



Protecting
Your Data™



RTX430-3QR

User Manual

Features

- Robust data storage in a portable RAID tower
- TrayFree™ bays for fast drive swaps
- Multiple connection types including USB 3.0
- Support for any capacity 3.5-inch SATA hard drive



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1 General Information

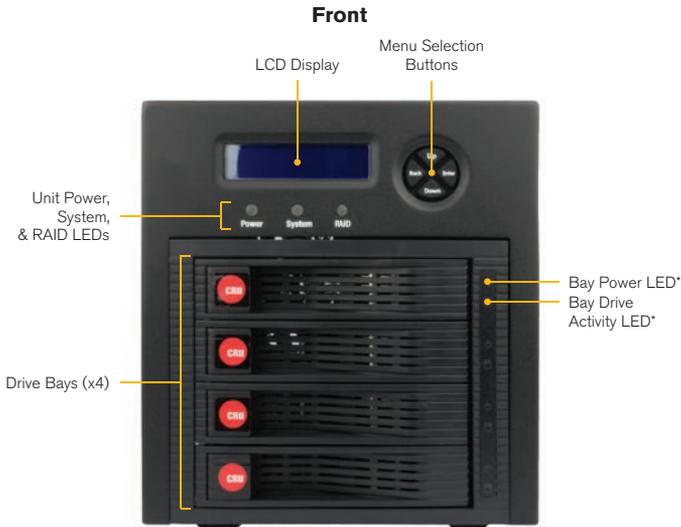
1.1 Package Contents

The following list contains the items that are included in the complete configuration for this device. Please contact CRU if any items are missing or damaged.

Item	Quantity
RTX430-3QR Enclosure	1
Power Cord	1
USB 3.0 Cable	1
eSATA Cable	1
Firewire 800 Cable	1

1.2 Identifying Parts

Take a moment to familiarize yourself with the parts of the product. This will help you to better understand the following instructions.



*Each drive bay has one (1) Bay Power LED and one (1) Bay Drive Activity LED located to the right of each respective drive bay.



Rear



1.3 LED Behavior

LED	Color	State	Description
Unit Power	Green	Solid	The RTX430-3QR is powered on.
System	Green	Solid	The System is performing as expected
	Amber	Solid	The internal temperature inside the RTX is approaching the preset warning temperature.
	Red	Solid	The internal temperature inside the RTX has exceeded the preset warning temperature.
RAID	Green	Solid	The RAID is operating as expected.
	Amber	Solid	The RAID has degraded or is being rebuilt.
	Red	Solid	The RAID has failed.
Drive Power (4x)*	Green	Solid	The drive inside the bay is receiving power.
Drive Activity (4x)*	Amber	Blinking	The drive inside the bay is being accessed by your computer.**

*There are four of these LEDs on the unit. One is located next to each drive bay.

** * The Drive Activity LED is controlled directly by the hard drive. When certain models of hard drives are used, the amber glow may remain constant or will not light. This is considered normal operation.



1.4 Warnings and Notices

Please read the following before using the product.

General Care

- The main circuit board of the RTX430-3QR enclosure is susceptible to static electricity. Proper grounding is strongly recommended to prevent electrical damage to the enclosure or other connected devices, including the computer host. Avoid all dramatic movement, tapping on the unit, and vibration.
- Avoid placing the hard drives close to magnetic devices, high voltage devices, or near a heat source. This includes any place where the product will be subject to direct sunlight. Do NOT allow water to make contact with the drive or the RTX enclosure.
- Before starting any type of hardware installation, please ensure that all power switches have been turned off and all power cords have been disconnected to prevent personal injury and damage to the hardware.
- To avoid overheating, the RTX enclosure should be operated in a well-ventilated area and in such a way that sufficient airflow is maintained across the controller chips.
- Remove the drives before transporting the RTX enclosure to prevent damage to the drive interfaces.

RAID

- Use only hard drives that are in perfect condition. Avoid using drives that have developed bad sectors during previous usage. This could lead to possible device failure or loss of data.
- The RTX enclosure supports 3.5-inch SATA hard drives of various specifications and different capacities. However, we recommend using drives of the same brand, capacity, and type for optimal performance. If drives of different capacities are used in a RAID, the capacity of the smallest drive will determine how much of each drive is used. The additional capacity on the larger drives will not be used by the RAID.
- RAID level 0 will allow you to use the full combined capacity of the drives, and offers the best data transfer speeds. However, RAID 0 offers no protection for the data. If one drive fails in a RAID 0, the data on all of the drives is irretrievably lost. Before creating a RAID, investigate the various RAID types and choose the one that is best for your needs.
- Always back up data before switching RAID types. **Switching RAID types will destroy current data. You must reformat your drives afterward.**



2 Introduction to RAID

A RAID (Redundant Array of Independent Disks) is an array of multiple hard drives that are combined in a way that provides faster performance and/or data safety. Your RTX unit is capable of creating and managing several different varieties of RAID. You may choose your preferred RAID level based on factors such as disk capacity, desired data safety, and desired performance.

2.1 Summary of RAID Levels

The RTX430-3QR enclosure supports RAID Levels 0, 1, 5, and 10. RAID Level 5 is most commonly used by those seeking an optimal balance of speed and data safety.

RAID Level	Description	Required No. of Drives*	Data Redundancy
0	Also known as striping. Data is distributed across multiple drives in the array. There is no data protection.	2	No data protection
1	Also known as mirroring. All data is replicated on two separate disks. This is a high-availability solution, but due to the 100% duplication, only half the total disk capacity is available for data storage.	2	1 drive
5	Also known as Block-Interleaved Distributed Parity. Data and parity information is subdivided and distributed across all disks. Can withstand the failure of one drive. The total capacity of all but one of the drives is available for data storage.	3	1 drive
10	Also known as a stripe of mirrors. Data is striped across two separate disks and mirrored to another disk pair.	4	1 drive**

* The RAID level becomes available as a menu option when exactly these numbers of hard drives are installed inside of the RTX enclosure.

** If both drives in either the RAID 0 or RAID 1 set fail, then the entire RAID will fail. If only one drive in each of the RAID 0 and RAID 1 sets fail, then the RAID is preserved.

2.2 Hot Spares (Host Standby)

Hot spares are drives connected as part of your RAID and are switched into operation when a drive fails. RAID 5 will support hot spares when configured with three hard drives (displayed as a “RAID5 3d” on the LCD Display). When a drive fails, the RTX enclosure will immediately rebuild the RAID. After that a new drive will need to be inserted in place of the failed one. Replacement drives should preferably be the same model and capacity as the other drives in the RAID.

3 Setup Steps

3.1 Drive Installation

- a. Pull the ejection handle on the TrayFree bay to open the bay door.
- b. Insert a SATA hard drive into the bay. Make sure it is label-side up with the SATA connection on the drive inserted first toward the rear of the enclosure.
- c. Shut the bay door and repeat these steps for as many bays as you have hard drives for.



3.2 Initial RTX Setup

The RTX430-3QR has one USB 3.0 port (which is backwards-compatible with USB 2.0 hosts), one eSATA port, two FireWire 800 ports, and one USB Mode Switch on the rear of the unit.

- Choose one of the connection types and connect the applicable cable from your computer to the corresponding port on the RTX® enclosure.
- Connect the power cord to the unit and the other end to a grounded electrical outlet.
- If you're using USB, make sure the USB Mode Switch is set to "USB 2.0" or "USB 3.0" to match the USB connection type used to connect the RTX enclosure to your computer.
- Flip the power switch on the rear of the RTX enclosure to turn it on.

3.3 Initial RAID Setup

You may skip this section if you purchased the RTX430-3QR with drives pre-installed.

3.3.1 Setting up a New RAID

If you are installing your own drives, follow the steps in Section 5.1, "Create a New RAID."

3.3.2 Changing the Pre-Configured RAID Type

The RTX430-3QR ships with RAID 5 as the default mode. To use a different RAID mode instead, follow the steps in Section 5.2, "Change the RAID Type."

Your RTX430-3QR is almost ready to use! If you've installed your drives into the RTX enclosure, then you will need to format them before using the RTX. See "Section 6: Usage with Windows and macOS Operating Systems" for formatting instructions.

4 LCD Menu Screens

Screen	Description
Mode	Shows the RAID level used.
Status	Indicates the overall health of the RAID. Available status messages are Normal or Degraded .
Disk#	Indicates the status of the individual disk in the numbered hard drive slot: <ul style="list-style-type: none">• OK: Indicates that the hard drive is in use or ready to use• No Disk: Indicates that the hard was removed or not installed• Unused: A new drive was installed and is not used by the RAID• Failing: Indicates the drive is malfunctioning. Possible causes of a failure message include an inability to recognize the drive, a compatibility problem, or damaged sectors.
Disk# Temp	Displays temperature of the individual disk in the numbered slot.
Sys Temp	Displays overall temperature inside the system.
Fan Status	Indicates whether the fan is operating normally or has failed and is in need of a replacement. Contact Technical Support if the fan has failed to arrange for a repair.
Change RAID Mode	Allows you to change the RAID level (see section 5.2).



5 RAID Configuration

If you purchased your RTX430-3QR with drives pre-installed, you do not need to modify the RTX's RAID configuration. The RTX430-3QR ships with RAID 5 as the default mode.

There are four options for RAID configuration. See Section 2.1 for details on the available RAID levels. Stop all data transfers before setting or changing RAID types or rebuilding a degraded array. Failure to do so can result in the loss of data. To set up or change the RAID type, disconnect all data cables and reboot the RTX enclosure. After the unit has initialized, the LCD will display the RTX's RAID mode and status.

Use the LCD Display and menu selection buttons to complete these steps.

5.1 Create a New RAID

Follow these steps if you are creating a new RAID from a set of hard drives that have not been used in an RTX430-3QR before.

STOP!

Following these steps will erase any data on the drives. Make a backup copy of any data you wish to keep before changing the RAID.

- a. Disconnect the RTX enclosure from the computer.
- b. Insert four hard drives (preferably all the same make, model, and capacity) into the RTX enclosure and flip the power switch on the rear of the unit.
- c. After the RTX enclosure powers on, it will begin alarming and the LCD will display the error "Error: Not a RAID Set." Press the **Enter** button on the front of the enclosure to silence the alarm.
- d. Press the **Enter** button a second time and the LCD screen will ask "Make New RAID?" Press **Enter** to confirm.
- e. The LCD will display "Select RAID Type." Press **Up** or **Down** to cycle through to your desired RAID type and then press **Enter** to confirm your selection.
- f. The screen will display "Will Erase all Data OK?" Pressing **Enter** will result in the loss of all data on the drives. Ensure all of your data is backed up, then press **Enter**.
- g. The new configuration will be selected and RTX enclosure will reboot. The RAID is now created.

5.2 Change the RAID Type

Follow these steps to change the level of RAID you wish to use with the RTX430-3QR.

- a. Disconnect the RTX enclosure from the computer.
- b. Press the **Up** button to cycle the LCD menu to the "Change RAID Mode" screen. Press the **Enter** button to select "Change RAID Mode."



- c. The LCD will display "Select RAID Type". Press **Up** or **Down** to cycle through to your desired RAID type and then press **Enter** to confirm your selection.
- d. The screen will display "Will Erase all Data OK?" Pressing **Enter** will result in the loss of all data on the drives. Ensure all of your data is backed up, then press **Enter**.
- e. The new configuration will be selected and the RTX enclosure will reboot. The RAID is now created.

5.3 Add a New Drive to an Existing RAID

Follow these steps to add a new drive to an existing RAID. This is necessary if you are replacing a failed hard drive within a RAID 1, RAID 5, or RAID 10, or if you are adding an additional drive to a RAID 1, RAID 5, or RAID 10.

- d. Remove the failed hard drive (if applicable).
- e. Insert a new hard drive in an empty TrayFree drive bay.
- f. After the hard drive spins up, the RTX unit should detect the drive. The LCD will ask to add a new disk. Press **Enter** to do so.

The disk will now be added to the RAID and the RAID will begin to rebuild. A 1TB hard drive takes just over three hours to rebuild. To display the approximate remaining time on the LCD display, press **Enter**.

6 Usage with Windows and macOS Operating Systems

6.1 Usage with Windows Operating Systems

6.1.1 Format a Drive

When you first mount a drive to a Windows operating system, a pop-up window will ask you if you would like to format it. Click **Format Disk** and skip to Step E in the instructions for your operating system below. If the prompt does not pop up, use the Disk Management utility by following the steps below for your specific Windows operating system:

Windows 10

- a. Right-click on the **Start Button** and then select **Disk Management**.
- b. The drive should appear in the list of Disks in the lower pane. You may need to scroll down to see it. If the drive is already formatted, you can identify it easily by its volume name. If the drive is not initialized or is brand new, a window will pop up asking you to select a partition type. Select **GPT** and press **OK**.



- c. To format the volume, right-click the **Drive Properties Box** of the drive (highlighted yellow in Figure 1) and select **New Simple Volume...**
- d. Unless you wish to customize the settings in these dialog prompts, click **Next** on the Select Partition, Specify Volume/Partition Size, and Assign Drive Letter or Path dialog prompts, leaving the default settings.
- e. You will now see a window that allows selection of a file system. Choose **NTFS** and enter a name for the new volume. Be sure to check the box labeled **Quick Format**, which will ensure that the formatting process takes less than a minute.
- f. Click **Next** and then **Finish** to start the format process. When the format is complete, the Drive Properties Box will update to show the new volume name. The new volume can now be found by opening a File Explorer window and clicking on **This PC** in the navigation pane to the left.

Windows 8.1

- a. Press **WINKEY + X** and then select **Disk Management**.
- b. The drive should appear in the list of Disks in the lower pane. You may need to scroll down to see it. If the drive is already formatted, you can identify it easily by its volume name. If the drive is not initialized or is brand new, a window will pop up asking you to select a partition type. Select **GPT** and press **OK**.
- c. To format the volume, right-click the **Drive Properties Box** (highlighted in yellow in Figure 1) and select **New Simple Volume...**

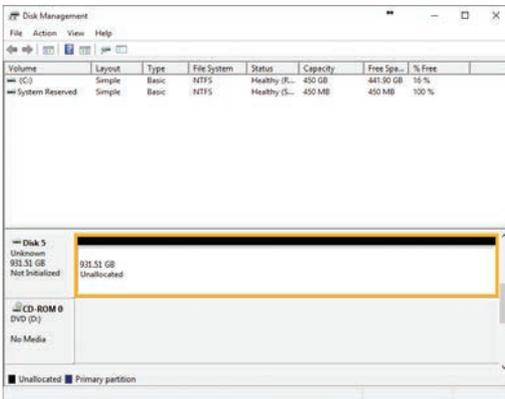


Figure 1. The Disk Management window in Windows 10 is very similar to the one found in Windows 8.1. The Drive Properties Box is highlighted in yellow.

- d. Unless you wish to customize the settings in these dialog prompts, click **Next** on the Select Partition, Specify Volume/Partition Size, and Assign Drive Letter or Path dialog prompts, leaving the default settings.
- e. You will now see a window that allows selection of a file system. Choose **NTFS** and enter a name for the new volume. Be sure to check the box labeled **Quick Format**, which will ensure that the formatting process takes less than a minute.
- f. Click **Next** and then **Finish** to start the format process. The new volume can now be found by opening a File Explorer window.

Windows 7

- a. Click on the **Start Button**, right-click the **Computer** button in the Start Menu, and then select **Manage**. In the left pane of the Computer Management window that opens, left-click on **Disk Management** (labeled 'A' in Figure 2).
- b. The drive should appear in the list of Disks in the lower pane. You may need to scroll down to see it. If the drive is already formatted, you can identify it easily by its volume name. If the Device Properties Box (labeled 'B' in Figure 2) says "Not Initialized", you'll need to initialize the disk before formatting it.

Right-click where it says "Not Initialized" and select **Initialize Disk**. If you are prompted to select a partition type, select **GPT**.

- c. To format the volume, right-click the **Drive Properties Box** (labeled 'C' in Figure 2) and select **New Simple Volume...**

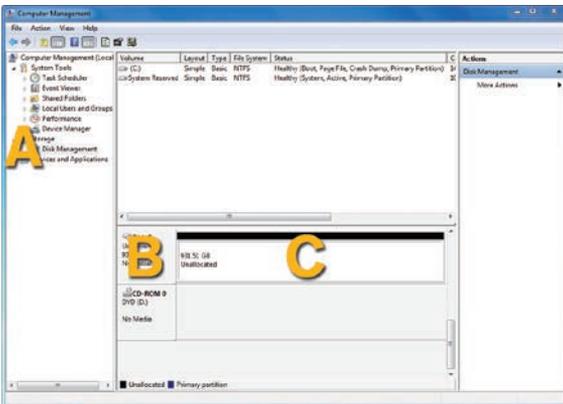


Figure 2. The Computer Management window in Windows 7. 'A' denotes the Disk Management section, 'B' denotes the Device Properties Box, and 'C' denotes the Drive Properties Box.



- d. Unless you wish to customize the settings in these dialog prompts, click **Next** on the Select Partition, Specify Volume/Partition Size, and Assign Drive Letter or Path dialog prompts, leaving the default settings.
- e. You will now see a window that allows selection of a file system. Choose **NTFS** and enter a name for the new volume. Be sure to check the box labeled **Quick Format**, which will ensure that the formatting process takes less than a minute.
- f. Click **Next** and then **Finish** to start the format process. When the format is complete, the Drive Properties Box will update to show the new volume name. The new volume can now be found by clicking on the **Computer** button in the Start Menu (Windows 7 or the Windows Server 2008 product family).

6.1.2 Mount and Unmount Volumes

Mount a Volume

If the drives or RAID inside of the RTX enclosure are already formatted, you can begin using the volume right away. When the RTX enclosure is properly connected and turned on, a window may open to allow you access to the volume. If no window appears, find the volume by opening a File Explorer window (Windows 10, 8.1, and Server 2012 R2), by clicking on **This PC** in the navigation pane of a File Explorer Window (Windows 10), by clicking on **Computer** in the navigation pane of a File Explorer Window (Windows 8.1 and Server 2012), or by clicking the **Computer** button in the Start Menu (Windows 7 or the Windows Server 2008 product family).

Unmount a USB Volume

Unmount the RTX enclosure before powering it down. Left click the **USB plug icon** with the checkmark on the Desktop task bar and select the proper volume(s) from the menu that pops up. You may have to click on the **Show Hidden Icons** arrow on the task bar to



Figure 3. The USB plug icon in the Windows 10 Desktop task bar.



Figure 4. macOS Disk Utility, showing the "Erase" submenu.



find the correct icon. Windows will indicate when it is safe to disconnect the RTX enclosure.

NOTE

Disconnecting the RTX enclosure while Windows is actively reading or writing to the volume can result in data loss.

Unmount an eSATA Volume

Many eSATA hosts do not support hotswapping, but third-party software utilities are available that will provide the functionality. If your host does not support hotswapping, you may download one of these utilities or follow these instructions: Ensure no file transfers are taking place and make sure no Drive Activity LEDs are blinking, as disconnecting the unit while a file transfer is in progress can result in data loss. Then disconnect power to the RTX enclosure. You may need to restart your computer to remount the RTX enclosure.

If you purchased an eSATA host card that does support hot-swapping, you should unmount the RTX enclosure before powering it down. To do so, left click the **USB plug icon** with the checkmark on the Desktop task bar and select the proper volume(s) from the menu that pops up. You may have to click on the **Show Hidden Icons** arrow on the task bar to find the correct icon. Windows will indicate when it is safe to disconnect the RTX enclosure.

NOTE

Disconnecting the RTX enclosure while Windows is actively reading or writing to the volume can result in data loss.

6.2 Usage with macOS

6.2.1 Format a Drive

To format a hard drive or SSD, use Disk Utility (see Figure 4), which can be found in **Applications → Utilities**, or by selecting **Spotlight Search** and typing in "Disk Utility" and hitting **Return** on your keyboard.

- a. Click on the drive in the window to the left.
- b. Click on the **Erase** button at the top.
- c. Enter a name for the new volume.
- d. Select the format type. Select **APFS** if it is an available option. Otherwise, select **OS X Extended (Journaled)**. If you need to use your RTX enclosure with both macOS and Windows 10 computers, select **ExFAT** instead.
- e. For the scheme, select **GUID Partition Map**.



- f. Click **Erase** to start the process.
- g. Once the format is complete, click **Done**.

6.2.2 Mount and Unmount Volumes

If the drives or RAID inside of the RTX enclosure are already formatted, an icon representing the available volume(s) will appear on the desktop. You can begin using the RTX enclosure right away. If the drives or RAID are unformatted, a message will appear on the desktop saying that the disk is unreadable. Use Disk Utility to easily format it (see Section 6.2.1).

Unmount the volume before powering down the unit by dragging the volume's icon to the **Trash**, or by selecting the volume then pressing **Command + E**.

NOTE

Disconnecting the RTX enclosure while macOS is actively reading or writing to the volume can result in data loss.

6.2.3 Create a Boot Drive

To create a boot drive, you must first install macOS on the drive in the carrier using a third-party app like MacDaddy Install Disk Creator. Next, go to **System Preferences** → **Startup Disk**. A window will list the available bootable volumes. Select the volume from which you wish to boot. Another method is to hold down the **Option** key during boot up. A screen should appear that allows you to select the volume you wish to use. This is useful if you are sporadically booting from the RTX enclosure.

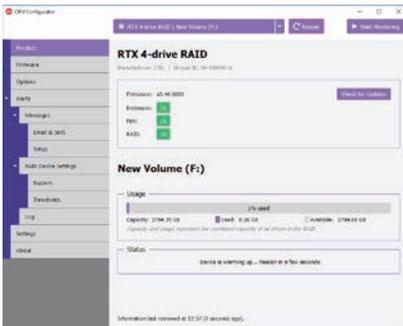


Figure 5. CRU Configurator allows you to customize your RTX enclosure's alarms, set up e-mail and SMS alerts, set a PIN number, and more.



7 Using CRU Configurator for Advanced Customization

The RTX430-3QR is compatible with CRU Configurator 4.0 or higher. CRU Configurator allows you to view and update the RTX enclosure's firmware, enable and disable audible alarms, change temperature and RAID event settings, and configure email or text notifications for when such events occur.

To download CRU Configurator and the full CRU Configurator manual, visit:

cru-inc.com/support/software-downloads/configurator-software-download

8 RAID Is Not A Backup

Because your RTX enclosure features redundant RAID modes which protect against a drive failure, it is an excellent part of any backup strategy. However, a RAID is not in itself a complete backup strategy.

Many things besides drive failure can damage or erase your data:

- Corruption caused by unexpected disconnection during data access (e.g. a cable is unplugged during a data transfer, or the computer crashes or loses power while writing to the drives)
- Corruption or destruction caused by viruses or other malware
- Sabotage by a disgruntled employee or acquaintance
- Theft of your RTX enclosure
- Natural disasters such as fire, flooding, etc.

Considering these possibilities, any single copy of your important data must always be considered at risk. That's why backing up is so important. Follow the 3-2-1 backup rule. Data should exist in three different places on two different storage media and at least one of those copies should be maintained offsite.

Without an effective backup strategy, recovering data may be impossible, or the cost of data recovery may be quite expensive. The CRU warranty does not cover costs associated with data loss (nor do the warranties of other data storage manufacturers).

Plan accordingly and backup data to minimize downtime!

Product Model	RTX430-3QR
Interface Types & Speeds	eSATA: up to 3 Gbps FireWire 800: up to 800 Mbps USB 3.0: up to 5 Gbps USB 2.0: up to 480 Mbps
Supported Drive Types	3.5" SATA hard drives
Data Connectors	One (1) eSATA connector Two (2) FireWire 800 connectors One (1) USB 3.0 connector (backwards compatible with USB 2.0)
Insertion Rating	Up to 50,000 carrier insertions
Supported RAID Levels	RAID 0, 1, 5, 10
Navigation Menu	LCD/button-driven menu system
Supported Operating Systems	Windows 10, 8.1, and 7 Windows Server 2016, 2012 and 2008 product families macOS 10.12 "Sierra" or newer Linux distributions that support the connection type used
Compliance	EMI Standard: FCC Part 15 Class B EMC Standard: EN55022, EN55024 CE, RoHS, RCM
Product Weight	Unpopulated: 9.1 pounds (4.13 kg) Populated: 15.1 pounds (6.85 kg)
Product Dimensions	6.89in W x 10.75in L x 7.68in H (175mm W x 273mm L x 195mm H)
Technical Support	Your investment in CRU products is backed up by our free technical support for the lifetime of the product. Contact us through our website, cru-inc.com/support or call us at 1-800-260-9800 or +1-360-816-1800.

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Product Warranty

CRU warrants this product to be free of significant defects in material and workmanship for a period of three years from the original date of purchase. CRU's warranty is nontransferable and is limited to the original purchaser.

Limitation of Liability

The warranties set forth in this agreement replace all other warranties. CRU expressly disclaims all other warranties, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose and non-infringement of third-party rights with respect to the documentation and hardware. No CRU dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty. In no event will CRU or its suppliers be liable for any costs of procurement of substitute products or services, lost profits, loss of information or data, computer malfunction, or any other special, indirect, consequential, or incidental damages arising in any way out of the sale of, use of, or inability to use any CRU product or service, even if CRU has been advised of the possibility of such damages. In no case shall CRU's liability exceed the actual money paid for the products at issue. CRU reserves the right to make modifications and additions to this product without notice or taking on additional liability.

FCC Compliance Statement: "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 this own expense.

In the event that you experience Radio Frequency Interference, you should take the following steps to resolve the problem:

- 1) Ensure that the case of your attached drive is grounded.
- 2) Use a data cable with RFI reducing ferrites on each end.
- 3) Use a power supply with an RFI reducing ferrite approximately 5 inches from the DC plug.
- 4) Reorient or relocate the receiving antenna.

