Quantum®

rdx®

Removable Hard Disk Storage System

User Guide

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1. Introduction:
Quantum RDX Hard Disk Storage System

1.1 Overview

Quantum RDX® storage is a removable, ruggedized, hard disk drive system. It features backup application compatibility, a high speed transfer rate for fast backups, portable cartridges, and a high level of data reliability. The storage system is available with an internal SATA or USB device (see Figure 1) or external USB device (see Figure 2).

Figure 1: RDX Internal Docking Station

Internal Docking Station (SATA or USB)

Figure 2: RDX External Docking Station

External USB Docking Station

1.2 Capacity and Transfer Rates

The capacity and transfer rate of the Quantum RDX storage system are outlined in the table below (see Table 1). The capacity and transfer rate will vary depending on the RDX cartridge type used.

Table 1: Capacity and Transfer Rates

Capacity	RDX 160 GB	RDX 320 GB	RDX 500 GB	RDX 640 GB	RDX 750 GB	RDX 1.0 TB
Native Capacity	160 GB	320 GB	500 GB	640 GB	750 GB	1.0 TB
Average sustained transfer rate (MBs/sec)[1]	USB 2.0: 25 MB/s SATA: 45 MB/s USB 3.0: 230MB/s					
Average access time (msec)	15					
Function	Removable disk drive					
Command set	• Packet command feature set, per ATA/ATAPI-7 • SCSI primary commands (SPC-2) • SCSI block commands (SBC-2)					
Supported file systems	ext2, ext3, FAT32, Mac OS Extended, NTFS[2]					

[1]*Actual results may vary depending on system environments, drive media used, or other factors.*

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

1.3 Supported Media

The RDX system supports any RDX cartridge. RDX cartridges are available in different capacity configurations, depending on your storage requirements.

1.4 Supported Operating Systems

The RDX storage system is supported on the following operating systems:

- Microsoft $^{®}$ Windows$^{®}$
  - o Windows Server 2003 R2—Standard, Professional, Small Business
  - o Windows Server 2008 R2—Standard, Professional, Small Business
  - o Windows Vista SPI—32- and 64-bit Business
  - o Windows XP—Home and Professional
  - o Windows 7
- Linux[3]
  - o CentOS Linux—v4.2, Kernel v2.6.9
  - o Fedora Core S—Kernel v2.6
  - o RHEL 3.0—Update 7
  - o RHEL 4.0—Update 3
  - o RHEL 5.0—Update 3
  - o RHEL 6.1/SP1
  - o SLES 9—Service Pack 3 x64
  - o SLES 10—x64
  - o SLES 11, SP1
- Mac
  - o Mac OS X—10.4 or newer

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

1.5 Software

GoProtect$^{®}$ Backup Software

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

Windows Software

The *RDX User Guide and Utilities CD* provides essential Windows software for use with the RDX system. The RDX software for Windows installs:

- A removable disk utility that provides basic diagnostic test capabilities and a firmware upgrade
- An application update that enables the **Eject** button to operate correctly under the Windows operating system
- An application that allows the right-click eject function 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 Section 2.3 Installing Utility Software for Windows and Section 4.2 Using the Removable Disk Utility for more information on these applications.

Linux Software

There is no special software necessary when running the Linux operating system. See Appendix A: Using the Linux Operating System for more information on using the RDX system with Linux.

1.6 Front Panel Features

The front of the RDX docking station has the following features and indicators:

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

Figure 3: Front Panel Features
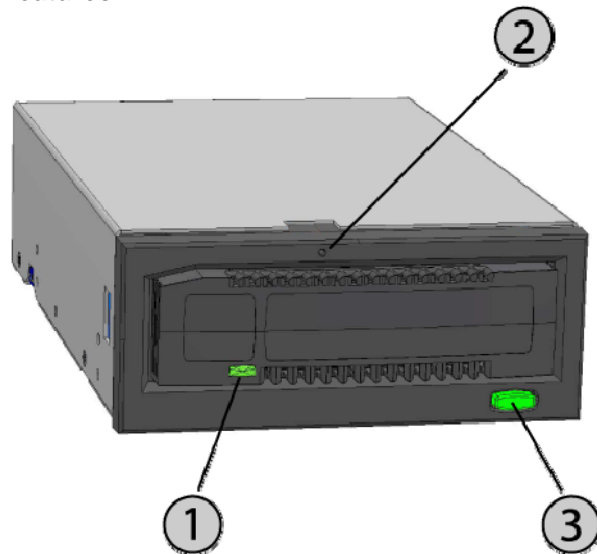
Table 2: Power Indicator
The **Eject** button is illuminated by a power indicator. Table 2 describes the operation of this indicator.

Indicator Status	Meaning	Description
OFF	No Power	Docking station does not have power.
Steady GREEN	Ready	Power is on and the RDX docking station is working properly.
Blinking GREEN	Ejecting	Cartridge is ejecting.
Steady AMBER	Fault	RDX docking station has detected a fault condition. For more information, run a diagnostic application (see Section 4.2 Using the Removable Disk Utility).
Blinking AMBER	Prevent	Host computer is accessing the media, and the user has pressed the Eject button. The indicator will blink amber for a few seconds, and then return to a steady green. The cartridge will eject 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 or the docking station has no power.
Steady GREEN	Ready	Cartridge is ready.
Blinking GREEN	Activity	Reading, writing, or seeking is occurring.
Steady AMBER	Fault	RDX docking station has detected a cartridge fault condition. For more information, run a diagnostic application (see Section 4.2 Using the Removable Disk Utility).

2. Quick Start Installation:
Quantum RDX Removable Hard Disk Storage System

2.1 Installing the RDX Internal (SATA or USB) Docking Station (Customer Kit)

This section describes how to install the RDX Internal drive.

Before You Begin

The RDX docking station ships ready to install in a standard 5.25-inch half-height drive bay.

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 Electrostatic Damage

To protect your computer and docking station from electrostatic damage (ESD), follow these guidelines:

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

- Before you open your computer or remove the RDX docking station 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.
- Do not touch any printed circuit boards or electronic chips on your RDX docking station or in your computer.
- Turn your computer and any peripheral devices off before installing the RDX docking station.

Installation Instructions

1. Carefully unpack the docking station and accessories.
2. Turn off the computer.
3. Open the computer cover, using a screwdriver if necessary.
4. Mount the docking station. Slide the RDX docking station into an unused drive bay until the bezel is flush with the front of the computer. Secure the docking station using mounting screws, being careful not to over-tighten the screws (see Figure 4 below).
5. Attach the power cable to the power connector (see Figure 4 below).
6. Connect the data cable (SATA or USB) to the data connector (SATA or USB) - see Figure 4 below. For USB installation, connect the other end of the cable to the appropriate USB connector on the motherboard.
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. (For SATA units only.) During power-up press the F2 key, or other hot key, to enter BIOS setup mode. Enable the SATA port connected to your RDX docking station. Save changes and exit from the BIOS.
11. If running Windows install the RDX software (see Section 2.3 Installing Utility Software for Windows).
12. If you are using the Linux operating system, see Appendix A: Using the Linux Operating System.

NOTE: If you install a new operating system on your computer with an RDX docking station attached, make sure the cartridge is removed. This prevents the operating system from confusing the removable drive with the system drive.

Figure 4: RDX Internal Connectors

Internal SATA Docking Station   Internal USB Docking Station
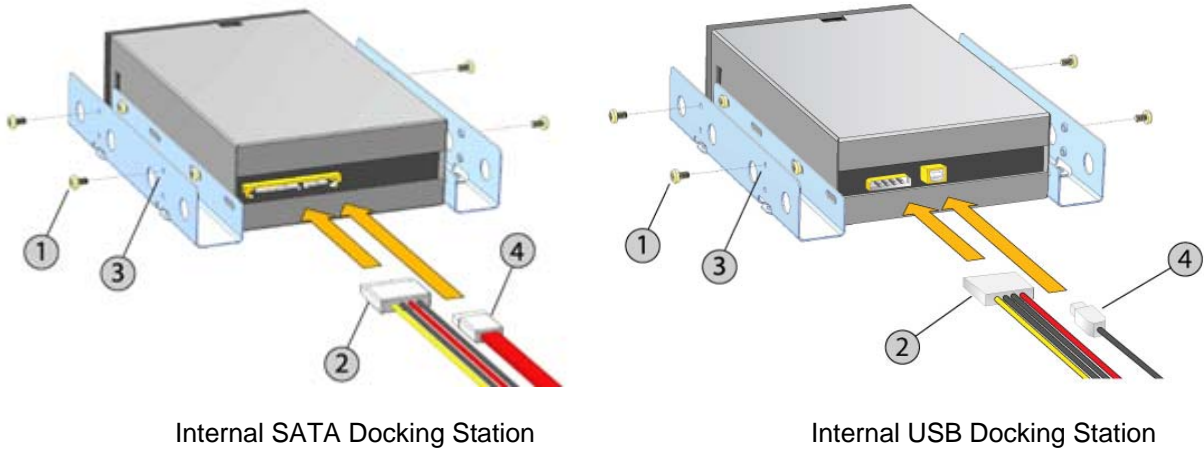
(1) Mounting Screws
(2) Power Adapter Cable
(3) Mounting Holes
(4) SATA Data Cable/USB Cable

2.2 Installing the RDX USB Removable Disk Docking Station

1   Carefully unpack the docking station and accessories.
2   Attach the USB cable to the USB port on the back of the RDX docking station and connect it to an available USB 2.0 port on the computer (see Figure 5 below).
3   Attach the power cable to the power connector (see Figure 5 below) and plug it into an outlet.
4   Select a convenient location for the RDX 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 RDX software (see Section 2.3 Installing Utility Software for Windows).
6   If you are using the Linux operating system, see Appendix A: Using the Linux Operating System.

Figure 5: RDX External USB Connectors
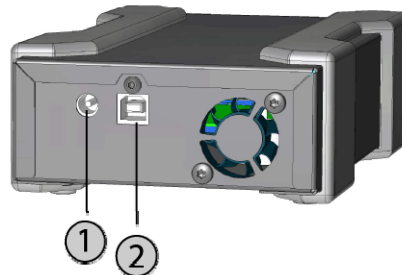
(1) AC Power Adapter
(2) USB Cable

2.3 Installing Utility Software for Windows

NOTE: RDX Utility software is required to use the RDX docking station with Microsoft Windows operating systems.

The *Quantum RDX User Guide and Utilities CD* provides the following essential Windows software for use with the RDX docking station:

- A removable disk utility that provides basic diagnostic test capabilities and firmware upgrades
- An application update that enables the **Eject** button and right-click eject function to operate correctly under the Windows operating system
- An application that automatically sets the SATA connection to DMA mode for improved performance
- A software program that simplifies the process of creating data backups

The software on this disc will not interfere with other applications running on the computer.

To install RDX Utility software for Microsoft Windows Vista/XP/Server 2003:

1. Log in as the Administrator to enable installation privileges.
2. Insert the RDX Utilities disc into the computer; a dialog box will open on the screen.
3. Click **Install RDX Utilities** and follow the on-screen prompts.
4. Optional: Click **Install Quantum GoProtect** and follow the on-screen prompts.
5. Once installation is complete, restart the computer.

Your new RDX system is ready for use. Refer to the backup software manual for instructions on backing up data.

3. Using the Quantum RDX Removable Hard Disk Storage System

3.1 Operating the RDX System

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

3.2 Handling the RDX Cartridges

Although RDX cartridges are rugged, it is always a best practice to take extra care not to drop them when handling. 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 RDX cartridges.
- Keep cartridges away from dust, dirt, and moisture.
- Avoid direct sunlight, heat sources, temperature extremes, and rapid changes in temperature.
- Never try to force the cartridge into the docking station. If it is difficult to insert, check the orientation and ensure correct alignment, using the keyed corner as a guide.

3.3 Loading and Unloading Cartridges

The front of your docking station has an opening for inserting RDX 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 docking station with the keyed corner facing the upper left corner of the docking station and the write-protect tab on the back right (see Figure 6). The cartridge only fits in one orientation. Push the cartridge gently into the docking station until it locks in place with a clicking sound.

Figure 6: Loading the Cartridge
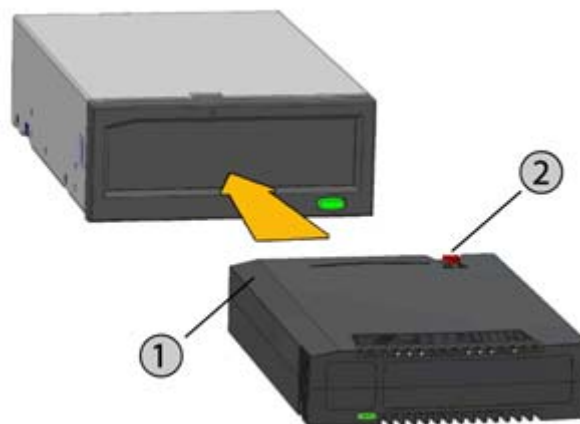
(1) Keyed Corner
(2) Write Protect Tab

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 docking station, grasp the exposed sides of the cartridge and pull the cartridge straight out (see Figure 7).

To unload a cartridge using the Eject button:

1 Push the Eject button.
2 When the cartridge has been ejected by the docking station, grasp the exposed sides of the cartridge and pull the cartridge straight out (see Figure 7).

NOTE: If the RDX software is not installed the **Eject** button and right-click eject method may not work properly (see Section 2.3 Installing Utility 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 Chapter 5 Troubleshooting for more details.

Figure 7: Unloading the Cartridge
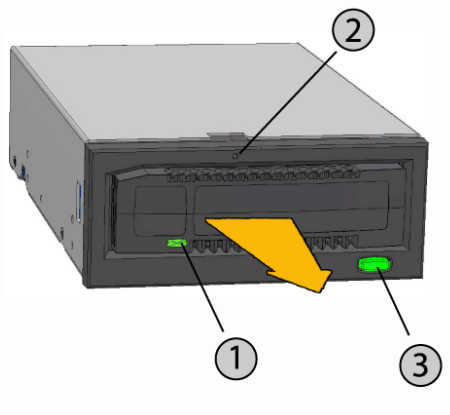
(1) Cartridge Indicator (located on cartridge)
(2) Emergency Eject Hole
(3) Eject Button/Power Indicator

To Emergency Eject a Cartridge

CAUTION: *Do not* emergency eject an RDX 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, use the following emergency eject hole method to recover the cartridge:

1   If you are using the RDX Internal docking station, turn off your computer. If using the RDX External docking station, unplug the power cable.
2   Insert a large straightened paper clip (or similar object) into the Emergency Eject Hole (see Figure 7). *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 docking station, grasp the exposed sides of the cartridge and pull the cartridge straight out (see Figure 7).
4   Restart your computer to reset the RDX docking station. If using the RDX External docking station, plug in the power cable for the docking station and then restart your computer.

4. Using the Quantum RDX Removable Disk Utility

4.1 Overview

The RDX Utility is a Windows application that allows you to diagnose problems with your RDX docking station. With the utility, you can:

- Identify the RDX docking station attached to your computer
- Retrieve device and cartridge status information
- Test the docking station and the cartridge
- Upgrade docking station firmware

4.2 Using the Removable Disk Utility

To run the RDX Utility for Windows:

Click **Start > All Programs > RDX > RDX Utility**.

For instructions on using the removable disk utility, click **Help**.

If the software is not installed on your computer, see Section 2.3 Installing Utility Software for Windows for installation instructions.

5. Troubleshooting:
   Quantum RDX Removable Hard Disk Storage System

5.1 Power Indicator is OFF

RDX Internal Docking Station

If the power indicator is off, the RDX Internal docking station does not have power. If this happens, follow these steps to verify the cable connections in the rear of the docking station:

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

RDX External Docking Station

If the power indicator is off, the RDX External docking station does not have power. If this happens, follow these steps to verify the cable connections in the rear of the docking station:

1. Check the power connection at the back of the docking station.
2. Check that the power adapter is plugged into an outlet.
3. If the power adaptor is plugged into an outlet strip make sure that it is turned on.

Low Power Mode (USB 3.0 External only)

If the USB cable is unplugged from the USB 3.0 External dock, the dock will enter Low Power Mode and the dock power light will turn OFF.

If a cartridge is in the dock when the unit goes into Low Power Mode, push the **Eject** button to eject the cartridge.

The dock will resume normal operation once the USB cable is reconnected to the computer.

5.2 Power Indicator is Steady AMBER

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

- The docking station 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 you are using the RDX Internal docking station, turn off your computer. If you are using the RDX External docking station, unplug the power cable.
2. Insert a large straightened paper clip (or similar object) into the Emergency Eject Hole (see Figure 7 in Section 3.3 Loading and Unloading Cartridges). *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 docking station, grasp the exposed sides of the cartridge and pull the cartridge straight out.
4. Restart your computer to reset the RDX docking station. If using the RDX External docking station, plug in the power cable for the docking station and then restart your computer.

5.3 Power Indicator is Blinking AMBER and 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 RDX docking station 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 utility software. See Section 2.3 Installing Utility Software for Windows 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 RDX docking station (i.e. F:), and select **Eject**.

5.4 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 RDX docking station.
- 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 4.2 Using the Removable Disk Utility.

5.5 Cartridge Does Not Eject

If the cartridge does not eject, verify that you have installed the utility software. See Section 2.3 Installing Utility Software for Windows for instructions on installing the software.

Follow these steps to remove a stuck cartridge:
1. If using the RDX Internal docking station, turn off your computer. If using the RDX External docking station, unplug the power cable.
2. Insert a large straightened paper clip (or similar object) into the Emergency Eject Hole (see Figure 7 in Section 3.3 Loading and Unloading Cartridges). *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 docking station, grasp the exposed sides of the cartridge and pull the cartridge straight out.
4. Restart your computer to reset the RDX docking station. If using the RDX External docking station, plug in the power cable for the docking station and then restart your computer.

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

- Restart the computer (recommended).
- Follow steps 1-4 in Section 5.6 Docking Station Does Not Appear in the Device Manager (Windows) if re-starting the computer is not desired.

5.6 Docking Station Does Not Appear in the Device Manager (Windows)

If the docking station 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:
     a.   Right-click on **My Computer.**
     b.   Select **Manage.**
     c.   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 RDX device listed under Disk drives. If the device does not appear, restart the computer.

5.7 Docking Station Performance Seems Slow

RDX Internal Docking Station

Some system SATA ports do not by default operate in DMA mode for the RDX Internal device. This results in slower performance and weaker data protection. Reinstall the utility software for Windows to set the SATA ports to the correct mode. Refer to Section 2.3 Installing Utility Software for Windows section.

RDX External Docking Station

The RDX External device may appear slow based on the type of USB port the device is attached to. Make sure your docking station is connected to a USB 2.0 or USB 3.0 port instead of a USB 1.1 port. For best performance, connect directly to a USB 2.0 or USB 3.0 root hub on the PC, and not an external hub.

The USB bus shares bandwidth between all USB devices connected to the system, including the RDX External docking station. 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.

Linux Users

Systems running Linux may see reduced performance when doing backups on RDX cartridges configured for FAT32. For best performance, configure the file system on the RDX cartridges for ext2 or ext3. See Appendix A.3 Using the RDX System with Linux.

5.8 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 RDX utility software to obtain more information about the failure.
3   Replace the cartridge if the error persists.

5.9 Firmware Download Fails with Windows Server 2003

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

5.10 System Will Not Complete Boot Process with RDX External Docking Station

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

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

6. Specifications:
Quantum RDX Removable Hard Disk Storage System

6.1 General

Manufacturer	Quantum Corp
Model Names	RDX-SATA, RDX-USB-INT, RDX-USB, RDX-USB3-INT, and RDX-USB3
Interface Type	Internal SATA, Internal USB 2.0, External USB 2.0, Internal USB 3.0, and External USB 3.0

6.2 Performance

Capacity	RDX 160 GB	RDX 320 GB	RDX 500 GB	RDX 640 GB	RDX 750 GB	RDX 1.0 TB
Native Capacity	160 GB	320 GB	500 GB	640 GB	750 GB	1.0 TB
Average sustained transfer rate (MBs/sec)[1]	USB 2.0: 25 MB/s SATA: 45 MB/s USB 3.0: 230MB/s					
Average access time (msec)	15					
Function	Removable disk drive					
Command set	• Packet command feature set, per ATA/ATAPI-7 • SCSI primary commands (SPC-2) • SCSI block commands (SBC-2)					
Supported file systems	ext2, ext3, FAT32, Mac OS Extended, NTFS[2]					

[1]*Actual results may vary depending on system environments, drive media used, or other factors.*

[2]*NTFS is the default file system on the cartridge. If you are using Linux the cartridge that comes with your system will need to be reformatted to support a file system that is compatible with a Linux-based operating system (see Appendix A.3 Using the RDX System with Linux).*

6.3 Reliability

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

6.4 Physical

	RDX Internal Docking Station	**RDX External Docking Station**	**RDX Media**
Form Factor	5.25 inch half-height internal	External	Removable Cartridge
Height	41.4 mm (1.63 inch)	51.8 mm (2.04 inch)	23.68 mm (0.93 inch)
Width	146.0 mm (5.75 inch)	109.8 mm (4.32 inch)	86.6 mm (3.4 inch)
Depth	171.9 mm (6.77 inch) including bezel	177.5 mm (7.00 inch) including bezel	119.18 mm (4.69 inch)
Weight	635 g (1.40 lbs)	540 g (1.19 lbs)	173 g (0.38 lbs)

6.5 Power

	Internal RDX Docking Station	**External RDX Docking Station**
Voltage Tolerance	+5VDC ±5% (SATA and USB) +12VDC ±10% (USB)	+12VDC ±10%
Power Consumption (Typical/Peak)	7.5W/13W (SATA) 6.6W/20W (USB)	6.6W/13W
AC Adapter	N/A	Universal Adapter 100-240 VAC, 50-60Hz input

6.6 Environmental

RDX Docking Station	Operational	Non-Operational
Temperature	10° 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

7. Regulatory:
Quantum RDX Removable Hard Disk Storage System

7.1 Environmental

- WEEE: product is registered and labeled as not appropriate for common disposal.
- RoHS: all materials and processes used in the system meet the limits for compliance.

7.2 Emissions

- (USA) This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

  This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
- (Europe) Meets the CE requirements as specified in EMC Directive 89/336/EEC, CISPR 22 & CISPR 24/.
- (Australia & New Zealand) C-Tick
- (Japan) This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take corrective actions. VCCI-A
- (Taiwan) This is a Class A Information Product; when used in residential environment, it may cause radio frequency interference. Under such circumstances, the user may be requested to take appropriate countermeasures.

Environmental Protection Use Period (EPUP) Disclaimer:
The number provided as the EPUP is provided solely to comply with applicable laws of the People's Republic of China. It does not create any warranties or liabilities on behalf of Quantum to customers. The EPUP assumes that the product will be used under normal conditions in accordance with the Quantum operating manual. Certain assemblies inside this product (for example, assemblies that contain a battery) may have an EPUP which is lower than the EPUP on this product.

Part Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyl (PBB)	Polybrominated diphenylether (PBDE)
Chassis	O	O	O	O	O	O
PCBA	X	O	O	O	O	O
Enclosure	O	O	O	O	O	O

O: Indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006.
X: Indicates that the content of the toxic and hazardous substance in at least one homogeneous material of the part exceeds the concentration limit requirement as described in SJ/T 11363-2006.

Appendix A: Using the Linux Operating System Quantum RDX Removable Hard Disk Storage System

A.1 Overview

This document describes the use of RDX removable disk docking stations on Linux operating systems. There are two models of the RDX docking station: an internal SATA version and an external USB version. Both the SATA and USB models support Linux.

A.2 Linux Compatibility

There are a large number of possible Linux distributions that will natively support the RDX docking stations natively. The Linux distributions listed in the table below have been tested and found compliant (see Table 1).

Table 1: Compatibility

Linux Distribution[1]	RDX Internal SATA	RDX External USB
RHEL 3.0 Update 7	Supported	Supported
RHEL 4.0 Update 3	Supported	Supported
RHEL 5.0 Update 3	Supported	Supported
RHEL 6.1/SP1	Supported	Supported
SLES 9 Service Pack 3 x64	Not Supported	Supported
SLES 10 x64	Supported	Supported
SLES 11 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 RDX Internal SATA product.

[1]*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.*

A.3 Using the RDX System with Linux

RDX Cartridge File System Considerations

The RDX cartridge is formatted as NTFS at point of sale. NTFS format does not allow writes in a Linux operating system. Your cartridge must be reformatted to a different file system supported by Linux, such as FAT32, ext2, or ext3, etc. Please refer to the man pages for **fdisk** and **mkfs** for detailed instructions on how to manipulate partition tables and create file systems on Linux. If you are creating multiple partitions on a cartridge, see the Eject section 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 4 GB 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 Section 5.10 System Will Not Complete Boot Process with RDX External for more information.

NOTE: Although **mkfs** will allow format of unpartitioned 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, while 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 RDX drive will not work properly. Use the eject command to unmount and eject the cartridge.

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

Backup With tar

The **tar** command works with RDX docking stations by writing the archive to a file on the cartridge. Use the **tar -M** option to create archives which span multiple cartridges on the RDX docking station. 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**.

A.4 Troubleshooting

SCSI Device Status

To find out whether the RDX 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 RDX drives recognized by the system. If the RDX docking station 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 distributions are unable to complete the file systems check.

Product Registration and Support

For product registration and support, go to www.quantum.com/ServiceandSupport

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