


Dell™ PowerVault™ RD1000

User's Guide



 NOTE: A NOTE indicates important information that helps you make better use of your computer.

 CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.

 WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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Introduction

Overview

The Dell PowerVault RD1000 is a removable, robust, hard disk drive system. It features backup application compatibility, high speed transfer rate for fast backups, portable cartridges and high level of data reliability. The RD1000 is available as an internal SATA device (see [Figure 1](#)) or external USB device (see [Figure 2](#)).

Figure 1. RD1000 Internal Drives

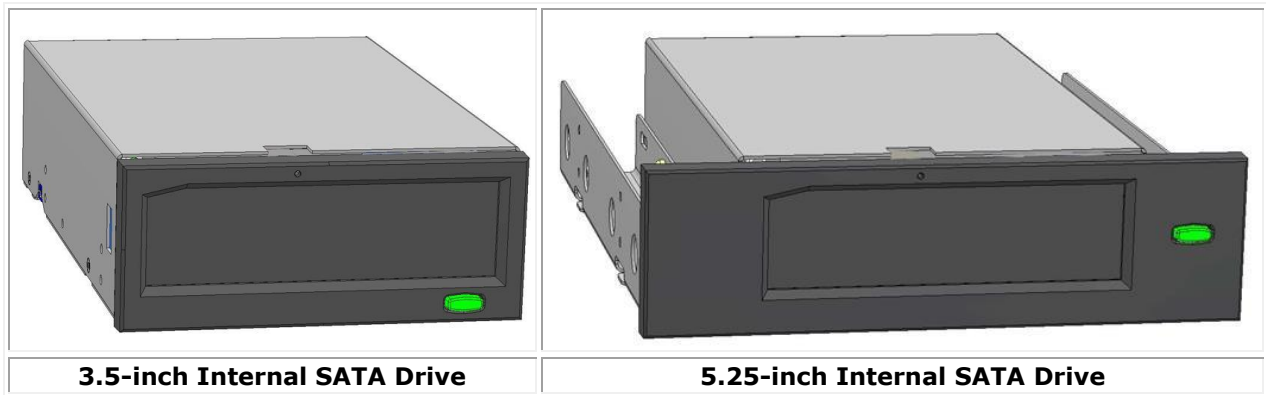
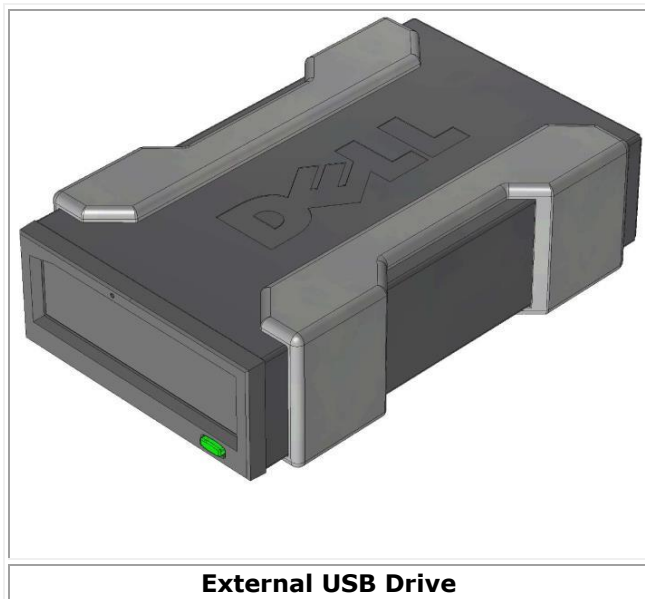


Figure 2. RD1000 External Drive



Capacity and Transfer Rates

The capacity and transfer rate of the RD1000 data storage system are dependent upon the inserted RD1000 media. Capacity and transfer rate will vary depending on the RD1000 cartridge type. The average transfer rates are listed in the table below.

Table 1. RD1000 Specifications

Characteristic	Storage capacity varies by individual cartridge capacity		
Transfer Rate	Dependent on system configuration (see below)		
Configuration	Theoretical Transfer Rate	Maximum Burst Transfer Rate	Typical Transfer Rate
RD1000 USB 2.0 USB 2.0 Host USB 2.0 Cable	480 Mbps (60 MB/s)	35 MB/s	25 MB/s
RD1000 USB 3.0 USB 2.0 Host USB 3.0 Cable	480 Mbps (60 MB/s)	35 MB/s	30 MB/s
RD1000 USB 3.0 USB 3.0 Host USB 3.0 Cable	5 Gbps (625 MB/s)	230 MB/s	80 MB/s
SATA	1.5 Gbps (187.5 MB/s)	45 MB/s	35 MB/s
Average access time (msec)	15		
Function	Removable disk drive		
Logical block size	512 bytes		
Supported file system	ext2, ext3, FAT32 and NTFS*		

*NTFS is the default file system on the cartridge. If you are using Linux then the cartridge that comes with your system will need to be re-formatted to support a file system that is compatible with a Linux based operating system (see section "RD1000 Cartridge File System Considerations" in the appendix).

Supported Media

The RD1000 hard drive system supports any Dell RD1000 cartridge. RD1000 cartridges are available in different capacity configurations depending on your storage requirements.

Operating System Requirements

The RD1000 hard drive system is supported on the following operating systems:

- Windows 2003 Service Pack 1 or later
- Windows 2008 R2 Service Pack 1 or later
- Windows 7
- Windows 8 / 8.1
- Windows Server 2012 / 2012 R2
- Linux (see "Linux Compatibility" section for more details)

Software

Backup Software

The RD1000 device works with industry backup applications that support removable disk media. See your backup software manual for instructions on backing up data.

Windows Software

The RD1000 Utility provides essential Windows® software for use with the RD1000 unit. The RD1000 Utility Software can be downloaded at www.Dell.com/support. The RD1000 Utility software for Windows installs:

- A removable disk utility that provides basic diagnostic tests capabilities
- An application update that enables the eject button to operate correctly under the Windows operating system
- An application that allows the right-click eject to operate in user-mode under the Windows operating system
- An application that automatically sets the SATA connection to DMA mode for improved performance

See "Installing Unit Software for Windows" and "Using the Removable Disk Utility" sections for more information on these applications.

Linux Software

There is no special software necessary when running Linux operating system. See "Using the Linux Operating System" appendix for more information on using the RD1000 with Linux.

Front Panel Features

The front of the RD1000 unit has the following features and indicators:

1. Cartridge Indicator (located on cartridge)
2. Emergency Eject Hole
3. Eject Button/Power Indicator

Figure 3. Front Panel Features

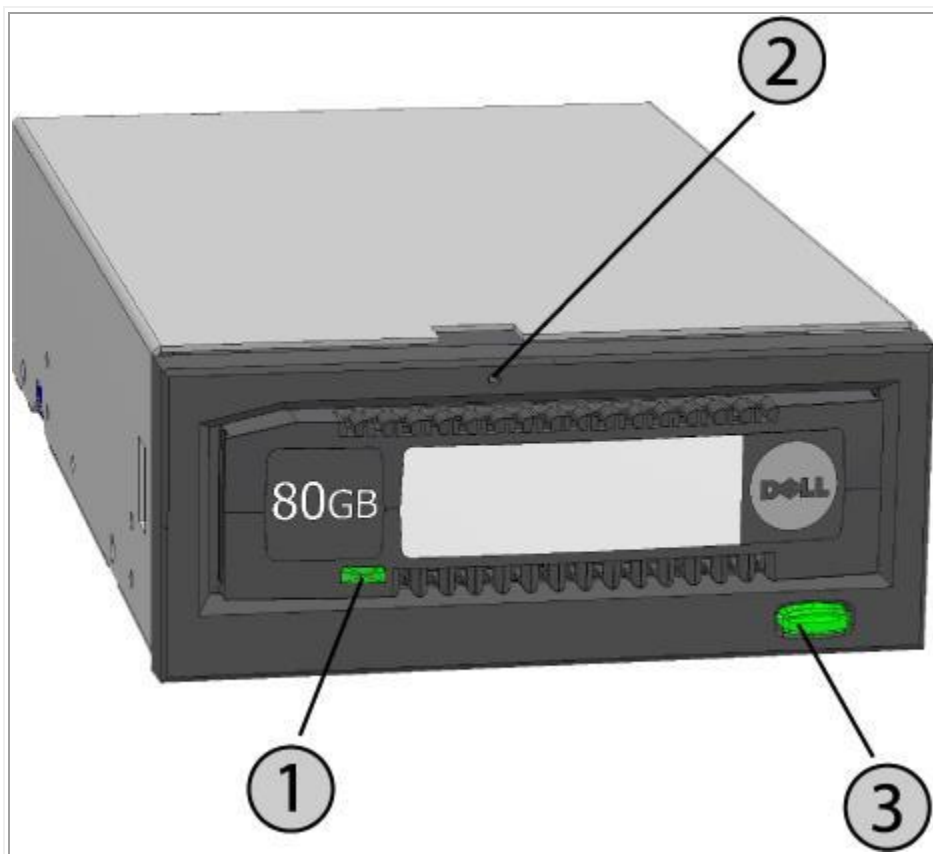


Table 2. Power Indicator

The eject button is illuminated by a power indicator. Table 2 describes the operation of this indicator:

Indicator Status	Meaning	Description
OFF	No Power / Low Power Mode	Unit is in Low Power Mode (see below), or unit does not have power
Steady GREEN	Ready	Power is on and the RD1000 unit is working properly

Blinking GREEN	Ejecting	Unit is ejecting the cartridge
Steady AMBER	Fault	RD1000 unit has detected a fault condition. For more information, run a diagnostic application (see section " Using the Removable Disk Utility ").
Blinking AMBER	Prevent	Host computer is accessing the media, and the user has pressed the eject button. The unit will blink amber for a few seconds then return to a steady green. The unit will eject the cartridge after the host access completes.

Table 3. Cartridge Indicator

The cartridge indicator displays the current status of the cartridge. Table 3 describes the operation of this indicator:

Indicator Status	Meaning	Description
OFF	Not Ready	Cartridge is not inserted properly, the unit is in Low Power Mode, or the unit has no power
Steady GREEN	Ready	Cartridge is ready
Blinking GREEN	Activity	Reading, writing, seeking
Steady AMBER	Fault	RD1000 unit has detected a cartridge fault condition. For more information, run a diagnostic application (see section " Using the Removable Disk Utility ").

Low Power Mode [RD1000 USB 3.0 External only]

- If the USB cable is unplugged from the USB 3.0 External dock, or the system that the dock is connected to is turned off or in standby mode, the dock will enter Low Power Mode and the dock Power Indicator will turn OFF.
- If the media is inserted in the dock while in Low Power Mode the cartridge indicator will also be turned off.
- To eject a cartridge from the dock when it is in Low Power Mode, push and hold the Eject button for approximately 10 seconds. The cartridge will be ejected, and the dock will go back into Low Power Mode.
- The dock will resume normal operation once the USB cable is reconnected to the computer.

Quick Start Installation

 **CAUTION:** Before performing any of the procedures in this section, read and follow the safety instruction in your Product Information Guide.

Dell-Installed PowerVault RD1000 Internal Drive

Dell performs the installation of a RD1000 Internal drive that is shipped as part of a system. If you are running Windows® you will need to install the software included on the RD1000 User's Guide and Utilities DVD, which includes essential Windows software for use with the RD1000 unit. In this case, installation instructions are provided below in the "Installing Unit Software for Windows" section. If you are using the Linux operating system see the appendix "Using the Linux Operating System".

Store the software DVD/diskette that came with your system in a safe place in case you ever need to reinstall the software. If the software is misplaced it can be downloaded from www.Dell.com/support.

User-Installed PowerVault RD1000 Internal Drive (Customer Kit)

This section describes how a user can install the PowerVault RD1000 Internal drive, in case it did not come pre-installed by Dell.

Before You Begin


The RD1000 unit ships ready to install in a standard 3.5-inch or 5.25-inch half-high drive bay depending on the configuration you order.

Depending on your computer you may need a standard (flat-blade) or Philips screwdriver to remove the computer cover and install the drive in your computer.

Important Information on Electro-Static Damage

To protect your computer and drive from electro-static damage (ESD), follow these guidelines:

- Before you open your computer or remove the RD1000 unit from its antistatic bag, ground yourself by touching the metal chassis of your computer or some other grounded object. For optimal protection, use an electrostatic grounding strap.

 **NOTE:** Your computer must be plugged into a grounded electrical outlet to be properly grounded.

- Do not touch any printed circuit boards or electronic chips on your RD1000 device or in your computer.
- Turn your computer and any peripheral devices off before installing the RD1000 unit.

Installation Instructions

1. Carefully unpack the unit and accessories.
2. Turn off the computer.
3. Open the computer cover, using a screwdriver if necessary.
4. Mount the unit. Slide the RD1000 unit into an unused drive bay until the bezel is flush with the front of the computer. Secure the unit using mounting screws, being careful not to over-tighten the screws (see [Figure 1](#) below).
5. Attach the power cable to the power connector (see [Figure 1](#) below).
6. Connect the SATA data cable to the SATA data connector (see [Figure 1](#) below).
7. Check all cables in your computer system. Before you reinstall your computer cover ensure that all cables are correctly routed so that they will not bind or become crimped. Also, make sure that no cables have loosened during the installation.
8. Replace your computer cover.
9. Turn on the computer.
10. During power-up press F2 key, or other hot key, to enter BIOS set up mode. Enable the SATA port connected to your RD1000 unit. Save changes and exit from BIOS.
11. If running Windows install the RD1000 software (see "Installing Unit Software for Windows").
12. If you are using the Linux operating system see the appendix "Using the Linux Operating System".


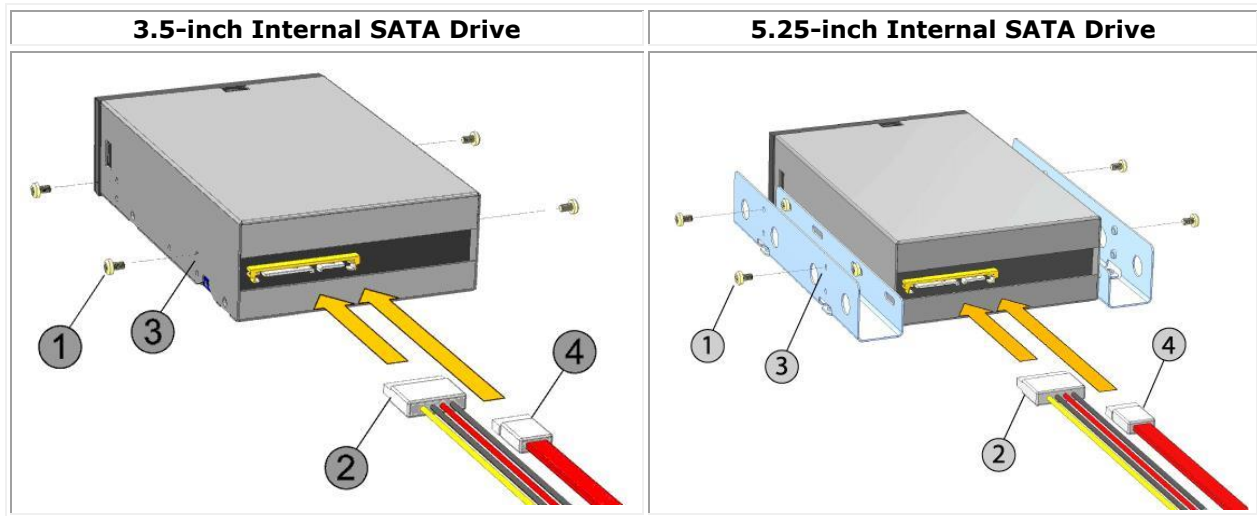
 **NOTE:** If you choose to install a new operating system on your computer with an RD1000 unit attached, make sure the cartridge is removed. This prevents the operating system from confusing the removable drive with the system drive.

Figure 1. RD1000 Internal SATA Connectors

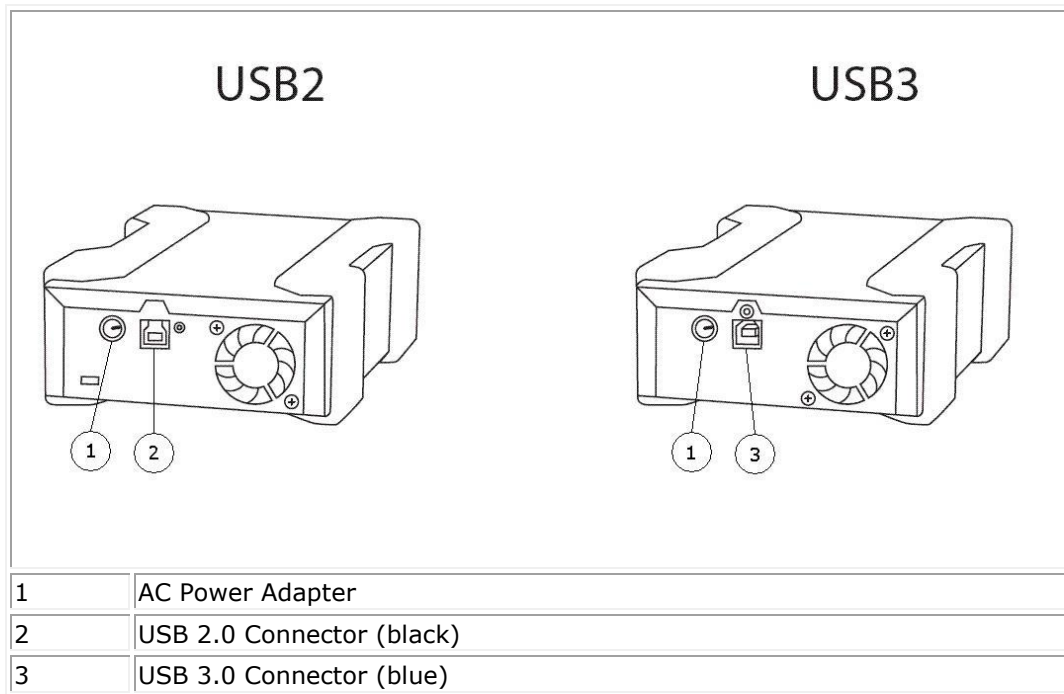


1	Mounting Screws
2	Power Adapter Cable
3	Mounting Holes
4	SATA Data Cable

Installing the Dell PowerVault RD1000 External Drive

1. Carefully unpack the unit and accessories.
2. Attach the USB cable to USB port on the back of the RD1000 unit and connect it to an available USB 2.0 port on the computer (see [Figure 2](#) below).
3. Attach the power cable to the power connector (see [Figure 2](#) below) and plug it into an outlet.
4. Select a convenient location for the PowerVault RD1000 External drive that is flat, sturdy, level and close to the host server. The drive can be oriented horizontally or vertically.
5. If running Windows install the RD1000 software (see "[Installing Unit Software for Windows](#)").
6. If you are using the Linux operating system see appendix "[Using the Linux Operating System](#)".

Figure 2. RD1000 External USB Connectors



USB Cables

The USB2 device will only accept USB 2.0 cables and is not compatible with a USB 3.0 cable (see "connector detail" in Figure 2).


The USB3 device will accept both USB 2.0 and USB 3.0 cables.

Note: Using a USB 2.0 cable with a USB3 device will not optimize the performance of the USB3 device (see the section on "Unit Performance Seems Slow")


Installing Unit Software for Windows

The RD1000 Utility provides essential Windows® software for use with the RD1000 unit. The RD1000 Utility Software can be downloaded at www.Dell.com/support. The RD1000 Utility software for Windows installs:

- A removable disk utility that provides basic diagnostic tests capabilities
- An application update that enables the eject button to operate correctly under the Windows operating system
- An application that allows the right-click eject to operate in user-mode under the Windows operating system
- An application that automatically sets the SATA connection to DMA mode for improved performance

 NOTE: If the RD1000 software is not installed the eject button and right-click eject method may not work properly.

To install the software (Microsoft® Windows Server 2003 / 2008 / 2012, Windows 7 / 8):

 NOTE: You must be logged in as the Administrator or have administrator privileges to install the software.

1. Go to www.Dell.com/support to download the RD1000 Utility.
2. Click on the executable setup file to install and follow the instructions.
3. Re-start the computer.

Your new Dell™ PowerVault™ RD1000 is ready for use. See your backup software manual for instructions on backing up data.

Using the Drive

Operating the RD1000 Unit

This section describes typical activities involved in operating and maintaining the RD1000 unit. For instructions on using your backup software, see the manual that came with your software.

Handling the RD1000 Cartridges

Although RD1000 cartridges are robust, the best practice is to handle them with extra care. This will ensure data integrity and long life. Observe the following precautions:

- Store cartridges in their protective cases when you are not using them.
- Do not stack RD1000 cartridges.
- Keep cartridges away from dust, dirt and moisture.
- Avoid direct sunlight, heat sources and temperature extremes or rapid changes in temperature.
- Never try to force the cartridge into the unit. If it is difficult to insert, check the orientation and insure correct alignment using keyed corner as a guide.

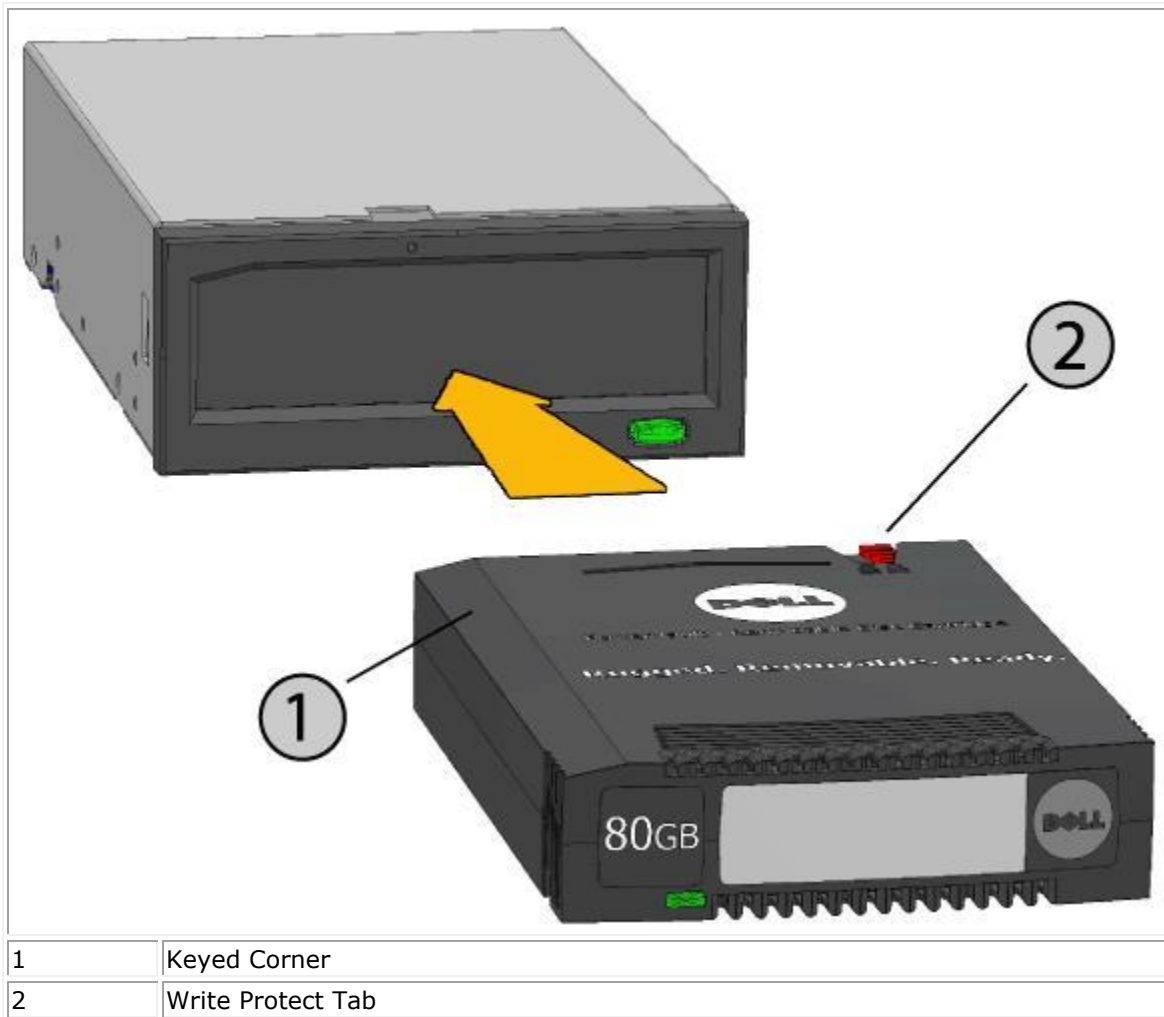
Loading and Unloading Cartridges

The front of your unit has an opening for inserting RD1000 cartridges. A protective door covers the opening. Below and to the right of the door is the power indicator that doubles as a cartridge-eject button.

To Load a Cartridge

Insert the cartridge in the unit with the keyed corner facing the upper left corner of the unit and the write-protect tab on the back right (see [Figure 1](#)). The cartridge only fits in one orientation. Push the cartridge gently into the unit until it is locked in place with a clicking sound.

Figure 1. Loading the Cartridge



To Unload a Cartridge

To unload a cartridge using the mouse right-click method (Windows only):

1. While running Windows® Explorer locate the drive letter for the device.
2. Right-click on the device and select **Eject**.
3. When the cartridge has been ejected by the unit, grasp the exposed sides of the cartridge and pull the cartridge straight out (see [Figure 2](#)).


To unload a cartridge using the eject button:

1. Push the eject button.
2. When the cartridge has been ejected by the unit, grasp the exposed sides of the cartridge and pull the cartridge straight out (see [Figure 2](#)).

To unload a cartridge when the unit is in Low Power Mode [RD1000 USB 3.0 External only]:

1. Push and hold the eject button for approximately 10 seconds.

2. The cartridge will eject, and the dock will return to Low Power Mode.

 NOTE: If the RD1000 software is not installed the eject button and right-click eject method may not work properly (see section "Installing Unit Software for Windows").


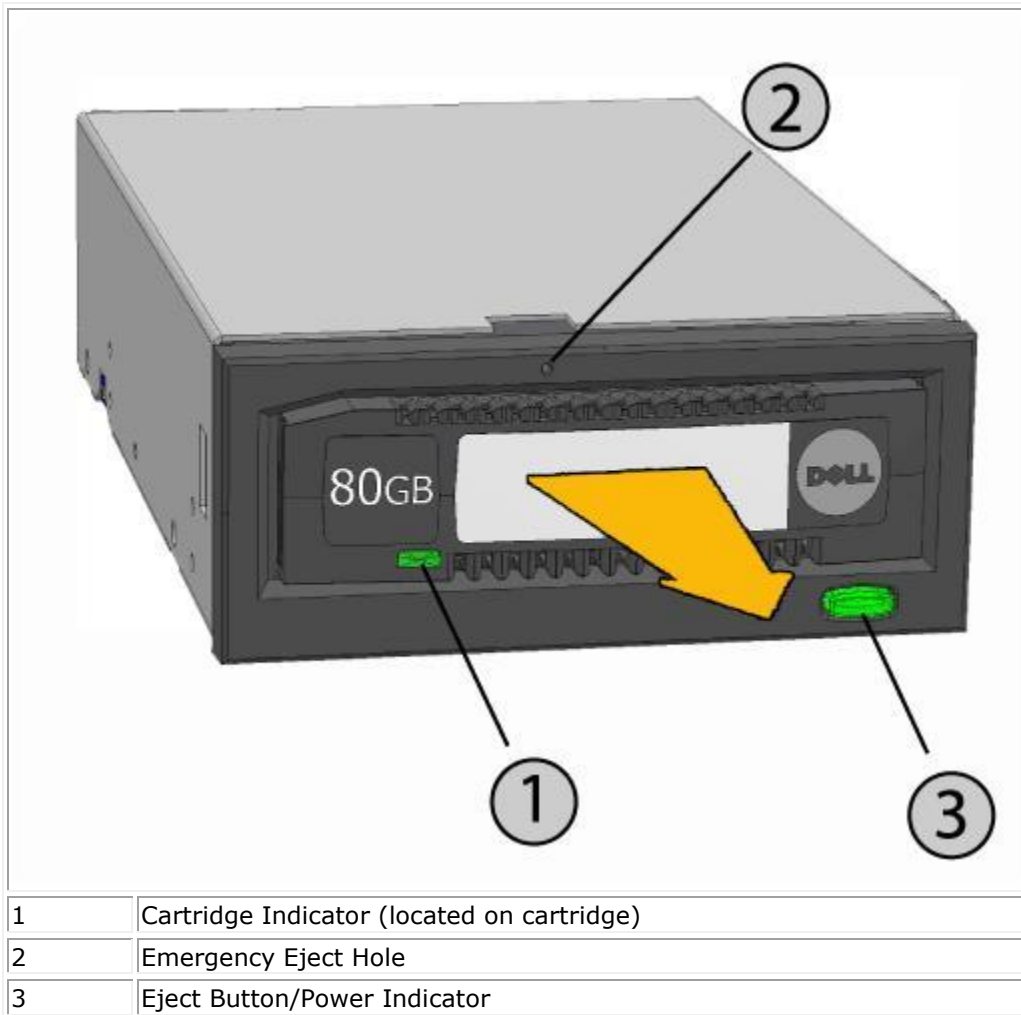
 NOTE: Under proper operation, the drive bay will make an audible noise during the ejection process. If the cartridge does not eject see the "Troubleshooting" section for more details.

Figure 2. Unloading the Cartridge



To Eject a Cartridge in Emergency

 NOTE: Do not emergency eject a RD1000 cartridge while the cartridge activity indicator is flashing.

If the cartridge does not eject, using either the eject button or the right-click eject methods then use the following emergency eject hole method to recover the cartridge:

1. If using the RD1000 Internal device, turn off your computer. If using the RD1000 External device, unplug the power cable.

2. Insert a large straightened paper clip (or similar object) into the Emergency Eject Hole (see [Figure 2](#)). **Do not insert the object in the hole at an angle.** Keep the object straight and apply some force to eject the cartridge.
3. When the cartridge has been ejected by the unit, grasp the exposed sides of the cartridge and pull the cartridge straight out (see [Figure 2](#)).
4. Re-start your computer to reset the RD1000 unit. If using the RD1000 External device, re-plug in the power cable for the unit and then re-start your computer.

Copying Files

The RD1000 device operates just like other disk drives attached to your computer. As a result, you can use file browsers such as Windows Explorer to drag and drop files to the RD1000 cartridge.

To Copy Files to an RD1000 Cartridge (Windows only):

1. Insert a cartridge into the RD1000 device.
2. Double-click on **My Computer** to see the list of devices attached to your computer.
3. Double-click on the removable disk drive to view the files on the RD1000 cartridge.
4. Drag and drop files into the browser window to copy files to the cartridge.

Using the Removable Disk Utility

Overview

The RD1000 Utility is a Windows® application that allows you to diagnose problems with your RD1000 device. With the utility, you can:

- Identify RD1000 devices attached to your computer.
- Retrieve device and cartridge status information.
- Test the unit and the cartridge.

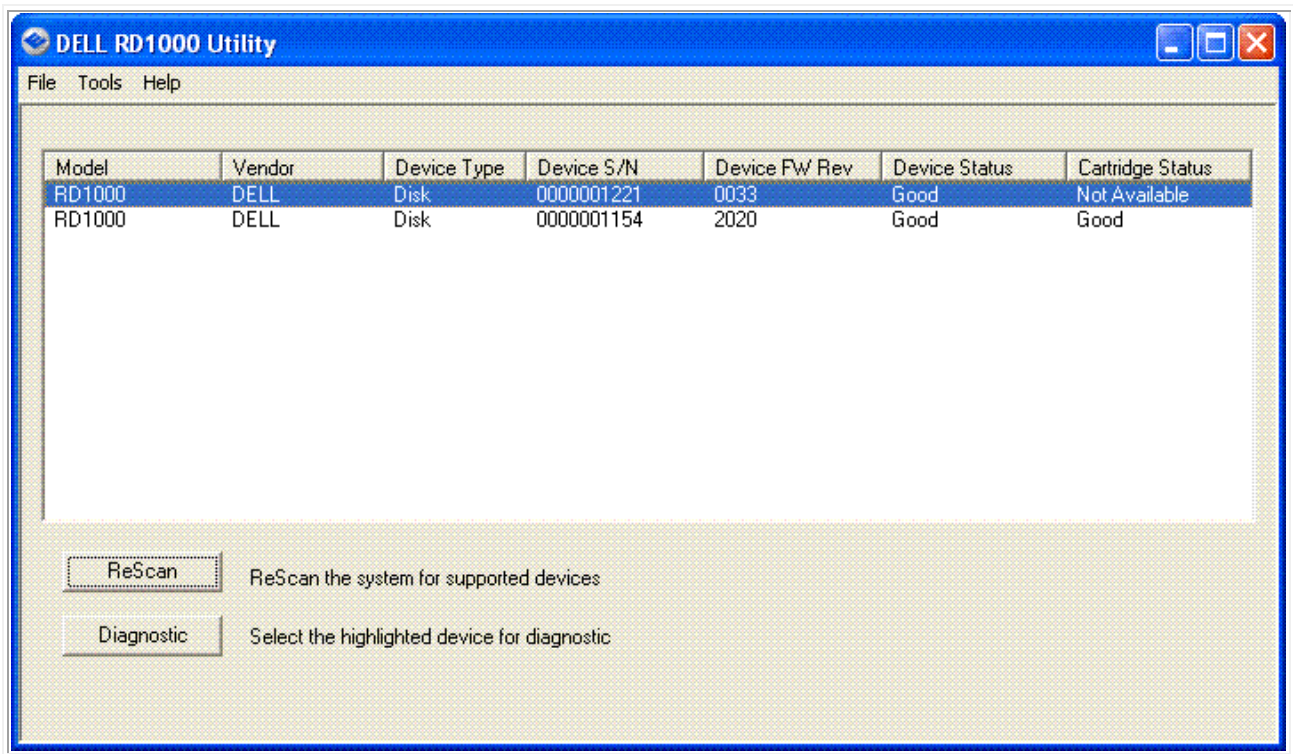
Using Removable Disk Utility

To run the RD1000 Utility for Windows:

Click **Start** → **All Programs** → **RD1000** → **RD1000 Utility**.

For instructions on using removable disk utility, click **Help** (see **Figure 1** below).

Figure 1. RD1000 Utility



If the software is not installed on your computer, see the section "Installing Unit Software for Windows" for installation instructions.

Troubleshooting

The Power Indicator is OFF

RD1000 Internal Drive

If the power indicator is off, the RD1000 Internal unit does not have power. Follow these steps to verify the cable connections in the rear of the unit:

1. Turn off the computer.
2. Check the SATA power and SATA data cable connections in the rear of the unit.
3. Turn on the computer.

RD1000 External Drive

If the power indicator is off, the RD1000 External unit does not have power, or the unit is in Low Power Mode. Follow these steps to verify the cable connections in the rear of the unit:

1. Check power connection at the back of the unit.
2. Check that the power adapter is plugged into an outlet.
3. If plugged into an outlet strip make sure that it is turned on.
4. [RD1000 USB 3.0 External only] If all of the above are OK, the unit may be in Low Power Mode. Check the USB connection between the unit and the computer. If the USB cable is not connected to the computer, or the computer is OFF, the unit will be in Low Power Mode.

The Power Indicator is Steady AMBER

If the power indicator is a steady amber, the RD1000 unit is not working properly. The error is due to one of the following conditions:

- The unit cannot eject the cartridge due to an obstruction.
- The internal electronics are damaged or malfunctioning.

Follow these steps to remove a stuck cartridge:

1. If using the RD1000 Internal device, turn off your computer. If using the RD1000 External device, unplug the power cable.
2. Insert a large straightened paper clip (or similar object) into the Emergency Eject Hole (see [Figure 2](#) in the "Using the Drive: Loading and Unloading Cartridges" section). **Do not insert the object in the hole at an angle.** Keep the object straight and apply some force to eject the cartridge.
3. When the cartridge has been ejected by the unit, grasp the exposed sides of the cartridge and pull the cartridge straight out.
4. Re-start your computer to reset the RD1000 unit. If using the RD1000 External device, re-plug in the power cable for the unit and then re-start your computer.

The Power Indicator is Blinking AMBER, and the Cartridge Does Not Eject

If the power indicator is blinking amber after you press the eject button, the Host computer is accessing the media. The RD1000 unit will eject the cartridge after the Host access completes.

If the cartridge does not eject after the Host computer access completes, you may not be running the correct unit software. See the "[Installing Unit Software for Windows](#)" section for instructions on installing the software.

If the cartridge still does not eject, use Windows Explorer to eject the cartridge. In **Windows® Explorer**, right-click on the drive letter for the RD1000 unit (i.e. F:), and select **Eject**.

The Cartridge Indicator is Steady AMBER

The cartridge indicator is located on the front of the cartridge. If this indicator is amber, the cartridge is not working properly. The error is due to one of the following conditions:

- The cartridge is not compatible with the RD1000 unit.
- The cartridge has been severely damaged.
- The cartridge has not been fully inserted.

Run the removable disk utility to obtain more information about the failure. See section "[Using the Removable Disk Utility](#)".

The Cartridge Does Not Eject


If the cartridge does not eject, verify that you have installed the unit software. For instructions on installing the software, see the "[Installing Unit Software for Windows](#)" section.

[RD1000 USB 3.0 External only] If the unit is in Low Power Mode (power connected, computer OFF/standby, or USB cable not connected), press and hold the Eject button for approximately 10 seconds. The cartridge will be ejected and the unit will return to Low Power Mode

Follow these steps to remove a stuck cartridge:

1. If using the RD1000 Internal device, turn off your computer. If using the RD1000 External device, unplug the power cable.
2. Insert a large straightened paper clip (or similar object) into the Emergency Eject Hole (see [Figure 2](#) in the Using the Drive: Loading and Unloading Cartridges section). **Do not insert the object in the hole at an angle.** Keep the object straight and apply some force to eject the cartridge.
3. When the cartridge has been ejected by the unit, grasp the exposed sides of the cartridge and pull the cartridge straight out.

4. Re-start your computer to reset the RD1000 unit. If using the RD1000 External device, re-plug in the power cable for the unit and then re-start your computer.

 **NOTE:** When the emergency eject is used the computer's operating system will lose recognition of the RD1000 media. Therefore, one of the following options can be preformed to restore recognition.

1. Re-start the computer (recommended).
2. Follow steps 1-4 in "The Unit does Not Appear in the Device Manager (Windows)" section if re-starting the computer is not desired.

The Unit Does Not Appear in the Device Manager (Windows)

If the unit does not appear in the **Windows Device Manager** and the power indicator is green, follow these steps to rescan the hardware:

1. Bring up the **Device Manager**:
 1. Right-click on **My Computer**
 2. Select **Manage**
 3. Select **Device Manager**
2. Right-click on the top folder (this should be your computer's name).
3. Select **Scan for Hardware Changes**.
4. You should see your RD1000 device listed under **Disk drives**. If the device does not appear, re-start the computer.

Unit Performance Seems Slow

RD1000 Internal Drive

Some system SATA ports do not by default operate in DMA mode for the RD1000 Internal device. This results in slower performance and weaker data protection. Reinstall the unit software for Windows to set the SATA ports to the correct mode. Refer to "[Installing Unit Software for Windows](#)" section.

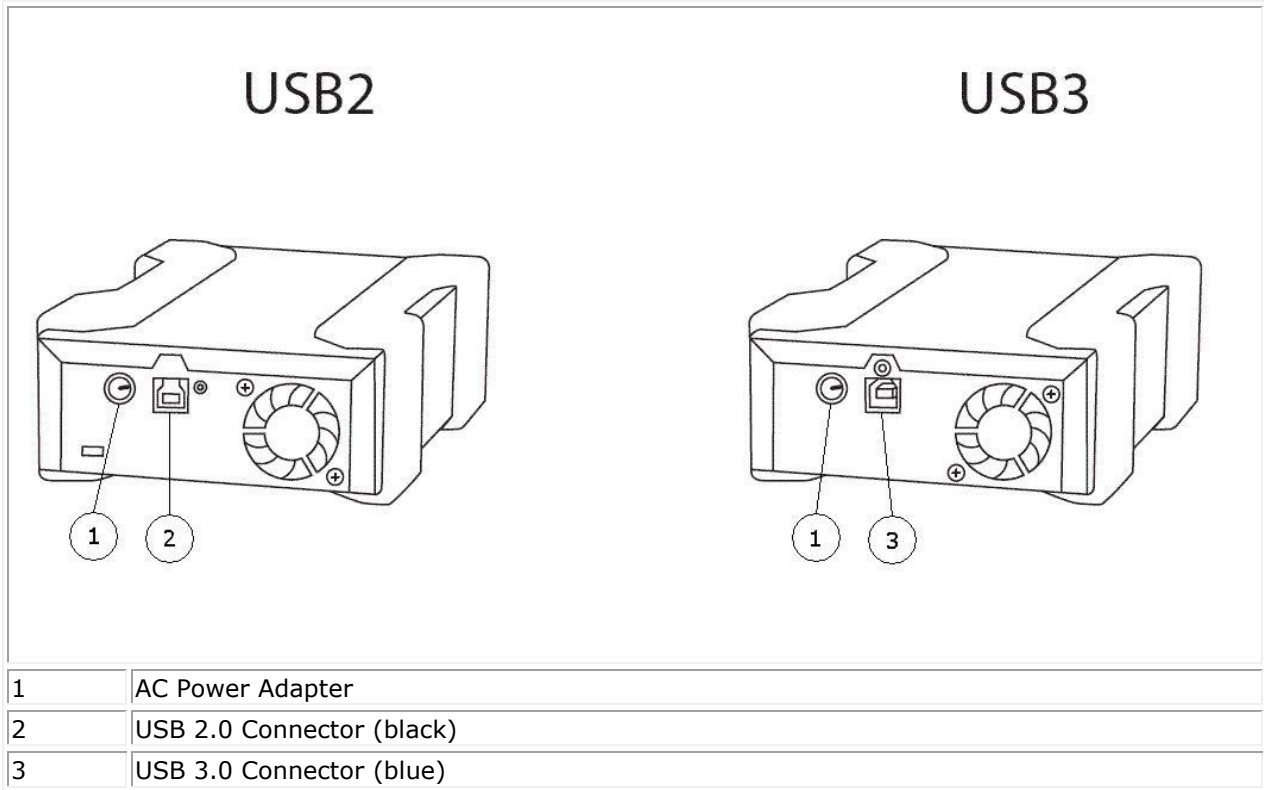
RD1000 External Drive

The RD1000 External device may appear slow based on the type of USB port the device is attached to.

a) If your RD1000 drive supports USB 3.0 make sure your unit is connected to a USB 3.0 port instead of a USB 2.0 port. For best performance, connect directly to a USB 3.0 root hub on the PC and not an external hub.

 **NOTE:** If your host system does not support USB 3.0, then a host adapter card supporting USB 3.0 may be required for your PC.

b) Make sure your unit is connected to a USB 2.0 port instead of a USB 1.1 port. For best performance, connect directly to a USB 2.0 root hub on the PC and not an external hub.



The USB bus shares bandwidth between all USB devices connected to the systems, including the RD1000 External unit. The use of cameras, flash memory devices, etc. on the USB bus may decrease performance of the device. Remove extra devices if they are not necessary.

If running Windows 2000 see section "[Slow Performance with RD1000 External and Windows 2000](#)" for additional information.

Linux Users

Systems running Linux may see reduced performance when doing backups on RD1000 cartridges configured for FAT32. For best performance, configure the file system on the RD1000 cartridges for ext2 or ext3. See section "[RD1000 Cartridge File System Considerations](#)" in the appendix.

Write Error

If the backup application reports a write error, follow these steps:

1. Verify that the write protect switch on the cartridge is set to the "unlock" position.
2. Check the cartridge indicator on the front of the cartridge. If this indicator is amber, the cartridge is not working properly. This may be due to severe damage to the cartridge. Run the RD1000 utility software to obtain more information about the failure.
3. Replace the cartridge if the error persists.

Firmware Download Fails with Windows Server 2003

If the firmware download fails with `error invalid parameter` and you are using Windows Server 2003, check to ensure you have at least Service Pack 1 installed.

Windows 2000 Cannot Eject Cartridge

When attempting to eject a cartridge while connected to the Windows 2000 operating system, ensure that any open **Explorer** windows are not selecting the removable device. Windows 2000 will not allow the cartridge to be ejected when the removable drive is selected. When using the eject button, the button will flash amber and the cartridge will not eject. When using the right-click eject function of **Explorer**, an error message will be displayed indicating that the drive is in use.

If the cartridge will not eject from either the front panel button or the right-click eject function of **Explorer** try closing all open **Explorer** windows and retry.

Slow Performance with RD1000 External and Windows 2000

USB 2.0 Drivers are not installed for any USB 2.0 controllers by default with a Windows 2000 installation. The device will operate at a slower USB 1.1 speed until the USB 2.0 drivers are installed. To install the USB 2.0 drivers, follow the steps below:

1. Right click on the **My Computer** icon and select **Manage**
 2. Select **Device Manager**
 3. Right click on the **Universal Serial Bus Controller** listed in the "other devices" section
 4. Select **Properties**
 5. Select **Update Driver** and follow the instructions to update USB 2.0 drivers.
-

System Will Not Complete Boot Process with RD1000 External

Some versions of BIOS do not handle large USB removable media correctly. If your system will not complete the boot process with the RD1000 External device attached, follow the steps below:

1. Make sure you are using the latest BIOS for your system by checking www.support.dell.com.
 2. Disable USB boot in the BIOS and retry.
 3. Attempt to eject the cartridge and retry boot, or boot with the RD1000 device disconnected.
 4. If using a FAT32 formatted cartridge, reformatting to another file system may fix the problem.
-

Specifications

General

Manufacturer	Dell Inc.
Model Names	PowerVault RD1000
Interface Type	Internal SATA, Internal USB (USB 2.0 or USB 3.0), or External USB (USB 2.0 or USB 3.0)

Performance

Characteristic	Storage capacity varies by individual cartridge capacity		
Transfer Rate	Dependent on system configuration (see below)		
Configuration	Theoretical Transfer Rate	Maximum Burst Transfer Rate	Typical Transfer Rate
RD1000 USB 2.0 USB 2.0 Host USB 2.0 Cable	480 Mbps (60 MB/s)	35 MB/s	25 MB/s
RD1000 USB 3.0 USB 2.0 Host USB 3.0 Cable	480 Mbps (60 MB/s)	35 MB/s	30 MB/s
RD1000 USB 3.0 USB 3.0 Host USB 3.0 Cable	5 Gbps (625 MB/s)	230 MB/s	80 MB/s
SATA	1.5 Gbps (187.5 MB/s)	45 MB/s	35 MB/s
Average access time (msec)	15		
Function	Removable disk drive		
Logical block size	512 bytes		
Supported file system	ext2, ext3, FAT32 and NTFS*		

Capacity and transfer rate will vary depending on the RD1000 cartridge type used.

*NTFS is the default file system on the cartridge.

Reliability

Unrecoverable error rate	1 error per 10 ¹⁴ bits read
MTBF	550,000 hours

Physical

	RD1000 Internal Devices		RD1000 External Device	RD1000 Media
Form Factor	3.5 inch internal	5.25 inch half-height internal	External	Removable Cartridge
Height	41.4 mm (1.63 inch)	41.4 mm (1.63 inch)	51.8 mm (2.04 inch)	23.68 mm (0.93 inch)
Width	101.6 mm (4.00 inch)	146.0 mm (5.75 inch)	109.8 mm (4.32 inch)	86.6 mm (3.4 inch)
Depth	159.4 mm (6.28 inch) including bezel	171.9 mm (6.77 inch) including bezel	177.5 mm (7.00 inch) including bezel	119.18 mm (4.69 inch)
Weight	408 g (0.90 lbs)	635 g (1.40 lbs)	610 g (1.34 lbs)	173 g (0.38 lbs)

Power

	Internal RD1000 Devices	External RD1000 Device
Voltage Tolerance	+5VDC ±5%, +12VDC ±10%	+12VDC ±10%
Power Consumption (Low Power Mode/Typical/Peak)	N/A / 7.5W / 20W	0.25W / 6.6W / 13W
AC Adapter	N/A	Universal Adapter 100-240 VAC, 50-60Hz input

Environmental

RD1000 Unit	Operational	Non-Operational
Temperature	5 to 40°C	-40 to 65°C
Thermal Gradient	10°C/hour	20°C/hour
Relative Humidity	20 to 80%, non-condensing	10 to 90%, non-condensing
Maximum Wet Bulb Temperature	29°C, non-condensing	38°C, non-condensing
Altitude	-50 ft to 10,000 ft	-50 ft to 35,000 ft
Vibration	sine vib 0.25G peak, 3-200 Hz	random vib 1.54G RMS
Shock	half sine 31G @ 2.6ms	half sine 71G @ 2 ms

Regulatory

For additional regulatory information, please see the product user documentation which accompanied your product and refer to the link below.

http://www.dell.com/content/topics/global.aspx/about_dell/values/regulatory_compliance/emc_reg_notice?~ck=ln&c=us&l=en&lnki=0&s=corp

Internal Drive Model Number: RDX-Internal-A

External Drive Model Number: RDx-External-A

Appendix: Using the Linux Operating System

Overview

This document describes the use of RD1000 removable disk drives on Linux operating systems. There are two models of the RD1000 device: an internal SATA version and an external USB version. Both SATA and USB models support Linux.

Linux Compatibility

There are a large number of possible Linux distributions which will support the Dell PowerVault RD1000 devices natively. The Linux distributions listed in the table below have been tested and found compliant (see **Table 1**). Check www.support.dell.com for any updates.

Table 1. Compatibility

Linux Distribution	RD1000 Internal SATA	RD1000 External USB
RHEL 3.0 Update 7	Supported	Supported
RHEL 4.0 Update 3	Supported	Supported
RHEL 5.0	Supported	Supported
RHEL 6.1 / SP1	Supported	Supported
SLES 9 Service Pack 3 x64	Not Supported	Supported
SLES 10 x64	Supported	Supported
SLES 11 x64 SP1	Supported	Supported

SLES – SUSE Linux Enterprise Server (Novell)

RHEL – Red Hat Enterprise Linux

SLES 9 Service Pack 3 does not support SATA ATAPI devices and therefore does not support the RD1000 Internal SATA product.

Only the newest Linux versions are fully compatible with the USB 3.0 docks. All other older versions of Linux will support the USB 3.0 dock at USB 2.0 speeds.


Using the RD1000 Drive with Linux

RD1000 Cartridge File System Considerations

The RD1000 cartridge is formatted as NTFS at point of sale. NTFS format does not allow write function in a Linux operating system. Your cartridge must be reformatted to a different file system supported

by Linux, such as FAT32, ext2, and ext3, etc. Refer to the man pages for **fdisk** and **mkfs** for detailed instructions on how to manipulate partition table and create file systems on Linux. If creating multiple partitions on a cartridge, see topic "Eject" below.

- The choice of the file system also has significant impact on backup performance. Ext3 typically gives the best overall performance.
- The FAT32 file system has a 4GB file size limit which can limit archive sizes when using **tar**.
- Some system BIOS do not handle FAT32 formatted disk volumes correctly and may hang on boot. This typically occurs when USB boot is enabled in the BIOS. See "System Will Not Complete Boot Process with RD1000 External" section in "Troubleshooting" for more information.


 NOTE: Although **mkfs** will allow format of un-partitioned media, we recommend always using **fdisk** to create partitioned media before formatting. Issues exist with the 2.4 kernel and **umount** when using un-partitioned media.

Automount

A cartridge must be mounted to be accessible by the backup application. Some Linux distributions include pre-configured **automount** for removable disks, others may require user configuration. Please refer to the man pages for **automount** for more information.

Eject

If the cartridge is mounted, the eject button on the RD1000 drive will not work properly. Use the **eject** command to un-mount and eject the cartridge.

 NOTE: The **eject** command cannot properly handle un-mount if multiple partitions are present on a removable disk. Each mounted partition must be un-mounted manually or the eject command will fail.

Backup With tar

The **tar** command works with RD1000 drives by writing the archive to a file on the cartridge. Use the `tar -M` option to create archives which span multiple cartridges on the RD1000 drive. For spanning removable disk cartridges use the `tar -M -L size` option (where size is the cartridge capacity in kilobytes) when creating multiple-volume backups. For more information refer to the man page for **tar**.

Troubleshooting

SCSI Device Status

To find out whether the RD1000 drive is recognized by the system, issue the following command:

```
cat /proc/scsi/scsi
```

This will print out a list of all the SCSI devices in the system. The list should include any RD1000 drives recognized by the system. If the RD1000 drive is not listed, check cable connections and power supplies (and BIOS settings for the SATA product.)

e2fsck File System Check Fails

If the **e2fsck** program is unable to successfully complete the file check of an ext2/ext3 cartridge, check to make sure you have the latest version of **e2fsprogs** installed. Under certain circumstances, earlier versions (pre 1.35) of **e2fsck** included with some distribution are unable to complete the file systems check.
