more channels.

Generally speaking most host adapters come with a driver CD that has the drivers on it required for your installation. Drivers are different for Linux, Windows, and Mac so be careful to use the proper driver.

The cards that we include in our packages should be up to date and their CD will have the necessary drivers for most Operation Systems. Check our website, www.granitedigital.com for possible updates or links to the chip manufacturer's website for additional drivers.



SATA II PCI-E type host adapter has 2 External Channels. Both ports use eSATA "I" type connectors.

Cards do not come with external cables. Generally SATA II cards use eSATA "I" connectors and SATA I cards use SATA "L" connectors. See page 4,5 for additional information.

Installing the Host Adapter

There are two types of Card Bus cards on the market, the original PCMCIA card which has been shipping for years and the new Express Card Bus which is newer and faster. You must know which type of Card Bus adapter is needed for your computer before trying to plug in.



Like the PCI Host Adapters, drives are needed to make the card work. A CD is supplied with the cards and updates are available at our website or the chip manufacturer's website.

There are currently two types of CardBus cards, the original PCMCIA type and the new Express Card Bus. SATA connectors can be either SATA "L" or "I" type.



Only use shielded cables for external use. These cables protect the data from static and noise.

Using the proper cable guarantees good data transfers and optimum performance. For external use "shielded cables" are designed to protect the data from static and noise. These cables are much heavier than the internal types and should be used with all of our external systems.

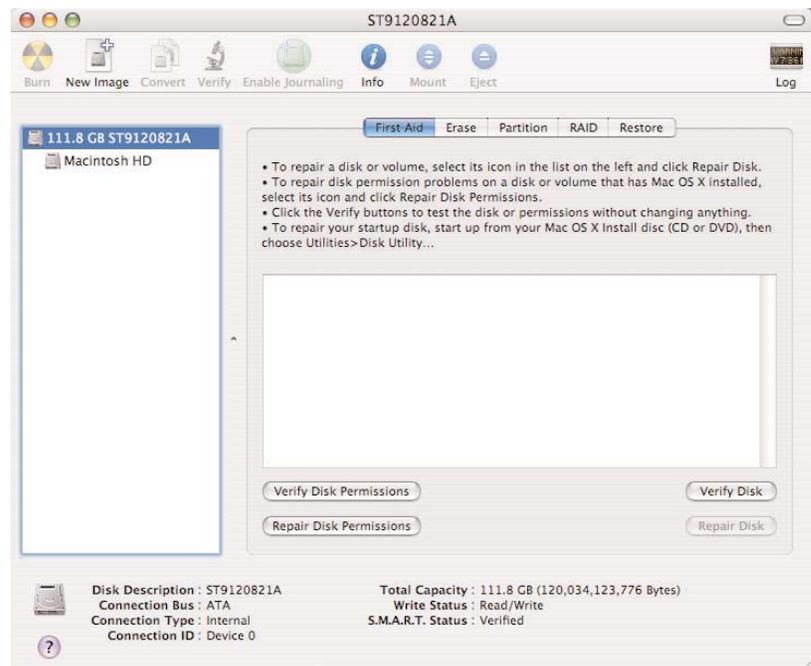


Non-shielded cables are designed for internal use only.

When purchasing external shielded cables know which type of connector ends you need and what length you need. Granite manufactures external cables in both 36 and 72 inch lengths. Connectors are either SATA "L" or eSATA "I" types. Different connectors are used on different host adapters and systems so know what type you need before purchasing the cable.

Page 11 *Drive & Host Adapter Install* Formatting & Partitioning

After the Host Adapter and drivers have been installed the next step is to format and partition your drive mechanism. This procedure is different in every operating system. The screen on the right is an example of what the Macintosh uses... it is called "Disk Utility". On a PC running windows it is called "Disk Management".



No matter which operating system you are running the basics are still the same. The drive will need to be formatted and partitioned before it can be used. Details for your operating system are provided by the manufacturer of that OS.

After you finish this initialization process the drive will then be ready to use. Again, every system is slightly different especially when it comes to Hot-Swapability.

On most Windows platforms, XP for example, SATA drives can simply be removed and they disappear. Then another drive can be reinserted and it will appear automatically. When you insert the drive on Macintosh computers it automatically appears but to remove it you must first throw it into the trash can. On Linux and Unix systems use the mount and unmount commands to remove and/or add a volume.

Troubleshooting

1- THE DRIVE DOESN'T MOUNT:

Macintosh OS 9: The Host Adapter manufacturer may have special drivers that will need to be installed with the PCI Host Adapter. Check the manufacturer's installation instructions for details.

Macintosh OS X: When you install a new drive mechanism using OSX, the Application "Disk Utility" is what you use to Partition, Format, RAID, Test, or Erase the drive. Disk Utility is located in the Applications / Utility folder.

Windows:

New drive mechanisms that are plugged into the Windows operating systems will need to be partitioned and formatted before they will show up as a new drive letter. Check the Microsoft website for details on how to use Fdisk and Format (98SE or ME) and how to use Disk Management Utility (2000 and XP). Formatting and partitioning a SATA drive is exactly the same as any other Microsoft supported drive.

Also read the Host Adapter manufacturer's instructions on driver installation. Every PCI Host is different and may need specific files to work.

2- COPIED FILES ARE MUCH BIGGER THAN ORIGINAL:

This problem is specific to the Macintosh. If you initialize a drive using Standard HFS partition, the files will appear very large. The solution is to reinitialize the drive using "Extended HFS+ Partitioning".

3- THE DRIVE DOES NOT RUN AS FAST AS IT SHOULD:

SATA bus speed is determined by four things:

1- The drive performance level. Faster drives (10,000rpm) have higher data transfer rates and make a difference in speed. A larger buffer size also improves drive performance.

2- The Host Adapter technology. SATA Host Adapters come in a variety of speeds and support RAID for even faster performance. Check the specifications on your Host Adapter to make sure that it fits your needs.

3- The computer itself and its PCI Bus. The faster the computer the faster its PCI performance. The SATA host adapter will work faster with faster PCI speeds.

4- The Operating System. Older Mac OS's and Windows OS's do not perform as well as newer ones. Using the most advanced and recent OS will offer a dramatic improvement in speed.

1 Bay Internal Hot-Swap Specifics

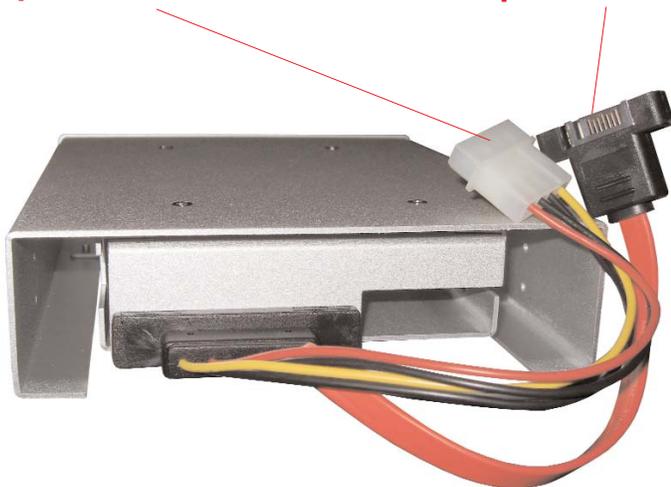


The 1 Bay Internal SATA Hot-Swap fits into any standard 5.25" opening. It comes complete with the necessary screws to mount it into the computer bay. Power to the SATA Hot-Swap is via a standard 4-Pin Power Connector. The data is supplied using the standard 7 pin SATA connector. Depending on the type of SATA Host Adapter the drives will be either Hot-Swapable or removable.



**Standard 4 pin
power connector**

**SATA data
7 pin connector**



Some cards do not support the Hot-Swap feature and the computer will need to be powered down before removing the drive mechanism. Check with your host adapter manufacturer to make sure it supports Hot-Swap. If you are using the drive as a boot drive, you cannot Hot-Swap it.

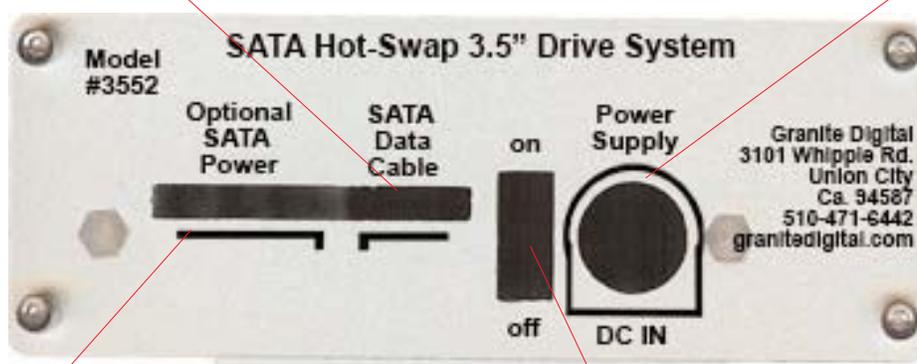
1 Bay External Specifics



The rear panel of the 1 Bay SATA System is simple and easy to use. The power supply or cable from a powered PCI Host Adapter plugs into the DC In connector. Next to that connector is the power on switch. This switch can be used to power the drive mechanism on or off... or leave this switch in the on position and simply pull the drive mechanism out about 1" and the drive will disconnect and power down.

SATA "L" connector from shielded cable plugs in here.

Power Supply or Powered PCI DC In Connector



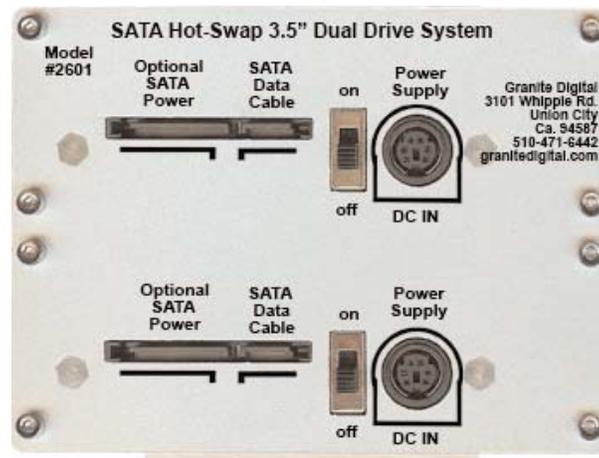
SATA Power connector allows one power supply to power two drives.

Power Supply On / Off switch.

The Optional SATA Power connector allows the case to supply power to an additional drive mechanism or case. We use this connector to power the second drive on our 2 Bay Systems.

When inserting the SATA Data Cable make sure the orientation is correct. The "L" type SATA connector only plugs in one way.

2 Bay External Hot-Swap Specifics



The power supply can be plugged into either DC IN connector. This supply powers both drives when the optional SATA Power Patch Cable is installed. Redundant power can be achieved by purchasing an additional power supply. This redundancy guarantees that if one supply fails, the other will take over without loss of data.

When using one power supply the switch next to the DC IN connector will turn both drives on and off.

Specifications

DIMENSIONS :

1.75"H x 5.75"W x 7.0"D - 1 Bay Internal

2.0"H x 4.75"W x 7.0"D - 1 Bay External

4.0"H x 4.75"W x 7.0"D - 2 Bay External

1.75"H x 19"W x 7.0"D - 2 Bay External RACK

POWER SUPPLY :

35W TUV/CE/UL/CSA - 90-264 VAC In. - 1 Bay External

35W TUV/CE/UL/CSA - 90-264 VAC In. - 2 Bay External

Optional:

35W Redundant Power Supply for 2 Bay External

DATA TRANSFER RATE :

300 MB/second (actual speed depends upon the drive and the computer, see page 4 for details)

DEVICE SUPPORT :

3.5" SATA Hard Drives

CONNECTORS :

1 SATA 7 Pin / 1 IDC Power In - 1 Bay External

2 SATA 7 Pin / 1 IDC Power In - 2 Bay External

OS COMPATIBILITY :

Works with all OS's that support SATA Hot-Swap or that have a compliant card and software. This includes Mac OS OS X.xx, Windows 98SE, ME, 2000, XP and Linux.

CABLE LIMITATIONS :

72" using Granite Shielded External Cables.

Warranty and Service

Granite Digital warrants your SATAVue Hot-Swap System against any defects in material and workmanship, under normal use, for a period of one year following its date of purchase. In the event this product is found to be defective within the warranty period, Granite Digital will, at its option, repair or replace the defective unit.

This warranty is void: a) if the unit is operated or stored under abnormal use and maintenance conditions; b) if the unit is repaired, modified or altered, unless such repair, modification or alteration is expressly authorized in writing by Granite Digital; c) if the unit is subjected to abuse, neglect, lightning strike, electrical fault, improper packaging, or accident; d) if the unit is installed improperly; e) if the serial number of the unit is defaced or missing.

Granite Digital will not, under any circumstances, be liable for direct, special, or consequential damages such as, but not limited to, damage or loss of property or equipment, loss of profits or revenues, cost of replacement goods, or expense or inconvenience caused by service interruptions. Under no circumstances will any person be entitled to any sum greater than the purchase price paid for the unit.

To obtain warranty service, you must contact Granite Digital's Technical Support Department by calling 510-471-6442. They will attempt to diagnose and correct your problem by phone. If the unit does not function properly, they will issue a Return Material Authorization (RMA) number. You may be asked to furnish proof of purchase to confirm that the unit is still under warranty. Also have the serial number available.

All enclosures returned to Granite Digital must be securely packaged and shipped postage prepaid. All the product returns must be authorized in advance by Granite Digital's Technical Support Department. Authorization is confirmed by issuance of the RMA number, which must be written prominently on the outside of the box in which the defective unit is returned to Granite Digital.