

Owners Manual

FireVue™



FireWire 400 / 800 Hot-Swap Systems

Macintosh, Windows, Linux



Trays fit any 3.5" IDE Drive

Granite
D-I-G-I-T-A-L

Supports
ATA-6
Large Capacity Drives

FireWire 1394 Hot-Swap Drive Systems / Case Kits

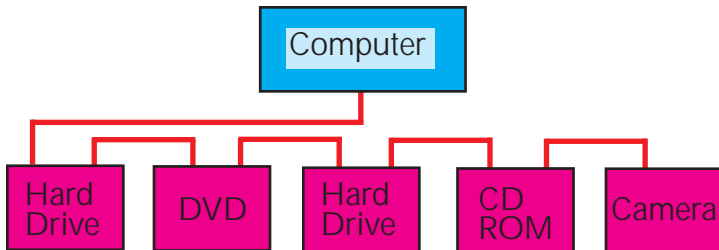
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How FireWire Works

FireWire (IEEE-1394) is a High Performance Serial Bus designed to go up to 800Mbps per second. This ultra-fast data transfer rate is perfect for storage applications using hard drives, cd-roms, optical drives, and tape drives. It is also the solution of choice for digital video camcorders and digital audio. The Firewire Bus allows up to 63 devices to be daisy-chained together.

Using Granite Digital FireVue™ Cables the distance between devices is increased to 32 feet; twice the *IEEE1394* 16 foot limitation. FireWire is "Hot-Pluggable" which allows the capability to add or remove any device with the computer turned on. Our case kit also provides power to the 1394 bus which allows the FireVue Case to be used with laptop computers and digital cameras.

If your computer does not have a built-in FireWire Port, there are two ways that you can add FireWire to your system. The first way is with the addition of a FireWire PCI Host Adapter. These small inexpensive cards simply plug into an open PCI slot. If possible, use only host adapters that use the TI (Texas Instruments) controller chip. These cards seem to be more compatible with all the available devices on the market. The second method of adding FireWire to a computer is with a PCMCIA CardBus Card. This is the preferred method when using laptop computers since they do not usually have available PCI slots. Again, the TI chipset seems to be the most compatible and is highly recommended.



Up to 63 devices can be daisy-chained together.

How FireWire Works

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

1) The bridge chip (our cases uses the Initio or Oxford) must be capable of running 400Mbits / second (FW 400) or 800Mbits / second (FW 800). There are many bridge chips that are installed in cases that do not perform at this level. Additionally, we are one of a few manufacturers that actually writes the firmware for the Oxford parts. This has allowed us to not only add additional compatibility but also to get every ounce of power from the Oxford part. The Granite Digital Website, www.granitedigital.com also has available utilities to continually upgrade this firmware as new devices hit the market. Currently our line of case kits supports the most popular Hard Drives, CD-Roms, CD-RW, DVD Readers, DVD-RW, Tape Drives, and Optical Drives.

2) The drive mechanism must go fast. Currently, there is no available drive that will transfer data and sustain 800 Mbits/second. The fastest drives usually perform in the 40+ MB/s (MegaByte Per Second) range. These drives include most of the 7200rpm mechanisms. The larger cache drives also perform better than the smaller cache drives. To see an unbiased (we hope) opinion take a look at www.barefeats.com. This site offers benchmark testing that covers most of the current drive models.

3) The computer and the speed of its PCI bus will directly affect the performance of the FireWire Bus. An example is the Macintosh Computer that helped pioneer FireWire. Earlier models run at a fraction of the speed of the newer models. The technology associated with FireWire has improved dramatically and with this change, speed has improved. To get the fastest speeds you will need the newest technology. On the Windows side, XP runs FireWire faster than 98SE. Again, the newer technologies offer the greatest performance levels.

Connecting FireWire Devices

There are basically two ways to connect FireWire devices together. The first way is by simply daisy-chaining the devices together and powering them all on. You must power all of the devices because each device actually acts as a signal repeater. This unique FireWire 1394 design allows for the use of longer cables and more connected devices. See the diagram below.

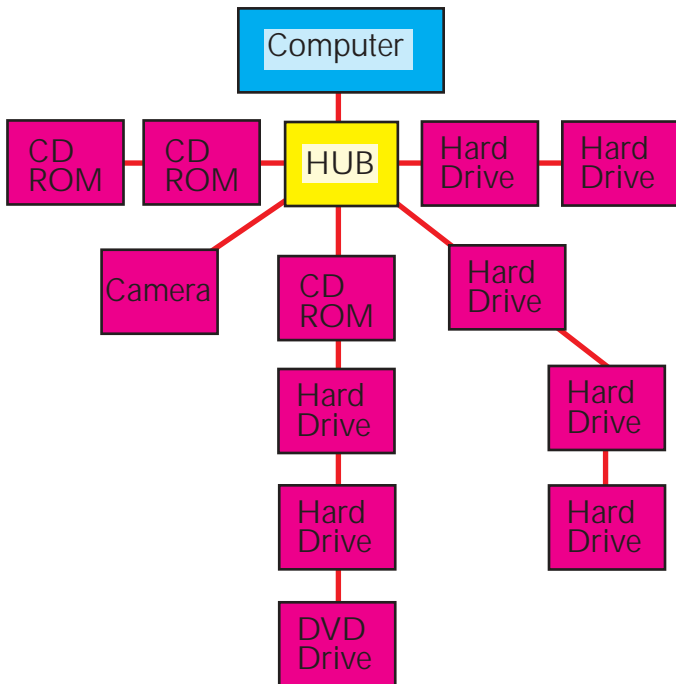


In theory you can have up to 63 devices daisy-chained together. However, in real life situations it would be difficult to run a large number of devices daisy-chained together in this fashion. If any device were to be powered down, the devices beyond the powered down device would immediately vanish from the FireWire 1394 Bus.

The second way to connect FireWire devices is with the use of a FireWire Hub. Hubs allow you to easily remove or add individual devices without disturbing its neighbors. The diagram on the next page shows how the hub eliminates the problems associated with daisy-chaining. However, it should be noted that you can still daisy-chain devices on each leg of the hub. With a little bit of thought, you can put similar devices together and customize your system to fit your usage needs. Each port of the hub is not affected by the other ports so you can easily remove individual devices or chains of devices without effecting its neighbors. The hub also acts as a repeater and hubs can also be daisy-chained together to achieve long cable lengths. With the use of hubs and good quality Granite cables, you can quickly and cost effectively set up a storage network that can't be beat. FireWire truly is designed to be easy to use and expandable.

Connecting FireWire Devices

The HUB below is a 6 port model. There are smaller and larger models available and HUBS can be daisy-chained together for virtually limitless expansion.



Drivers and OS Issues - System Requirements

Macintosh Computers :

The G3 was one of the first computers to offer FireWire as an on-board port. These machines like the rest of the Apple products use a 6-pin connector. The 6-pin connector supplies bus power, as opposed to the 4-pin connector on cameras and on some laptops that do not offer bus power. The new G5's also supports the 800Mbps 9 pin connector.

If running our drive on one of the older Macs like the G3, be aware that sustained data transfer rates will not be as good as with the newer machines. Technology has improved dramatically and true data transfer rates have tripled as the FireWire 1394 technology has progressed. The older machines can achieve about a 14MB/s (Megabytes per second) sustained data transfer rate while the new ones go much faster.

The early G4 models are a bit faster than the original G3s. If using a DV Camera and FireWire as a storage device, we advise that this is the minimum platform to use for achieving good quality results. DV uses approximately 4MB/s (Megabytes per second) in order to capture data but then there is also the application overhead and the reverse data stream back to the FireWire storage device. Adding it all together, about 12-14 MB/s (Megabytes per second) is needed to get perfect results. Adding more memory will allow your application program to run more efficiently. We recommend at least 256MBs of RAM memory as a minimum.

The G4's along with the other new generation G5 Macintosh's will run FireWire Hard Drives at very close to the 40MB/s (Megabyte per second) or the new 80MB/s FireWire 800 limit. This means that combining a fast 7200 rpm hard drive mechanism in one of our drive enclosures will help to achieve speeds well into the 40 plus MB/s (MegaBytes per second) range. Additionally, using multiple FireWire channels and RAIDing (striping) two or more channels together, speeds close to 150MB/s can be achieved. RAID software is available from a variety of third party manufacturers and also it's built into the OSX operating system.

Drivers and OS Issues - System Requirements

Windows Computers :

FireWire is supported by Windows 98SE, ME, 2000, and XP. The drivers necessary for running FireWire is on the Microsoft Installation CD. Most of the time these files are automatically installed at installation time, however, if they were not, access the Microsoft CD and install them separately. This is especially true with 98SE and ME.

The other item needed to run FireWire devices is a PCI or CARDBUS FireWire Card. Some computers come equipped with these already but if purchasing a third party card, we believe the TI (Texas Instruments) based cards are the most compatible. These cards cost a little more but their added compatibility is well worth the extra cost. These cards should need no additional software to run on your PC so the standard Microsoft drivers will work perfectly.

To achieve the highest performance in FireWire you must understand that Microsoft has improved on the FireWire implementation as the operating systems have improved. In other words, FireWire runs faster using a new computer with XP than it will with an older machine running 98SE. If you are looking to achieve close to the 40MB/s performance levels, will require a computer with a fast PCI bus, adequate memory, and a fast processor. Usual speeds on the older machines are around 14MB/s while speeds can go up into the high 30MB/s when using a state-of-the-art computer. Additionally, speed can also be improved by using the fastest drive mechanisms. Currently, the fastest drives are made by IBM and recently Western Digital introduced a drive with an 8MB buffer that gives IBM a run for its money. As time goes by, expect more high performance drives in the 7200rpm and in the future 10,000rpm models. Higher speeds can also be achieved by running RAID on multiple drives with multiple FireWire Channels. For more information on these additional technologies, feel free to call our Sales/Techs at 510-471-6442...it's your dime but the information is priceless.

Drivers and OS Issues - Macintosh OS 9.xx, OS X

Apple introduced FireWire with OS 8.6. Since this introduction, many advances have been made. We recommend running OS 9.2.2 when using FireWire. This newer version of the OS uses the latest FireWire extensions, FireWire Enabler 2.8.6 and FireWire Support 2.8.6. These two files are needed to run FireWire and this latest version fixes many previous bugs. If you must run an older OS, we recommend using these two files from 9.2.2 to replace the earlier Apple driver files. Safely do this by moving the original files that are in your Extensions Folder to your desktop and replacing them with the newer files. After rebooting your computer the new drivers will take effect.

When plugging in a new drive, the Macintosh will ask if you want to initialize the drive. There are two type of file systems that can be installed, the standard HFS or the extended HFS+. Always choose HFS+. If you do not, the files that you copy to the drive will become very large because the block size is designed for a small drive not a large one.

When running a third party FireWire Driver, please be aware that it may cause this drive and possibly others not to mount. Currently, most of the software developers have worked out the "Ownership" issues but there are still some issues with some third party drivers. If your drive does not show up on the desktop, then check your extension folder for third party drivers and remove them. Leave on the Apple FireWire Drivers, which are FireWire Enabler and FireWire Support.

When running OSX, there are a few issues to consider. To make the FireWire drive bootable under both OS9 and OSX, you will need to initialize the drive using the OSX CD. When it asks if you want to install OSX drives, answer YES. After initializing the drive under OSX, go ahead and install OSX via the CD. Then install OS9 by either using a 9.2.2 CD or just copying the System Folder and OS9 Application Folder across.

Drivers and OS Issues - Windows 98SE, ME, 2000, XP

Windows 98SE (second edition) was the first MicroSoft OS version that included support for FireWire 1394. This first implementation does not operate as efficiently as the newer versions of the MicroSoft OS family and speeds will be slower when running this Operating System. This was Microsoft's first OS with FireWire support but it is not as good as what is currently available in the newer OS's.

When using these older OS's (98SE & ME), use the Fdisk and Format Utilities in order to format and partition a new drive. Complete instructions are detailed on the Microsoft web site. Initializing a FireWire drive is identical to initializing any standard IDE mechanism and this must be performed before the drive will work. Fdisk and Format are accessed from the the DOS Prompt.

The newer OS's, 2000 and XP use the Disk Management utility to partition and format a new drive. Information on this utility is also available on the Microsoft web site. The interface is graphical and this new drive will usually appear at the end of the list of drives. The drive will show up as a "non-allocated" volume. After you partition and format the drive, the drives icon will appear with the other drives in the "My Computer" window.

*****Note :** You will be given choices as to which file system you want to run, FAT32, NTFS, etc. If you choose NTFS, the drive can only be read by the Windows 2000 operating systems. If you want to also use the drive with 98SE or ME, choose FAT32 as your file system choice.

Update Firmware

All of our FW 400 bridge boards contain a special flash memory that allows them to easily be updated. Usually the only reason that a bridge board needs to be updated is if a new drive comes out and the board is not compatible with it.

Updating should only be done with the drive mechanism not mounted. This is done by either throwing the drive in the trash (Macintosh) or stopping the drive (Windows). A mounted drive may have problems being updated because the operating system still has control of the drive. When we update the firmware, our application takes the drive offline. In other words, we take control of the drive and OS's sometimes have a problem with this.

This window displays the serial number and firmware version of every Granite bridge you have connected. It also displays if the drive is attached by showing the letters, ata or cd under dev1 and dev2.



After pressing the Browse button and selecting the new update file, the file-name is displayed in this window.

Once you have selected the proper file, Update starts the process.

Scan allows you to re-scan the firewire buses for new or removed bridge boards.

It is also advisable to only have the cases to be updated plugged into the firewire bus. The power must be on but the drives unmounted. Other devices (like cameras, printers, scanners, etc.) can cause problems in the upgrade process. If something goes wrong, you will need to call the Granite Digital Technical Support Department... 510-471-6442. They will need the serial number that is printed on the label of the bridge board. Once the firmware has been updated you can check the LCD module and verify that the new firmware version and date have changed.

Updating Firmware

The Relax/Granite Field Upgrade Utility can be downloaded from our web site, www.granitedigital.com. We have versions for Mac and Windows. Once installed, launch this application and check the serial number and version of your bridge board that is installed in the case. The letters ATA should also appear under Dev1.

Included with the “Field Upgrade Utility” is our FireWire Browser. This application displays everything that is attached to your FireWire bus. It can be a very useful tool for checking your devices and cables. The main



window displays all the available FireWire buses and all the devices that are plugged into that bus. This is the perfect tool to quickly find out if the devices you have plugged in are showing up on the FireWire Bus. Additionally if you double click on the any item in the list, the Browser will give you a long list of information about the device and the manufacturer.

The Browser works with virtually all devices including hard drives, cd-roms, dvd-roms, tape drives, printers, cameras, and any other device that complies with the IEEE-1394 standard and is registered with this standard.



Removing the Hot-Swap Tray

We have designed our 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.

Removing the tray is done by lifting the handle up and gently pulling out the tray. Make sure that the key lock is in the unlocked position before trying to remove the tray.

The system ships with the key in the unlock position and the key is located inside the tray along with the hardware for fastening the hard drive to the tray.



When the key lock is unlocked, the slots will be lined up at the bottom.

Grip the tray firmly when removing it so that it does not get accidentally dropped. This is very important after you have installed the hard drive. Drives are fragile and should be handled with care. The tray protects the drive but the mechanism can still be damaged if it gets dropped.

Gently pull the tray out. If you ship the drive mechanism, make sure to package the drive in a box with at least 4" of foam all around the tray.



Removing the Hot-Swap Tray

The Tray should be placed on a flat work surface. When installing the hard drive, static electricity can cause damage to the drive mechanism. Take care to

make sure you are grounded properly and are working on a surface that is not prone to static discharge. One way to add a little security is to touch something that has a good ground before touching the drive mechanism. One area that is grounded is the rear of the Hot-Swap Case when it is properly plugged into a grounded outlet.



Slide the tray top to the rear and remove the package of hardware.



Once the cover is removed and the hardware package opened, prepare your drive mechanism for installation. IDE drives have jumper setting for slave, master, master with slave, etc. The settings should always be set to **MASTER**.



Installing the Drive

*** Note that the drive must be set to the Master position (this is done with a set of jumpers on the rear of the drive mechanism). The Master position should be labeled on the the drive mechanism, but if it is not, jumper settings will be available on any drive manufacturer's website. Leaving the drive in a setting other than Master will make the drive malfunction when used with our tray. If you have any questions, please feel free to call our technical support department for help...

510-471-6442. It's your dime but the support is free.



Plug in the 4 pin power cable and the 40 pin data cable. Both cables have locating tabs so you can not plug them in upside down. Make sure they are completely plugged into their respective sockets. Sometimes rocking the 4 pin cable into its socket makes it easier to insert it.

With the two cables inserted, gently lower the drive into the tray bottom. Next line up the drive so that it is centered. Make sure the mounting holes line up and also make sure that the flat LCD data cable is properly positioned under the drive and properly connected to the LCD module in the front. If you accidentally pull this cable out, it can be reinserted by opening the connector with a small flat headed screw driver. With the connector open, insert the cable again and then carefully close the connector again.

Installing the Drive

There are two different types of screws used on drive mechanisms. We supply both types. Test the screws to make sure they are the correct size.



Using a Phillips head screw driver install the (4) mounting screws that hold the drive in place. These screws secure the drive and guarantee that it will be properly grounded when inserted into the system. Do not over tighten the screws. Once the (4) screws are inserted check to make sure that no cables are pinched and that the drive is centered properly.

The top slides on two rails and locks into place. Make sure that both sides are even when the top is slid on.



Now reinstall the top of the tray. The side with the notch goes to the front. When sliding the top into place, it will snap into its final position. You are now ready to install the tray back into the Hot-Swap System.

Installing the Drive



When the tray is flush with the front it has been inserted correctly. Now you can turn the key lock and power the drive mechanism up.

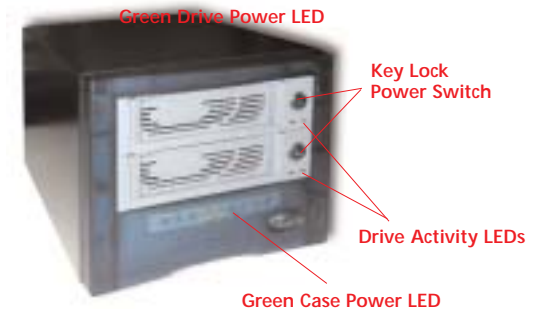


The tray slides back into the Hot-Swap System with very little effort. As the tray reaches the last 1/4 inch, push it in using the handle. The tray will now be flush with the front and has seated properly. Never force the tray into place and always make sure there is nothing in the opening before you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

Using the key that is supplied lock the tray into place. When this is done the drive mechanism and the LCD display are also powered up. The drive is now ready to be used.

Note : There is a master power switch that must be turned on. This switch can remain on all the time. The key lock is what powers the drive and can be used as the power switch.

Testing the Drives



Without connecting the drive to the computer, plug in the power cable and turn the drive on using the main power switch on the front of the case. The Green Power LED on the case should come on immediately.

Next use one of the keys that are supplied with the system and lock the tray in place. This also turns on the power to the drive mechanism and the Green Drive Power LED should come on. The key acts as an on/off switch and is what will normally be used to turn the drive power on and off. The main power switch in the rear should only be turned off if you are going to move the drive, otherwise simply leave it turned on for normal use. The power consumption is minimal even with the main power switch on.

Finally if both green power LED's turn on you can go ahead and plug the data cable into the back of the enclosure and connect it to the computer.

Troubleshooting

1- THE DRIVE DOESN'T MOUNT:

The easiest way to diagnose what is going on with a drive that will not appear is to figure out if the hardware is working correctly. Do this by using our "Field Upgrade Utility" that is available for download on our website, www.granitedigital.com. Once you have downloaded the utility, launching it shows you a window similar to the one below.

The Field Upgrade Utility can be used as a diagnostic tool. You can tell if the cable and the case are working correctly because the serial number and version date should be shown in the window. If this is not the case, check that the cable is securely attached, the power to the case is on, the green LED is lit. If the serial number and version date are shown but the letters "ata" do not show up under *dev1*, then the drive is not being recognized. Check and make sure the drive is set to **master**. To set the jumpers, go to the drive manufacturer's website and download their specification sheet on the drive. If both the serial number and the "ata" is displayed, then the hardware is working correctly.



We next need to look at software and formatting.

Macintosh OS 9: The most common reason the initialization screen does not come up and the drive does not mount is when third party drivers have accidentally taken control of the FireWire bus. To eliminate this problem go into the Extensions folder and remove all third party FireWire Drivers. The Apple drivers will run most drives and do not conflict with other drives. The two Apple files that must be present are, FireWire Enabler and FireWire Support. Remember you will need to reboot in order for any Extension Folder changes to take place. If the drive was originally partitioned on the internal IDE bus or

Troubleshooting

if it was a Windows drive, there is also the chance that the drive will not mount. To reinitialize a drive in this state use the diagnostic menu on our LCD module and quick erase the drive. Then plug the drive into the Macintosh and the window to initialize the drive will appear as soon as the drive mechanism comes up to speed. Use Extended HFS+ on your partition selection. Once the drive has been re-initialized, you can put it back into the FireWire Case and it should mount. Use the Field Upgrade Utility to double check the drive and remember to set it back to master when installing it into the case.

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 FireWire drive is exactly the same as any other Microsoft supported drive.

Again you can use the "Field Upgrade Utility" to check and make sure that the drive is being seen properly prior to formatting. You should see their serial number, version date, and the letters "ata" under dev1.

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".

Troubleshooting

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

FireWire bus speed is determined by four things:

1- The drive performance level. Faster drives (7200rpm) have higher data transfer rates and make a difference in speed. Larger buffer size also improves drive performance.

2- The bridge technology. In this case you have chosen the fastest case available. Our Hot-Swap System will transfer up to 80MB/s (Megabytes per second). This is currently faster than the fastest drives on the market (IBM 7200rpm Deskstar's).

3- The computer itself and its FireWire host adapter. The faster the computer the faster its FireWire performance. Also important is the actual PCI speed that the computer supports. The FireWire host adapter will work faster with faster PCI speeds. We have also found that the TI (Texas Instruments) host adapters seem to be the most compatible and fastest.

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.

4- THE DRIVE DISAPPEARS WHEN I TURN OFF OTHER DEVICES:

FireWire is a serial bus and every device that is daisy-chained together actually acts as a repeater. When powering down a FireWire device, all the devices after it will disappear from the computer. The way to eliminate this problem is by adding a FireWire HUB. The HUB allows each device to be easily removed and reinstalled at any time without disturbing its neighbors.

Troubleshooting



Specifications

DIMENSIONS :

Varies, check spec. sheet on website - Fits a 3.5" IDE Drive Mechanism of any capacity.

POWER SUPPLY :

60W-2, 200W-4, 300W-8 TUV/CE/UL/CSA

90-264 VAC Universal AC In.

Output +5V -- +12V

DATA TRANSFER RATE :

400 / 800 Mbit/second (actual speed depends upon the drive and the computer, see pages 3 and 4 for details)

DEVICE SUPPORT :

3.5" IDE Hard Drives, ATA 33/66/100/133 Speeds

COMPATIBILITY :

IEEE 1394-1995 and 1394A and 1394B

IDE Ultra ATA 33/66/100/133 Bus

CONNECTORS :

1 - IEEE 1394 6 Pin Type 400 Mb/s model

1 - IEEE 1394 9 Pin Type 800 MB/s model

1 - IDC Power In All models

OS COMPATIBILITY :

Works with all OS's that support IEEE-1394 or that have a compliant card and software. This includes Mac OS 9.xx, OS X.xx, Windows 98SE, ME, 2000, and XP.

CABLE LIMITATIONS :

4.5 meters (15 feet) with standard cables, 10 meters (32 feet) with Granite Digital Gold Cables. Our high quality cable design allows us to transfer data at twice the distance of standard 1394 cables.

Warranty and Service

Granite Digital warrants your FireVue 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.