



PRO Mini

MPD Pack Portability
- Plus -

Available PCI Express Expansion Card Slot

Installation and User's Manual



Designed for Video Editing and Content Creation Professionals



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1. Introduction

We appreciate your purchase of the Pro Mini from Dulce Systems. You have everything you need to quickly and easily connect this video storage unit to your editing computer or workstation. You are a short time way from your next blockbuster creation.

This Installation and User's Manual is intended to streamline the process of getting your RAID storage system up and running so you can get to work quickly.

For most typical video editing storage requirements, we have preconfigured the PRO Mini to provide a streamlined installation. Refer to the Pre-Configuration Sheet for the exact pre-configuration of your PRO Mini; the default configuration is for RAID 5 (efficient protection mode) and pre-formatted for Mac OS X or Windows OS. Just simply follow the installation steps outlined in this manual, and you will up and running in no time.

Safety Considerations

1.1.1. SAFETY CONSIDERATIONS



WATER AND MOISTURE

To reduce the risk of fire or electrical shock, do not expose unit to rain or moisture. Do not operate unit near water – such as: bathtub, washbowl, kitchen sink or laundry tub, wet basement, or near a swimming pool.

STABILITY

Do not place this unit on an unstable cart, stand, bracket, or table. Unit may fall, causing serious injury.

VENTILATION

Do not block front and rear ventilation. Proper airflow is required to ensure reliable operation and prevent unit from overheating. Do not place unit in an enclosed space where insufficient ventilation is available.

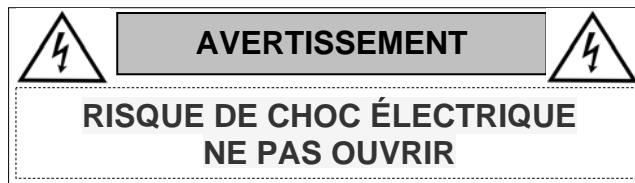
ELECTRICAL

Do not defeat the safety purpose of the grounding power plug. The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon or against it.

SERVICING

Do not attempt to service this unit yourself. Opening or removing the front, side and rear covers will expose you to dangerous voltages or other hazards.

1.1.2. DES MESURES DE SÉCURITÉ



EAU ET HUMIDITÉ

Pour réduire le risque d'incendie ou de choc électrique, ne pas exposer l'unité à la pluie ou l'humidité. Ne pas faire fonctionner l'appareil près de l'eau - telles que: baignoire, un lavabo évier ou un bac à lessive, sous-sol humide, ou près d'une piscine.

STABILITÉ

Ne pas placer cet appareil sur un chariot, un support, un support ou une table qui est instable. L'unité peut tomber et causer des blessures graves.

VENTILATION

Ne pas bloquer la ventilation avant et arrière. Une ventilation adéquate est nécessaire pour assurer un fonctionnement fiable et empêche l'unité de la surchauffe. Ne pas placer l'appareil dans un espace clos où la ventilation ou pas disponible est insuffisant.

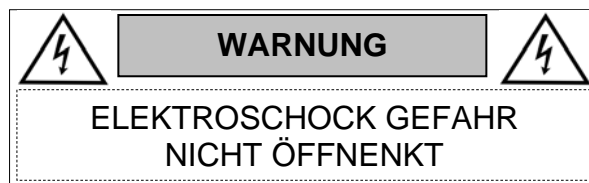
ÉLECTRIQUE

Ne supprimez pas le dispositif de sécurité de la prise d'alimentation mise à la terre. Le cordon d'alimentation doivent être acheminés de sorte qu'il n'est pas susceptible d'être piétinés ou pincés par des objets placés sur ou contre lui.

ENTRETIEN

Ne tentez pas de réparer cet appareil vous-même. Ouvrir ou retirer l'avant, latérales et les couvertures arrière peut vous exposer à des tensions dangereuses ou autres dangers.

1.1.3. SICHERHEITSHINWEISE



WASSER UND FEUCHTIGKEIT

Um die Gefahr eines Brandes oder eines Stromschlags zu verringern, darf nicht zu regen oder Feuchtigkeit aussetzen. Nicht betreiben, Einheit der Nähe von Wasser - wie zum Beispiel: Badewanne, Waschbecken, Spülbecken oder einer Waschmaschine, feuchten Keller oder in der Nähe eines Schwimmbeckens.

STABILITÄT

Haben Sie dieses Gerät nicht auf einen instabilen Wagen, Ständer, Halter oder Tisch. Gerät könnte herunterfallen und schwere Verletzungen verursachen.

LÜFTUNG

Blockieren Sie nicht die Vorder-und Hinterachse Belüftung. Zuverlässiger Betrieb erfordert ausreichende Luftzufuhr um das Gerät vor Überhitzung zu vermeiden. Stellen Sie keine Einheit in einem engen Raum, wo nicht genügend Belüftung vorhanden ist.

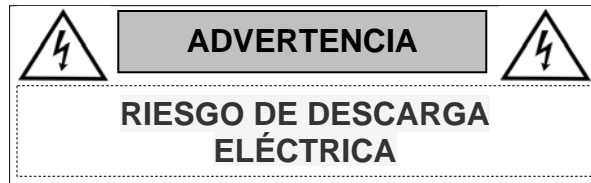
ELEKTRISCHE

Umgehen Sie nicht die Sicherheitsfunktion des geerdeten Netzstecker. Das Netzkabel muss so verlegt, dass es nicht darauf getreten werden oder darauf abgestellte Gegenstände auf oder gegen das Netzkabel gestellt werden.

WARTUNG

Dieses Gerät sollte nur durch autorisierte Personal gewartet werden. Das Öffnen oder Entfernen der vorderen, seitlichen und hinteren Abdeckungen werden in der Exposition gegenüber gefährlichen Spannungen oder anderen Gefahren führen.

1.1.4. CONSIDERACIONES DE SEGURIDAD



AGUA Y HUMEDAD

Para reducir el riesgo de incendios o descargas eléctricas, no exponga la unidad a la lluvia o la humedad. No opere la unidad cerca del agua - como por ejemplo: bañera, lavabo fregadero de la cocina, el lavadero, sótano húmedo o cerca de una piscina.

ESTABILIDAD

No coloque este aparato en un carrito, soporte, soporte o mesa que sea inestable. La unidad puede caerse y causar lesiones graves.

VENTILACIÓN

No obstruya la ventilación delantera y trasera. Flujo de aire adecuado es necesario para garantizar un funcionamiento fiable y evitar que la unidad se sobrecaliente. No coloque la unidad en un espacio cerrado donde la ventilación no hay suficiente.

ELÉCTRICA

No anule el propósito de seguridad del enchufe de conexión a tierra. El cable de alimentación debe colocarse de forma que no es probable que sean pisados o aplastados por objetos colocados sobre o contra ella.

SERVICIO

No intente reparar esta unidad usted mismo. Si abre o retira la parte frontal, lateral y cubiertas traseras le expondrá a tensiones peligrosas u otros peligros.

1.2. System Requirements

Operating Systems:

- Windows 7 / Server / XP / 2000 / Vista
 - 64-bit / 32-bit
- Mac OS X 10.6 or higher.



Editing Computer or Workstation:

- Apple G5 with one available PCI-e Gen1 x8 slot.
- Apple Mac Pro with one available PCI-e Gen2 x4 slot (Slot 3 or 4).
- Windows compatible PC with one available PCI-e Gen2 x8 slot.
- CDROM drive or Internet access (to install drivers and utilities)

1.3. Technical Support

Phone	818-435-6008
FAX	818-576-0324
E-mail	support@dulcesystems.com
Web	www.dulcesystems.com

If the product requires service, please contact Dulce Systems Technical Support and obtain an RMA number. Ship the product properly packaged to:

Dulce Systems
Attn: RMA#
9620 Topanga Canyon Place, Suite E Chatsworth, CA 91311

2. Getting Started

The PRO Mini comes pre-configured and ready for use, just install the MPD Pack and the supplied PCI-e (PCI-express) HBE (Host Bus Extender) card, connect the cables and install the software driver and RAID Console.

2.1. *Packaging*



Please do not discard the boxes and packing materials in case you might need to reuse them later. Always ship the product in its original packaging. Improperly packaged products will be subjected to shipping damage, for which you will be liable for the repair.

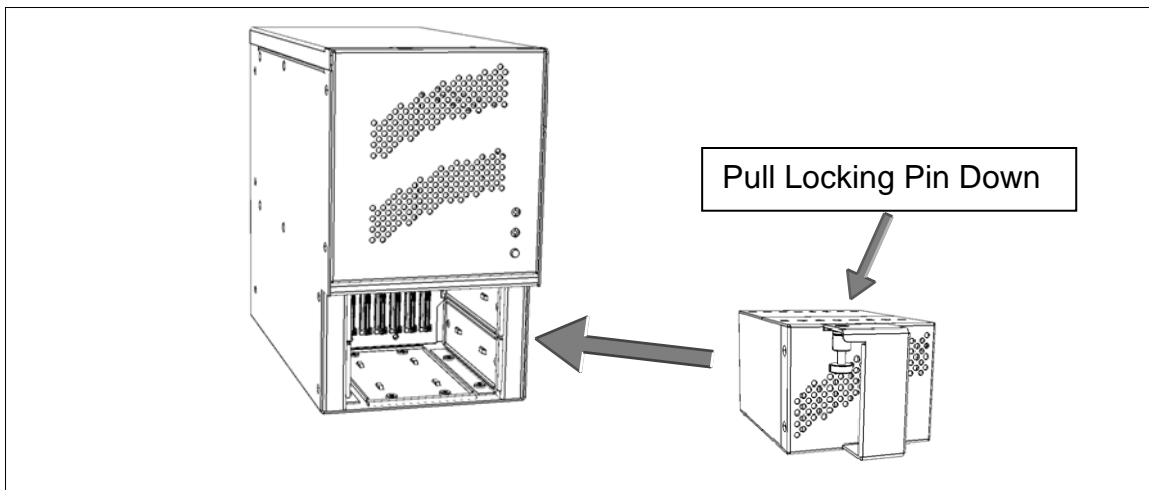
2.2. *Check List*

- Installation and User's Manual (this manual)
- Pre-Configuration Sheet (specifies pre-configured for Mac or Windows)
- Installation CD ROM (contains OS Drivers and RAID Manager)
- Power Cord (North America user only)
- Pro Mini system enclosure/chassis
- MPD Pack with 8 disk drives installed
- PCI-e x8 Host Bus Extender card
- 1-meter PCI-e x8 Interface Cable (3 and 7 meters optional)

3. Overview

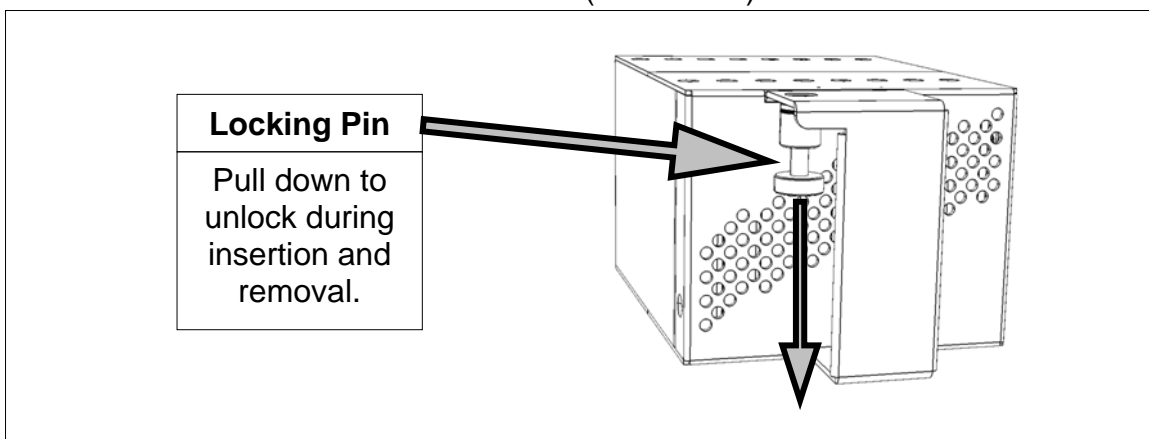
3.1. *The Bezel*

The PRO Mini does not have a front bezel that needs to be removed to access the Disk Module (MPD Pack). The Disk Module (MPD Pack) is held by a spring loaded Lock Pin. The spring loaded lock pin is simply pull down to remove or insert the Disk Module (MPD Pack).

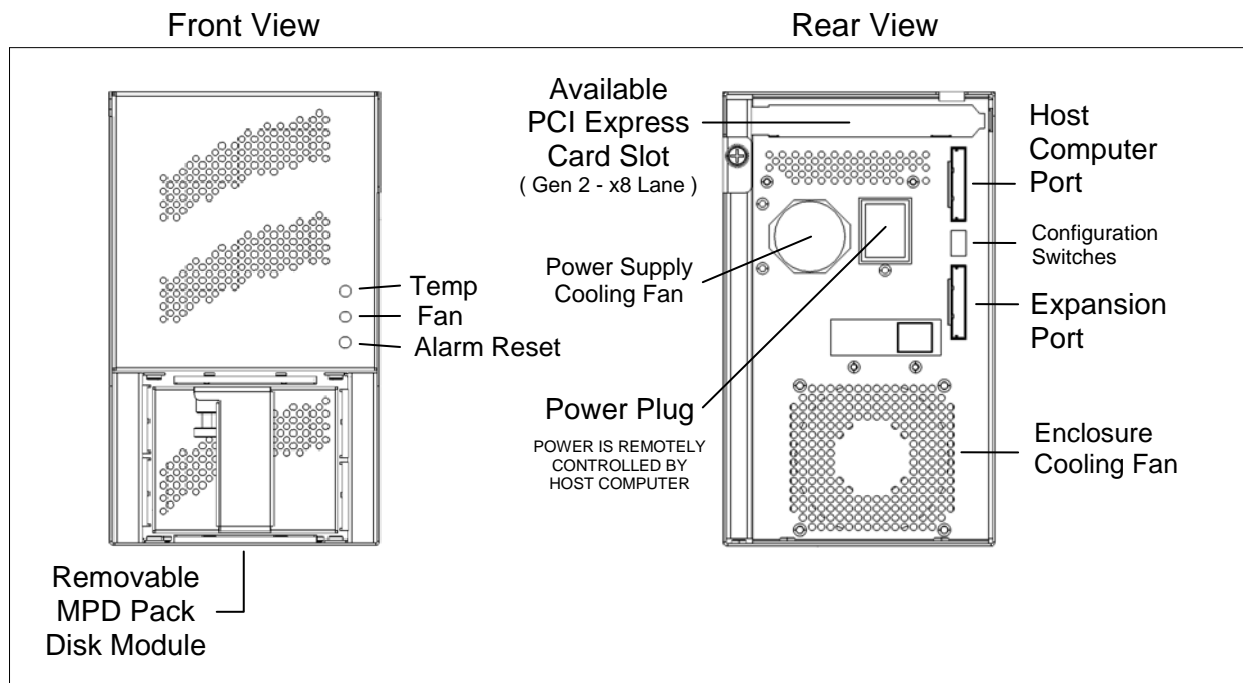


3.2. *Disk Module (MPD Pack)*

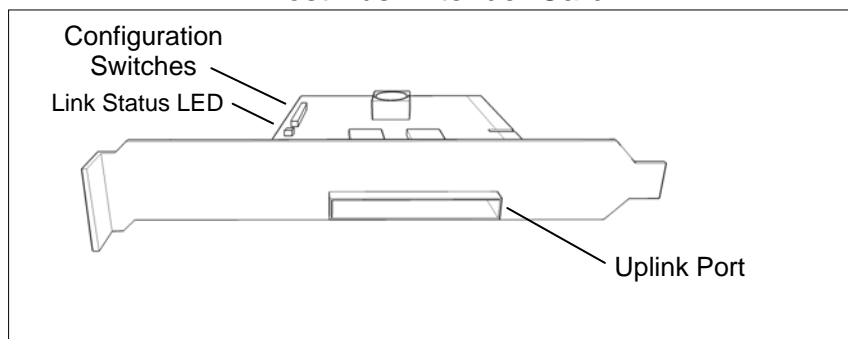
Disk Module (MPD Pack)



3.3. Front, back and adapters



Host Bus Extender Card



4. Installation

Please follow these few steps to install the PRO Mini. This process typically takes about 20 minutes to complete.

Overview of installation:

- Disk Module MPD Pack Installation
- Host Bus Extender installation
- Connect Uplink cable to the Drive Enclosure
- Driver Installation
- RAID Console Installation

The PRO Mini is normally shipped pre-configured in RAID 5 mode and pre-formatted for Apple Mac OS X or Windows OS, as specified in the supplied Pre-Configuration Sheet:



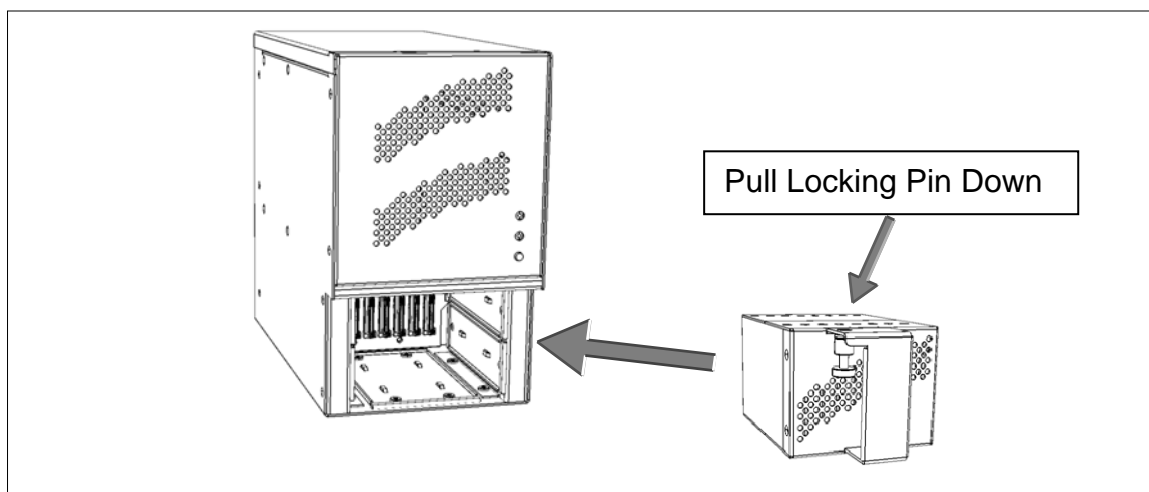
Mac OS X: After the Driver / RAID Manager Installation and a reboot are performed, the PRO Mini icon will appear on the desktop ready for use.



Windows OS: After the Driver installation and a reboot are performed, the PRO Mini will appear in 'My Computer' and is ready for use. The RAID Manager is installed using a RAID Manager Installer.

4.1. *Disk Module (MPD Pack) Installation*

Install the Disk Module (MPD Pack) into the open slot. Pull the Lock Pin down and insert drive pack fully, release Locking Pin to secure.



4.2. Host Bus Extender Card

The HBE is for installation in a desktop computer with an available PCI-e slot. Turn off the computer and unplug the power source before proceeding with the Host Bus Extender (HBE) Card installation.



PCI-express Host Bus Extender (HBE)

Note: PCI-e (PCI express) and PCI-x cards are not compatible and are not interchangeable. The card slot connectors of PCI-e and PCI-x cards are similar in appearance; however, a PCI-e card slot connector will only allow a PCI-e card to be inserted, and a PCI-x card slot connector will only allow a PCI-x card to be inserted. If the Dulce Host Bus Extender (HBE) will not fit into your computer's connector, please verify the computer connector is a PCI-e connector slot or contact Dulce Systems Technical Support:

Dulce Systems Technical Support

(818) 435-6008 (PST 8AM to 5PM)

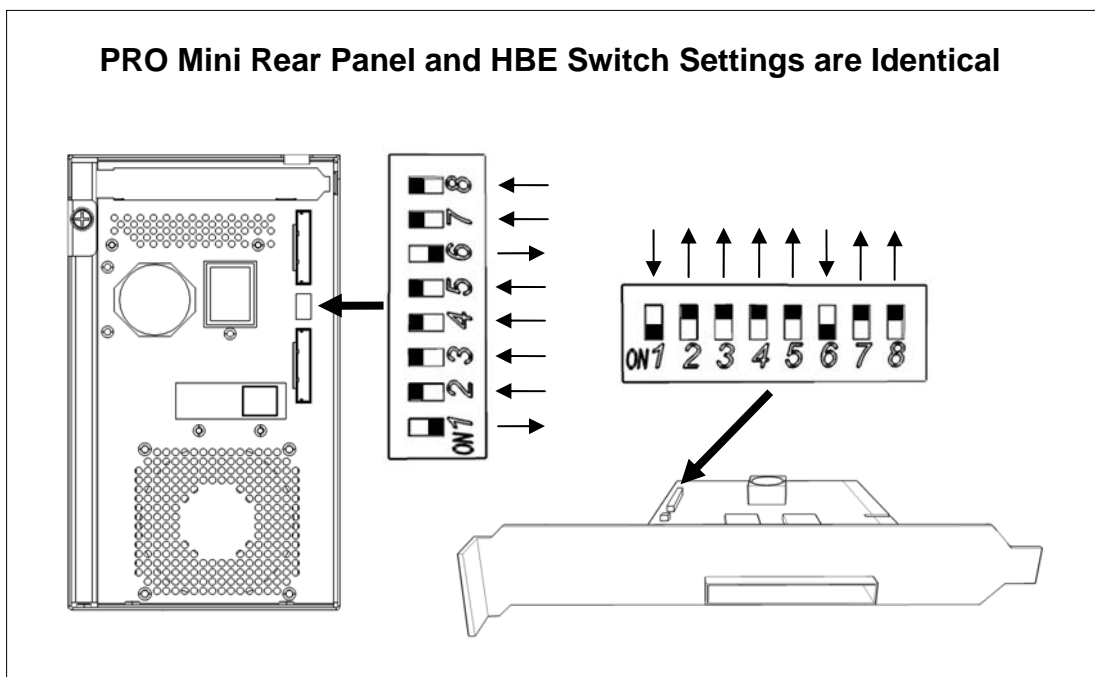
support@dulcesystems.com

4.2.1. Switch Settings

Configuration switches are provided to allow the PRO Mini to accommodate PCE-e cable lengths from 1 to 7 meters. The switch settings are configured at the factory to match the PCI-e cable length originally shipped with the PRO Mini; the switch settings only change if a new PCI-e cable length substituted for the original cable length.

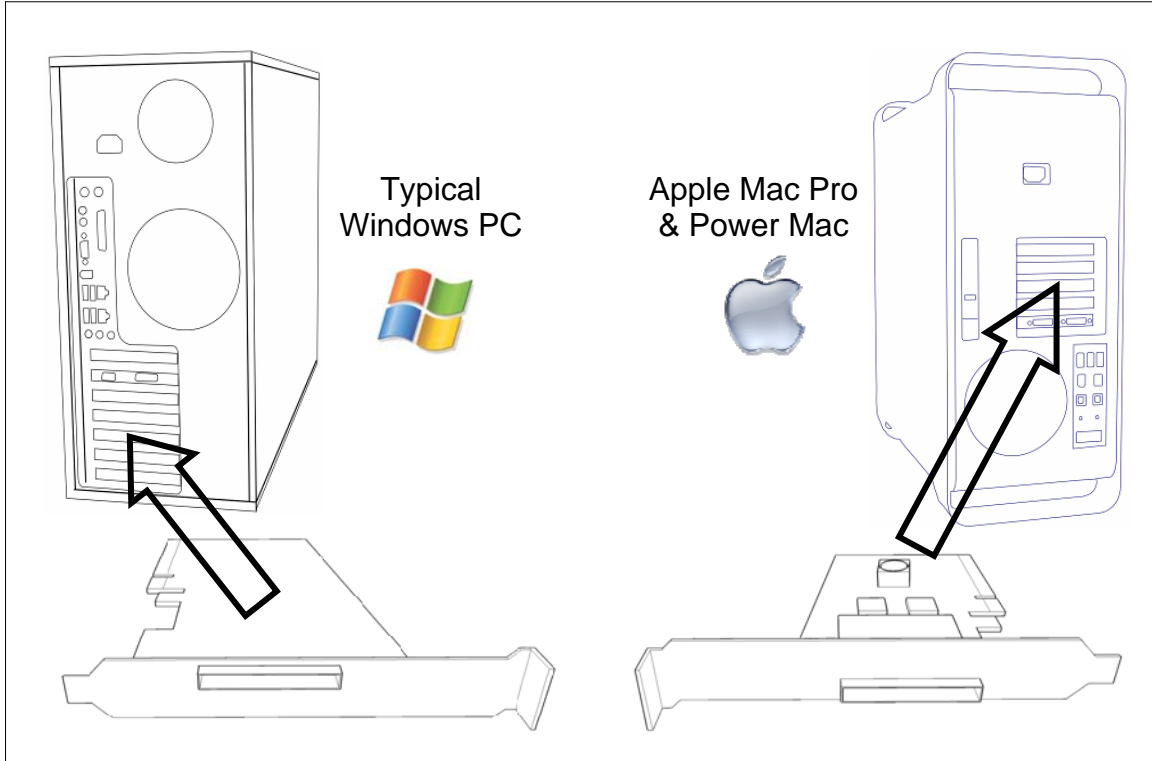
Cable length selection

The PRO Mini and HBE configuration for cable lengths of 1 to 3 meters are shown below. If longer cable lengths are used, the appropriate switch settings are provided with the cable.



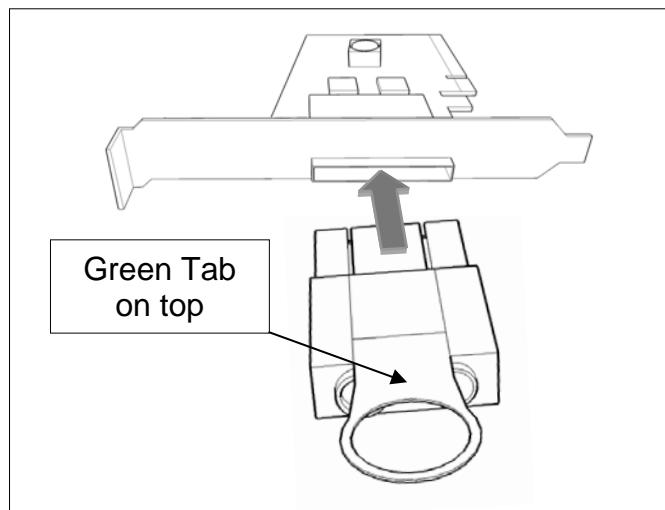
4.2.2. HBE Card Installation

The PCI-e HBE Card requires an x8 lane slot connector or larger. Computers with PCI-e slot connectors less than x8 lanes will not physically accommodate the HBE. PCI-e slots with x16 lane connectors will accommodate a HBE Card.



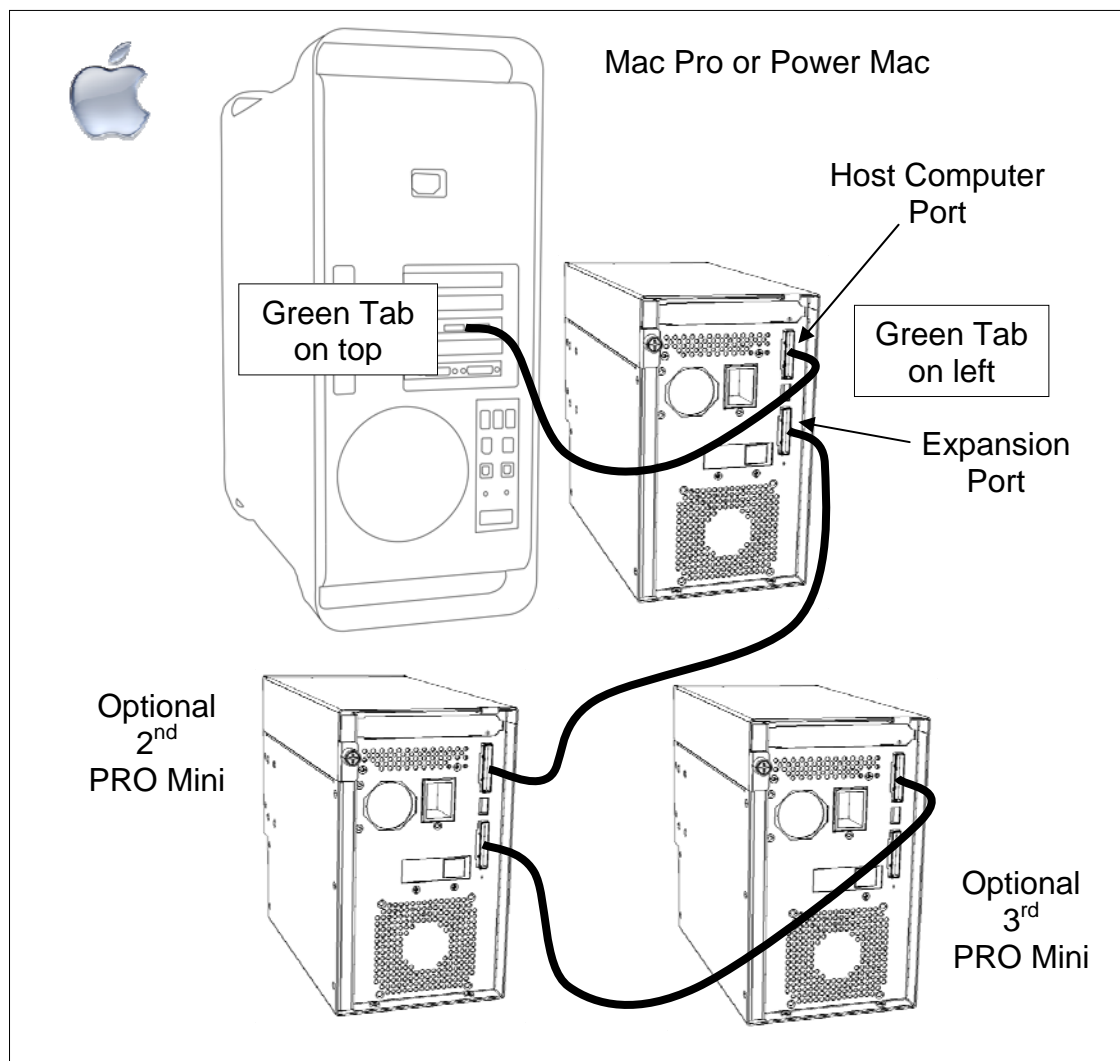
4.2.3. HBE Cable Connection

The HBE PCI-e x8 cable interfaces/connects the Mac, or PC, to the PRO Mini. The green tab is up in the Mac orientation. To remove, pull the tab to unlock the latch and then pull the metal body to remove the connector.



4.2.4. Mac Connection

The PRO Mini is connected to the Mac as shown below:



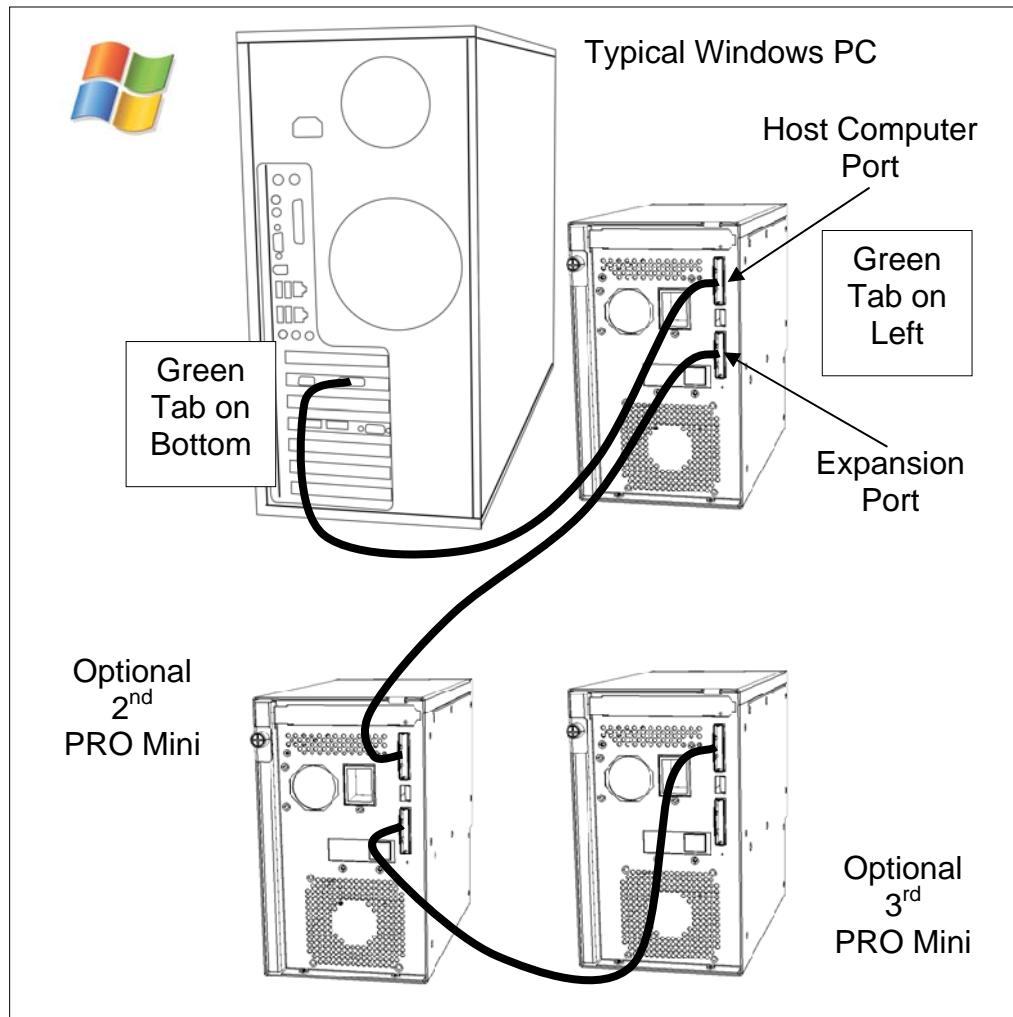
The PRO Mini features an Expansion Port; the Expansion Port allows for adding storage capacity, and increased storage throughput, without requiring additional Mac PCI-e slots. An additional PRO Mini is added by simply connecting the Host Computer Port of the PRO Mini to the Expansion Port of the previous PRO Mini; up to 3 units can be accessed from a single Mac PCIe card slot.

Each additional PRO Mini automatically appears as a separate device to the Mac; simply adding a PRO Mini adds total storage capacity by automatically providing an additional storage device.

To optionally add storage capacity, as a single device with increased write/read transfer rate performance, the Mac Operating System's Disk Utility is used to STRIPE additional PRO Mini units together to operate as a single device.

4.2.5.Windows PC Connection

The PRO Mini is connected to a Windows PC as shown below:



The PRO Mini features an Expansion Port; the Expansion Port allows for adding storage capacity, and increased storage throughput, without requiring additional Host Computer PCI-e slots. The Host Computer Port of an additional PRO Mini is simply connected to the Expansion Port of the previous PRO Mini; up to 3 units can be accessed from a single host computer PCIe card slot.

Each additional PRO Mini automatically appears as a separate device to the Host Computer; simply adding a PRO Mini adds total storage capacity by automatically providing an additional storage device.

To optionally add storage capacity, as a single device with increased write/read transfer rate performance, the Windows Operating System's Disk Manager is used to STRIPE additional PRO Mini units together to operate as a single device.

4.3. Driver Installation

4.3.1. Mac Pro – Expansion Slot Utility settings

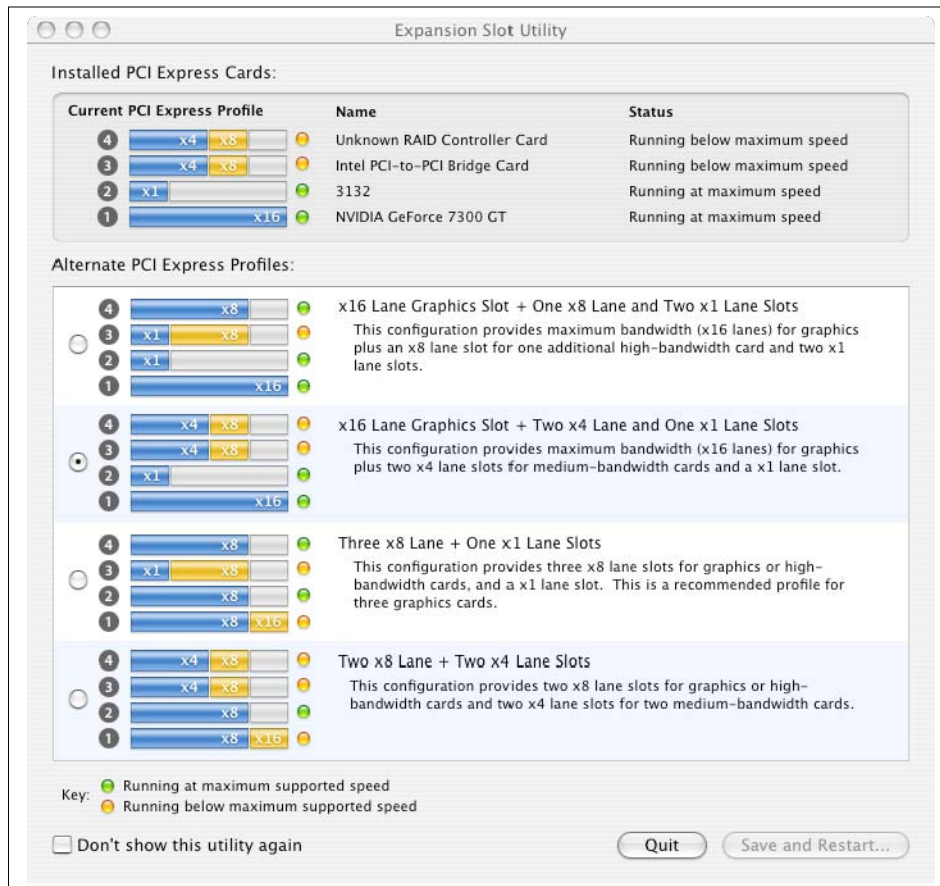


This section applies exclusively to the Apple Mac Pro produced in 2006 and 2007. Skip this section for Mac Pros from Early 2008 and later as well as all other computers.

The Mac Pro (Intel Xeon-based) will detect changes in the PCI-e slot configuration; it will automatically launch the Expansion Slot Utility where you can make performance adjustments for the various PCI-e slots. The utility can be manually started also, it can be found at: Under my Mac Pro: /System/Library/CoreServices.

Ensure there is at least an x4 speed assignment for the slot where the RAID Controller is installed (x8 is preferred), making sure also that your video capture/playback card and video display card also get a sufficient x value.

Example below is a good balance; it shows the RAID Controller in slot 4, a popular video capture card in slot 3, a eSATA adapter in slot 2, and the standard graphic card in slot 1.



4.3.2. Mac Driver Installation



For the latest Mac drivers, please visit our web site and download the appropriate driver for your Mac.

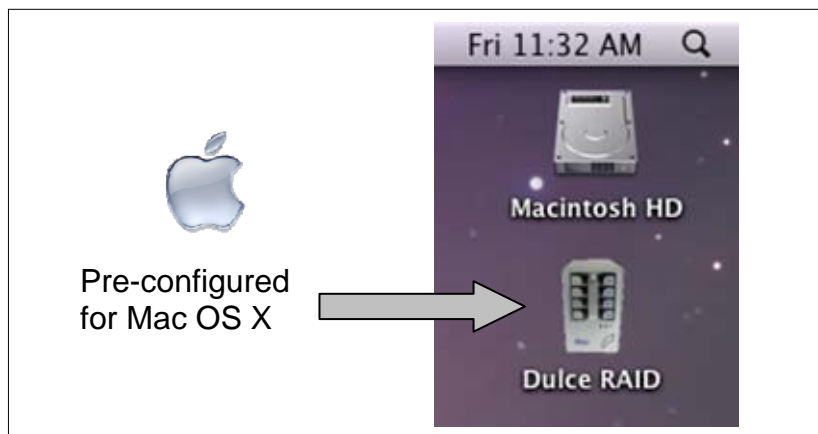
Download From:	www.dulcesystems.com/download or the included CDROM Disk
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After downloading, a Zipped folder named Dulce MRAID Install will be placed on your desktop. Open it and follow the steps provided by the installer.

The installer will install the required driver, and also install the Dulce RAID Manger (MRAID). The Dulce RAID Manager is contained in a folder that is placed on your Desktop (unless you specify otherwise during the installation) named MRAID.

After driver installation, reboot the computer and the PRO Mini icon will appear on the desktop. The installation is now complete:

Your new storage is now ready to go to work.



You may proceed to the Dulce RAID Manager Console section if you wish to change the configuration or just to learn about the RAID Console.

4.3.3. Windows 7 / XP / Vista and Server Driver Installation



After boot, Windows will detect the RAID Controller and launch the "Found New Hardware Wizard"; click Cancel to dismiss the wizard.

The Dulce RAID Controller drivers are separated into categories:
Windows 64-bit OS / Windows 32-bit OS / Windows XP

Details of a Windows OS are available in the 'System' opening screen:
Start > Control Panel > System

Download the driver appropriate for your version of Windows.

Download From:	www.dulcesystems.com/download or the included CDROM Disk
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Unzip the downloaded folder and place the content on the Desktop.

Note: Windows 64-bit OS & Windows 32-bit OS drivers are divided into two categories – 'scsiport' and 'storport'. Windows Server 2003 & 2008 use 'storport'; all others use 'scsiport'

Launch the Hardware Update Wizard:

Start > Control Panel > System > Hardware > Device Manager
Or, reboot and Windows will launch the "Found New Hardware Wizard"

Expand 'Other Devices', right click RAID Controller, click Update Driver...., click Yes then Next.

Select "Install from a list....(Advanced)", click Next.

Browse to the unzipped folder previously placed on the Desktop, and follow the instructions on screen.

4.4. RAID Console Installation

4.4.1. Apple Mac RAID Console Installation



The RAID Console is automatically installed during the driver installation process. No additional steps are required to install the RAID Console. You may proceed directly to the RAID Console Operation section.

4.4.2. Windows PC RAID Console Installation



Download the latest RAID Console utility.

Download From:	www.dulcesystems.com/download or the included CDROM Disk
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Unzip and run the Windows installer to install the RAID Manager utility.

4.5. E-mail notification

Setting up an e-mail event notification is easy using the built-in SMTP mail configuration option.

For the latest up-to-day procedure, please check the Tech Notes section of the Dulce support web site:

www.dulcesystems.com > Support > Tech Notes

5. PCI Express Expansion Feature

5.1. *PRO Mini PCI Express (PCIe) Card Slot*

The PRO Mini features a PCIe Bus Connector Card Slot to accommodate an additional PCIe Card. This feature is provided as many computer motherboards, including the Mac Pro, provide a limited number of PCIe Card connectors. In most situations were a PCIe Card was removed to install the PRO Mini; the removed PCIe Card can be inserted into the PRO Mini PCIe Bus Connector Slot.

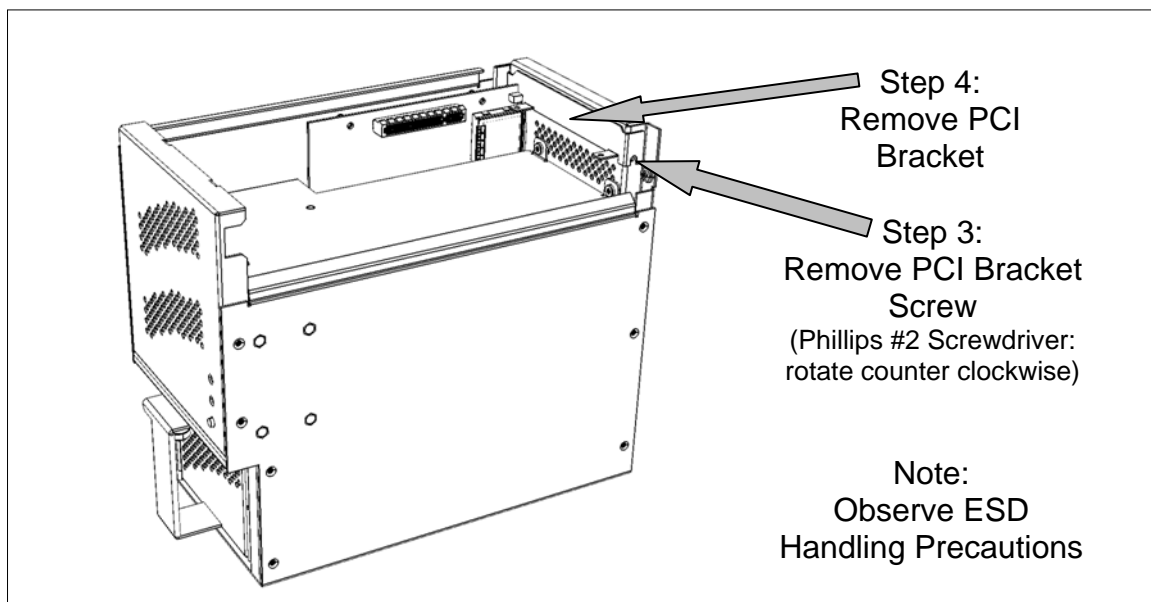
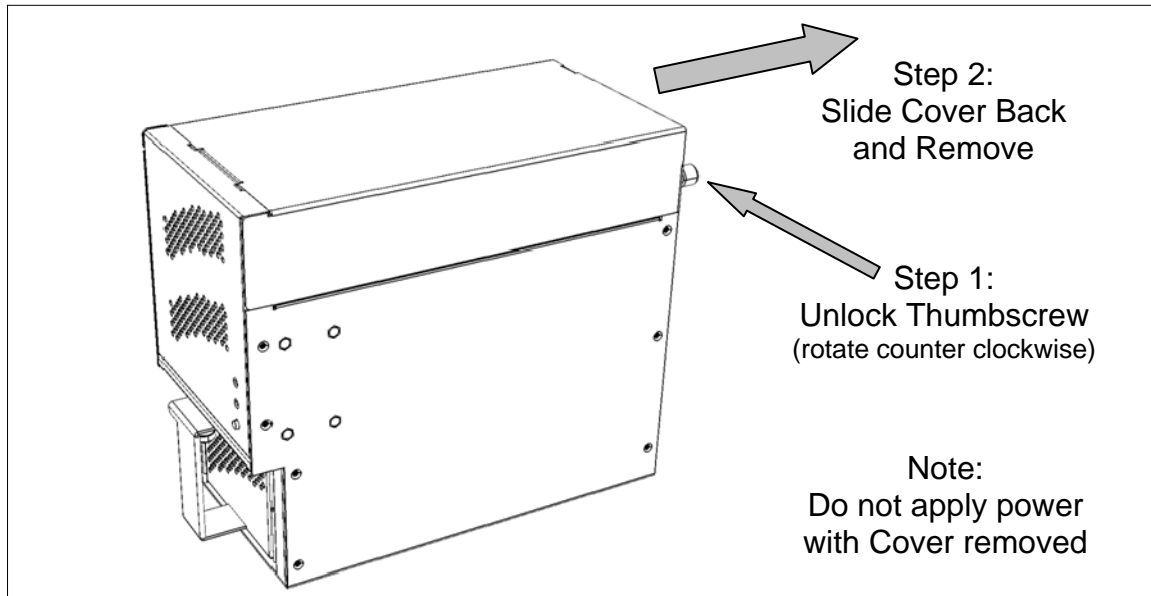
The PRO Mini PCIe Bus Connector provides PCIe Gen 2 with x8 lanes, allowing the PRO Mini to accommodate higher performance PCIe Cards. The PRO Mini internal PCIe Bus Switch provides the featured PCIe Bus Connector Card Slot with over 2GB/S of PCIe Bus bandwidth, while simultaneously providing the PRO Mini internal RAID Controller with sufficient PCIe Bus bandwidth to continue operation at full video data read/write performance.

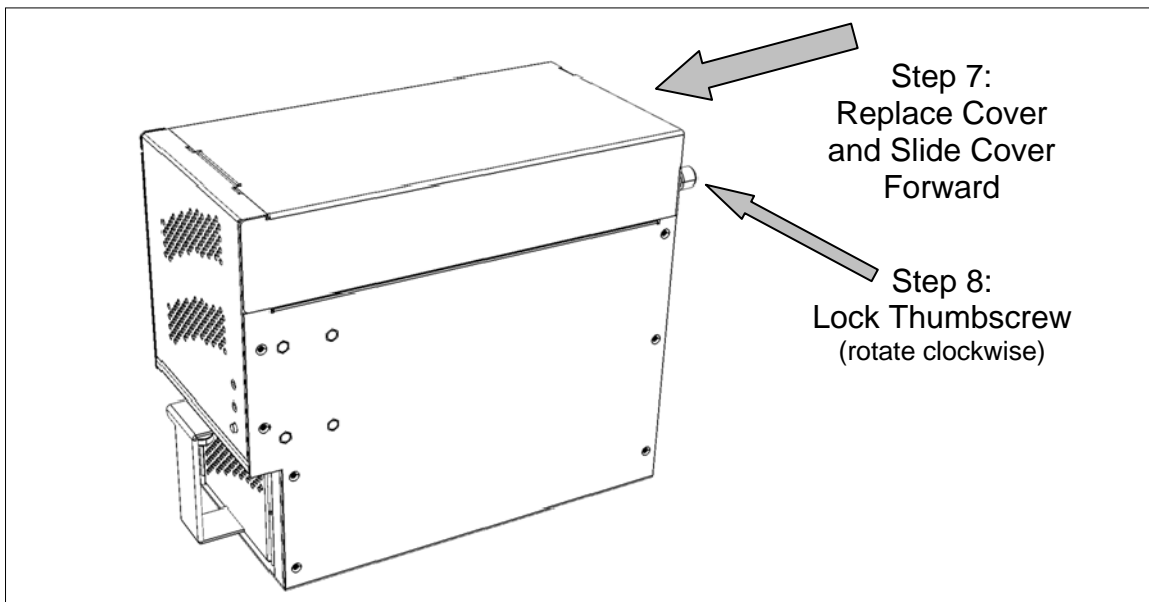
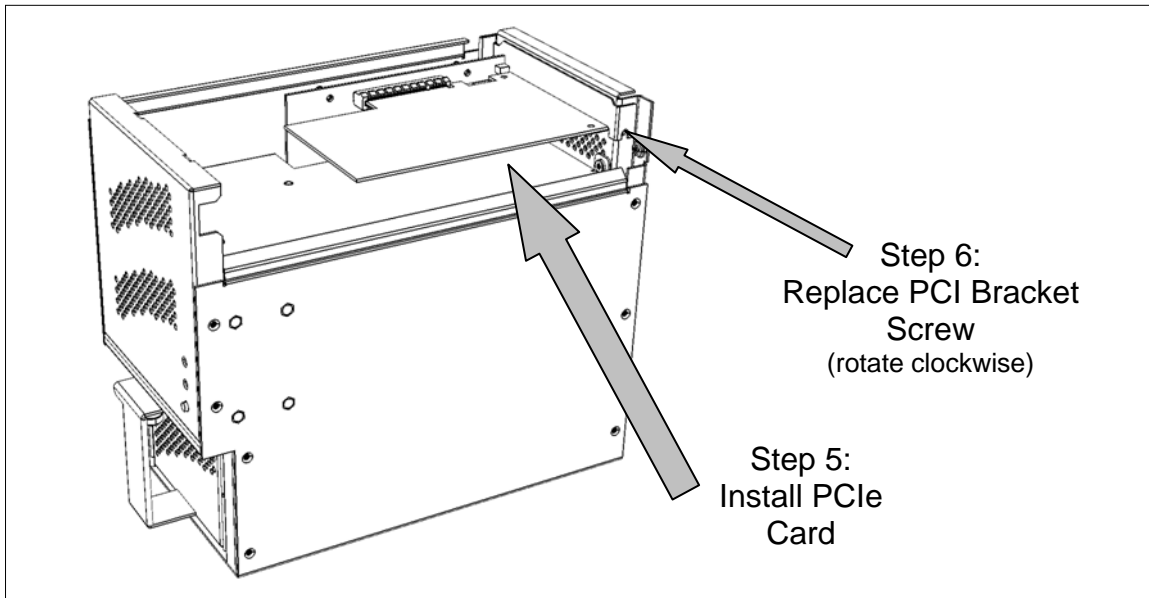
The PRO Mini's PCI Express Card Slot, allows the Host Computer to essentially operate the PCIe Card as if the PCIe Card is directly inserted into the Host Computer motherboard. The PCIe Card drivers and software utilities continue to be appropriate.

5.1.1. PCI Express (PCIe) Card Installation

For simplified installation of a PCIe Card, it is best if the PCIe Card is previously (or has been previously) verified for proper operation with the Host Computer. The PCIe Card is connected directly into the Host Computer motherboard, the PCIe Card driver and utilities installed, and the PCIe Card operation/performance verified. Once verification is complete, the PCIe Card is ready for PRO Mini installation.

PCIe Card installation is diagrammed in the eight following steps. If the PCIe Card was previously verified, the PCIe card will be available at the next Host Computer boot-up. If the PCIe Card's drivers and software utilities are not currently installed, the PCIe Card will not be available until after the appropriate drivers and utilities are installed.





Installation is Complete: Attach any appropriate cables to the new PCIe Card.

6. RAID Console Operations

6.1. Start RAID Console GUI

The RAID Console is where all of the management and maintenance of the storage unit is accomplished. After the installation process, the RAID Console is executed from your computer's Web Browser.

6.1.1. Start Apple Mac RAID Console GUI



For optimum results use FireFox web browser instead of Safari.

Double click on the Dulce RAID Console icon in the Dulce MRAID Install folder to launch the RAID Console. For quicker access, you may move the Dulce RAID Console icon to the dock.

Or manually enter **127.0.0.1:81** on the browser address line to start RAID Console.

- Default login name is: admin
- Default password is: 0000 (four zeros)

Welcome screen of RAID Console after successful login:

Raid Set	IDE Channels	Volume Set(Ch/Id/Lun)	Volume State	Capacity
Raid Set # 00	Ch01	ARC-1220-VOL_#00 (0/0/0)	Normal	2000.0GB
	Ch02			
	Ch03			
	Ch04			

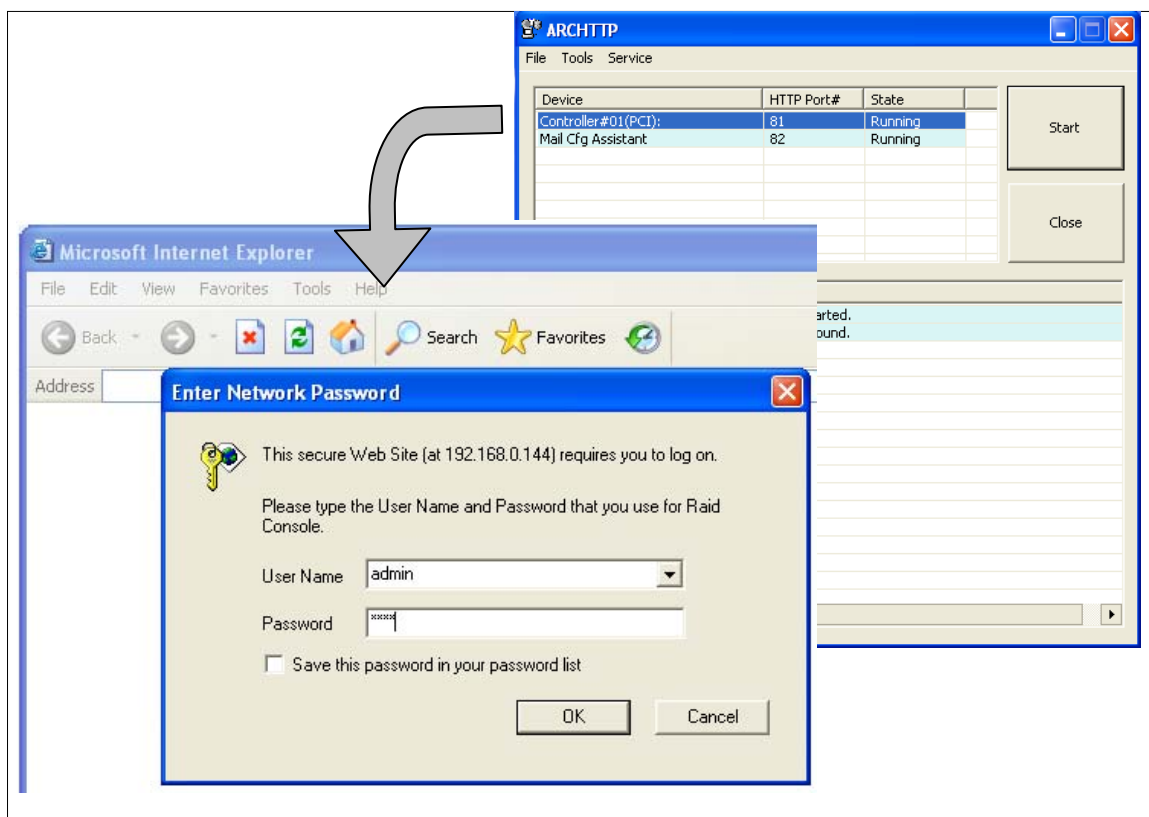
Channel	Usage	Capacity	Model
Ch01	Raid Set # 00	500.1GB	Hitachi HDT725050VLA360
Ch02	Raid Set # 00	500.1GB	Hitachi HDT725050VLA360
Ch03	Raid Set # 00	500.1GB	Hitachi HDT725050VLA360
Ch04	Raid Set # 00	500.1GB	Hitachi HDT725050VLA360
Ch05	N.A.	N.A.	N.A.
Ch06	N.A.	N.A.	N.A.
Ch07	N.A.	N.A.	N.A.
Ch08	N.A.	N.A.	N.A.

6.1.2. Start Windows PC RAID Console GUI

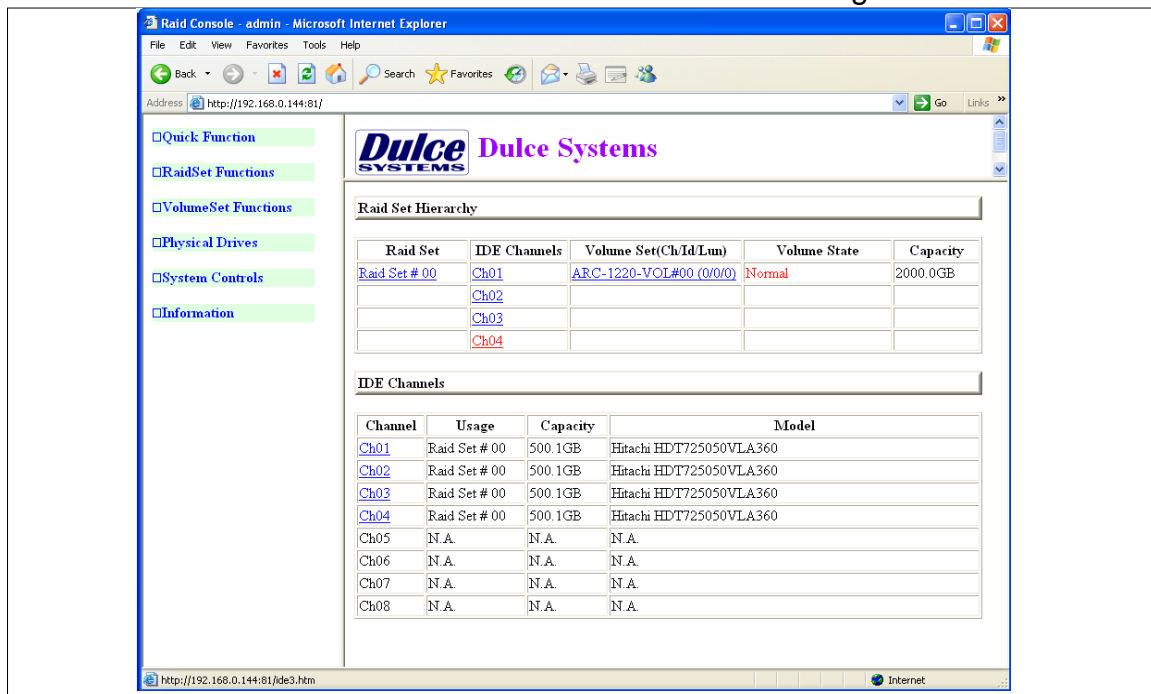


Start the RAID Console from Start > All Programs > Areca Technology > ArchHttpSrvGUI > Areca HTTP Proxy Server GUI.

- The ARCHTTP service will start
- Double click on the Controller #01 to start the RAID Console
- Default login name is: admin
- Default password is: 0000 (four zeros)



- Welcome screen of RAID Console after successful login:



6.2. Change RAID Mode – Deleting / Creating

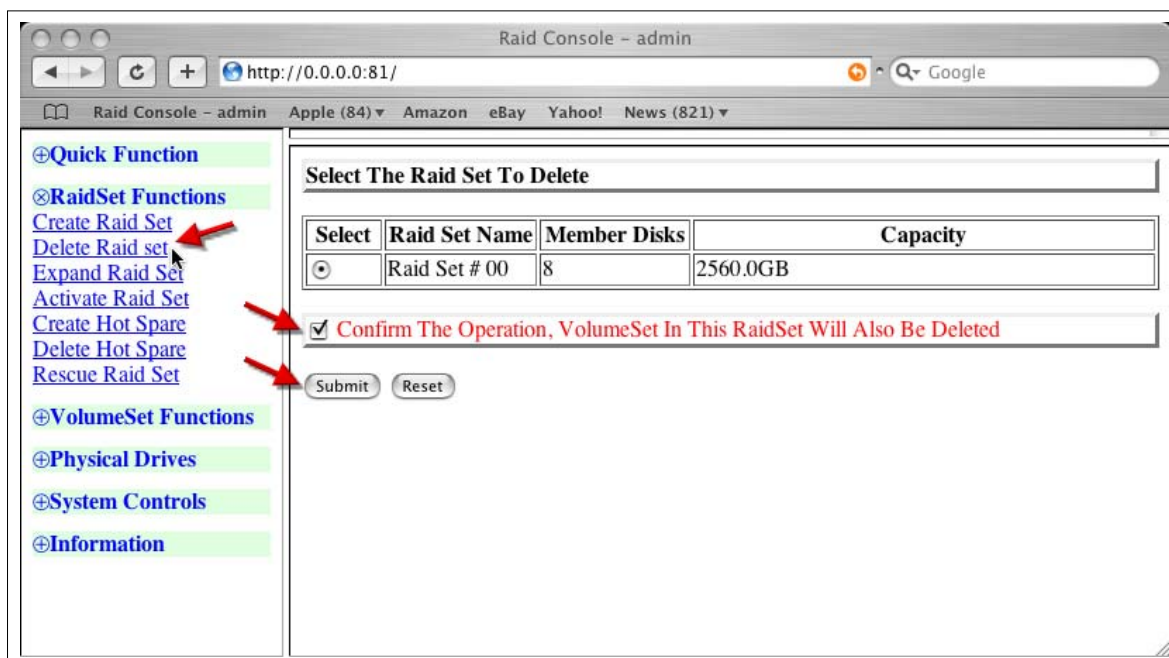


This procedure will erase all data on the PRO Mini MPD Pack. Changing the RAID mode requires the current RAID Set to be deleted first, and then create a new RAID Set with the new RAID mode.

6.2.1. Delete the RAID Set

From the RAID Console GUI. On the left side menu bar click on

- RaidSet Functions > Delete Raid Set
- Select the Raid Set and check the Confirm box
- Click Submit to delete the RAID Set



6.2.2. Create a RAID Set



No need to wait for hours of format, simply select the **No Init** option in the **Volume Initialization Mode** field.



For Windows XP (32 bit) with larger than 2TB RAID, read next section.

From the RAID Console GUI. On the left side menu bar click on

- Click on **Quick Function > Quick Create**
- Change the Select Raid Level as desire
- Change Greater Two TB Volume Support: Set to **64bit LBA**
Windows XP (32 bit): Set to **No**.
- Volume Initialization Mode: Change to **No Init**.
- Check Confirm the Operation
- Click **Submit**

Raid Console - admin

http://localhost:81/

Apple (95) Amazon eBay Yahoo! News (605)

Quick Function
Quick Create

RaidSet Functions

VolumeSet Functions

Physical Drives

System Controls

Information

Dulce Systems

Quick Create Raid/Volume Set

Total Number Of Disks	8
Select Raid Level	Raid 3
Maximum Capacity Allowed	3500 GB
Select Capacity	3500 GB
Greater Two TB Volume Support	64bit LBA
Volume Initialization Mode	No Init (To Rescue Volume)
Select Stripe Size	N.A. KBytes

Confirm The Operation

Submit Reset

No Init allows for immediate RAID Set availability. The RAID is ready for the OS format and partition.

6.2.3. Create >2TB RAID Set for Windows XP (32bit):

If RAID is larger than 2TB, configure using multiple 2TB Volumes and then use Windows to span them together. This will end up with one drive letter of the full capacity of the RAID.

1)
Create the RAID Set under RaidSet Functions by selecting all of the drives.

Create multiple Volume Sets under the VolumeSet Functions

- Select the desired Volume Raid Level
- Set the Select Volume Capacity to 2199GB
- Set Greater Two TB Volume Support to No
- Set Volume Initialization Mode to No Init (if applicable)*
- Check the Confirm the Operation box
- Click Submit

Repeat this step until all of the space is assigned.

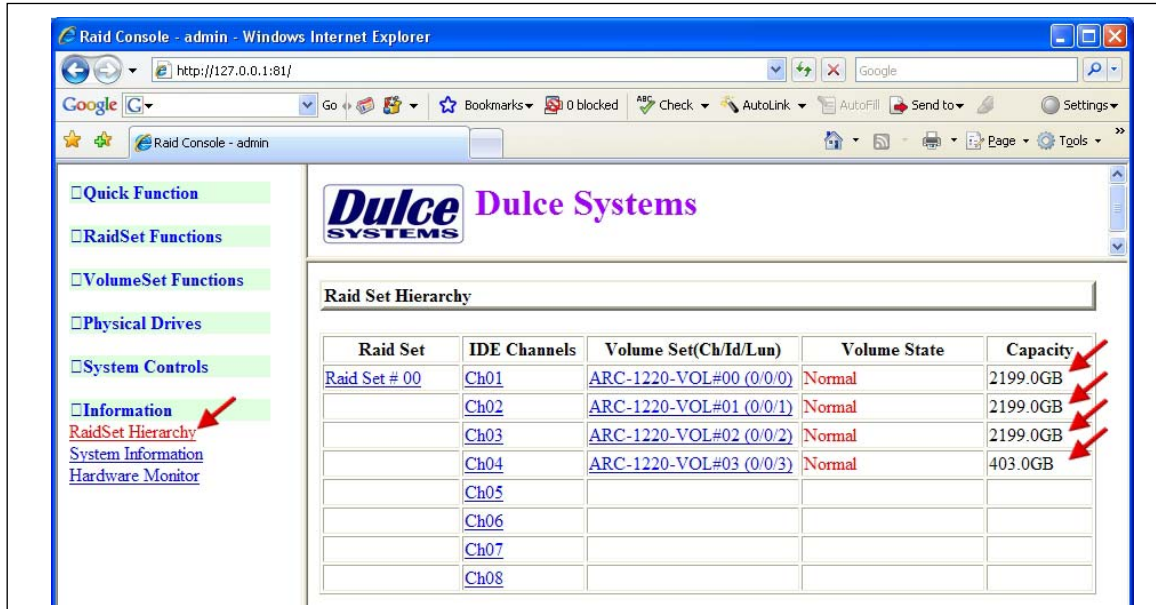
The screenshot shows a web-based RAID configuration interface. On the left, a sidebar contains a tree view with 'Functions' expanded, showing options like 'Create Volume Set', 'Delete Volume Set', 'Modify Volume Set', 'Check Volume Set', 'Stop Volume Set', and 'Check'. A red arrow points to 'Create Volume Set'. The main area is titled 'Enter Volume Attribute On Raid Set # 00' and contains a form with the following fields:

- Volume Name: ARC-1220-VOL#00
- Member Disks: 8
- Volume Raid Level: Raid 3 (dropdown)
- Max Capacity Allowed: 7000 GB
- Select Volume Capacity: 2199 GB
- Greater Two TB Volume Support: No (dropdown)
- Volume Initialization Mode: No Init (To Rescue Volume) (dropdown)
- Volume Stripe Size: N.A. KBytes
- Volume Cache Mode: Write Back (dropdown)
- Tagged Command Queuing: Enabled (dropdown)
- SCSI Channel:SCSI ID:SCSI Lun: 0 : 0 : 0

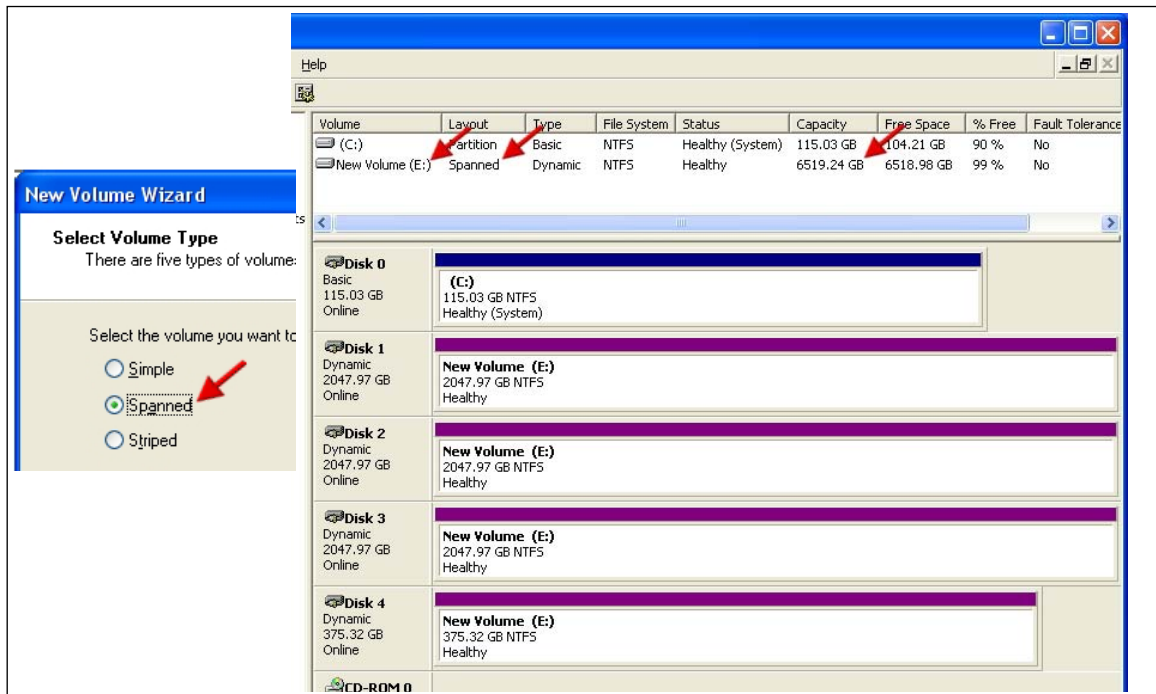
At the bottom of the form, there is a checked checkbox labeled 'Confirm The Operation' and two buttons: 'Submit' and 'Reset'. Red arrows point to the 'Confirm The Operation' checkbox and the 'Submit' button.

* By setting the Volume Initialization Mode to No Init will result in immediate availability of the RAID set, no need to wait for long initialization time.

To view and confirm the Volume settings, select Information > RaidSet Hierarchy.

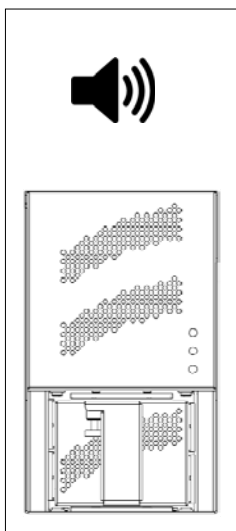


2)
In Windows Disk Management, make these volumes as Dynamic Disks and span them together to make one large disk. Spanning is recommended as oppose to striping. Striping in this configuration requires more system overhead and will actually reduce performance. Use Spanning.



7. Alarm Conditions / Degraded RAID Set

There are two possible sources for alarms: one from the front of the drive enclosure, the other from the RAID Controller installed inside the PRO Mini.

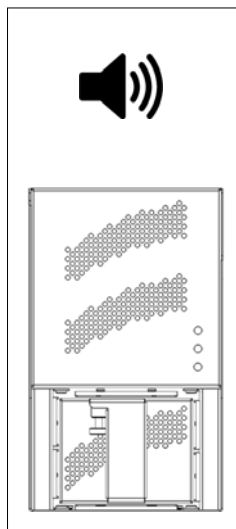


Enclosure Alarms (front right) (Audible and red indicators):

- Temperature (enclosure detected over heating condition)
- Fan (enclosure cooling fan not operational, could lead to overheating)



Mute Alarm: Enclosure audible alarm can be muted by pressing the Reset button next to the indicators, the red indicator remains on until the condition is corrected.



RAID Controller Alarm (Audible and RAID Console GUI indicator):

- Degraded RAID Set (one or more drives not detected or down)
- Temperature (RAID Controller detected over heating)



Mute Alarm: RAID Controller Alarm can be muted by the RAID Console. Start the RAID Console GUI, go to System Controls > View Event / Mute Beeper.

The Systems Event Information screen provides a log of events which triggered the alarm. The example below shows the RAID Set is degraded because Disk Drive #4 / Device Slot#4 has Failed.

Example below showing the RAID Set / Volume degraded from Disk Drive #4 / Device Slot#4 having Failed.

The screenshot shows the Dulce Systems RAID Console web interface. The browser address bar shows 'http://0.0.0.0:81/'. The left sidebar contains navigation links under categories like 'Quick Function', 'RaidSet Functions', 'VolumeSet Functions', 'Physical Drives', 'System Controls', and 'Information'. The main content area displays 'System Events Information' with a table of events. Three red arrows point to the 'Event Type' column for the following rows:

Time	Device	Event Type	Elapse Time	Errors
2007-4-24 9:34:56	IDE Channel 4	Device Removed		
2007-4-24 9:34:56	Raid Set # 00	RaidSet Degraded		
2007-4-24 9:34:56	ARC-1220-VOL#00	Volume Failed		
2007-4-24 8:45:4	ARC-1220-VOL#00	Create Volume		
2007-4-24 8:45:4	Raid Set # 00	Create RaidSet		
2007-4-24 8:44:37	Proxy Or Inband	HTTP Log In		
2007-4-24 8:30:46	H/W Monitor	Raid Powered On		
2007-4-23 19:29:45	Raid Set # 00	Delete RaidSet		
2007-4-23 19:23:57	ARC-1220-VOL#00	Create Volume		
2007-4-23 19:23:57	Raid Set # 00	Create RaidSet		
2007-4-23 19:20:0	Raid Set # 00	Delete RaidSet		
2007-4-23 19:7:44	IDE Channel 1	Device Inserted		
2007-4-23 19:7:40	IDE Channel 8	Device Inserted		

7.1. Servicing a Disk Module

Dulce recommends shipping the Disk Module (MPD Pack) to Dulce for service. However, if returning a Disk Module to Dulce will result in an excessive interruption to your workflow, a defective Disk Module can be serviced yourself.

See **Appendix A**, at the end of this manual, for detailed instructions on servicing a Disk Module by replacement of a Failed Disk Drive.

8. Formatting and Partitioning

8.1. Apple OS X Formatting



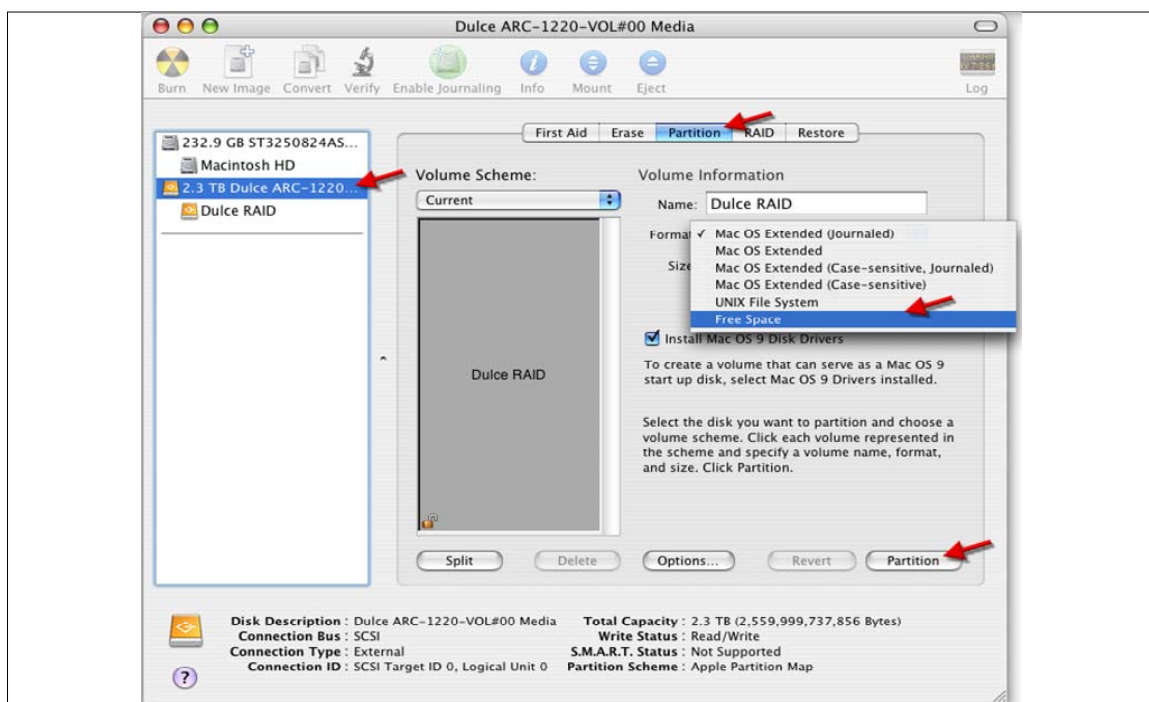
The PRO Q are shipped pre-configured for Mac OS X, the RAID will appear on the desktop after driver installation and reboot.

Should it be necessary to re-format and partition the RAID, use the Apple Disk Utility.

To start Disk Utility, move pointer to upper left corner of screen, click on Go then click on Utilities. Locate and launch Disk Utility.

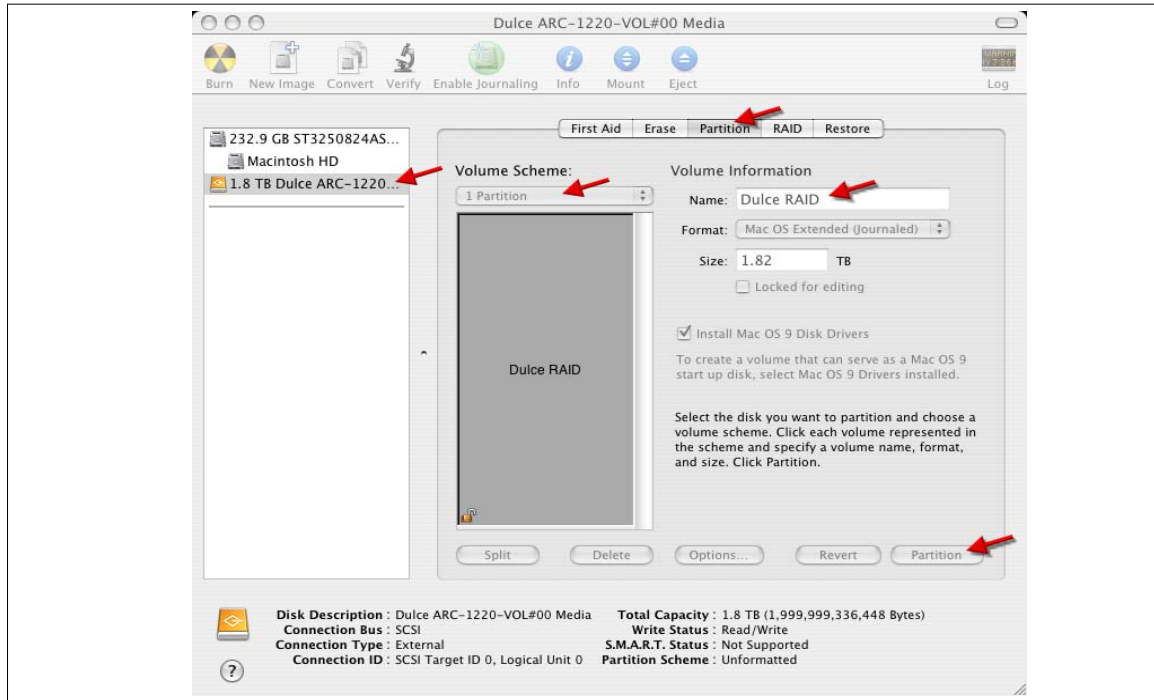
8.1.1. Erase an existing partition

Select the RAID on left, click on Partition tab, select Free Space. Click on Partition on lower right.



8.1.2. Create a new partition

Select Dulce on the left side drive list, click on Partition tab, change Volume Scheme to 1 Partition, change Name as desired, click on Partition on lower right.



The drive will appear on the desktop after successful completion of the Partition.

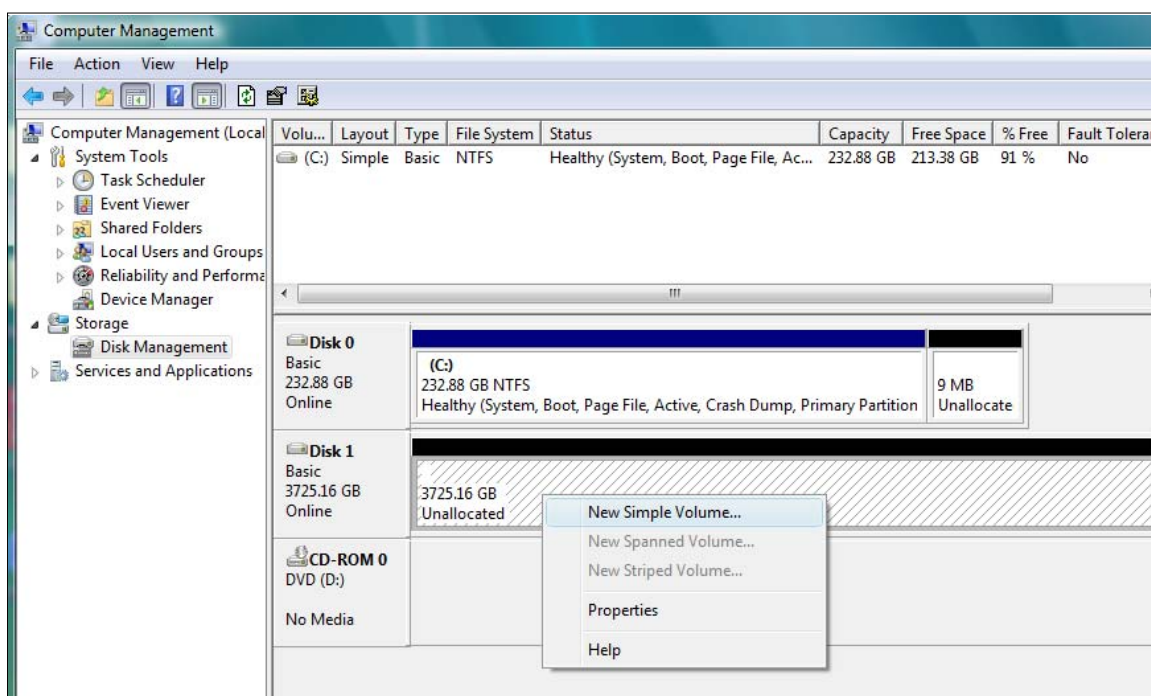
8.2. Windows 7 / XP / Vista and Server Formatting



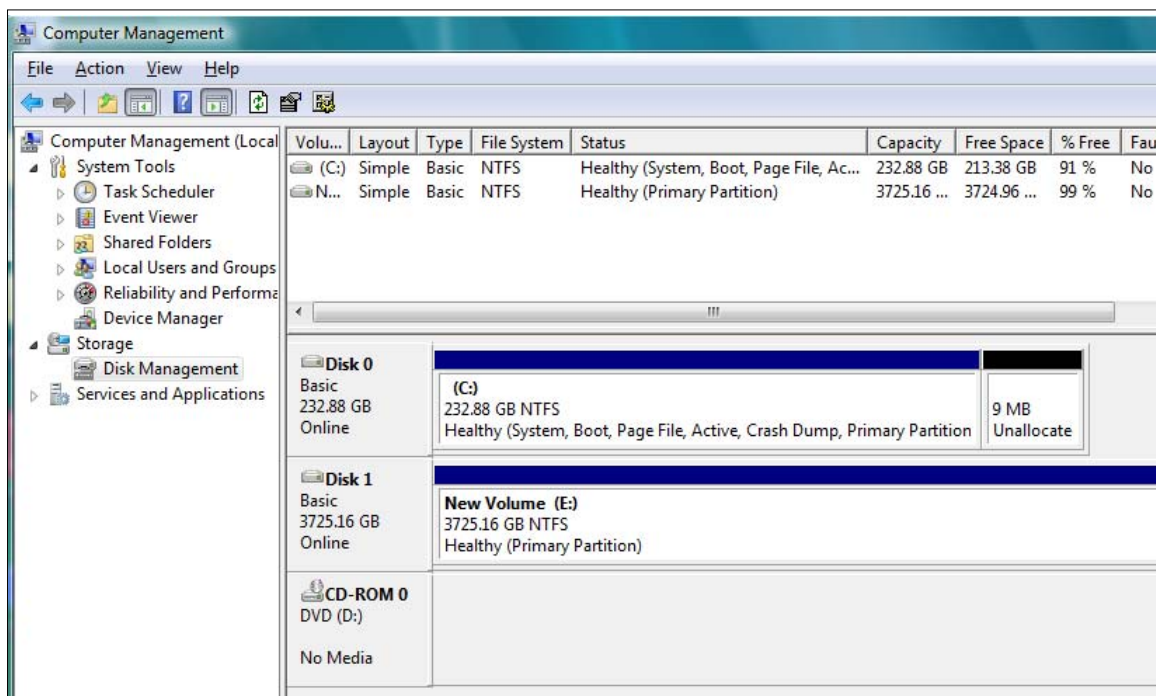
Start Disk Management (can be found at Control Panel > System and Maintenance > Administrative Tools > Computer Management. Under Storage.)

If the RAID shows up as Unknown / Not Initialized, right click on the disk and Initialize it.

If the drive is larger than 2TB, if using Vista, right click over the disk and Convert to GPT Disk. Windows XP 32 bit does not support larger than 2TB capacity. Configure with multiple capacities of 2TB or less.



Right click the Unallocated segment and select New Simple Volume. Enter the desired Volume Size, assign the desired Drive Letter or Path, check Perform a Quick Format at the Format Partition screen.



9. RAID Level Descriptions

Although the RAID Controller supports a large variety of RAID Levels, RAID 5 is the most commonly used for video and content creation purposes.

RAID Level	Description	Advantage	Disadvantage	Ideal for
0	Striping.	Highest performance.	No disk redundancy, one drive failure will lose all data.	Highest performance; but, appropriate only for short-term data projects. Not appropriate for video data archiving.
1	Mirroring.	Highest redundancy.	Less cost efficient for redundancy, loses ½ disk capacity.	Data protection for RAIDs with consisting of only 2 disk drives.
3	Striping with a dedicated parity drive.	Efficient drive redundancy, 1 drive used for parity.	Loses 1 disk drive capacity.	Well balanced for video requiring performance and redundancy.
5	Striping the parity across all drives.	Efficient drive redundancy, parity distributed to all drives.	Loses 1 disk drive capacity.	Well balanced for file video requiring performance and redundancy.
6	Striping with two dedicated parity drives.	Double drive redundancy, 2 drives used for parity.	Loses 2 disk drive capacity.	Mission critical.
JBOD	Just a Bunch of disks.	Each drive can be accessed individually from operating system.	No redundancy.	Audio applications.
RAID + Spare	A drive is set aside as an online hot spare.	Automatic rebuild of a failed drive.	Loses another drive capacity. (In addition to the drive(s) needed for the RAID level selected.)	Not appropriate for removable Disk Drive Pack products. RAID Level 6 is recommended.

10. Limited Warranty

WHAT THE WARRANTY COVERS

Dulce Systems warrants your product against any defect in material and workmanship and conforms to Dulce published specifications under normal use.

WHAT THE WARRANTY DOES NOT COVER

The warranty does not cover equipment which has been damaged due to accident, misuse, abuse, fire, flood, "Acts of God," or other contingencies beyond our control; use of incorrect line voltages; improper or insufficient ventilation; failure to follow operating instructions; or improper or unauthorized repair; improperly packaged for shipping; packaged in non-approved shipping container; shipping damage.

The warranty is voided by removal or alteration of the product or parts identification labels.

Dulce has no liability for general, consequential, incidental or special damages. These include loss of recorded data, the cost of recovery of lost data, lost profits and the cost of the installation or removal of any Products, the installation of replacement Products, and any inspection, testing, or redesign caused by any defect or by the repair or replacement of Products arising from a defect in any Product.

WHAT THE WARRANTY PERIOD IS

Dulce Systems warrants your PRO Mini product for 36 months. The warranty period begins at the date of shipment to the original end user, company or organization.

Our warranty applies to repaired or replaced Products for the balance of the applicable period of the original warranty or ninety days from the date of shipment of a repaired or replaced Product, whichever is longer.

WHAT WE WILL DO TO CORRECT THE PROBLEM

We may elect which remedy or combination of remedies to provide at our sole discretion. We shall have a reasonable time after determining that a defective Product exists to repair or replace a defective Product. Our replacement Product under its limited warranty will be manufactured from new or reconditioned parts.

Your exclusive remedy for any defective Product is limited to the repair or replacement of the defective Product.

We will return the repaired or replacement Product to you prepaid using the same method of shipping (ex: overnight, ground, 2nd day, ...) as was shipped to us. If a more expedited return shipping method is required, extra charges might apply at our discretion.

HOW YOU CAN GET SERVICE

Contact our Technical Support to obtain a RMA (Return Materials Authorization) number. The model number, serial number, and description of the problem will be required. A valid proof of purchase might be required to further validate the Products warranty eligibility, the valid proof of purchase document must show the product model, serial number, purchase date, and supplier name. If the valid proof of purchase is not available, the original manufacturing date of the product will be used to determine the warranty period.

No returns will be accepted without a RMA number. We reserve the right to refuse the delivery of the return.

You shall bear all shipping, packing and insurance costs and all other costs, excluding parts and labor, necessary to effectuate repair or replacement under this warranty.

All products returned to us must be shipped in the original packaging or Dulce approved packaging. If you do not have the original packaging, call us to request packaging. A nominal fee will be charged for the requested packaging and for shipment. Ship the RMA to us pre-paid.

Products that are improperly packaged for shipping; packaged in a non-approved shipping container; or incur shipping damages are not covered under warranty.

HOW STATE LAW RELATES TO WARRANTY

In the United States, some states do not allow exclusion or limitation of incidental or consequential damages, so the limitations above may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

11. Product Registration

REGISTER NOW

It will take only one minute to register.

Please visit our web site and register online.

www.dulcesystems.com/register

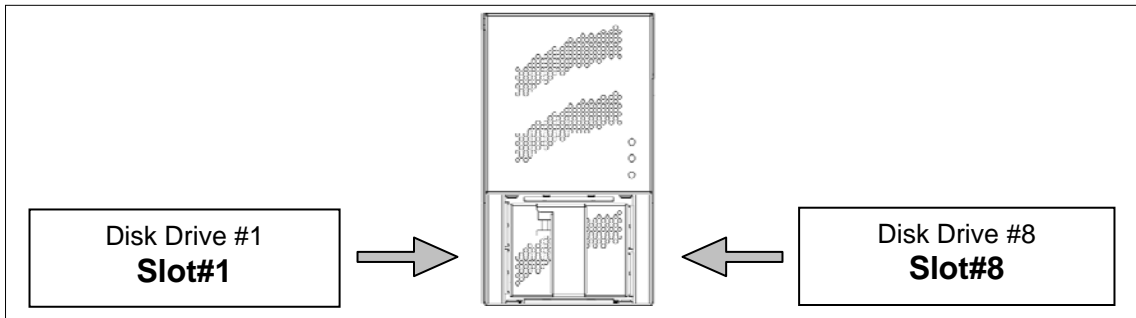
A valid proof of purchase might be required to further validate the Products warranty eligibility, the valid proof of purchase document must show the product model, serial number, purchase date, and supplier name. If the valid proof of purchase is not available, the original manufacturing date of the product will be used to determine the warranty period.

12. Appendix A

Replacing a Disk Drive in the MPD Pack

NOTE: 2.5" Disk Drives have aluminum casings. Care must be observed to not over tighten/torque the disk drive retaining screws during installation & assembly.

The 1st step is to identify the disk drive for replacement. The disk drives contained in a MPD Pack are presented in the RAID Manager's Raid Set Hierarchy as 'Devices' Slot#1 through Slot#8. The eight disk drives are arranged in the MPD Pack with Slot#1 on the far left, and proceeding to Slot#8 on the far right, as shown below:



In this example, the RAID Manager Raid Set Hierarchy (shown below) indicates Disk Drive #4 / Slot #4 has failed, and is the disk drive for replacement. Disk Drive #4 / Slot # 4 is the 4th disk drive from the left.

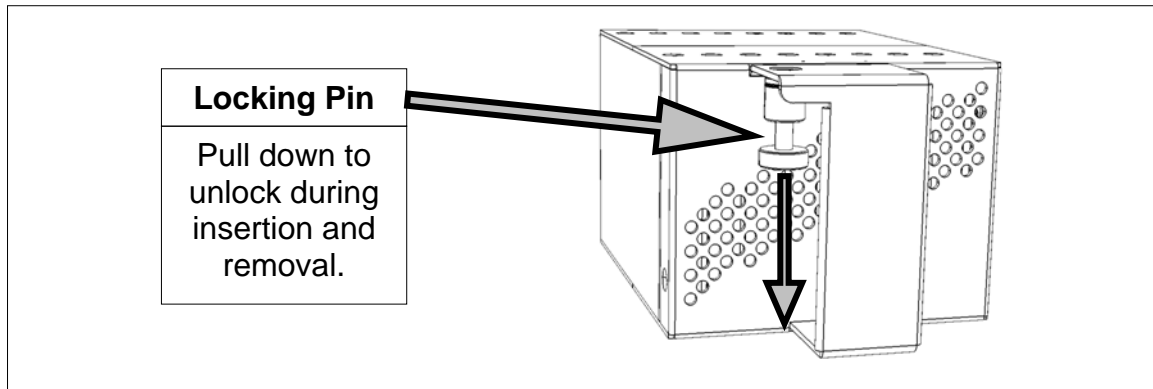
The screenshot shows the RAID Storage Manager web interface. The RAID Set Hierarchy table is as follows:

RAID Set	Devices	Volume Set(Ch/Id/Lun)	Volume State	Capacity
Raid_Set #0	E#1Slot#1	Volume #0 (0/0/0)	Degraded	7000.0GB
	E#1Slot#2			
	E#1Slot#3			
	Failed			
	E#1Slot#5			
	E#1Slot#6			
	E#1Slot#7			
	E#1Slot#8			

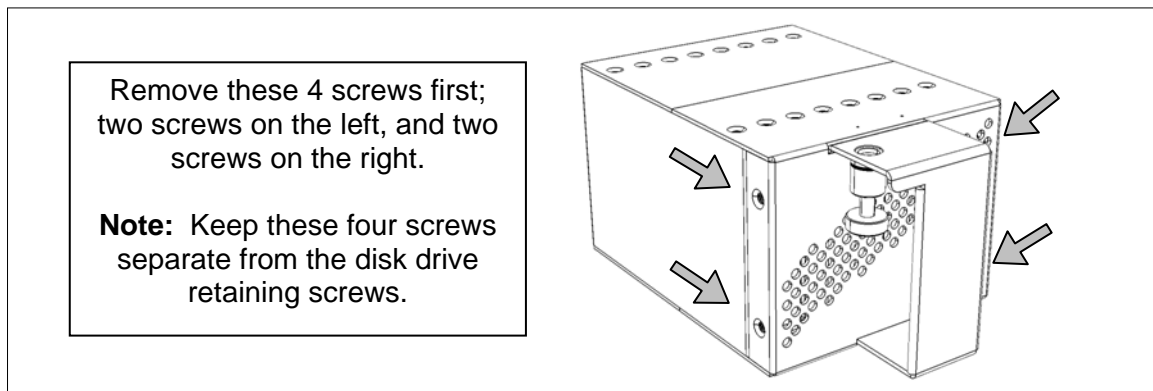
The Enclosure #1: ARECA SAS RAID AdapterV1.0 table is as follows:

Device	Usage	Capacity	Model
Slot#1(11)	Raid Set #0	1000.2GB	Hitachi HDS721010CLA332
Slot#2(10)	Raid Set #0	1000.2GB	Hitachi HDS721010CLA332
Slot#3(F)	Raid Set #0	1000.2GB	Hitachi HDS721010CLA332
Slot#4	N.A.	N.A.	N.A.
Slot#5(D)	Raid Set #0	1000.2GB	Hitachi HDS721010CLA332
Slot#6(A)	Raid Set #0	1000.2GB	Hitachi HDS721010CLA332
Slot#7(C)	Raid Set #0	1000.2GB	Hitachi HDS721010CLA332
Slot#8(B)	Raid Set #0	1000.2GB	Hitachi HDS721010CLA332

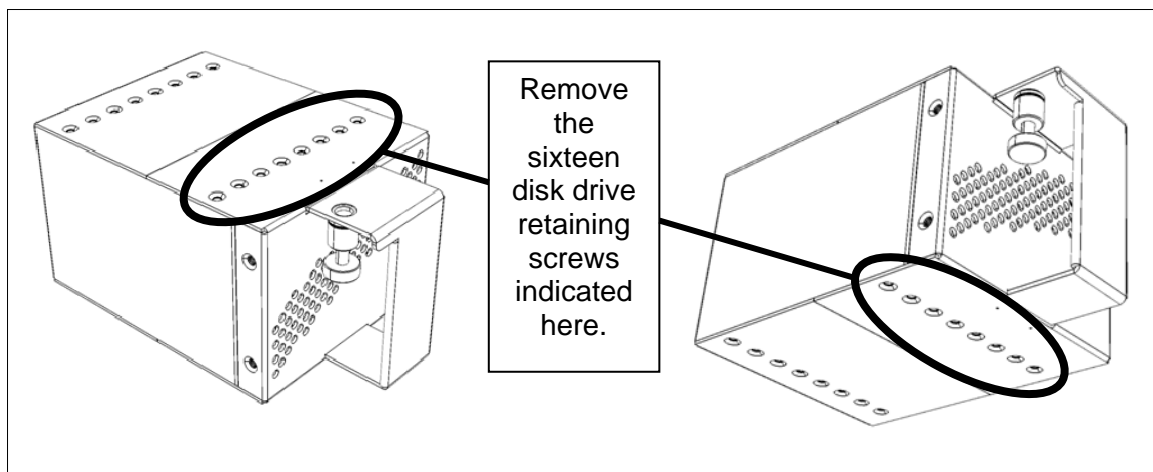
2nd Step – Pull the Locking Pin down and pull MPD Pack from the PRO Mini chassis.



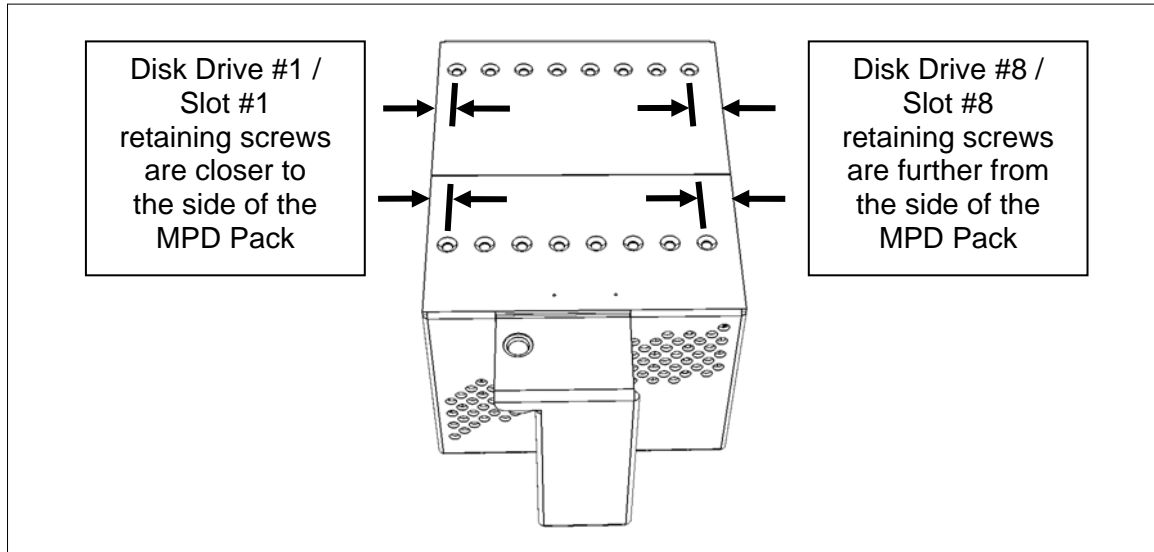
3rd Step – Remove the 4 screws located below using a Phillips #1 screwdriver:



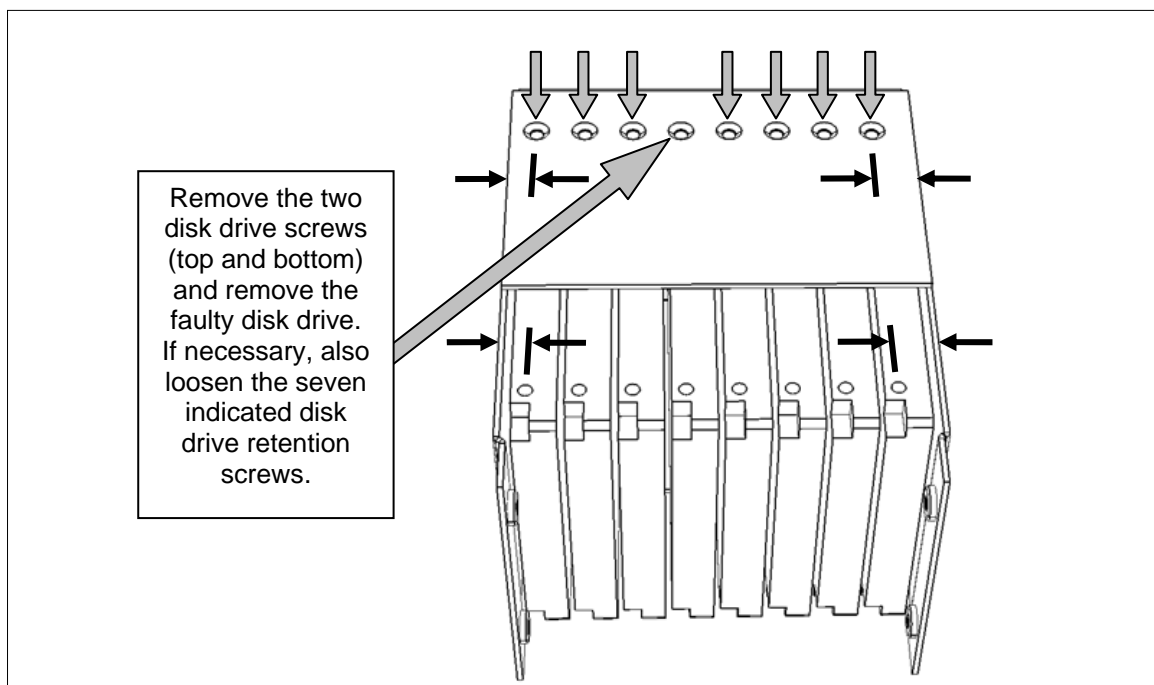
4th Step – Remove the 16 screws indicated below using a Phillips #1 screwdriver. Keep the disk drive screws separate from the four screws of the previous step.



The 5th Step is to note the distance between the disk drive retaining screws and the side of the MPD Pack. Disk Drive #1 (Slot #1) retaining screws are closer to the side of the MPD Pack, and Disk Drive #8 (Slot #8) retaining screws are further from the side of the MPD Pack. This notation will be helpful in the following steps for replacing a disk drive, and for reassembling the MPD Pack.



6th Step – Locate the disk drive for replacement (#4 in this example) and remove both retaining screws for the disk drive. Remove the disk drive from the MPD Pack. Note: if the disk drive cannot be removed, or if the replacement disk drive cannot be inserted, please also loosen the indicated disk drive retention screws.

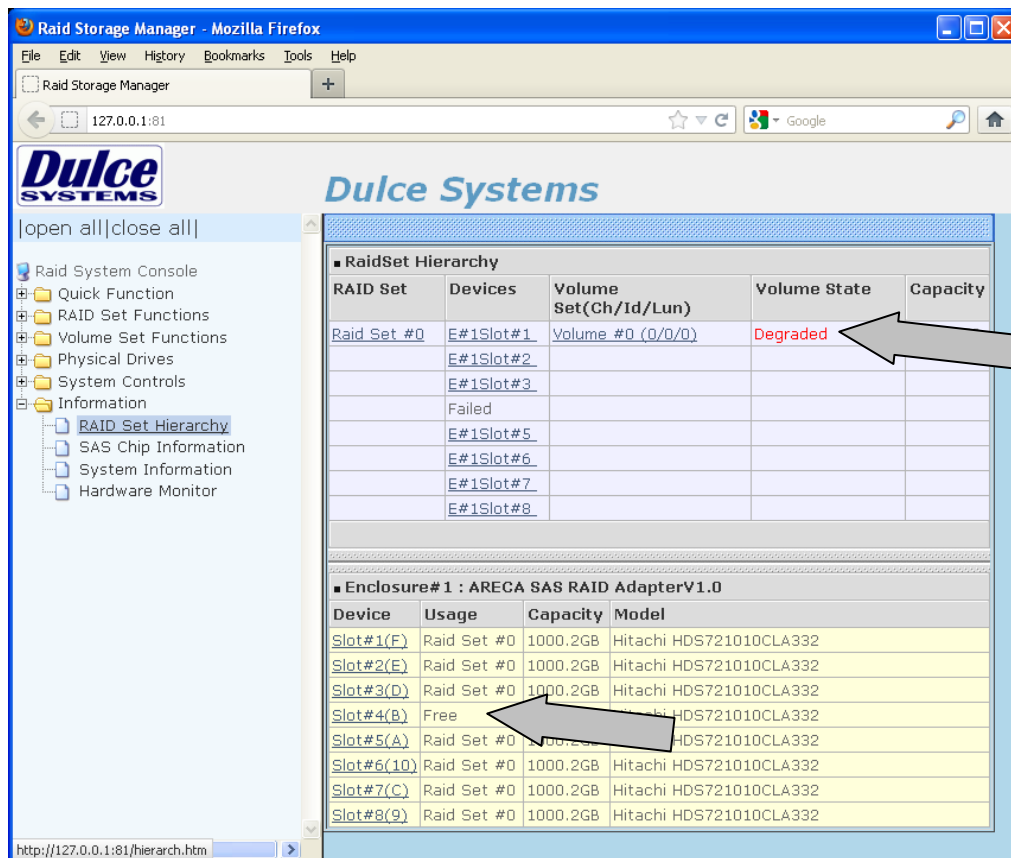


7th Step – Once you have removed the failed disk drive, insert the new drive and secure it with 2 screws (one on top and one on bottom). If the seven other disk drive screws required loosening, please retighten them.

NOTE: 2.5" Disk Drives have aluminum casings. Care must be observed to not over tighten/torque the disk drive retaining screws during installation & assembly.

8th Step – Replace the 16 disk drive screws from Step 4 (above), and replace the four screws from Step 3 (above).

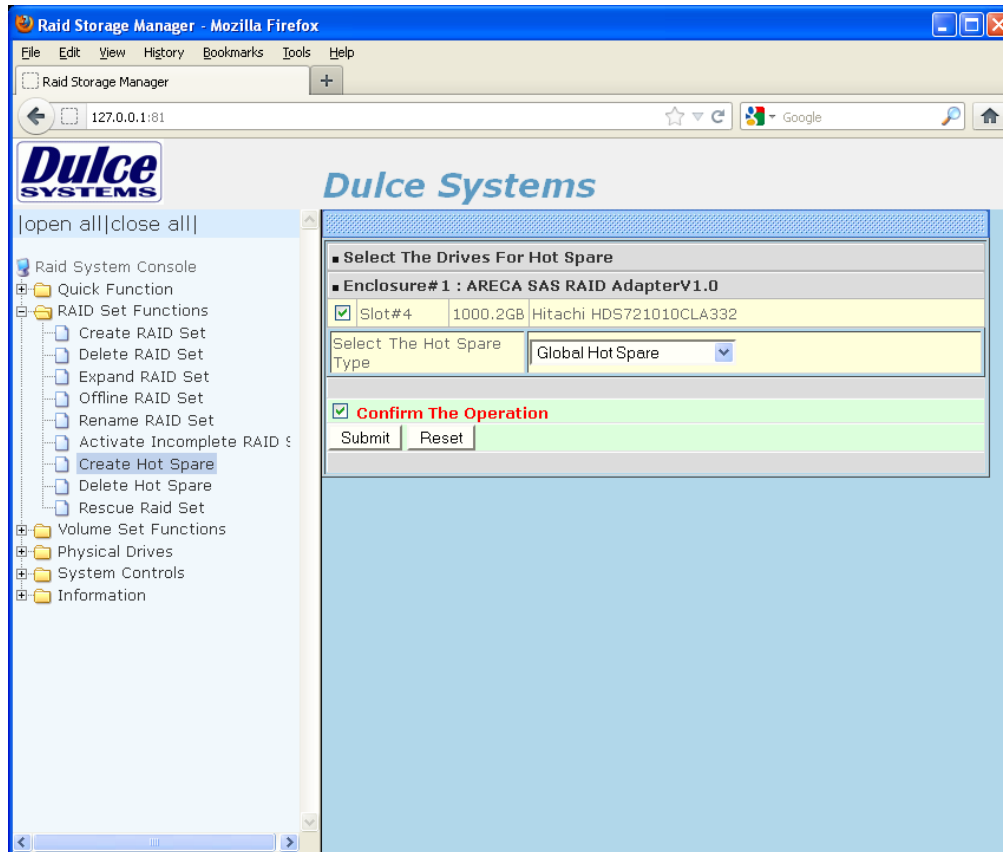
9th Step – Launch the Dulce PRO Mini RAID Manager and insert the MPD Pack into the PRO Mini Chassis (Hot Insertion). Allow the Dulce Systems RAID Controller to initialize the disk drives (60 Seconds). Verify the RAID Set Hierarchy's 'Volume State' is 'Degraded' and the replaced disk drive (#4 in this example) is shown as 'Free' in the 'Usage' column as shown below:



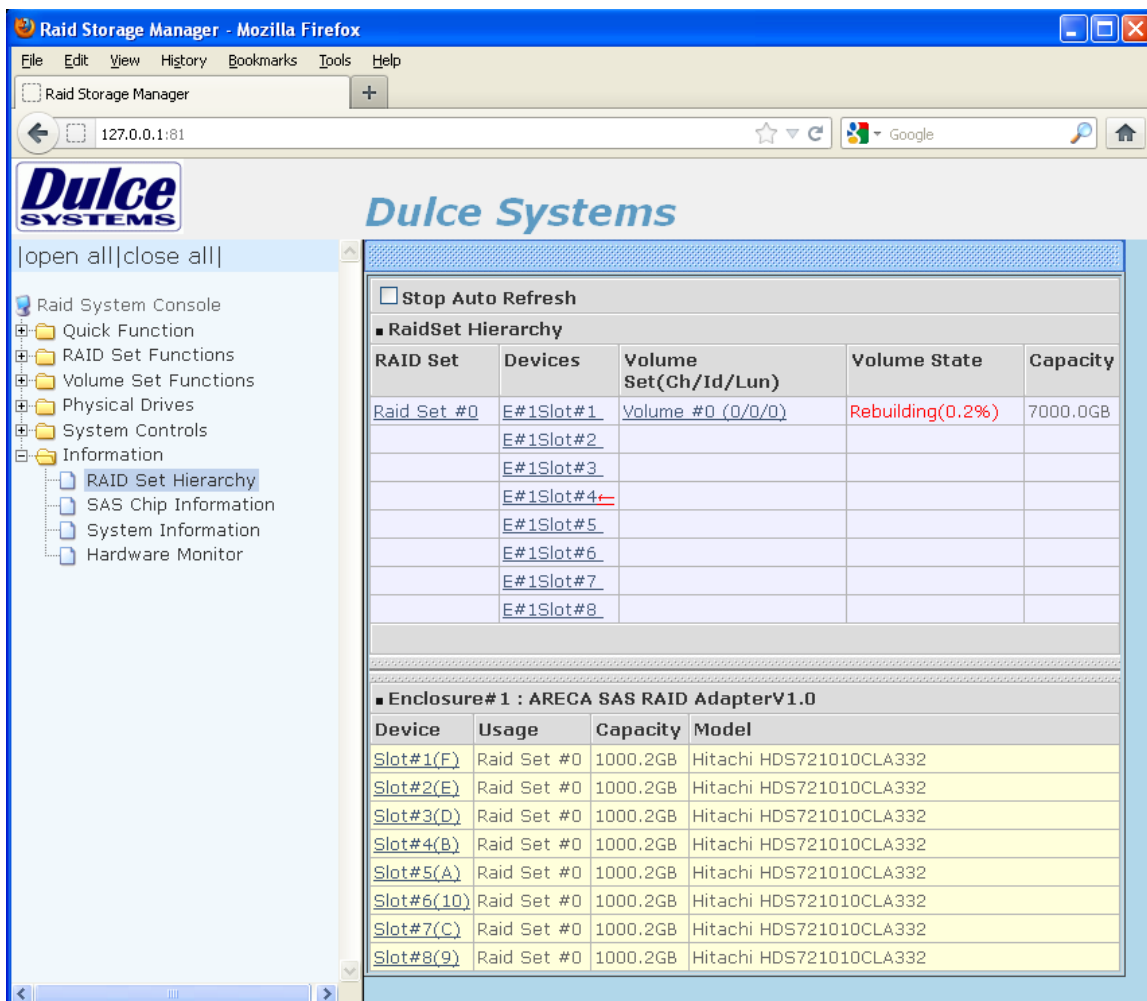
If the RAID Set Hierarchy's 'Volume State' is 'Degraded' and the replaced disk drive is shown as 'Free' in the 'Usage' column, then proceed to Step 10; otherwise contact Dulce Systems Technical Support:

Phone	818-435-6008
FAX	818-576-0324
E-mail	support@dulcesystems.com

10th Step – Authorize the Dulce Systems RAID Controller to rebuild the replaced disk drive by designating the replaced disk drive (#4 in this example) as a Hot Spare as shown below:



After the above 'Confirmed The Operation' is checked, and the 'Submit' button is clicked, the disk drive data rebuild will start automatically. This can be verified by viewing the Raid Set Hierarchy (Next Page):



The RAID Set Hierarchy page will automatically refresh and display the rebuild progress (% completed). When the rebuild progresses to 100%, the Volume State will return to 'Normal'.

The RAID / Volume data is available during the rebuilding process; however, the performance priority will be allocated to the rebuild process.

NOTES:



www.dulcesystems.com