Quantum

User's Guide User's Guide User's Guide User's Guide User's Guide

Quantum TC2201E

TC2201E

81-81447-01 B01

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Contents

Figures

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Preface

Audience

This document is written for operators of the TC2201E router.

Purpose

This document explains how to use the TC2201E router.

Document Organization

This document is organized as follows:

- Chapter 1, Introduction, provides an overview of the TC2201E router.
- Chapter 2, Getting Started, introduces the TC2201E router and covers the installation of the router.
- Chapter 3, Quantum Visual Manager, discusses Ethernet visual management interface.
- Chapter 4, Troubleshooting, discusses basic troubleshooting of the TC2201E router.
- Appendix A, 3-Pin to DB-9 Serial Pin Assignments, discusses the pin out assignments.
- Appendix B, Inband SCSI-3 Commands, lists the inband SCSI-3 command tables.
- Appendix C, Using the Command Line Interface, lists the inband CLI commands available through the serial interface.

- Appendix D, Using the FTP Interface, provides information on using the FTP interface.
- Appendix E, How to Change Block Sizes, provides information on changing block sizes for your application.

This document concludes with a glossary.

Notational Conventions

This manual uses the following conventions:

Note: Notes emphasize important information related to the main topic.

Caution: Cautions indicate potential hazards to equipment and are included to prevent damage to equipment.

Warning: Warnings indicate potential hazards to personal safety and are included to prevent injury.

This manual uses the following:

- Right side of the library — Refers to the right side as you face the component being described.
- Left side of the library — Refers to the left side as you face the component being described.

Related Documents

Documents related to the PX502, PX506, and PX510 tape libraries are shown below:

Quantum TC2201E Series Documentation

Document No.	Title	Description
81-81449	*Quantum TC2201E Installation Instructions*	Provides information on installing the TC2201 in a rack.

Refer to the appropriate product manuals for information about your tape drives and cartridges.

SCSI-2 Specification

The SCSI-2 communications specification is the proposed American National Standard for information systems, dated March 9, 1990. Copies may be obtained from:

Global Engineering Documents
15 Inverness Way, East
Englewood, CO 80112
(800) 854-7179 or (303) 397-2740

Contacts

Quantum company contacts are listed below.

Quantum Corporate Headquarters

To order documentation on the Quantum PX500 Series libraries or other products contact:

Quantum Corporation
P.O. Box 57100
Irvine, CA 92619-7100
(949) 856-7800
(800) 284-5101

Technical Publications

To comment on existing documentation send e-mail to:

doc-comments@quantum.com

Quantum Home Page

Visit the Quantum home page at:

http://www.quantum.com

Customer Support

The Quantum Customer Support Department provides a 24-hour help desk that can be reached at:

North/South America:	(949) 725-2100 or (800) 284-5101
Asia/Pacific Rim:	(International Code) + 61 7 3839 0988
Europe/Middle East/Africa:	(International Code) + 44 (0) 1256 848748

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Europe/Middle East/Africa:	eurohelp@quantum.com

Chapter 1
Introduction

The Quantum TC2201E iSCSI router provides bi-directional connectivity between two iSCSI networks, and two Narrow/Wide Fast/Ultra160 LVD/SE SCSI buses.

Supported devices include:

- Initiator Devices – iSCSI hosts
- Direct Access Devices – RAID controllers, Disk drives, JBODs
- Sequential Access Devices – Tape drives
- Changer Devices – Tape and Magneto-Optical libraries

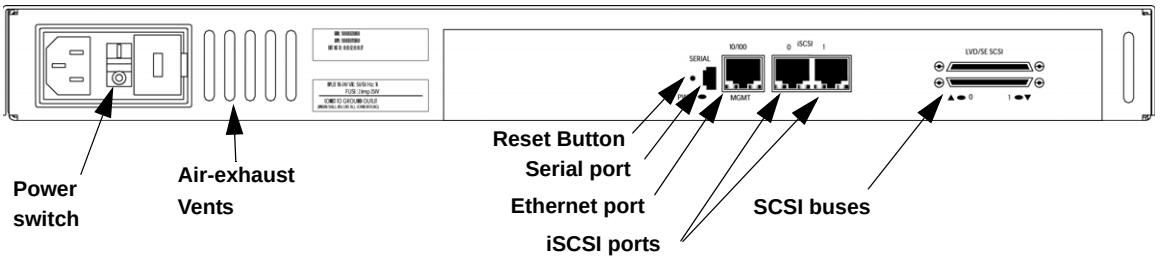
External Features

Figure 1 and figure 2 show the front and back panels of the Quantum TC2201E iSCSI router.

Figure 1 Front Panel

The air intake vents shown in figure 1 provide cooling for the unit during operation and should always remain unobstructed. The exhaust vent for air is located on the back panel.

Figure 2 Back Panel

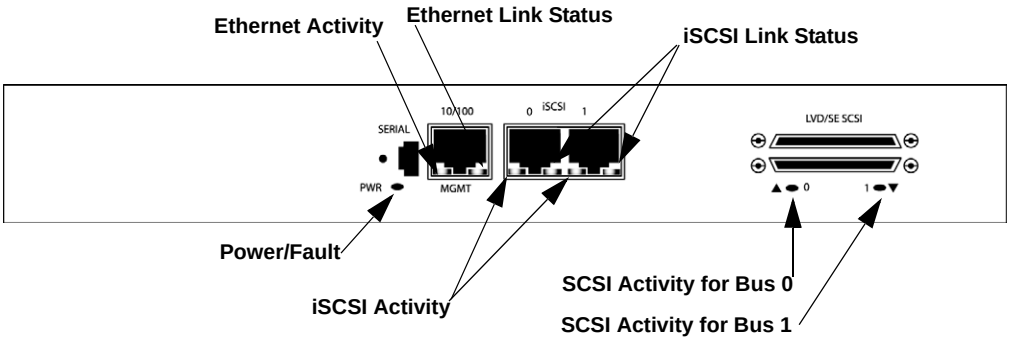


Besides the air-exhaust vents, SCSI and iSCSI interfaces are found on the back panel. Also on the back panel, Ethernet and Serial ports provide connections for configuration and management of the unit. The LEDs (operation indicators) provide basic status information. In addition, a power connector and power switch are located on the back panel along with a Reset Button that is used to manually force a reboot of the TC2201E. For proper operation of the TC2201E, cable connections on the back panel should remain securely in place.

Operation Indicators

The TC2201E is equipped with rear panel LED indicators for monitoring overall unit status (see figure 3).

Figure 3 TC2201E LEDs



The LED functionality of the TC2201E is detailed below:

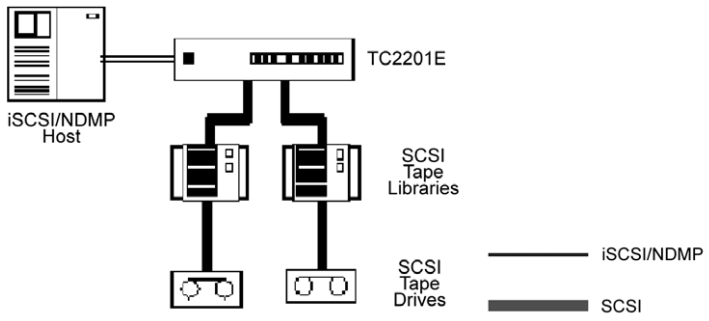
- *Power and Fault (Pwr)*—This bi-color LED is green to show that power is currently active and is continuously amber-colored to show that the TC2201E detects a fault condition in the TC2201E.
- *iSCSI (Link/Act)*—When lit green, the right indicator signifies a good iSCSI link on the port. When lit green, the left indicator signifies iSCSI port activity.
- *SCSI Bus (0, 1)*—When lit, these green indicators signify SCSI activity on the bus corresponding to the number of the indicator.
- *Ethernet (Link/Act)*—When lit green, the right indicator signifies a good Ethernet link on this management port. When lit green, the left indicator signifies Ethernet port activity on this management port.

How the TC2201E Works

The TC2201E is a router that translates the iSCSI protocol to and from the SCSI Protocol—transparently transferring commands, data, and status information—so that devices and hosts can communicate with each other. Interconnection is provided between two SCSI buses and one or two iSCSI networks, also making use of iSCSI's ability to encapsulate SCSI protocol packets.

Figure 4 shows a host accessing SCSI tape drives and libraries via the TC2201E.

Figure 4 Example Configuration

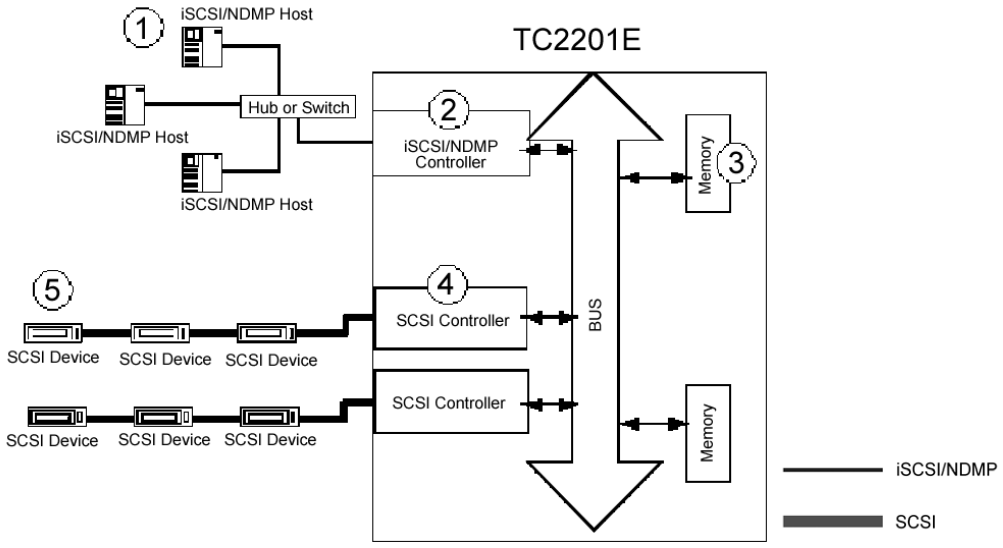


Processing SCSI Information

The following section describes how the TC2201E processes SCSI information when attached to iSCSI hosts. Figure 5 illustrates steps 1 through 5 of the process.

1. A iSCSI host issues a command. The iSCSI host encapsulates the command in the iSCSI protocol and sends the packet to the TC2201E.
2. The iSCSI controller in the TC2201E receives the packet, interprets the iSCSI information, and places the packet in buffer memory.
3. The TC2201E's processor interprets the information and programs a SCSI controller to process the transaction.
4. The SCSI controller sends the command to the SCSI device (target).
5. The SCSI target interprets the command and executes it.

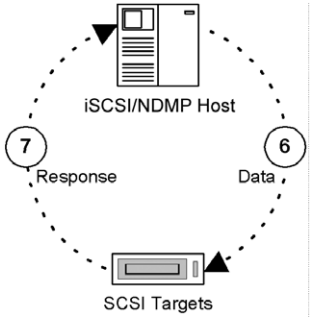
Figure 5 Information Processing



6 Data flows between the iSCSI host and SCSI target through payload buffers (see figure 6).

7 Response information flows from the SCSI target back to the iSCSI host (see figure 6).

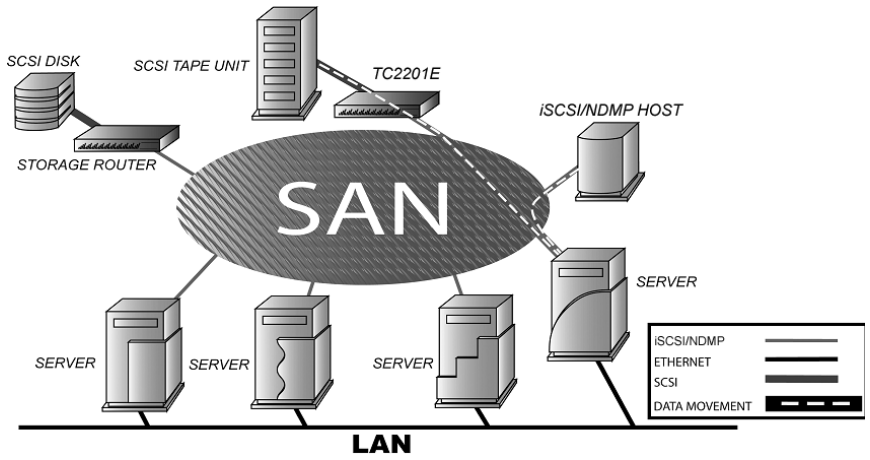
Figure 6 Flow of data and responses



LAN-free Backup and Restore

LAN-free backup and restore moves the bulk of data backup and recovery traffic from the LAN and onto a dedicated storage network. The TC2201E supports LAN-free backup/restore environments (see figure 7).

Figure 7 LAN-free backup



TC2201E Features

iSCSI Features

The TC2201E provides the following iSCSI features:

- Dual iSCSI ports (10/100/1000 baseT Ethernet)
- iSNS support
- Error Recovery Level 0
- Multiple iSCSI connections per session
- VLAN Quality of Service (QoS) support

SCSI Bus Features

The TC2201E provides the following SCSI bus features:

- Auto-negotiation for Narrow, Wide, Fast, and up to Ultra160
- Concurrent commands, tagged command queuing and disconnect/ reconnect
- SCSI-2 and SCSI-3 protocols
- Connection type is VHDCI 68-pin D shell, P type connectors
- LVD/single-ended termination
- Fully supports Quantum tape libraries and autoloader devices

Management Features

The TC2201E provides the following management options:

- Out-of-band 10/100 Ethernet TCP/IP management access Port
- Serial 3-pin connector for terminal access
- DHCP for easier network administration
- Indexed and Auto Assigned addressing modes
- Support for SCSI-3 Commands
- Ethernet RJ-45 connector for FTP, command line, and web browser access
- Field-updateable firmware

TC2201E Benefits

The Quantum TC2201E is designed to connect SCSI devices into an iSCSI network. The Quantum TC2201E is neatly packaged in a 1U form factor with two 1 Gb/s iSCSI ports and two LVD/SE SCSI buses. SCSI buses automatically negotiate for Fast, Narrow, Wide, and up to Ultra160 SCSI. External throughput is up to 200 MB/s
bi-directional per iSCSI port (or 100 MB/s one way per iSCSI port), or up to a total of 400 MB/s bi-directional for both ports.

Enterprise Class Performance

The TC2201E offers enterprise class performance with memory buffer bandwidth exceeding 1 Gb/s and delivering end-to-end throughput of up to 400 MB/s bi-directional for both ports (or 200 MB/s each way for both ports together). The TC2201E performs fast tape reads and writes, which enables it to handle larger data sets while completing backup and restore tasks within a smaller timeframe.

Ease of Use to Reduce SAN Management Costs and Complexity

The Quantum TC2201E is significantly easier to install than other routers due to the "store-and-forward" configuration feature and the Visual Manager (VM) software. "Store-and-forward" allows configuration files and TC2201E operational settings to be saved and copied to other like routers, reducing redundant setup tasks. Using VM, service professionals and end users can configure a TC2201E with simple "point and click" choices on a graphical representation of the TC2201E.

Add Intelligence to SCSI Storage

The TC2201E has many features that provide intelligence to SCSI devices and help manage SAN configurations, performance and reliability. A short list includes Visual Manager, dynamic storage allocation (i.e. map activation without reboot), SCSI target reset, custom mapping, and access controls (LUN masking and management). These features of the TC2201E provide customers with a high level of storage functionality for high performance backup and recovery, reliability, security and manageability in their nearline storage solutions.

Industry Leading Inter Operability

Quantum has a proven history of industry leading inter operability, which we incorporate into all our products. Quantum and its partners have tested thousands of different configurations, discovering and resolving many troublesome inter operability ability problems.

TC2201E Specifications

Physical Specifications

The physical specifications of the TC2201E are:

- Internal power supply with detachable power cord
- iSCSI link status and activity LEDs
- SCSI Bus activity LEDs
- Ethernet link status and activity LEDs
- Power/Fault LED
- Airflow with internal fan
- Rack mount or desktop enclosure
- Power Switch

Physical Dimensions

The physical dimensions of the TC2201E are:

- Width 43.18cm (17.00 inches)
- Depth 27.3cm (10.75 inches)
- Height 4.37cm (1.72 inches, 1U)
- Weight approx. 4kg (9 lbs.)

Operating Environment

The operating environment of the TC2201E is:

- 10 to 40°C
- 20 to 80% Relative Humidity (non-condensing)

Non-operating Environment

The non-operating environment of the TC2201E is:

- -40 to +65°C
- 10 to 90% Relative Humidity (non-condensing)

Power

The power requirements for the TC2201E are:

- 100 - 240 VAC, Auto Sensing
- 50/60 Hz, 1.0 Amps
- Consumption Rate: No more than 119.5 BTUs of heat per hour

Chapter 2

Getting Started

This chapter describes how to install the TC2201E and what to consider when unpacking the unit for the first time. The TC2201E can be set up as either a desktop or rack installation and connected to various types of devices.

Note: Read this chapter carefully and completely before working with the TC2201E.

Before physically installing the TC2201E, consider carefully the location for the unit installation, the intended use of the unit, and the type of devices to which the unit will be attached.

Caution: When installing the TC2201E, use only the screws and other hardware provided in the shipping container for the TC2201E. Using alternate hardware may cause damage to the unit.

Location

The TC2201E can be placed on a desktop or mounted in a standard 19-inch rack depending on the specific requirements of the installation.

The operating environment should meet the requirements found in Physical Specifications. If you plan to use the TC2201E on a table top, attach the stick-on feet to the bottom of the unit.

Note: The TC2201E has cooling fans mounted inside of the enclosure and air exhaust vents on the front of the enclosure. The rear (port-side) intake vents and the front (logo-side) exhaust vents should remain clear of obstructions to ensure proper airflow.

Unpacking the Box

Unpack the shipping container of the TC2201E in an area clear of any clutter using the following instructions:

1. Remove all items from the shipping container. Check each item for any damage. Keep the TC2201E in the protective bag until you are ready to install it.
2. Make sure you received all the equipment you ordered. If an item appears missing, contact your sales representative immediately.

Mounting the TC2201E on a Desktop

Use the following instructions to mount the TC2201E on a table or desktop.

1. Remove the TC2201E from the protective bag.
2. Attach the stick-on feet to the bottom of the unit.
3. Place the TC2201E on the table or desktop.

Mounting the TC2201E in a Rack

Before beginning installation, review the following installation procedure. When familiar with the installation procedure, follow the steps indicated to mount the TC2201E into a standard 19" rack using the provided mounting materials, which include:

- One TC2201E
- Two ear brackets
- A bag of mounting screws (8 **#M6x12** Phillips screws and 4 **#6-32x.312** Phillips screws)

Required Tools

The following tool is required for installation:

- #2 PHILLIPS screwdriver

Installing the TC2201E With Ear Brackets

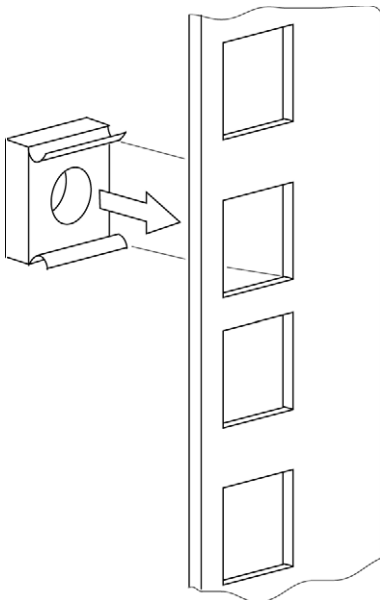
To install the TC2201E with ear brackets:

1. Remove the TC2201E from the protective bag.
2. Determine where the TC2201E will be mounted.

> **Note:** Place the TC2201E so the intake/exhaust vents remain clear of obstructions to ensure proper airflow.

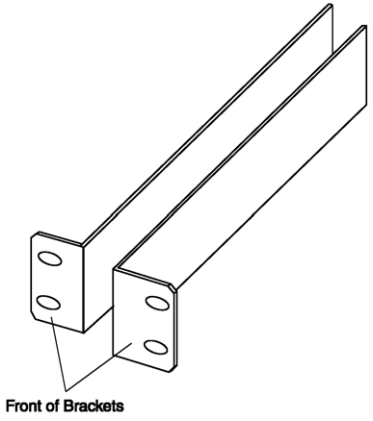
3. Remove any blanking panels and other equipment from the chosen rack location.
4. Install the cage nuts on the vertical mounting rails of the rack cabinet, as shown in figure 8 below.

Figure 8 Installing Cage Nuts



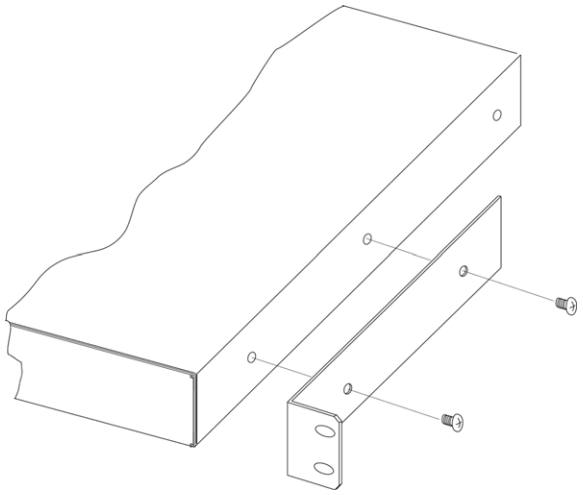
5 Locate the front of the ear brackets, as shown in figure 9 below.

Figure 9 Locating front of ear brackets



6 Attach the ear brackets to the TC2201E, using two of the **#6-32x.312** Phillips screws on each side (as shown in figure 10 below). Position the front of each bracket next to the end of the TC2201E that will be facing out of the rack (see Step 7 for more information). Tighten the screws securely.

Figure 10 Attaching the Ear Brackets



7 If you are mounting the TC2201E in the rack with the ports facing inside the rack (shown in Figure 2-4) or with the ports facing outside the rack (shown in Figure 2-5), attach the front of the mounting brackets to the rack using two of the **#M6x12** Phillips screws for the front of each ear bracket. Tighten the screws securely.

> **Warning:** To reduce injury or equipment damage, the mounting brackets must be level. If the brackets are not level, the TC2201E cannot be installed correctly

Figure 11 Mounting at Front of Rack

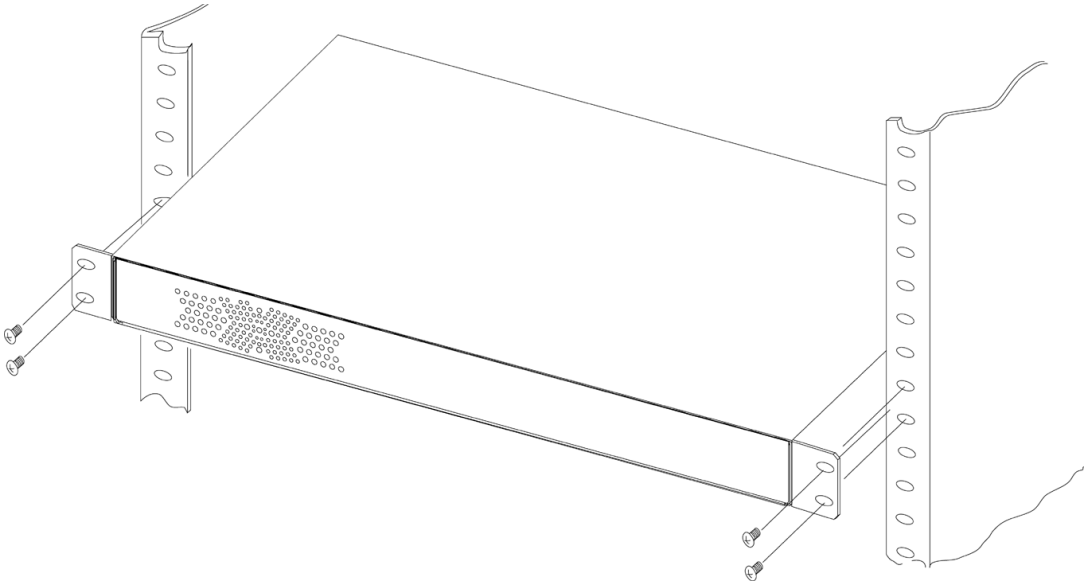
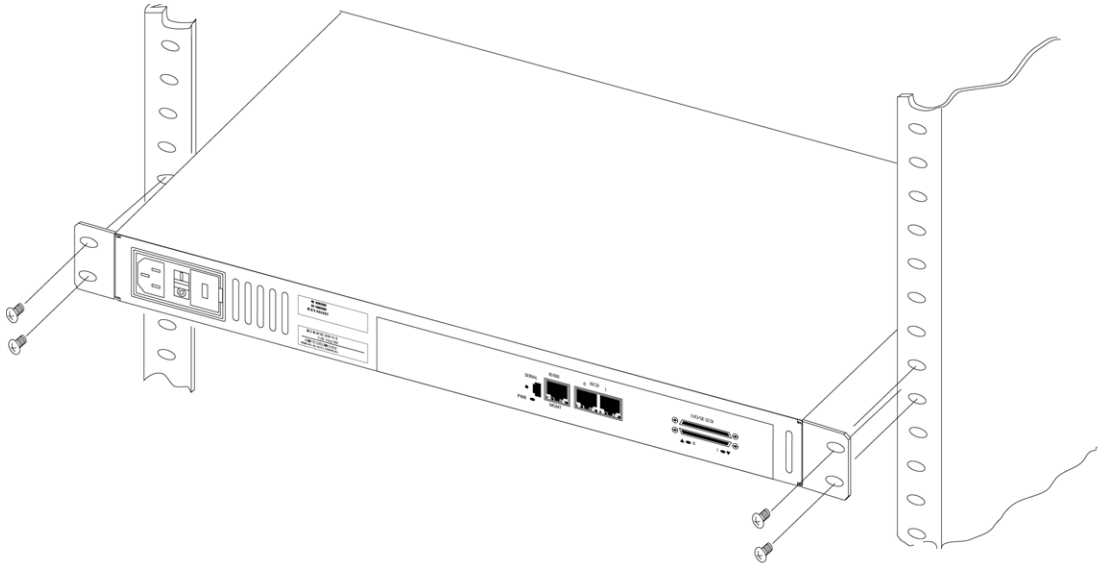


Figure 12 Mounting at Back of the Rack



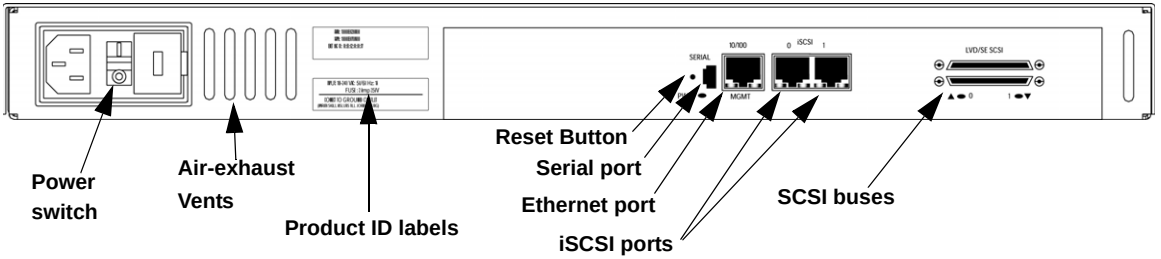
Once the TC2201E is installed, you are ready to connect it to the other system components.

Interfaces and Connections

There are four types of interfaces to the TC2201E:

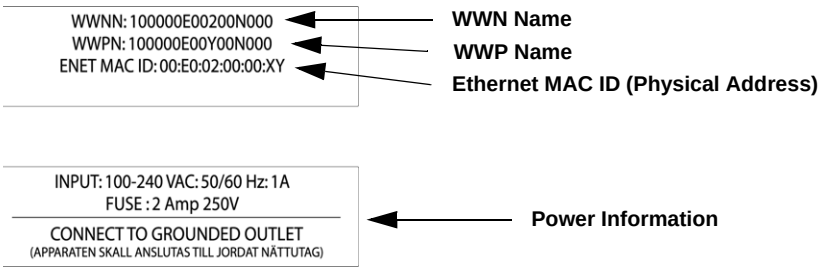
- iSCSI
- SCSI
- RS-232 (3-pin Serial) [Service Management/Configuration Interface]
- Ethernet [Web-based Management/Configuration Interface]

Figure 13 Port locations



Note: For convenience in configuring ports, key information is indicated on a label located on the back panel of the TC2201E.

Figure 14 WWN/MAC ID label



iSCSIConnections

Before connecting the TC2201E to other iSCSI devices, it is important to understand the configuration requirements of the environment to which it will be connected. Failure to correctly configure an iSCSI device may impair the operation of the network to which it is attached.

The iSCSI RJ-45 connectors on the unit can be directly connected to a standard 10/100/1000BaseT Ethernet network.

Typical installations will have the TC2201E connected to an Ethernet switch.

Ethernet switches may allow for individual ports to be configured for different media types. The TC2201E must be connected to the switch port with the appropriate Ethernet cabling for both the TC2201E and the switch port to which it is connected.

To connect the TC2201E to an iSCSI network or host:

1. Locate the iSCSI ports on the back of the TC2201E.

Figure 15 iSCSI ports

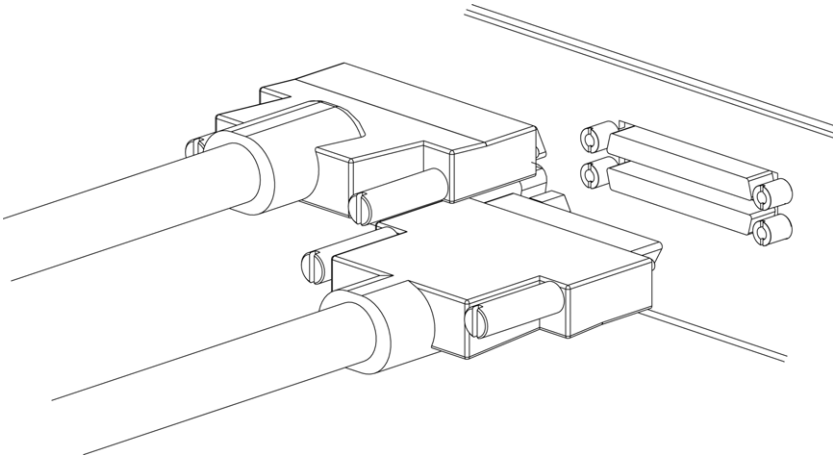
2. With the TC2201E powered off, connect the TC2201E into the iSCSI environment using the appropriate cabling. Be sure to insert the cable connectors in the proper orientation.

SCSI Connection

The TC2201E can support Fast/Ultra160 Narrow/Wide SCSI, depending on the specific configuration. The TC2201E is factory configured to support LVD/Single-Ended buses. Two VHDCI 68-pin D-shell, P-type connectors are located on the rear panel of the unit, allowing the unit to be attached at the end of up to two SCSI buses. The TC2201E must always be installed at the end of SCSI buses.

The TC2201E supplies termination power (TERMPWR) to each SCSI bus. An internal self-resetting fuse in the TERMPWR will reset after a fault is cleared.

Figure 16 High Density SCSI Cables



Warning: During attachment of high density SCSI cables, please note the orientation (as shown in Figure 2-11) of the high density SCSI port connectors on the back panel of TC2201E. Failure to maintain appropriate orientation of the cables to the SCSI port connectors can result in damage to the SCSI port connectors on the TC2201E.

Caution: Do not plug HVD devices to an LVD/SE bus. Failure to heed this caution may result in severe damage to equipment.

Caution: SCSI ports on the TC2201E are not hot-pluggable. Power off the TC2201E whenever connecting/disconnecting the SCSI cables.

Any SCSI cables used with the TC2201E series product must meet SCSI 2 standards and must be LVD rated (specifically low noise cabling). The cables should be rated at 24 Ohm impedance and should have a *VHDCI 68pin.8mm D-shell/P-type to Standard 68pin SCSI D-shell* connector at the

end being attached to the TC2201E. The type of connector at the other end of the cable will be dependent on the device being connected.

Warning: Please be advised that failure to comply with the minimum high density cable specifications can result in damage to the TC2201E or an operational failure of the product.

Note: SE is not supported by SCSI-2 protocols. While it is possible to mix SE and LVD devices on the same bus, doing so may result in substantially decreased performance on the bus.

To connect the TC2201E to a SCSI bus:

1. Power off the SCSI devices on this bus.
2. Connect a SCSI cable to one of the SCSI connectors on the back panel of the unit. The TC2201E should always be installed at the end of the SCSI bus.
3. Make sure that the bus is terminated correctly. By default, the TC2201E is automatically terminated. However, the device at the other end of bus must also be terminated.

Figure 17 TC2201E SCSI connection

4. Power on the SCSI devices on this bus, but not the TC2201E.
5. After all the SCSI devices on this bus have completed their individual POST (Power-On Self Test) processes, power on the TC2201E.

Ethernet Management Connection

10/100BaseT Ethernet connectivity provides enhanced management and configuration capabilities. The RJ-45 connector on the unit can be directly connected to a standard 10/100BaseT Ethernet network.

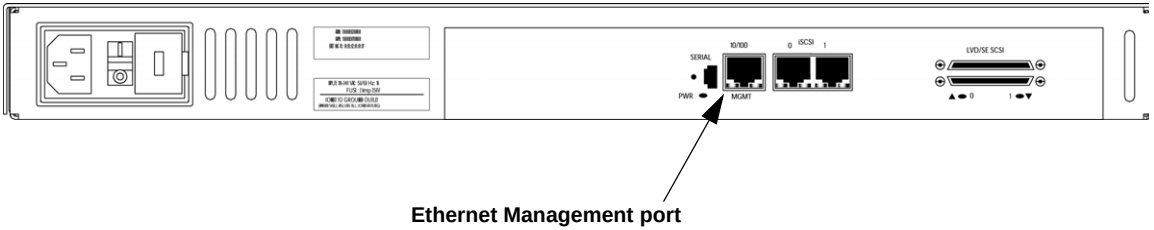
If your network does not have a DHCP server, you will need to manually configure an IP address via the serial port using the Command Line Interface (see appendix C, Using the Command Line Interface).

For more information about the IP network address and the visual management system, refer to the chapter 3, Quantum Visual Manager.

> **Note:** For manual configuration of the IP address, the TC2201E's default IP address is 1.1.1.1 but this is technically not a valid IP address. It is recommended that you change the setting to a valid address, as described in appendix C.

Ethernet capabilities include Telnet, FTP, and an HTTP (web browser) support for configuration and management.

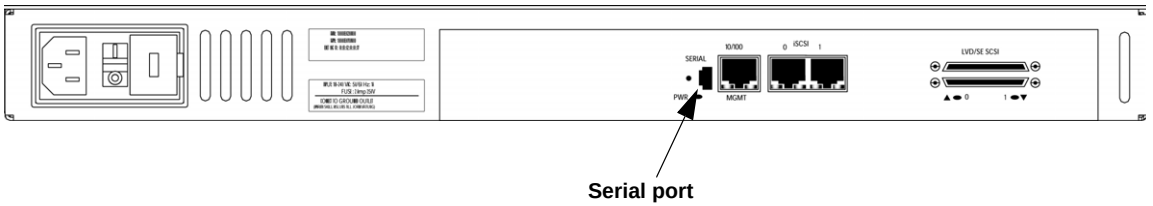
Figure 18 TC2201E Ethernet port



RS-232 Serial Management Connection

The 3-pin connector on the back panel of the TC2201E provides a serial port that is compatible with RS-232 signaling levels. The TC2201E is designed to communicate with a terminal or any operating system utilizing a terminal emulator. The baud rate, data bits, stop bits, parity, and flow control of both the TC2201E and the host system must use the same settings. Refer to appendix C for more information on serial management.

Figure 19 TC2201E Serial Port



Setting Up Serial Port Communications

Leave the TC2201E turned off until you have set up the serial port communications on your host computer, unless serial I/O was previously established and is currently running.

The TC2201E is designed to communicate with a terminal or any operating system utilizing a terminal emulator. For example, Windows 9x, NT 4.0, or Windows 2000 operating systems can use Hyperterminal. Be sure the baud rate, data bits, stop bits, parity, and flow control are set correctly.

To set up serial communications with the TC2201E:

1. Leave power to the TC2201E turned off until you have set up the serial port communications on your host terminal.
2. Plug the serial cable into one of the host computer's serial ports (COM1 or COM2), and then plug the other end of the serial cable into the TC2201E's serial port.

> **Note:** A 3-pin serial cable is included in the shipping container for the TC2201E.

3. Start the terminal emulator.
4. Set the terminal emulator to use the appropriate COM port.

> **Note:** Auto Detect or VT100 are the recommended settings for Windows HyperTerminal emulation type.

5 Specify the following settings for the port:

Baud Rate:	9600, 19200, 38400, 57600, or 115200
Data Bits:	8
Stop Bits:	1
Parity:	None
Flow Control:	None or XON/XOFF

> **Note:** Before initially powering on the TC2201E, make sure all the storage devices are powered on first and that they have finished performing their self tests. This will help ensure that device discovery works correctly.

6 Proceed to the following instructions on connecting the power to the TC2201E.

Connecting the Power Cable

The power supply used with the TC2201E supports 100 - 240 VAC (Auto Sensing), but the correct type of power cable needed for your installation should still be verified. The power cable shipped with the TC2201E is a 120 VAC 3-conductor power cable for use in the United States and Canada. This is the power cable that should be used with the TC2201E unless your installation requires otherwise, in which case you should obtain the appropriate power cable as needed.

To connect the power cable to the TC2201E:

1 Connect the female end of the power cable to the power connector on the back panel of the TC2201E.

2 Plug the male end of the power cable into the power source.

3 Switch on power to the TC2201E using the Power Switch located on the back panel of the TC2201E.

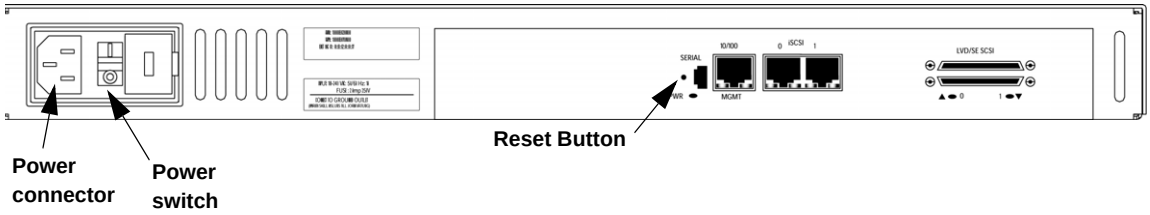
If accessing the serial port, once you set the baud rate in the terminal emulator, wait until the TC2201E completes the Power-On Self Test (POST) and then the Firmware Initialization process. This can take up

to 90 seconds, during which time the POST and initialization information may or may not be visible on the terminal or terminal emulator.

The baud rate used by the terminal or terminal emulator must be 9600, 19200, 38400, 57600, or 115200. The TC2201E will not function properly at any other baud rate.

Once the POST and firmware initiation processes are complete, the main menu should be accessible over the serial port. Optionally, the main menu can also be accessed over the Ethernet port as described in the next Chapter of this manual.

Figure 20 TC2201E Power Switch and Connector



Configuring the TC2201E

The TC2201E can be configured in a variety of ways. The following are general procedures for setting up basic operation. Not all of these settings will apply to every environment, but these guidelines should provide the fundamental steps for configuring the TC2201E.

Configuring the TC2201E using the Visual Manager

To configure the TC2201E using the visual manager:

1. While DHCP support is enabled by default on the TC2201E, it is important to ensure that the Ethernet setting for DHCP is set to Enabled or that a valid IP address and IP gateway have been properly

configured for network operation of the TC2201E. Depending on the network environment, it may be possible to use the TC2201E's default IP address of 1.1.1.1 to configure the unit.

> **Note:** In the event that DHCP is not used, note that the TC2201E's default IP address of 1.1.1.1 is technically not a valid IP address. It is recommended that you should change the setting to an IP address that is a valid address (via the serial port using the Command Line Interface). Refer to Using the Command Line Interface on page 103 for information on configuring the IP address.

2. Verify that the Ethernet and iSCSI ports all have good network connections. This can be accomplished by issuing a standard "ping" command to the IP addresses for each port. In the event that a port fails to respond, check all cable connections (use new cables where necessary) and be sure there is a good link light showing on the network switch for all connections to the TC2201E.
3. To begin configuration of the TC2201E, enter the IP address of the Ethernet management port into the web browser address field and press the **Enter** key. The home page of the TC2201E should appear. If not, please verify the IP address or use the Command Line Interface instructions in the next section.
4. In the Home page of the Visual Manager interface, select "Ethernet" from the Main menu on the left.
5. When the security prompt appears, enter the appropriate user name and password values and then select the **Submit** button. The default user name is 'root' and the default password is 'password'.
6. The Ethernet page will appear. Select each Ethernet port from the menu on the left and verify that all Ethernet settings are correct for the network environment that the TC2201E is connected to.
7. Select the Discovery page to verify that all target devices are visible as expected and that the status for each device appears as expected (i.e. in the "UP" state). If any device is shown in the "DOWN" state, inspect that device. If a device fails to appear at all, make sure the

device is powered on and check cable connections. It may be necessary to perform a manual discovery (select **GO** button) or to reboot the TC2201E (menu selection on left).

> **Note:** During reboot, some older browsers will need to be manually returned to the desired page after the reboot page counter has completed counting down to "0".

8 Select the SCSI Bus page. SCSI ID 7 is the default SCSI Initiator ID for each of the TC2201E's SCSI buses. If any devices attached to a TC2201E bus are using SCSI ID 7, then that bus's Initiator ID must be changed. To change a bus's Initiator ID: Select the desired bus from the TC2201E GUI or the SCSI Bus submenu. Then use the Initiator ID field drop-down list to select an unused ID number. Click the **Submit** button to record the change.

If the TC2201E does not see all of the devices expected, check that the initiator ID(s) are set to a unique value for each bus attached to devices. For any changes, submit those changes and reboot the TC2201E.

You have now successfully configured the TC2201E. This procedure may not apply to all situations but does address most key issues required for initial setup.

Configuring the TC2201D Using the Command Line Interface

To configure the TC2201E from the command line interface:

1 Establish communications over the serial port and then bring up the Command Line Interface (CLI).

2 In the main menu of the CLI, several menu options should be visible. Select menu option **1**, "Perform Configuration" and then menu option **3**, "Ethernet".

3 To enable remote management capabilities, toggle DHCP to Enabled or enter a valid IP address and IP gateway, so that the TC2201E is configured properly for network operation. When Ethernet settings are complete, select **X** to go back to the main configuration menu.

4 Select menu option **5** to access the SCSI Bus menu. SCSI ID 7 is the default SCSI Initiator ID for each of the TC2201E's SCSI buses. If any devices attached to a TC2201E bus are using SCSI ID 7, then that bus's Initiator ID must be changed. To change a bus's Initiator ID: Select

the desired bus by pressing the Enter key. Then use the Edit Initiator Settings menu option to make changes. Select **X** to return to the Configuration menu.

5. Select the letter **A** from the Configuration Menu to save your configuration changes to the TC2201E. Once the TC2201E saves your configuration changes, enter **X** to exit to the Main menu.
6. Select menu option **2** to access the System Utilities menu.
7. Select menu option **1** to access the System Statistics menu.
8. Select menu option **1** to access the Display Parallel SCSI Protocol Status menu.
9. Select menu option **2** to access the Display Attached SCSI Devices menu.
10. Select menu option **4** to display all local SCSI devices. If any device is shown in the "DOWN" state, inspect that device. If a device fails to appear at all, make sure the device is powered on and check cable connections. It may be necessary to perform a manual discovery (select menu option 1, 2, or 3) or to reboot the TC2201E (from main menu). Select **X** four times to return to the Configuration menu.
11. Select menu option **4** to reboot the TC2201E. In about 2 minutes, the TC2201E will once again display the main menu.
12. If the TC2201E does not see all of the devices expected, repeat step 3 above, and check that the initiator ID(s) are set to a unique value for the selected bus. Again, you must save any changes and reboot the TC2201E.

    You have now successfully configured the TC2201E. This procedure may not apply to all situations, but does address most key issues required for initial setup.

Save Backup Version of Configuration

Once all desired configuration settings are in place, it is recommended to save a backup version of the configuration settings. By doing so, this will help ensure that in the event of a serious problem such as a forgotten user name or password, it will be possible to restore all the settings. For more information, see Using the FTP Interface on page 155.

Advanced Configuration Options

The following two sections provide some advanced configuration tips that go beyond the quick setup procedures listed above.

iSCSI Configuration

For iSCSI environments, the TC2201E provides a number of optional configuration settings that can be used to enhance operation and security. For more information about the settings described in this section, see Chapters 6 and 7 of this manual.

Secure Connections

CHAP (Challenge-Handshake Authentication Protocol) provides a secure procedure for connecting to systems, as follows:

1. After a link is made, the TC2201E sends a challenge message to the connection requestor. The requestor responds with a value obtained by using a one-way hash function.
2. The TC2201E checks the response by comparing it its own calculation of the expected hash value.
3. If the values match, the authentication is acknowledged; otherwise the connection is usually terminated.

   At any time, the TC2201E can request the connected party to send a new challenge message. CHAP identifiers are changed frequently and authentication can be requested by the TC2201E at any time.

Port Failover

The iSCSI Portal Group Settings primarily serve to provide port failover functionality for the TC2201E. By default, the TC2201E is set to use one Portal Group for both ports, which effectively enables failover capability between the two iSCSI ports.However, this option can be disabled so that each port can be mapped separately.

Automated Device Discovery

iSNS servers maintain information about iSCSI clients and will respond to iSNS protocol queries and requests, and initiate iSNS protocol State Change Notifications. To use iSNS with the TC2201E, simply enable the TC2201E as a client and then enter a DNS name or IP address for up to three iSNS servers.

The default setting is Disabled. When enabled, the TC2201E will function as an iSNS client and will initiate transactions with iSNS servers using the iSNSP. The iSNS client is a process that is co-resident in the TC2201E, and which can register device attribute information with the iSNS server. The capability is used for automated device discovery.

SCSI Configuration

For SCSI devices, the TC2201E provides a number of optional configuration settings that can be used to enhance operation and security.

Buffered Tape Writes

Buffered Tape Writes is an option designed to enhance system performance. By returning status on consecutive write commands prior to the tape device receiving data, Buffered Tape Writes remove the latency of waiting for responses from the tape device. In the event that data does not transfer correctly for any reason, the router will return a check condition on a subsequent command.

Commands other than Write(6) are not issued until status is received for any pending write. Also, status is not returned until the device completes the command. For instance, when a synchronizing command is sent to a drive, such as sending a Write File mark, a good status means all prior commands have been successfully completed and data has been successfully written to the medium. This is appropriate for such tasks as file backup/restore.

> **Note:** By default, the Buffered Tape Writes option is disabled. If the application requires confirmation of individual blocks being written to the medium, such as audit trail tapes or log tapes, this option should be disabled.

Chapter 3

Quantum Visual Manager

This chapter describes the Quantum Visual Manager (QVM). The current configuration and operating status of the TC2201E can be accessed from any standard Web browser, after the user logs in with the appropriate username and password. Information is presented in HTML format in accordance with the W3C specification for HTML 3.2. Current W3C Recommendations and other technical documents can be found at http://www.w3.org/TR.

Visual Manager allows access to configuration settings such as:

- Baud rate of the serial port
- iSCSI settings
- Ethernet address
- Device maps and host associations
- Trace level and event log settings

Most settings may be changed and saved to the TC2201E.

Note: Unless otherwise indicated, configuration changes take effect when the unit next powers on or reboots.

Accessing Visual Manager

1. Connect a 10baseT or 100baseT Ethernet cable to the TC2201E.
2. Apply power to any connected SCSI or iSCSI devices.
3. After all attached devices have gone through their power up routines, boot up the TC2201E.
4. Turn on the host computer.
5. If the IP address for the TC2201E is known, open the computer's Web browser and enter the IP address into the Address field. The factory default of the TC2201E has DHCP enabled. To disable DHCP, refer to appendix C, Using the Command Line Interface for information on disabling the DHCP option.

Note: For manual IP address configuration, the TC2201E has a default fixed IP address of 1.1.1.1 but this is technically not a valid IP address. For remote access from WAN or Internet locations, the IP address must be changed to a valid IP address. Valid IP addresses have the form x.x.x.x where each x is an integer in the range of 0 to 255.

If you do not know the IP address of the TC2201E, then connect to the TC2201E using the serial (RS-232) connection (a 3-pin serial cable is included with the TC2201E). Current settings can be viewed and changed from the Ethernet Configuration Menu of the serial interface.

Note: To access the QVM user interface, the TC2201E must be assigned an IP address.

Note: If the TC2201E is to use a static IP address, the default IP address 1.1.1.1 should be changed to an address that is appropriate for the IP network it will reside on. Note that the default IP address can be used in a direct connection between the TC2201E and the host computer via a crossover Ethernet cable.

Note: For DHCP usage information, see the Network settings in this chapter and in Appendix D.

Note: Unless otherwise indicated, configuration changes take effect when the unit next powers on or reboots.

6 Once the host computer's web browser can access the TC2201E, Quantum Visual Manager (QVM) will display the TC2201E's "Home page" in the browser window. This page provides a high-level snapshot of the TC2201E's status, and is accessible to anyone who knows (and can reach) the TC2201E's IP address. The Report Page is also accessible without needing special access. However, additional TC2201E information, and all TC2201E configuration settings, are user- and password-protected. Selecting other options will cause a login window to appear, where the user can enter a user name and password. The TC2201E defaults are **root** for user name and **password** for password. This information is required only once per session (described below).

Note: For the QVM interface's dynamic display of the TC2201E configuration to be presented properly, use version 6.2 or later of Netscape's browser on non-Solaris platforms, or Netscape version 6.2.3 for Solaris platforms. If using Internet Explorer, use revision 6.0 or later.

Note: It is recommended to change the user name and password from the defaults. For more information, see Main Menu > System > User Settings.

7 Upon successful login, the user has initiated a "session", and has full access to the TC2201E QVM for the duration of the session. A session ends when the user exits all instances of the web browser. Log-in will be required again, via the TC2201E's home page, to initiate a new session.

Note: To end the current session of Visual Manager, it is necessary to close all instances of the browser window. Merely navigating the browser to another URL is not sufficient to end the current session.

Making Changes via Visual Manager

To make changes to settings, use a standard keyboard and mouse to enter new information. Select the **Submit** button to send changes from the Web browser to the TC2201E. Other than dynamic mapping changes, configuration changes will not take effect until the next time the TC2201E reboots. The unit can be forced to reboot by selecting the **Reboot** option from the Main Menu.

Detailed instructions about all settings are provided later in this chapter.

Note: It is recommended not to bookmark Visual Manager pages with a Web browser. Because configuration information is transmitted via URLs, the use of bookmarks could cause the TC2201E to be configured with information present when the bookmark was created. For similar reasons, it is also recommended not to use navigation features of the Web browser (such as the **Back** or **Refresh**/**Reload** buttons) to navigate Visual Manager.

It is recommended that you navigate only using the Web page links contained in Visual Manager itself. Depending on the Web browser used, these links will often appear as highlighted text. By clicking on these links, Visual Manager can be safely navigated.

When Visual Manager for the TC2201E is accessed, the TC2201E home page appears as follows.

Figure 21 Visual Manager Home Page

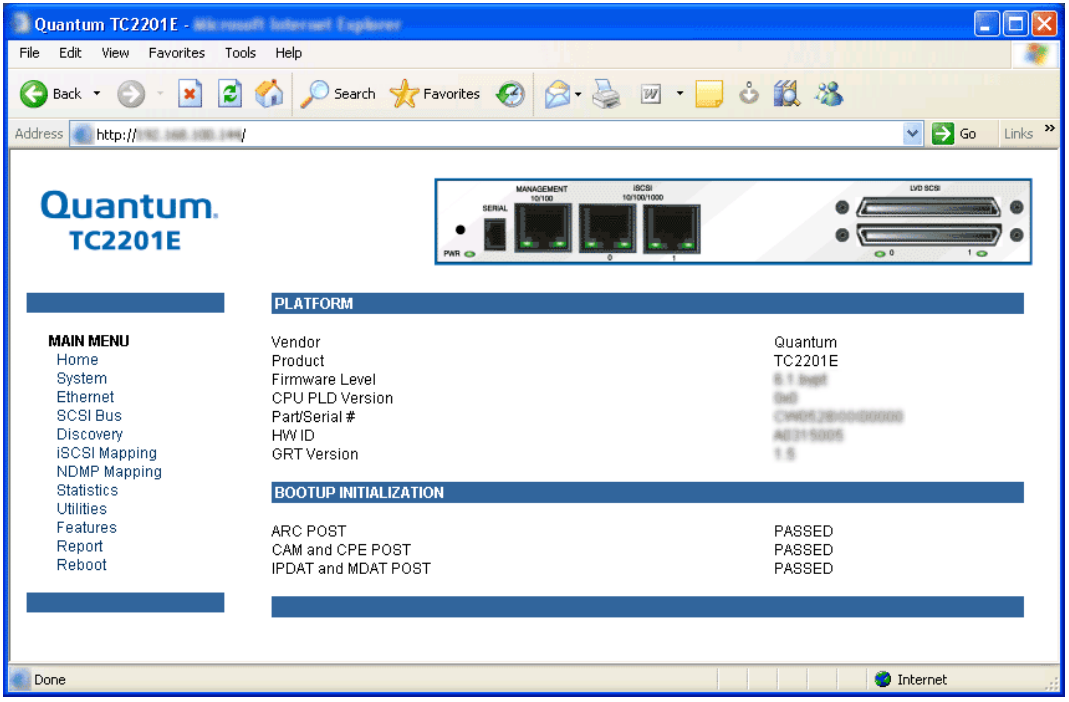


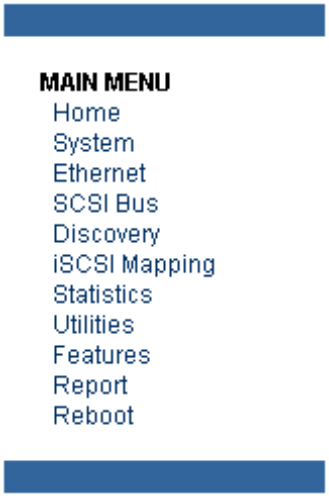
Figure 22 TC2201E Image

A port-side view (figure 22) of the TC2201E is shown on the home page. On all password protected pages of the Visual Manager interface the TC2201E image is interactive, as described below:

- Left-clicking on a port opens a menu for making changes to settings for that particular port.

The interactive TC2201E image is available for most menus.

Figure 23 Main Menu



The main menu on the left side of the TC2201E home page provides a list of menu items that are links to various TC2201E functions, information, and other menus.

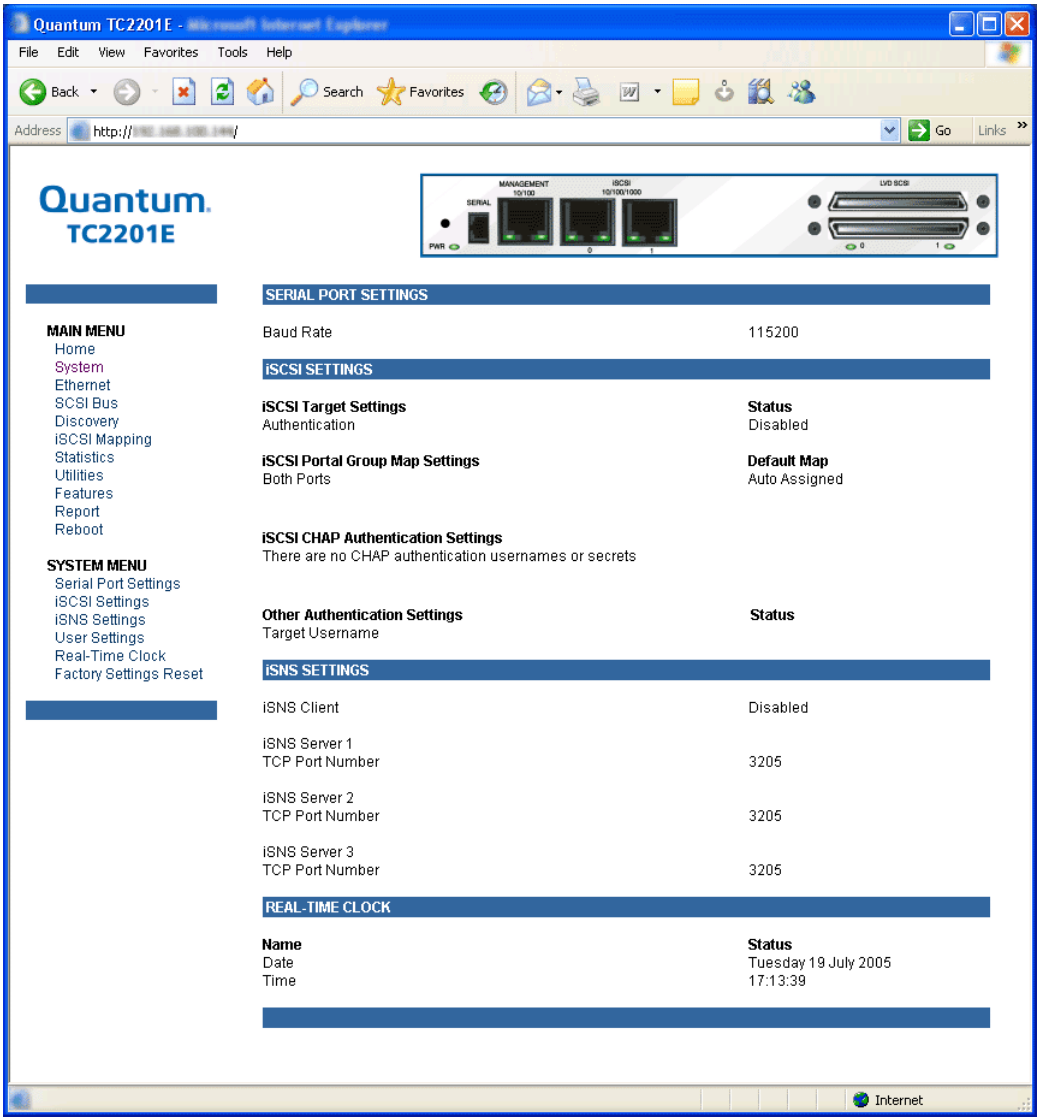
Main Menu

The following are descriptions of the menu items listed under the Main Menu category.

Main Menu > **System**

This page provides access to the System information and settings.

Figure 24 System Page

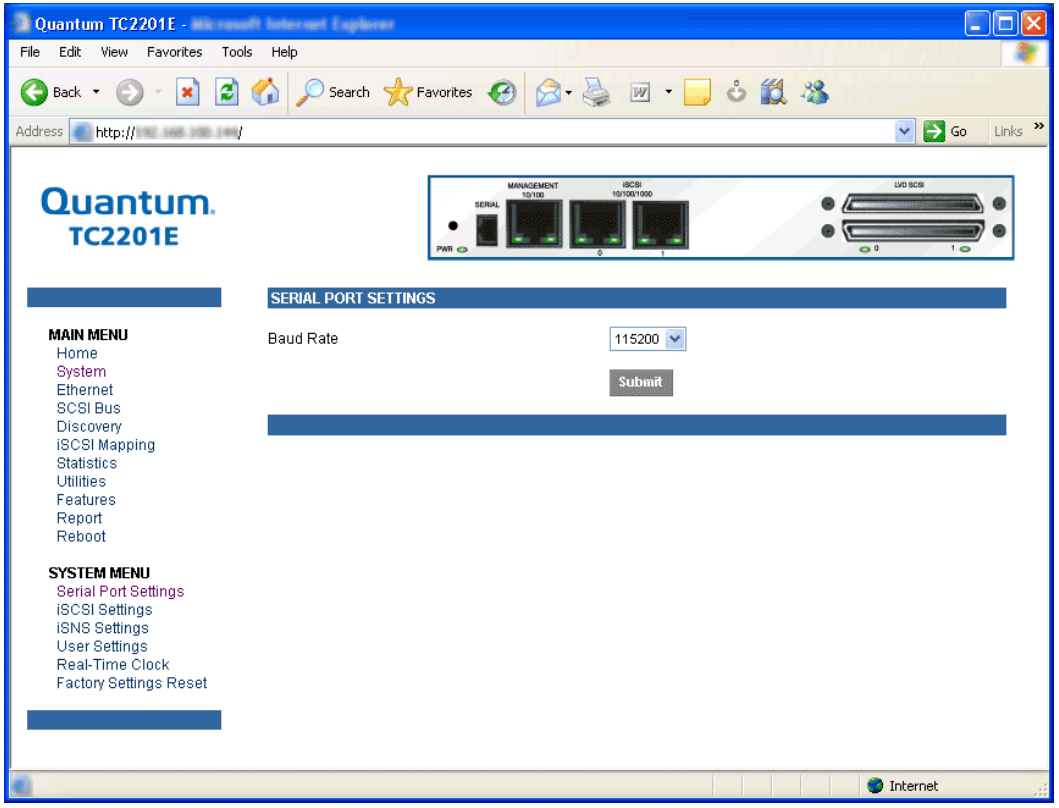


This page shows system status and allows configuration of standard system components and ports.

Main Menu > **System** > **Serial Port Settings**

This page shows the current baud rate for the serial port and allows it to be changed.

Figure 25 Serial port settings page

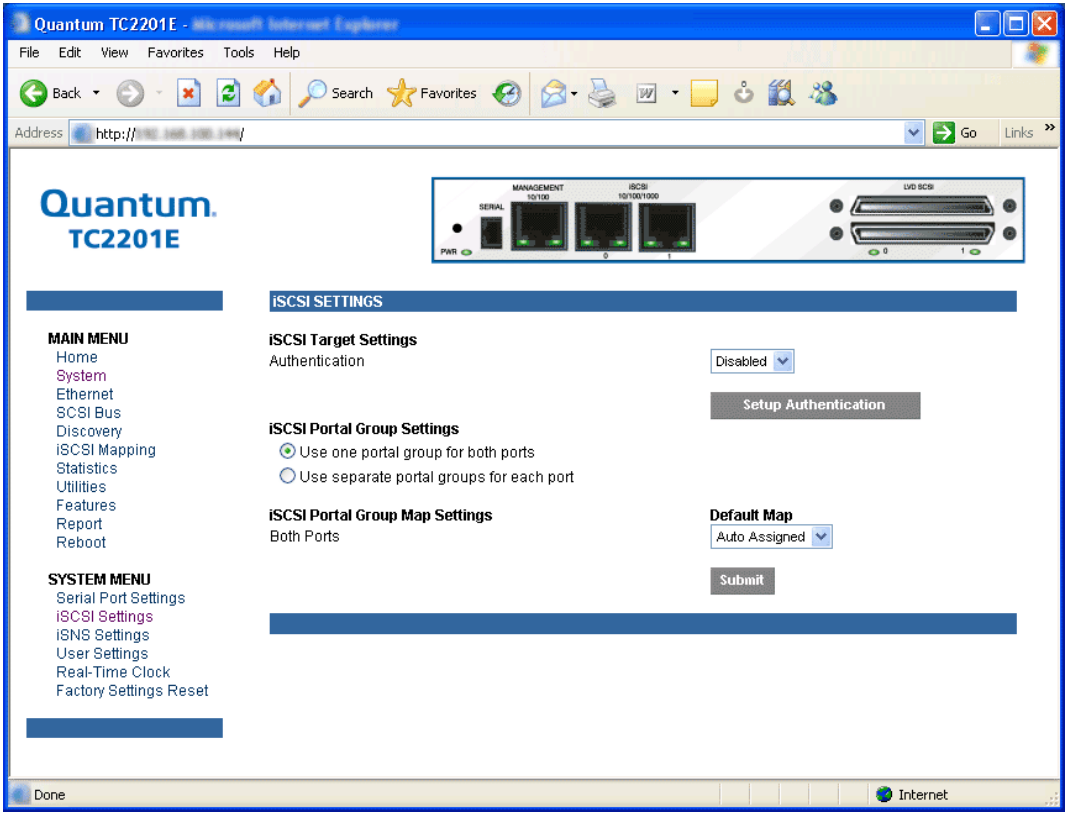


To make any changes, modify the entries by using the field's down arrow and selecting a choice. Then select the **Submit** button. Baud Rate sets the serial port baud rate. The baud rate shown is the current setting. The default Baud Rate setting is 115200.

Main Menu > **System** > **iSCSI Settings**

This page allows for configuration of iSCSI settings.

Figure 26 iSCSI Settings Page



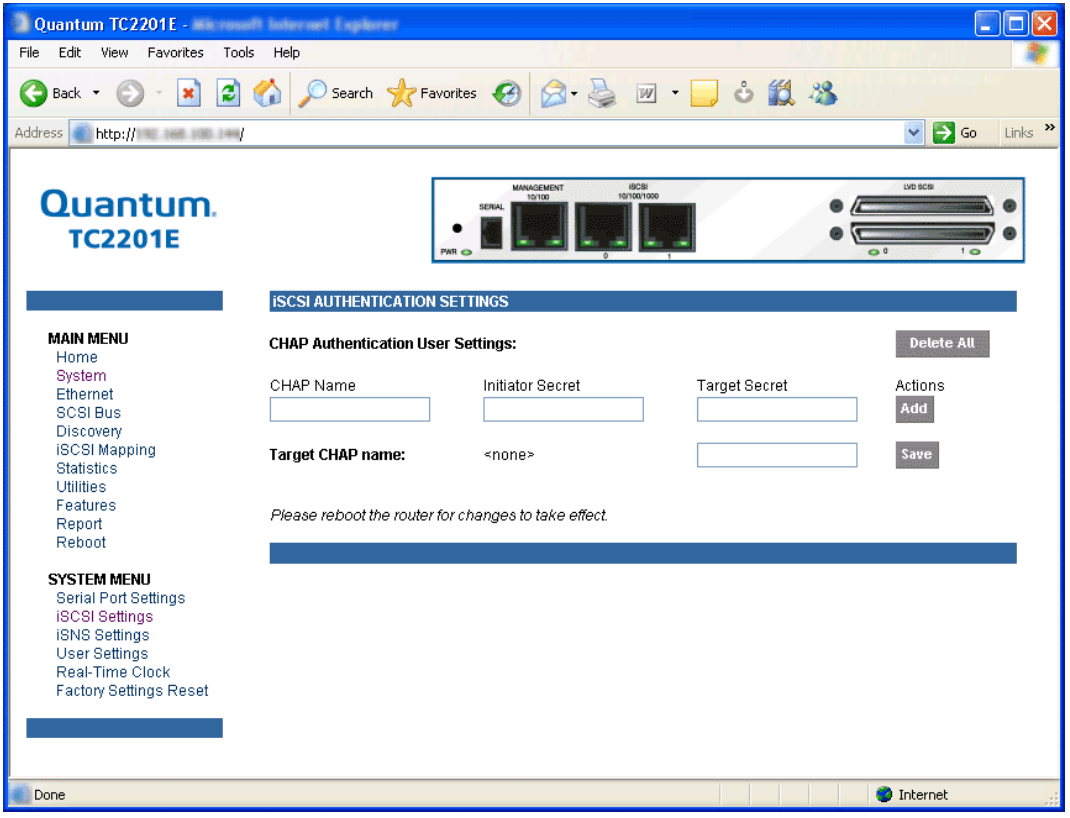
To make any changes, modify the entries as described below and then select the **Submit** button.

iSCSI Target Settings

- **Authentication** can be toggled between Enabled and Disabled. The default setting is Disabled. When set to Enabled, CHAP authentication for iSCSI is enabled.

- **Setup Authentication** button opens the iSCSI Authentication page. This page consists of entry fields for CHAP name, Initiator Secret, and Target Secret, as well as a field for Target CHAP Name.

Figure 27 iSCSI Authentication Settings Page



- CHAP Names are 1 to 255 characters in length and Initiator/Target Secrets are 12 to 16 characters in length. Target CHAP Name is 1-18 characters.
- Select **Delete All** to remove all CHAP Authentication User Settings. Delete All does not remove the Target CHAP name.
- For each existing entry, select **Edit** to make changes or **Delete** to remove specific entries.

- Select **Add** in make a new entry.
- Select **Save** to save the CHAP authentication changes. These changes will become activated after the next time the TC2201E reboots.

iSCSI Portal Group Settings *(continued from iSCSI Settings Page)*

- **iSCSI Portal Group Settings** can be toggled between the following two settings:
  - **Use one portal group for both ports**: By default, the TC2201E is set to use one Portal Group for both ports, which enables failover capability between the two iSCSI ports.
  - **Use separate portal groups for each port**: This option disables failover capability between the two iSCSI ports, so that each port can be mapped separately.

iSCSI Portal Group Map Settings

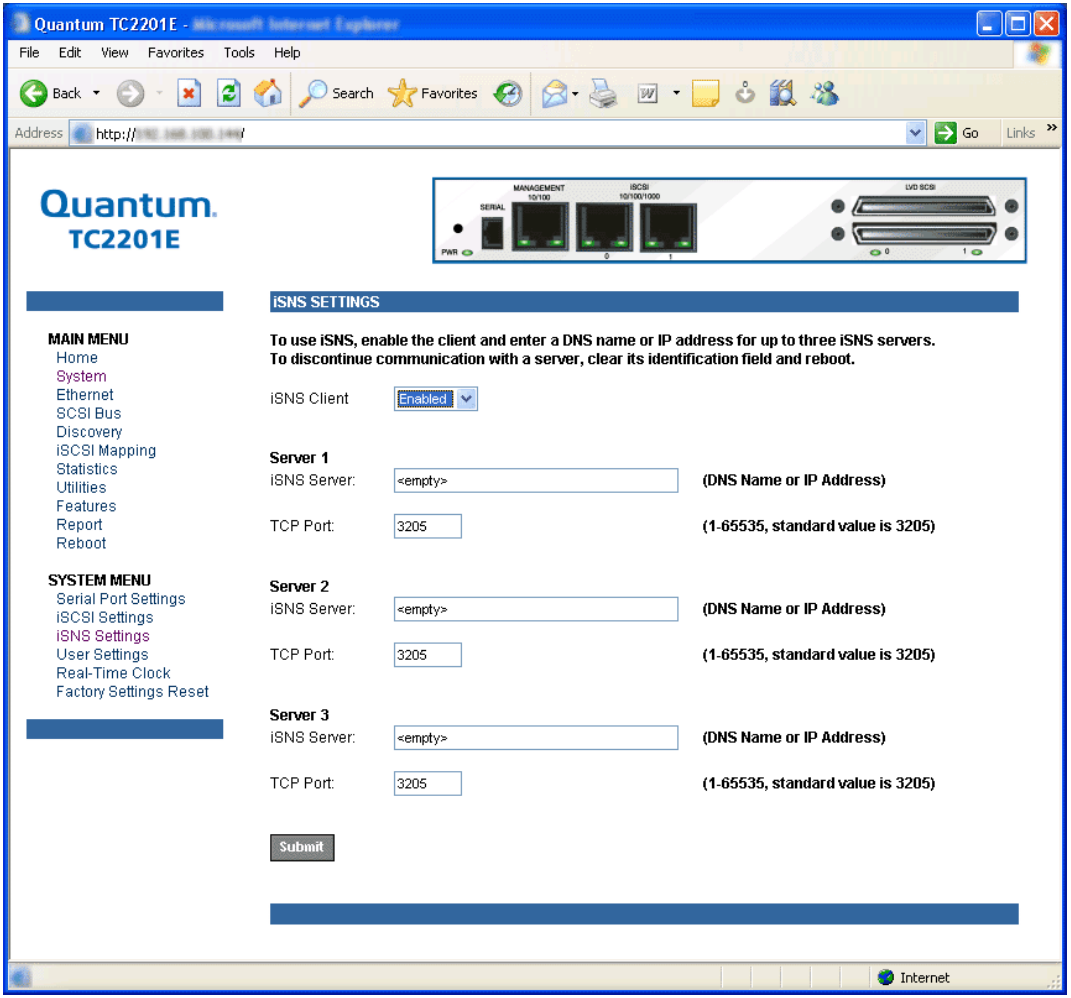
- **iSCSI Portal Group Map Settings** allows selection of the default map(s) to the current iSCSI portal group(s). Map selections include Auto Assigned and Indexed.

Once all changes are made, select the **Submit** button to send the changes to the TC2201E. Changes will become activated after the next time the TC2201E reboots.

Main Menu > **System** > **iSNS Settings**

This page allows for configuration of iSNS settings.

Figure 28 iSNS Settings Page



iSNS servers maintain information about iSCSI clients and will respond to iSNS protocol queries and requests, and initiate iSNS protocol State Change Notifications.

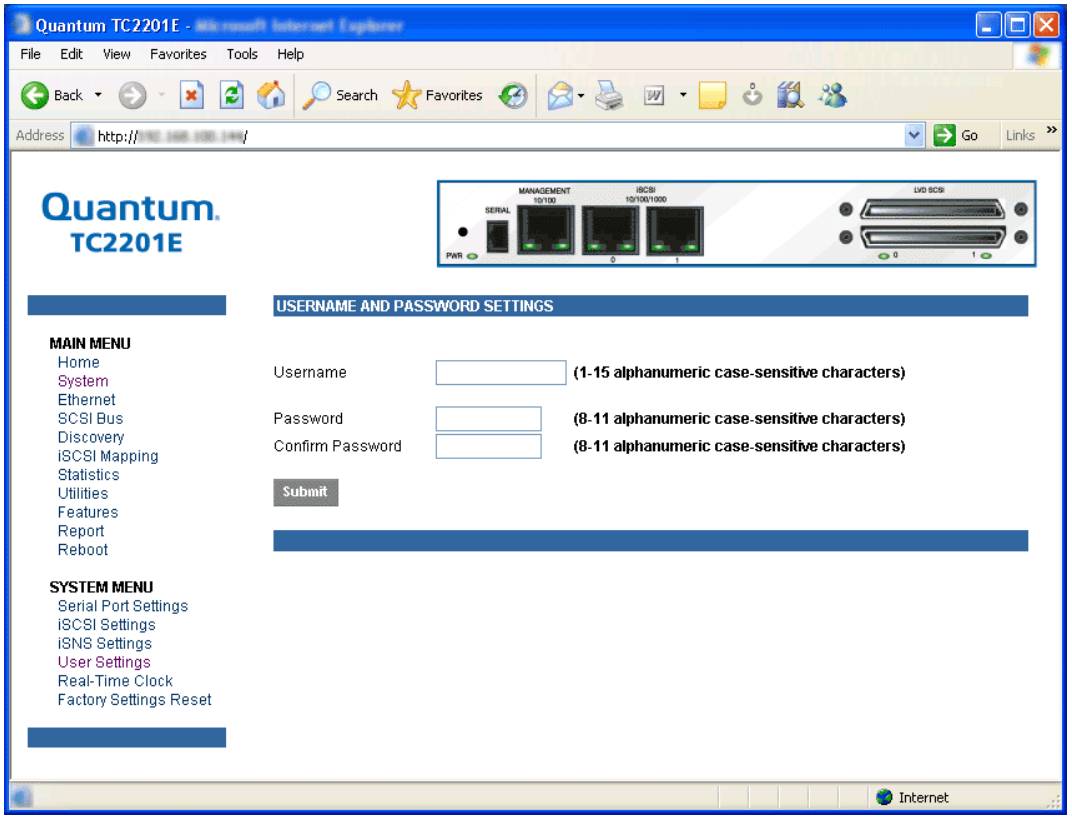
To use iSNS, enable the TC2201E as a client and then enter a DNS name or IP address for up to three iSNS servers. To make changes or to discontinue communication with a server, change or clear the identification field(s), select the **Submit** button, and then reboot the TC2201E to activate changes.

- **iSNS Client** can be toggled between Enabled and Disabled. The default setting is Disabled. When enabled, the TC2201E will function as an iSNS client and will initiate transactions with iSNS servers using the iSNS Protocol. The iSNS client is a process that is co-resident in the TC2201E, and which can register device attribute information with the iSNS server. The capability is used for automated device discovery.
- **Server 1, Server 2, and Server 3** can be set up by entering a DNS name or IP address into the field for iSNS Server and entering the server TCP Port into the field TCP Port. The standard value for TCP Port is 3205.

Main Menu > **System** > **User Settings**

This page allows for setup of security options for username and password.

Figure 29 User settings page



Security settings include the **User Name** and **Password** for the TC2201E. The administrator user name and password should be unique and kept confidential. It is recommended to use a combination of letters and numbers when creating user names and passwords. For the password, enter the password in the Confirm Password field to help ensure there are no typos made in the password. Then, select the **Submit** button to activate the user name and password you have setup.

The default settings are ‘root’ for the user name and ‘password’ for the password.

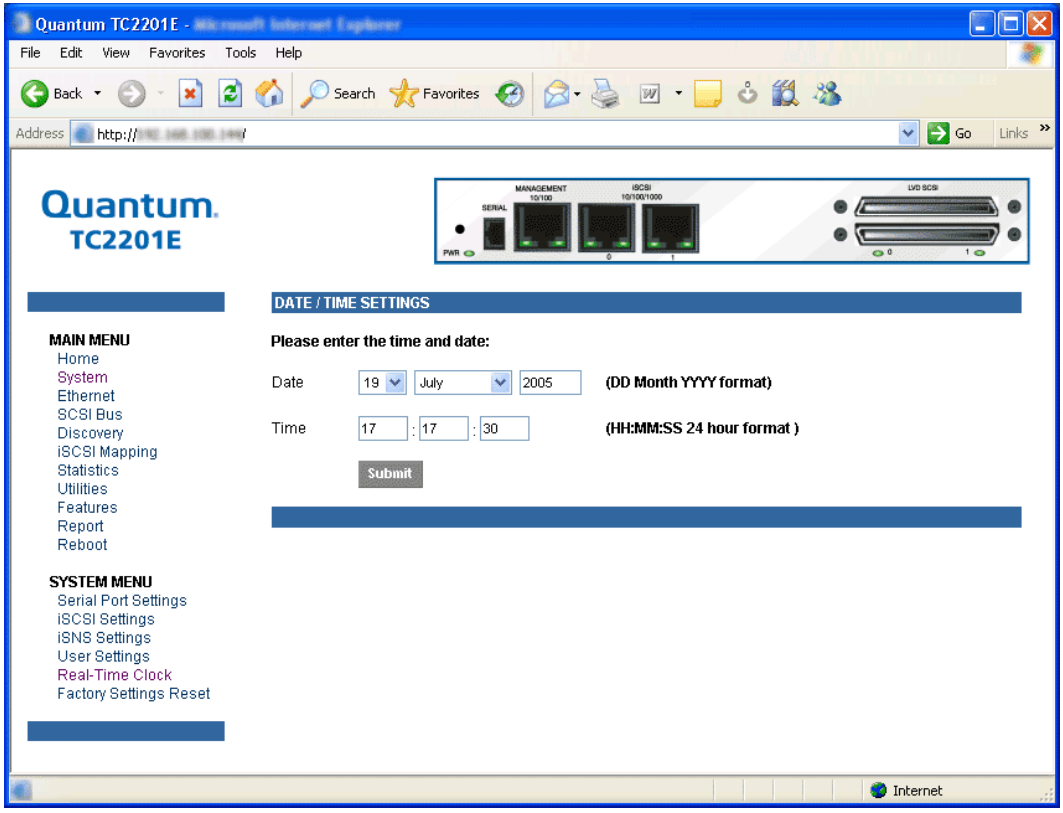
Note: The security settings entered here affect all user interfaces of the TC2201E after reboot of the TC2201E.

Note: In the event that either or both the user name and password are forgotten, it is possible to reset the user name and password to their default values by resetting the TC2201E to factory defaults from the Command Line Interface using the serial port (see appendix C on page 103). Note that resetting to factory defaults from the serial port will also reset all other configuration settings to factory defaults, as well as erase all current maps. It is recommended to capture a copy of the system report (available from the System Utilities Menu) in order to make reconfiguration easier.

Main Menu > **System** > **Real Time Clock Configuration**

This page allows for set up of the date and time.

Figure 30 Real Time Clock Configuration Page



To make any changes, modify the entries as described below and then select the **Submit** button.

- **Date Settings** are for setting the date, month, and year. Use a four digit number to represent the year.

- **Time Settings** are for setting the hours, minutes, and seconds. This is a 24 hour clock.

> **Note:** Be sure to correctly set the time and date in the Real Time Clock configuration menu so that event logging is accurate.

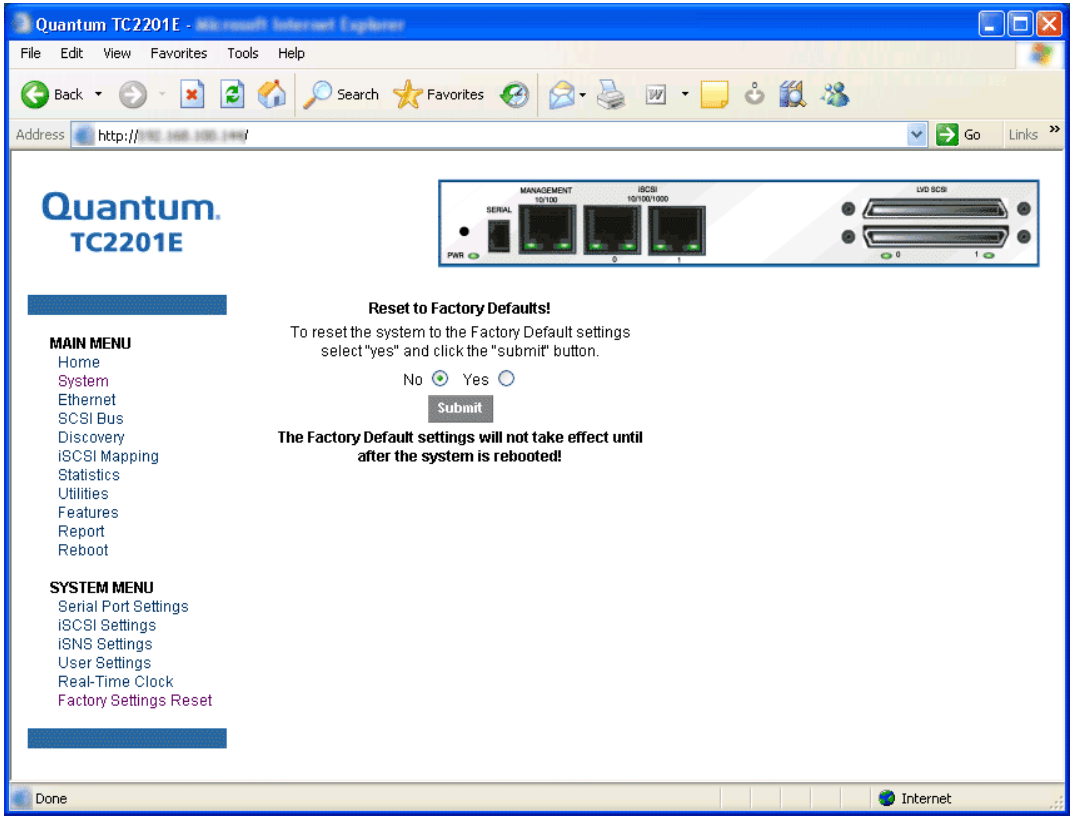
Main Menu > System > Factory Settings Reset

This page allows the TC2201E to be reset to the factory default settings. The TC2201E must be rebooted before the reset settings will take effect.

> **Note:** Resetting to factory defaults from the QVM interface will not affect ethernet connectivity. User configured values for the IP address, gateway, and subnet mask are retained after the TC2201E resets. Note that user names and passwords are NOT retained.

> **Note:** Settings are not reset to factory defaults until the TC2201E is rebooted.

Figure 31 Factory Settings Reset Page

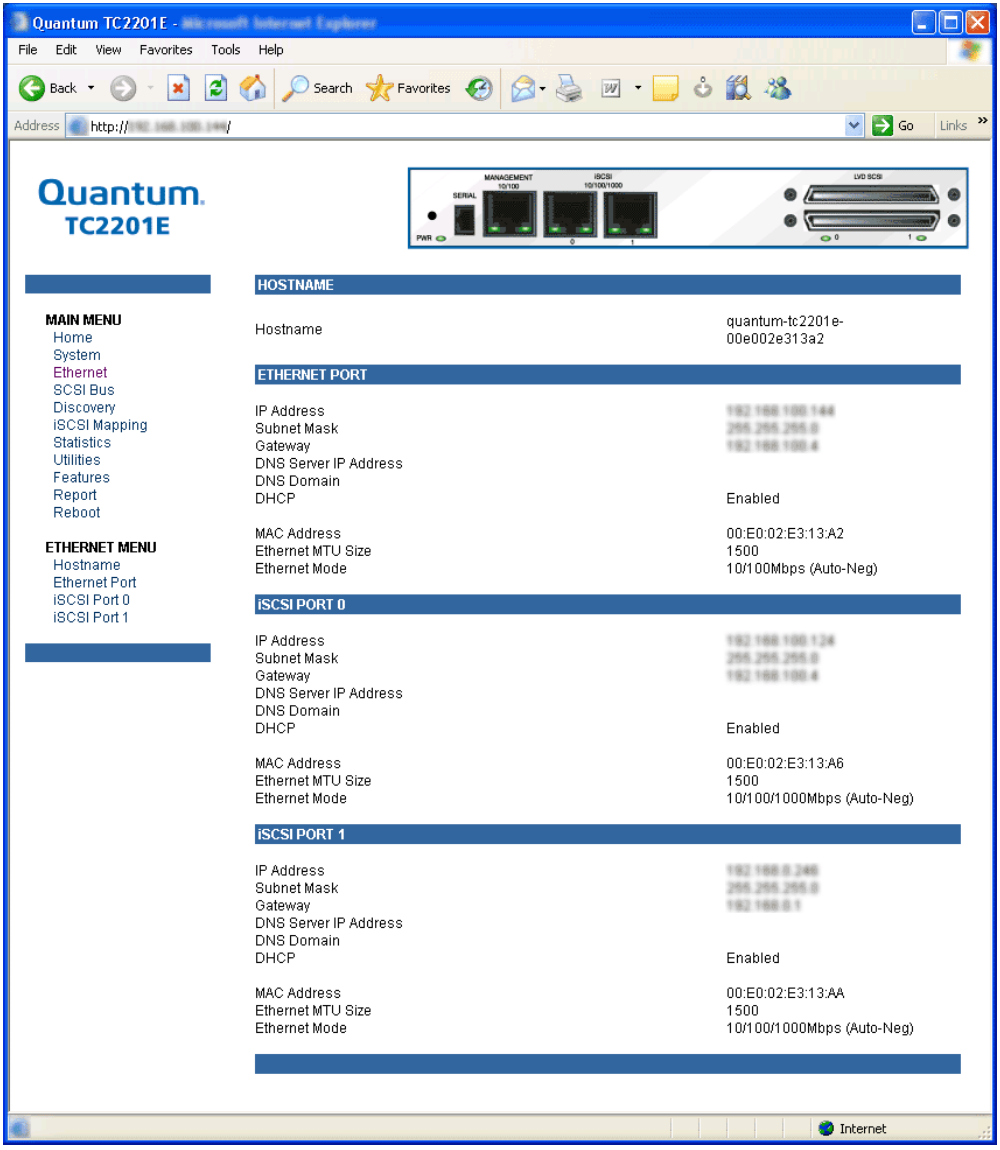


When this option is selected, a confirmation message will appear to verify the selection. If a response of **Yes** is given to the confirmation message, current TC2201E activities will be disrupted while the unit resets the current configuration to the factory defaults and saves those options to FLASH memory as the current configuration.

Main Menu > **Ethernet**

This page provides status and links for Ethernet and iSCSI port configuration pages.

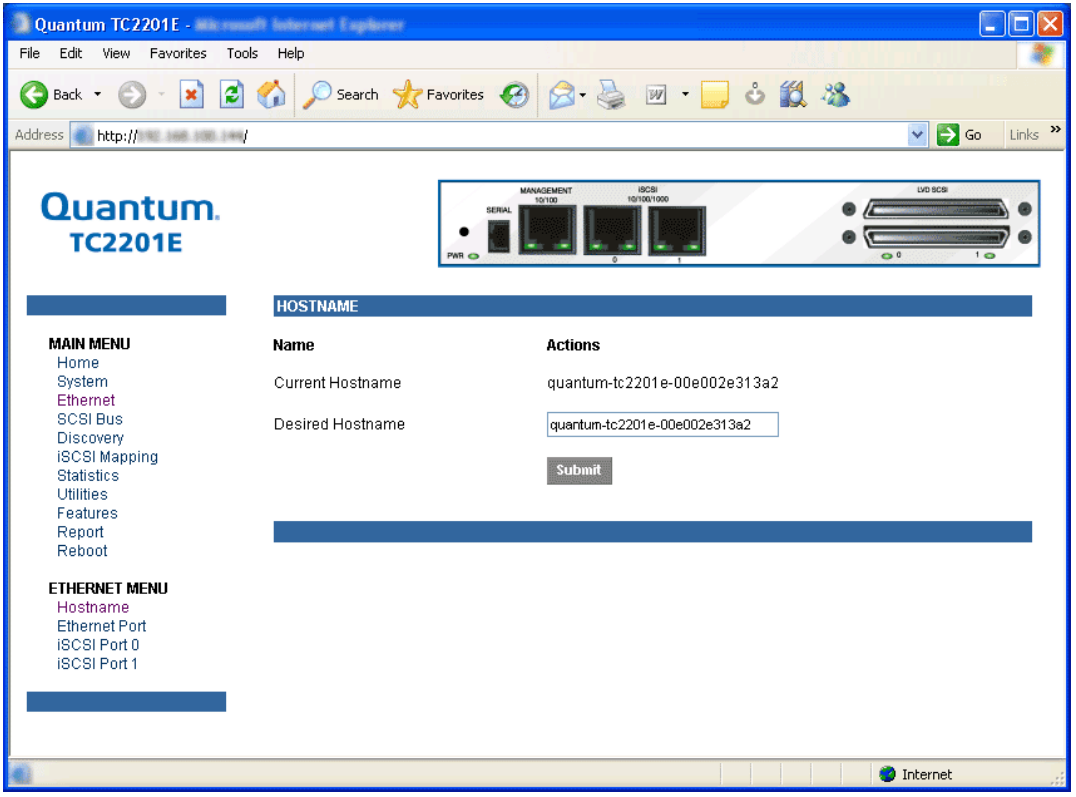
Figure 32 Ethernet Settings Page



To make any changes, modify the entries as described below and then select the **Submit** button.

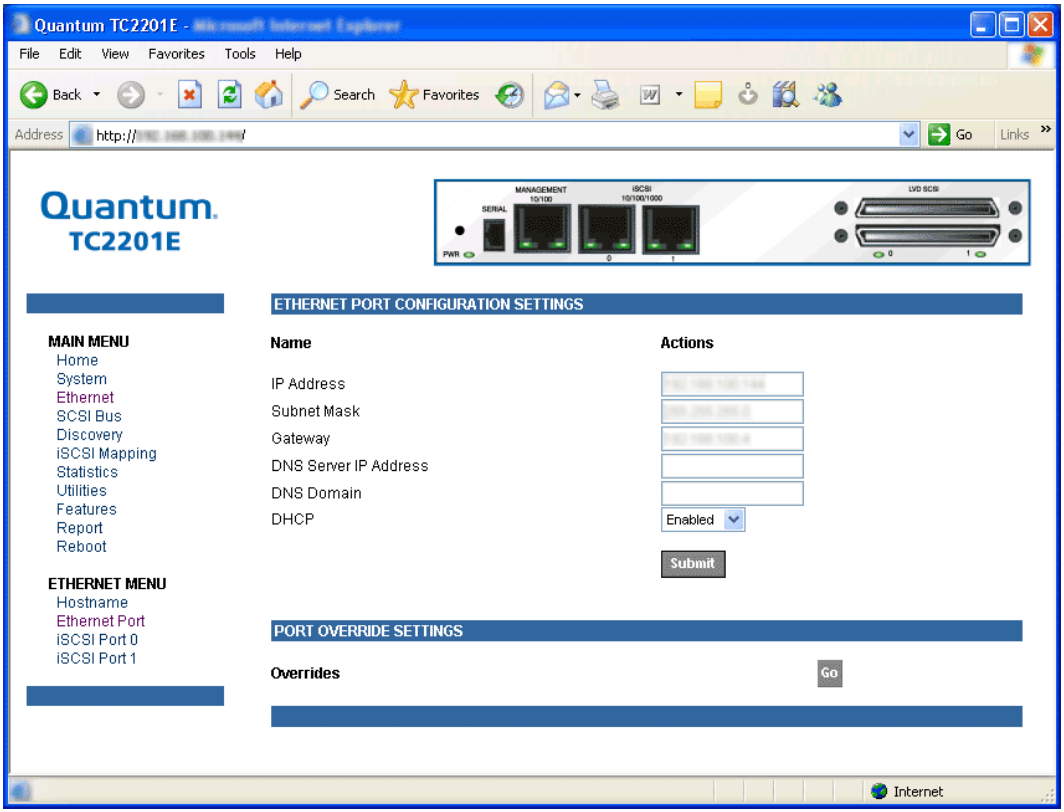
- **Hostname** is an alphanumeric entry of one word up to 255 characters long. To change this entry, select hostname from the Ethernet Menu to open the Hostname page. From the hostname page, changes to the hostname can be entered into the Desired Hostname field. Select the **Submit** button to accept the changes.

Figure 33 Host name Page



- **Ethernet Port** opens the following port configuration page:

Figure 34 Ethernet Port Configuration Page



Both the Ethernet management port and the two iSCSI ports can be configured for appropriate Ethernet network settings.

- **IP address** is the IP address of the TC2201E. The default setting for the Ethernet port is 1.1.1.1. The default setting for iSCSI Port 0 is 169.254.1.1. The default setting for iSCSI Port 1 is 169.254.1.2.
- **Subnet Mask** is the IP subnet mask for the TC2201E. The default setting is 255.255.255.0.
- **IP Gateway** is the IP address of the gateway for the Ethernet network connected to the TC2201E. The default setting is 0.0.0.0.

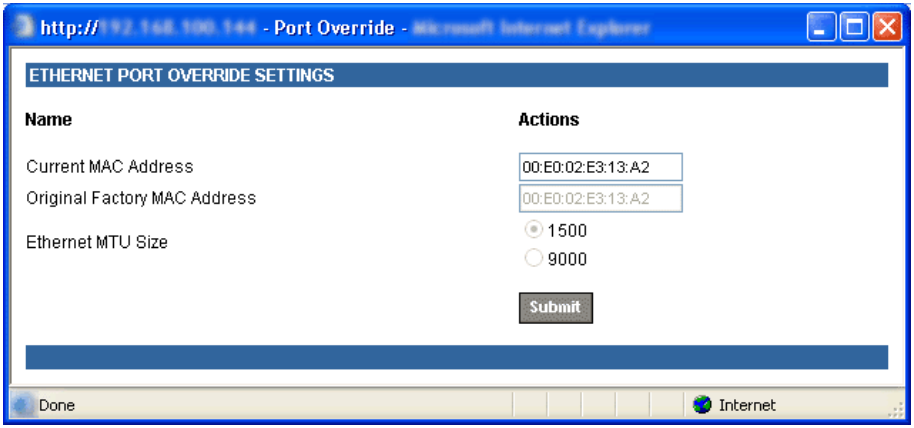
- **DNS Server IP Address** is the IP address for the DNS server and should be similar in form to XXX.XXX.XXX.XXX where each XXX represents an integer in the range of 1 to 255.
- **DNS Domain** is the domain name used by the DNS server. For example, a domain name could appear similar to "server.company.com".
- **DHCP** enables/disables support for Dynamic Host Configuration Protocol (DHCP). When enabled, the TC2201E will retrieve a dynamic IP address from a DHCP server located on the Ethernet network that the TC2201E is connected to. The default setting is Enabled. If DHCP is changed from Disabled to Enabled, it is necessary to **reboot** the TC2201E before an IP address will be requested from the DHCP server. After the TC2201E finishes rebooting, the QVM session will have to be restarted. The TC2201E's IP address will be different than the former non-DHCP IP address.

> **Note:** To use the DHCP feature, a DHCP server must be operational on the Ethernet network connected to the TC2201E. If the DHCP feature is used when there is no DHCP server, the standard for DHCP requires that the TC2201E wait three minutes for a response from a DHCP server before timing out. During this period, the TC2201E menus and functions will not be accessible.

A DHCP server may allow the setup of a lease reservation for an IP address if provided with the MAC address of the TC2201E. This forces the DHCP server to always provide the same IP address to the TC2201E. This setup is useful for remote management of the TC2201E via Telnet or Visual Manager. Because the method of setting up a lease reservation varies depending on the DHCP server, it is recommended to contact your Network Administrator for assistance.

- **Override Settings** are provided to enhance inter operability with some devices that require special consideration during setup of the TC2201E. Access to the Overrides Settings is reserved for authorized Quantum technicians. Selecting the **Go** button opens a login prompt for which an authorized technician will have the appropriate user name and password.

Figure 35 Ethernet Overrides Settings Page



To finalize any changes for the override settings, select the **Submit** button on the Ethernet Override Settings page.

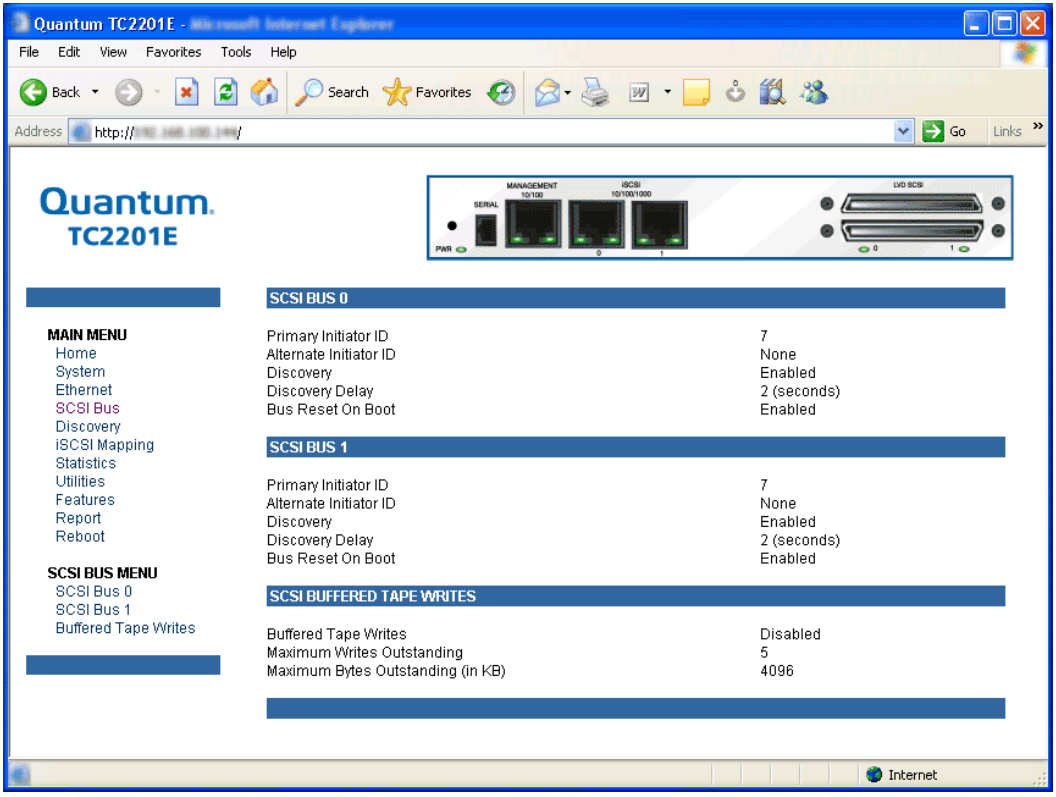
Note: Override settings should not be changed except by or under the direction of an authorized Quantum technician.

- **Current MAC address** is the current Media Access Control (MAC) address configured for the TC2201E. The MAC address is a hardware address that uniquely identifies each physical node on an Ethernet network. While the MAC address can be changed, it is highly recommended not to change this address.
- **Original Factory MAC address** is the MAC address assigned by the hardware manufacturer to the Ethernet adapter in the hardware. The TC2201E comes initialized with this assigned MAC address.
- **Ethernet MTU Size** is the Maximum Transmission Unit (MTU) for Ethernet. This setting can be configured for 1500 or 9000 byte frames. The Ethernet Management port is permanently set to 1500 and cannot be changed. The default setting for the iSCSI ports is also 1500 but a value of 9000 can be configured for jumbo frame support for iSCSI frames.

Main Menu > **SCSI Bus**

This page allows for viewing the current SCSI attributes and settings for buffered tape writes.

Figure 36 SCSI Bus Page

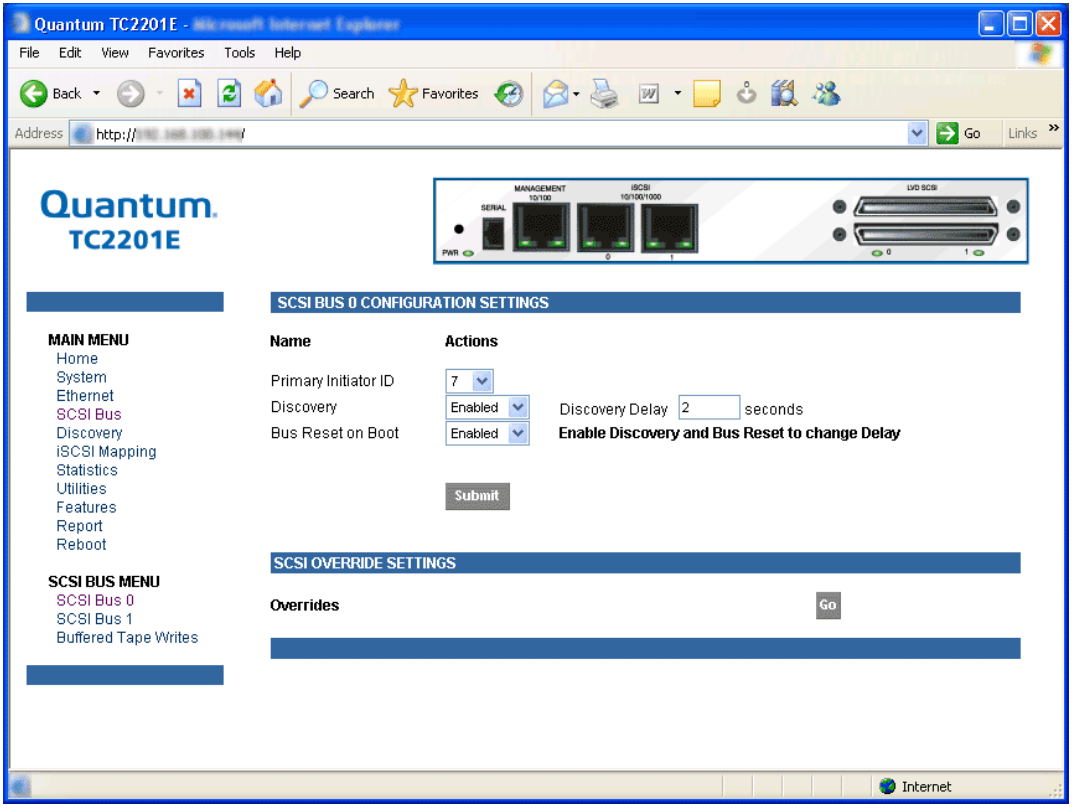


To make any changes, modify the entries as described below and then select the **Submit** button.

SCSI Bus 0 or 1

Selecting either of these two options opens the following page for configuration of SCSI bus settings.

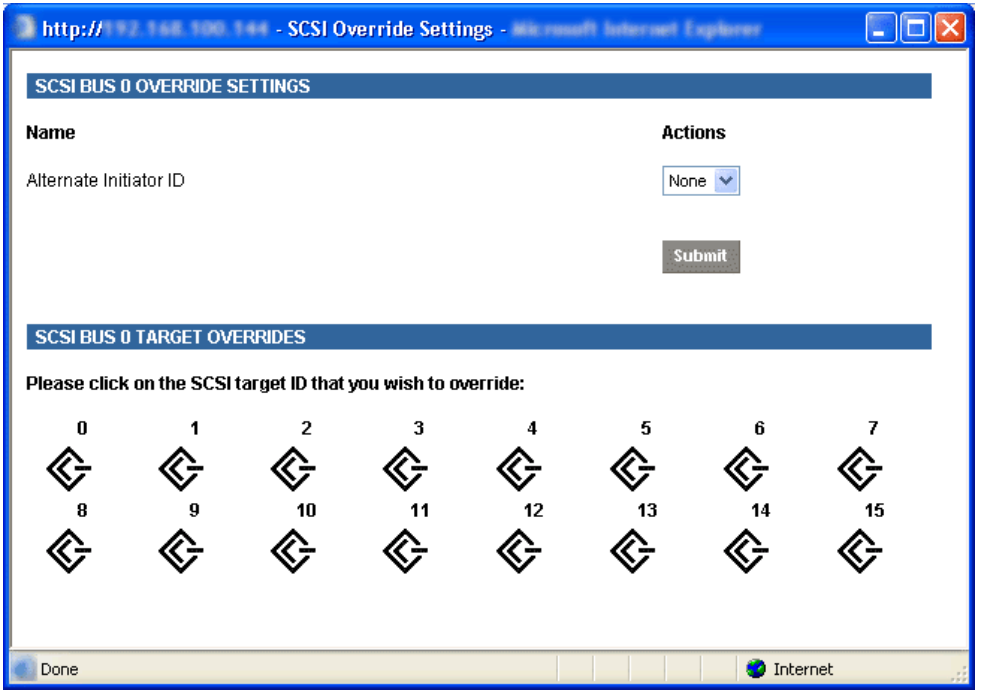
Figure 37 SCSI bus Configuration Page



- **Primary Initiator ID** must be assigned an Initiator ID. This ID should be a unique ID on the bus. The default setting is 7.
- **Discovery** enables/disables device discovery on this SCSI bus. The default setting is **Enabled**.
- **Discovery Delay** is the time in seconds that the TC2201E waits after a power-up or reboot process (which typically takes approximately 2 minutes) before starting to discover SCSI devices. Quantum recommends you set the value to at least 2 seconds to ensure all SCSI devices complete their individual power-ups. However, the user should be aware this delay is added to the time it takes for the TC2201E to reboot and for QVM to be active again. The default setting is 2 seconds.

- **Bus Reset on Boot** enables/disables automatic discovery of SCSI devices after an initial power up or reboot of the TC2201E. The default setting is **Enabled**.
- **Override Settings** are provided to enhance inter operability with some storage devices that require special consideration during setup of the TC2201E. Access to the Overrides Settings is reserved for authorized Quantum technicians. Selecting the **Go** button opens a login prompt for which an authorized technician should have the appropriate user name and password.

Figure 38 SCSI Overrides Settings Page



To finalize any changes for the override settings, select the **Submit** button.

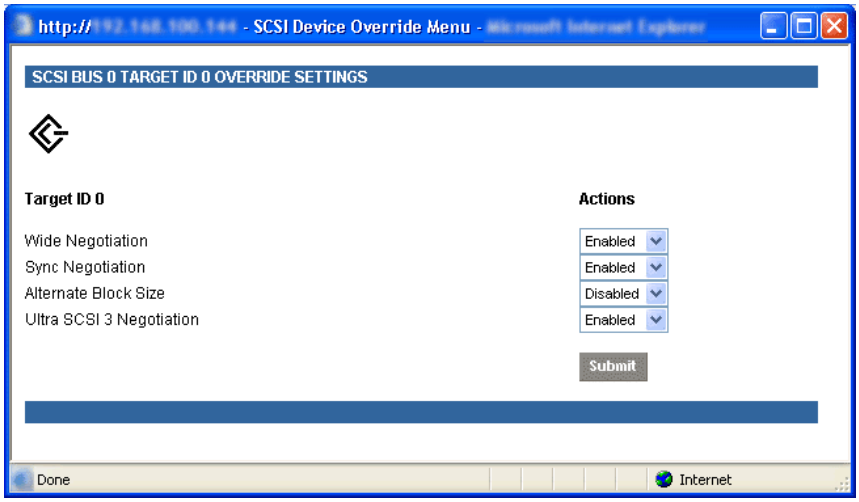
Note: Override settings should not be changed except by or under the direction of an authorized Quantum technician.

- **Alternate Initiator ID** can be assigned an Initiator ID, which is the ID for a second SCSI device that can request operations from other SCSI devices, or targets. This ID should be a unique ID on the bus. The default setting is NONE.

SCSI Bus Target Overrides

- Selecting a SCSI Target ID (0 through 15) opens the SCSI target overrides page:

Figure 39 SCSI target Overrides Settings Page



To finalize any changes for the override settings, select the **Submit** button.

> **Note:** Override settings should not be changed except by or under the direction of an authorized Quantum technician.

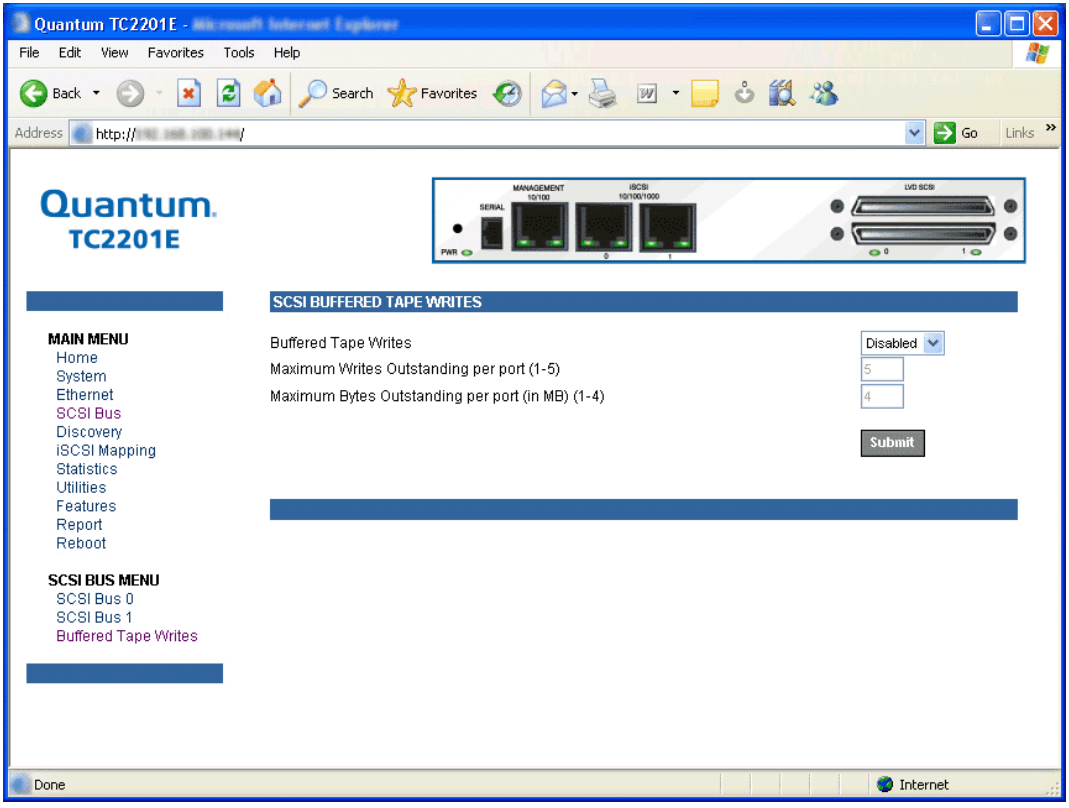
- **Wide Negotiation** enables/disables the option for negotiation on a wide SCSI bus. The default setting is Enabled.
- **Sync Negotiation** enables/disables the option for synchronous negotiation on the SCSI bus. The default setting is Enabled.

- **Alternate Block Size** enables/disables block sizes of 520 bytes each, which is the common block size used in AS/400 environments. The default setting is disabled.
- **Ultra SCSI 3 Negotiation** enables/disables Ultra SCSI 3 support for the selected Target ID. This feature is useful for solving certain compatibility issues in mixed vendor environments, where, for example, there may be a device that cannot handle automatic negotiation of the bus speed, or possibly where there is a device that does negotiate to use Ultra SCSI-3 but somehow cannot actually handle the speed. The default setting is Enabled.

Main Menu > **SCSI Bus** > **Buffered Tape Writes**

This page allows for making configuration changes for buffered tape writes.

Figure 40 SCSI Bus Page



Buffered Tape Writes can be enabled or disabled. The default setting is enabled. Buffered Tape Writes is an option designed to enhance system performance. By returning status on consecutive write commands prior to the tape device receiving data, Buffered Tape Writes remove the latency of waiting for responses from the tape device. In the event that data does not transfer correctly for any reason, the router will return a check condition on a subsequent command.Commands other than Write(6) are not issued until status is received for any pending write. Also, status is not returned until the device completes the command. For instance, when a synchronizing command is sent to a drive, such as

sending a Write File mark, a good status means all prior commands have been successfully completed and data has been successfully written to the medium. This is appropriate for such tasks as file backup/restore.

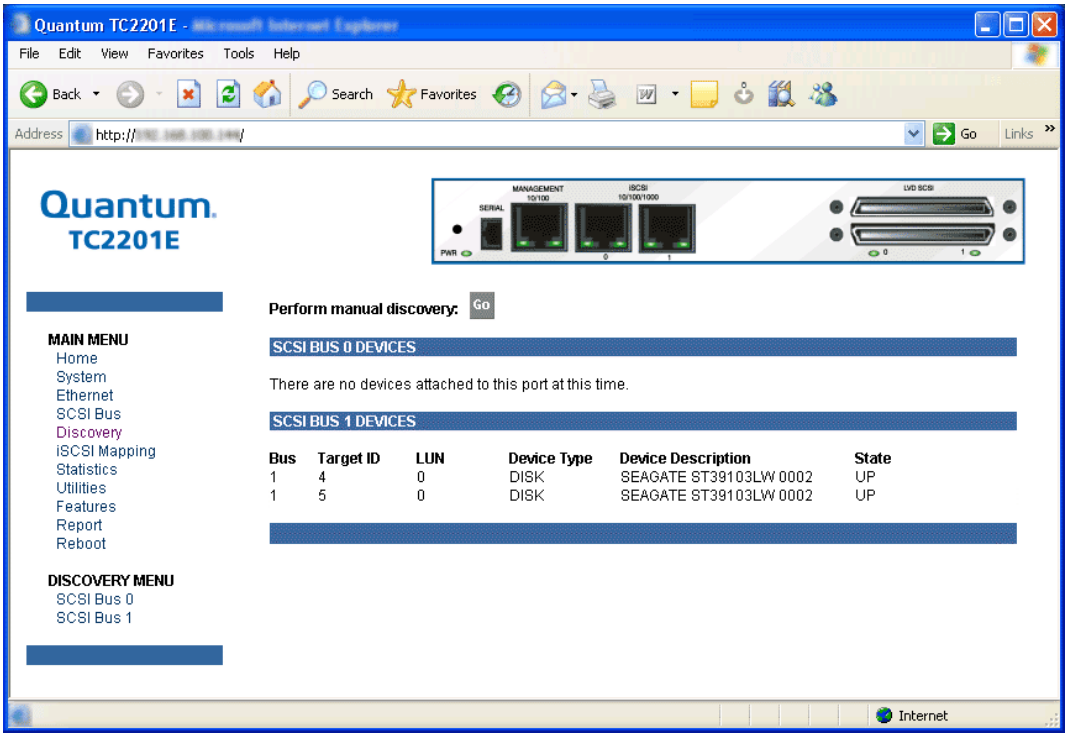
> **Note:** If an application requires confirmation of individual blocks being written to the medium, such as audit trail tapes or log tapes, this option should be disabled.

- **Maximum Writes Outstanding** determines the maximum number of writes that can be buffered. Any additional writes beyond the maximum level allowed will be sent to the storage device without using buffering, but these writes may also be subsequently buffered when completion notices for earlier writes are received.
- **Maximum Bytes Outstanding** determines the maximum number of write bytes (shown in units of kilobytes) that can be buffered. Any additional writes beyond the maximum level allowed will be sent to the storage device without using buffering, but these writes may also be subsequently buffered when completion notices for earlier writes are received.

Main Menu > Discovery

This page shows currently known target devices and allows manual discovery of new target devices.

Figure 41 Discovery Page



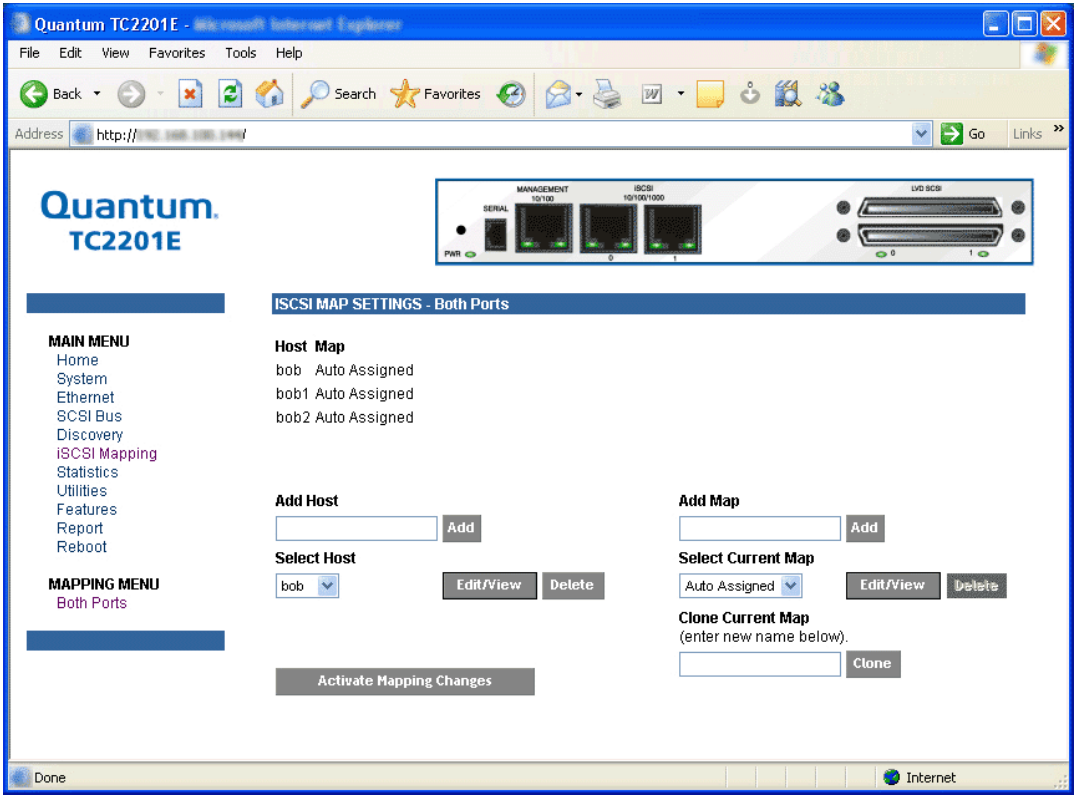
From the Discovery Menu, select the SCSI bus to view/discover devices specific to that bus. The **Go** button activates discovery for all the ports and buses, or for just the selected port or bus. When the discovery process is activated, it is performed according to the settings configured in the iSCSI and SCSI configuration pages.

Caution: Discovery should not be used when SCSI command or I/O operations are in progress.

Main Menu > iSCSI Mapping

This page shows all available iSCSI hosts with maps that have been assigned to the current port. Maps and hosts may be added, edited, or deleted. To choose a different port, select from the list of ports shown in the menu under the heading Mapping Menu by left-clicking on the desired port.

Figure 42 iSCSI Mapping Page



After the iSCSI port has been selected, mapping information for that port is displayed including the name of the port, the currently selected host and map. The following options are also available:

- Add a new host or map by selecting the respective **Add** button.
- Select an existing host or map from the pull-down lists for **Select Host** and **Select Map**.

- Delete the currently selected host or map by selecting the respective **Delete** button.
- View or Edit the currently selected host or map by selecting the respective **Edit/View** button.
- Clone (via the **Clone Map** button) the currently selected map and set up the name of the new cloned map. This option makes it easier to setup new maps with similar information to previously created maps. Auto Assigned maps cannot be cloned.
- Select the **Activate Mapping Changes** button to dynamically update the current map without rebooting the TC2201E. These changes are made effective immediately after being submitted.

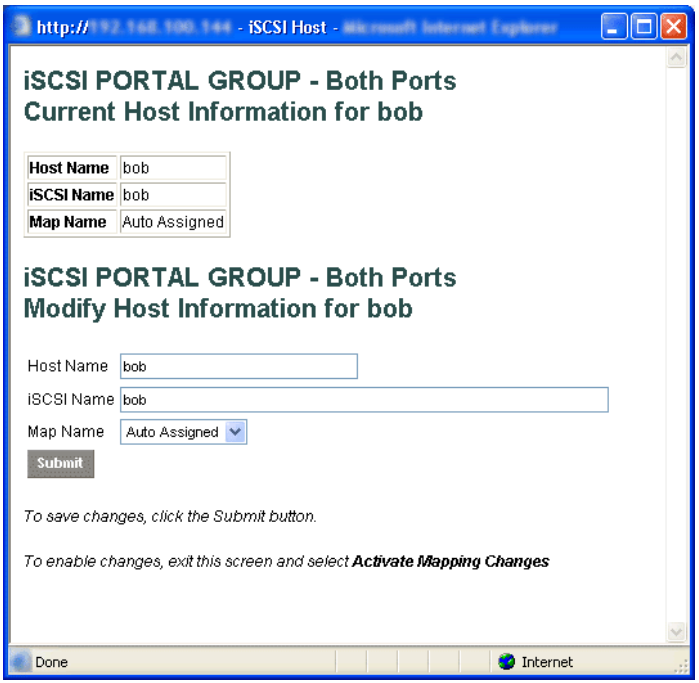
Caution: Before activating any port mapping changes, it is strongly recommended that the user verify there are not any command or data operations occurring in conjunction with devices affected by the mapping changes. For example, deleting a LUN or device from a map may disrupt I/O transfers with that device. It is the user's responsibility to ensure that no operations will be negatively impacted due to the activation of mapping changes.

Note: All current Mapping Settings will take effect immediately! If another management interface has made unsaved mapping changes, those changes will be lost.

Note: If the **Activate Mapping Changes** button is not selected, the mapping changes will not take effect unless the TC2201E is rebooted.

The following shows the select host page when the Select Host **Edit/View** button is selected.

Figure 43 Select Host Page



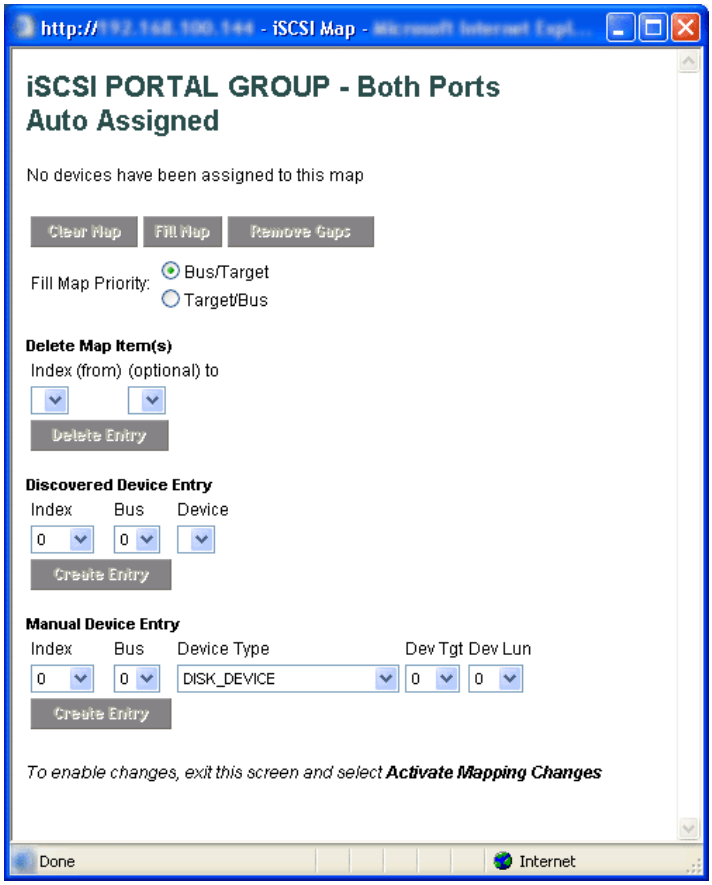
The current host information is shown at the top of the page. This information can be changed in the Modify iSCSI Host section.

- New or updated information can be typed into the field boxes for Host Name, iSCSI Name, and Map Name.
- The Map Name can be selected from the drop-down list.
- To make the changes permanent, select the **Submit** button.

Note: Host settings are saved to memory when the **Submit** button is selected but are not activated until either the **Activate Mapping Changes** button is selected or the TC2201E is rebooted.

The following shows the select current map page when the Select Current Map **Edit/View** button is selected.

Figure 44 Select Current Map Page



- To completely clear the current map of all entries, select the **Clear Map** button.
- To fill the map, select the fill option from the pull-down list and then select the **Fill Map** button. When the map is filled, the menu shows the current mappings.

- To remove all gaps, or unfilled entries, from this map, select the **Remove Gaps** button. When removing gaps from the table, this option also renumbers all Indexes in sequential order starting with Index 0.

> **Note:** Some operating systems require gaps be removed in the mapping table in order to detect all devices.

- To delete a specific map entry, select an Index from the pull-down list under Delete Map Item. To delete multiple Indexes, also select the end of the range from the optional pull-down list. Either way, select the **Delete Entry** button to remove the item(s) from the map.
- To create a specific map item, the Index, Bus, and Device can be selected from the pull-down lists for either Discovered Device Entry or Manual Device Entry. Discovered Device Entry is limited to devices already discovered. Manual Device Entry allows you to manually set up a device type at a specific Device Target and Device LUN. To make the changes permanent, select the **Create Entry** button.

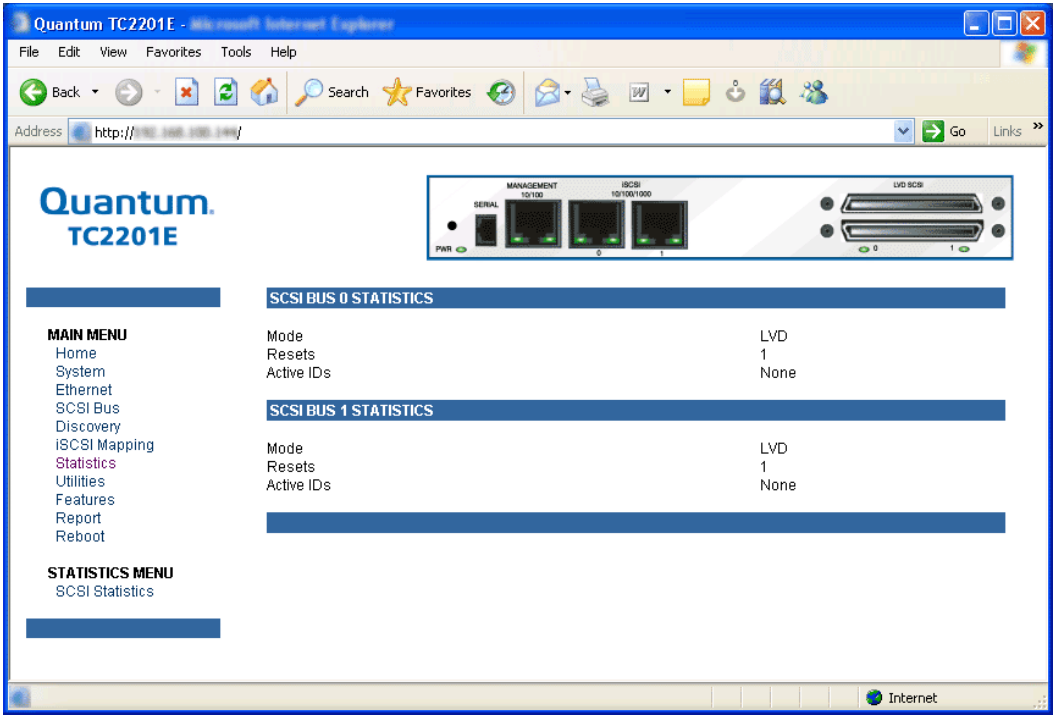
> **Note:** Maps named 'Auto Assigned' may not be modified, cleared, filled, or have entries removed.

> **Note:** Map settings are saved to memory when any of the buttons within the page are selected but are not activated until either the **Activate Mapping Changes** button is selected or the TC2201E is rebooted.

Main Menu > **Statistics**

This page shows SCSI bus statistics.

Figure 45 Statistics Page

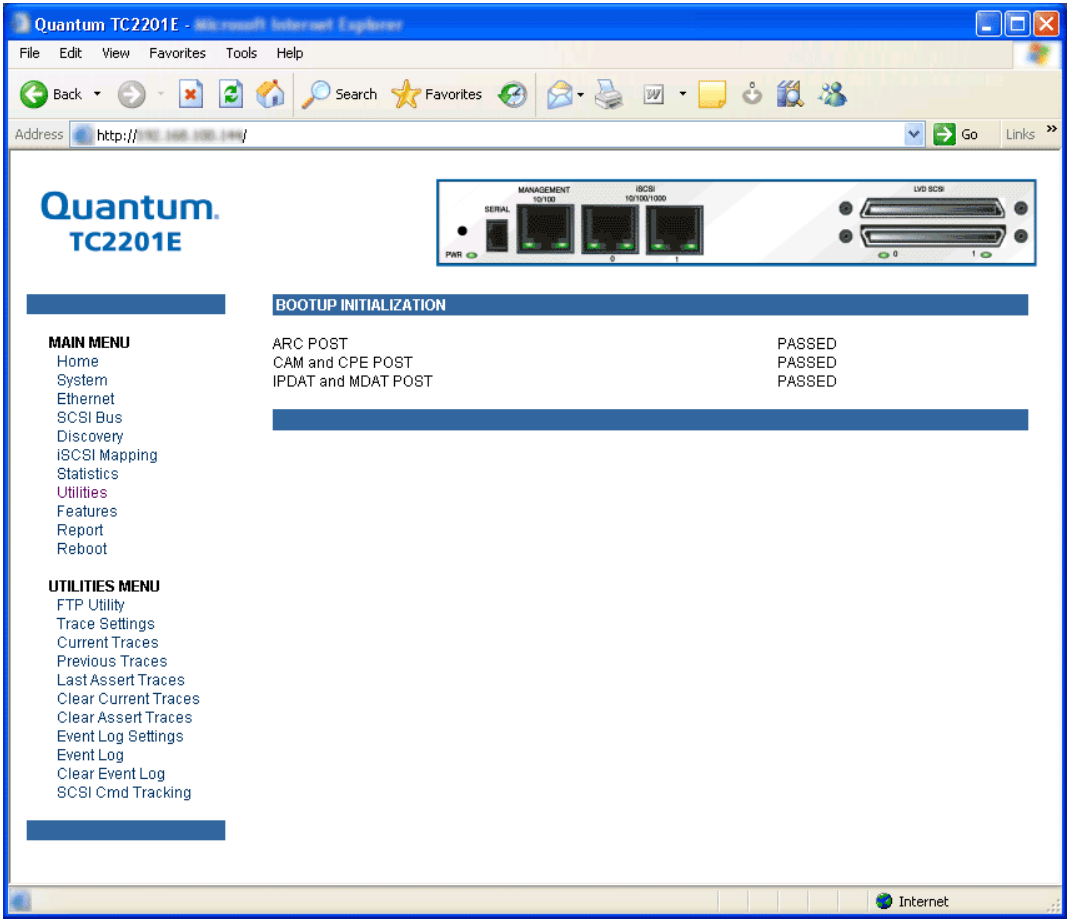


Select SCSI Statistics from the Statistics Menu on the left and then select the **Go** button to clear all current statistics for the selected buses and continue logging any new statistics.

Main Menu > **Utilities**

This page allows access to the FTP utility and the settings and information for the event log and various trace options. Select from the list of menu options shown under the heading Utilities by left-clicking on the desired selection.

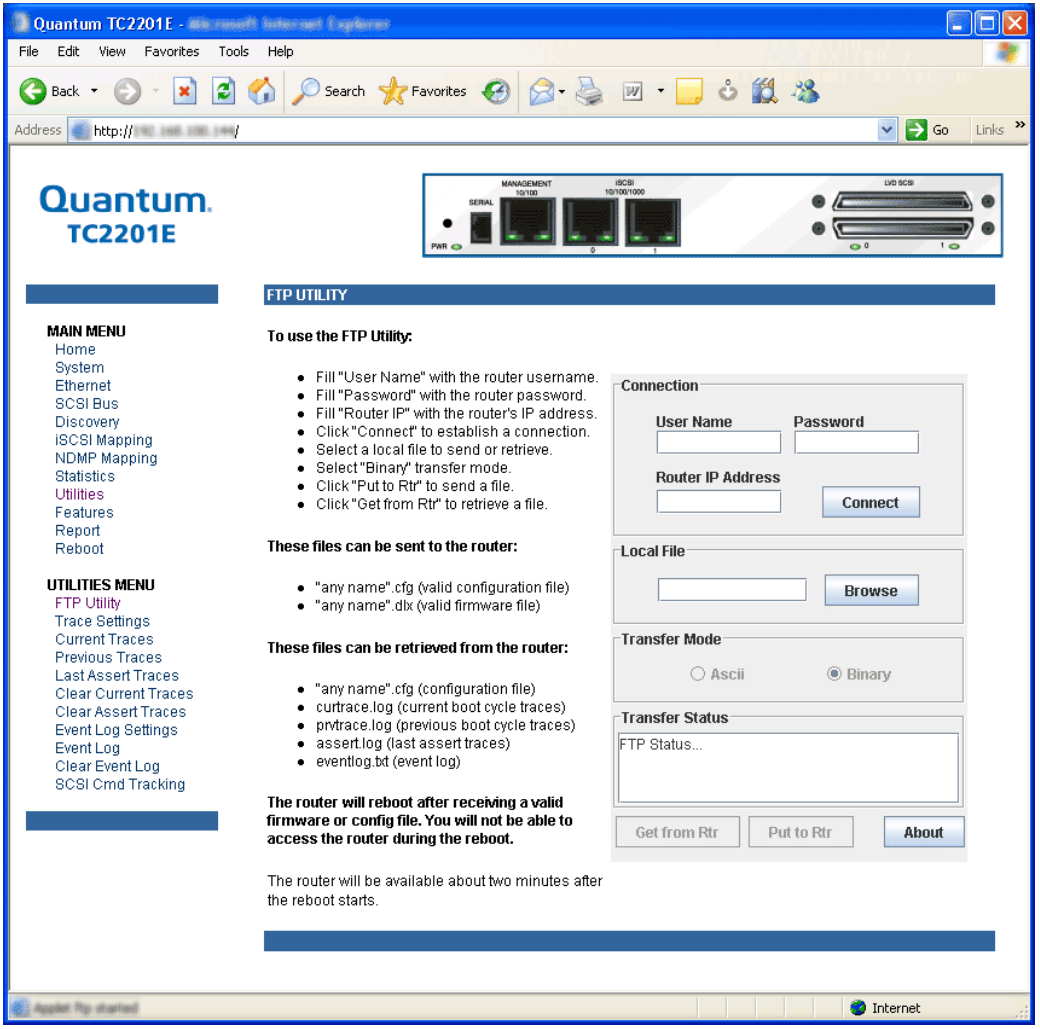
Figure 46 Utilities page



Main Menu > **Utilities** > **FTP Utility**

This page provides access to an FTP Utility.

Figure 47 FTP utility page



Note: Internet access is required to verify the signature for the FTP applet and to download the JAVA applet plug-in for your browser.

The FTP Utility requires the use of a JAVA applet and will prompt for permission to install the applet, if needed. If you receive this prompt,

follow the on screen instructions to complete installation of the applet. The FTP Utility then prompts for permission to run the applet.

To proceed, select the **Grant this session** button so the FTP Utility becomes available for use.

To use the FTP Utility, do the following:

1. 1. Fill in the User Name, Password, and IP Address of the TC2201E.
2. 2. Select the **Connect** button to establish an FTP session with the TC2201E.
3. 3. Select a local file to upload or download. The following file types are supported.

For uploads, or files sent to the TC2201E, you can select from .cfg (configuration files) and .dlx (firmware files) formats.

For Downloads, or files retrieved from the TC2201E, you can select from .cfg (configuration files) as well as from either curtrace.txt (system traces for current boot cycle) or prvtrace.txt (system traces from previous boot cycle).

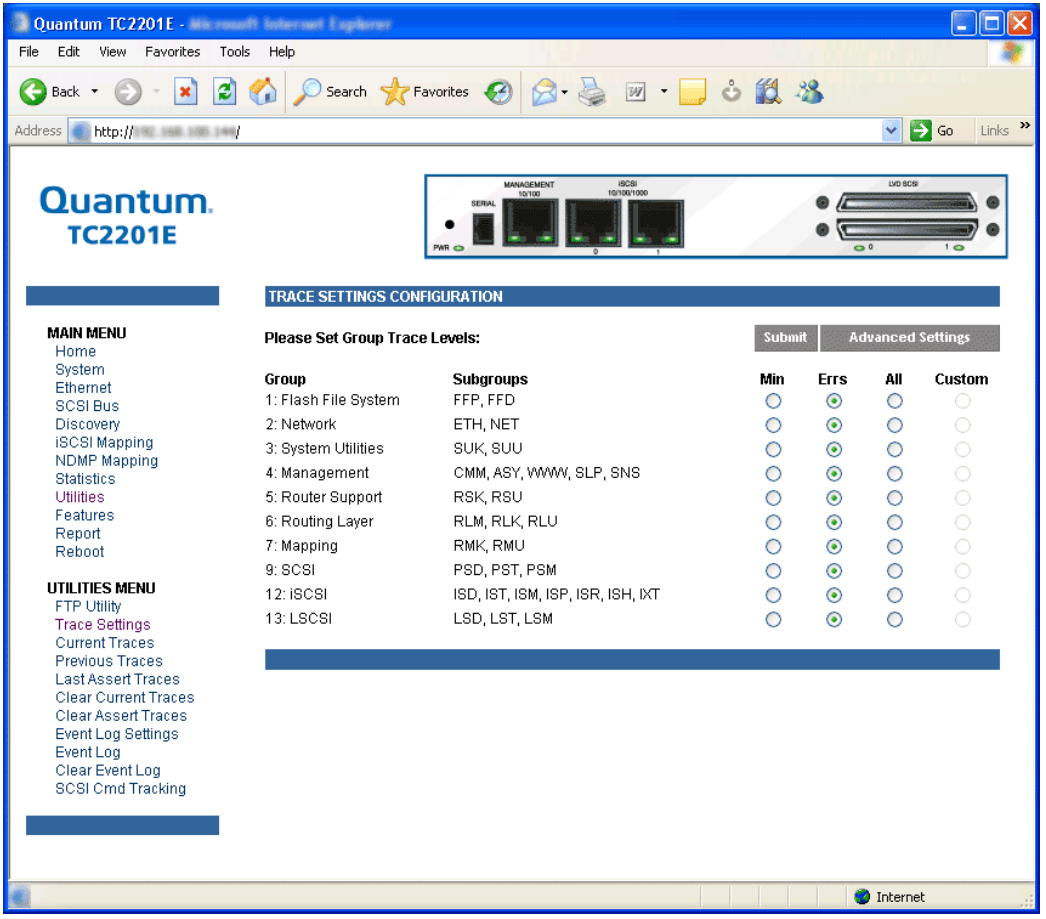
4. Select binary transfer mode for the TC2201E.
5. 5. Select the **Put to Rtr** button to upload a file to the TC2201E or the **Get From Rtr** button to download a file from the TC2201E.

If a valid firmware or configuration file is sent to the TC2201E, an automatic reboot will occur once the file has been received by the TC2201E. The user will not be able to access the TC2201E from the Visual Manager web interface during the time that the reboot is in process, usually a period of about 2 minutes.

Main Menu > **Utilities** > **Trace Settings**

This page allows the configuration of trace settings.

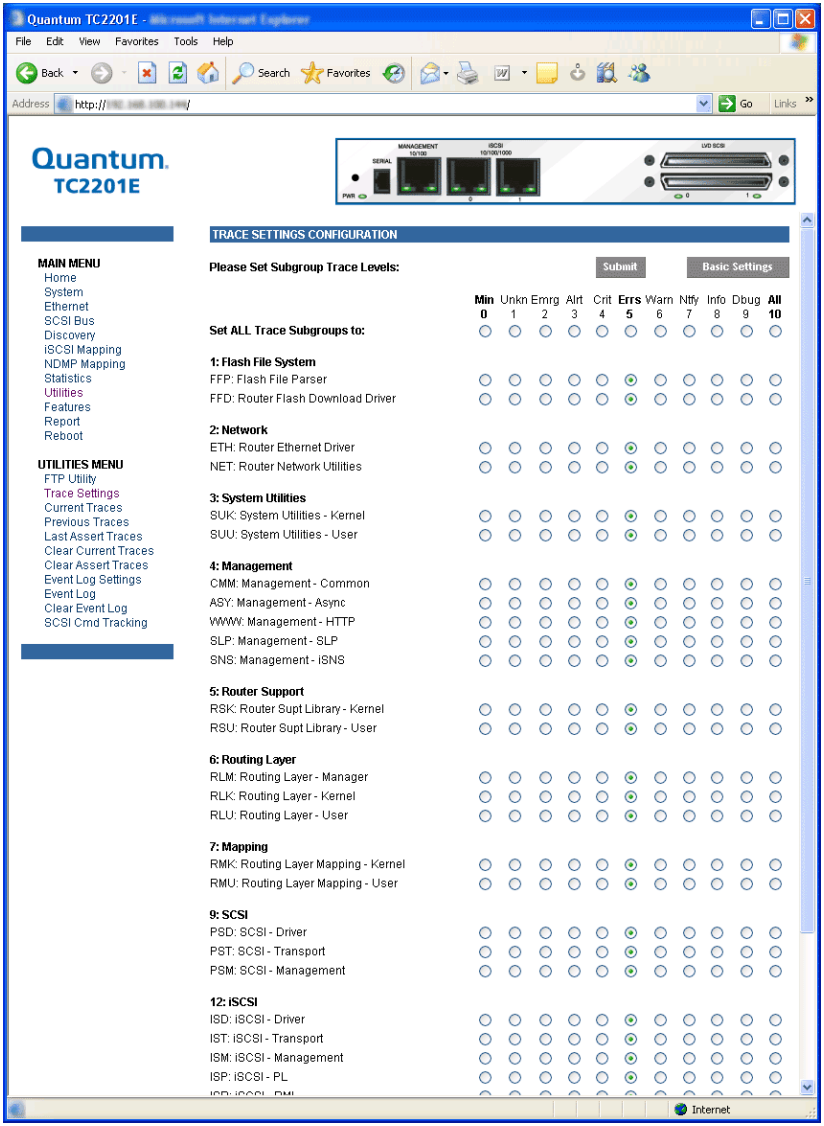
Figure 48 Trace settings page



Select the **Submit** button to submit changes for the Basic Trace Settings Page, for trace logging of the TC2201E.

Select the **Advanced Button** to open the Advanced Trace Settings Page, which appears similar to the Basic Trace Settings Page but offers an expanded view with more trace options.

Figure 49 Advanced trace settings page



For both the Basic and Advanced pages, the default setting for each trace setting is Min (track non-error conditions) but any or all settings can be changed to Errs (track error conditions) or All (track both error and non-

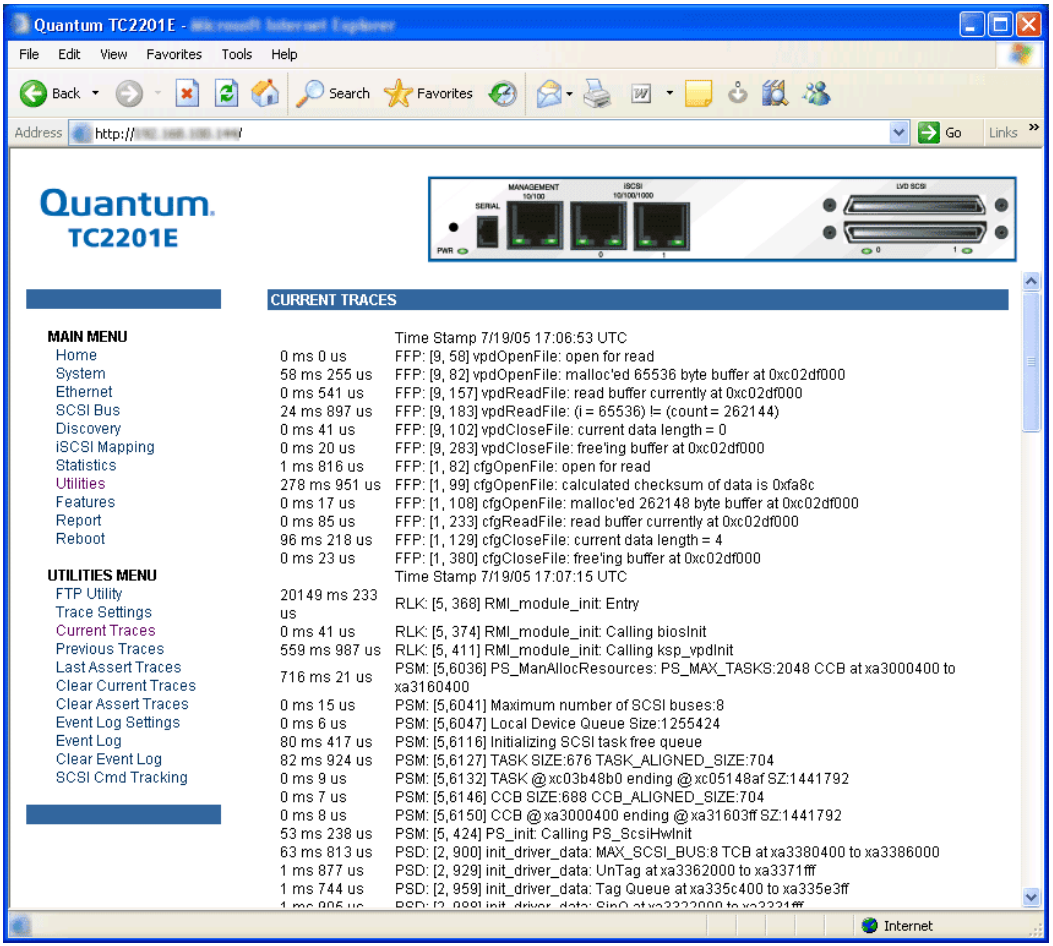
error conditions) or to advanced trace level settings located between these.

> **Note:** These settings are normally used for diagnostic purposes as directed by an authorized Quantum service technician. Using these settings during normal operations can result in performance degradation of the TC2201E.

Main Menu > **Utilities** > **Current TracesPrevious TracesLast Assert Traces**

The Current Traces, Previous Traces, and Last Assert Traces menu options show the indicated trace information. Current Traces shows data since the TC2201E was last booted. Previous Traces shows data from the last boot cycle. Last Assert Traces shows data from the last assertion.

Figure 50 Current TracesPage

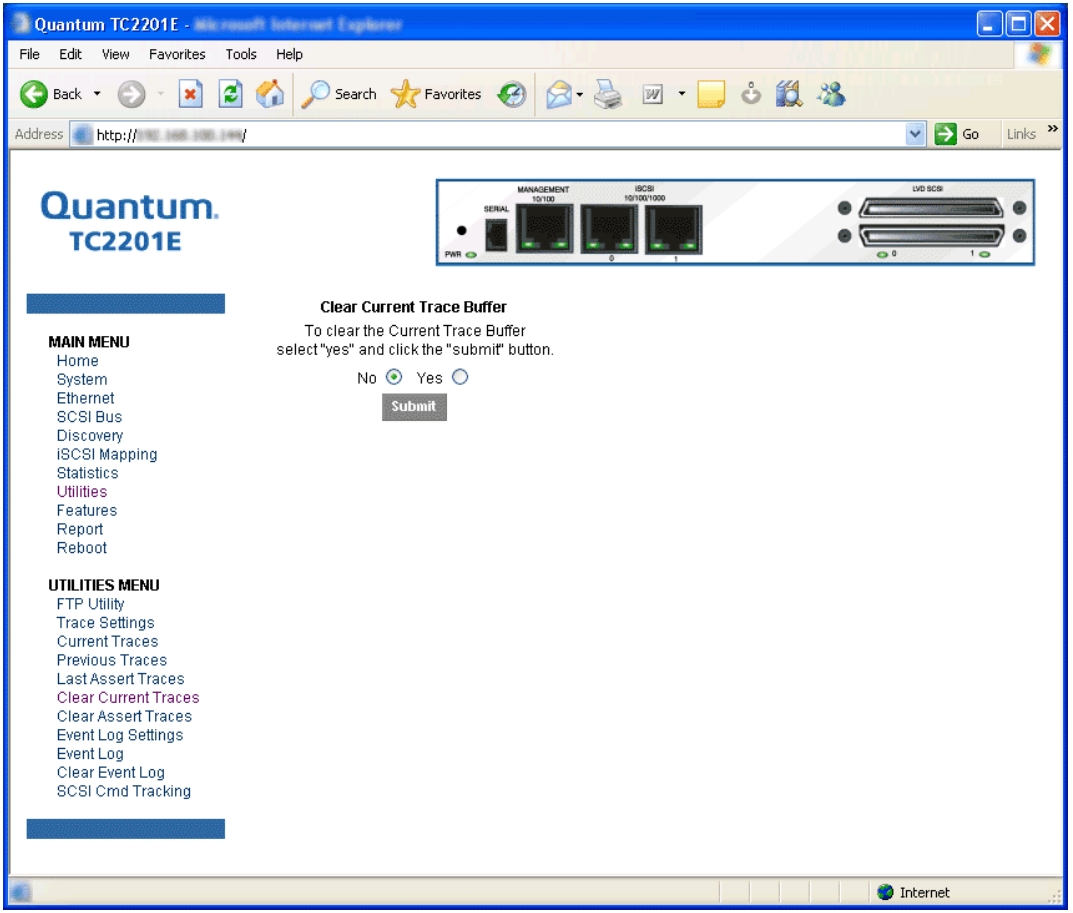


Trace buffers can be cleared by selecting either the **Clear Current Traces** option or the **Clear Assert Traces** option.

Main Menu > **Utilities** > **Clear Current Traces**

This page allows the current trace buffer to be cleared.

Figure 51 Clear Current Trace Buffer Page

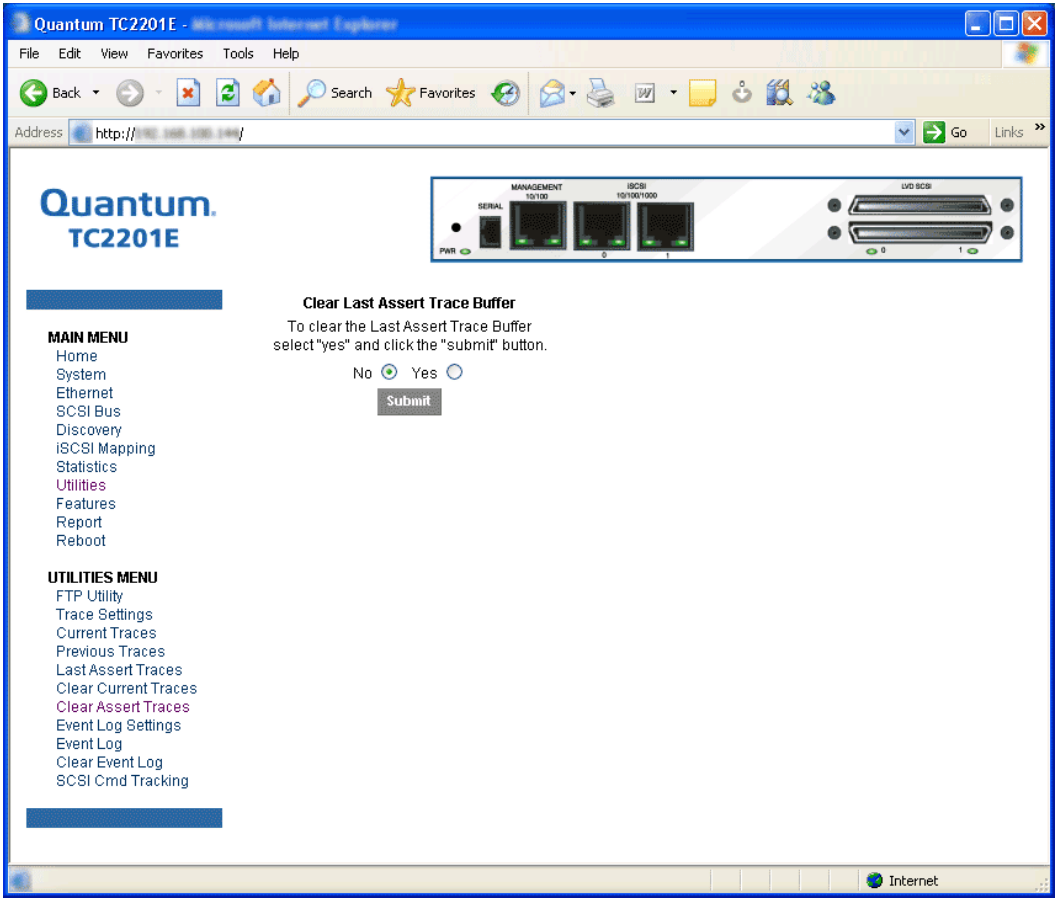


When this option is selected, a confirmation message will appear to verify the selection. If a response of Yes is given to the confirmation message, the unit will clear the current trace buffer. Current TC2201E activities will *not* be disrupted by this operation. Select the **Submit** button to finalize your choice.

Main Menu > Utilities > Clear Assert Traces

This page allows the assert trace buffer to be cleared.

Figure 52 Clear Assertion Trace Buffer Page

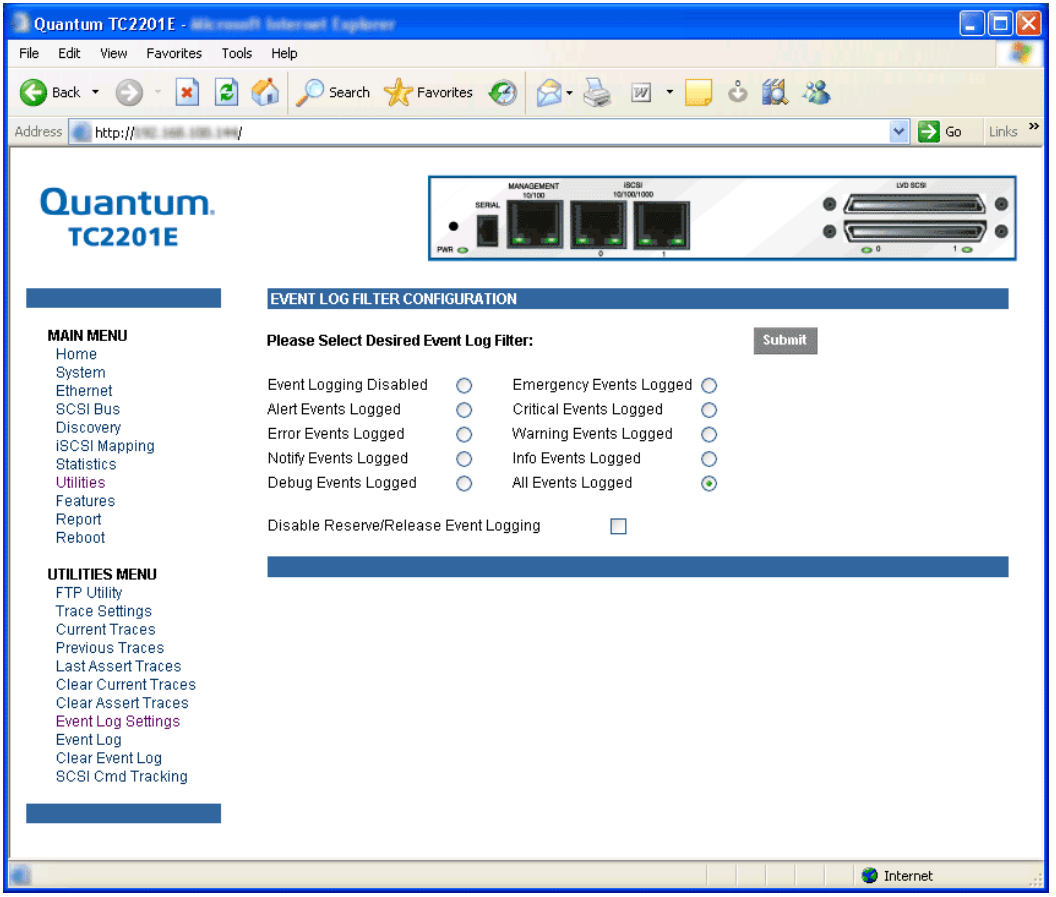


When this option is selected, a confirmation message will appear to verify the selection. If a response of Yes is given to the confirmation message, the unit will clear the assert trace buffer. Current TC2201E activities will *not* be disrupted by this operation. Select the **Submit** button to finalize your choice.

Main Menu > **Utilities** > **Event Log Settings**

This page allows set up of Event Log Settings.

Figure 53 Event Log Settings Page



To make any changes, modify the entries as described below and then select the **Submit** button.

Select from the Event Log settings shown. Each option enables/disables its respective filtering option. Event logging captures over 2000 events

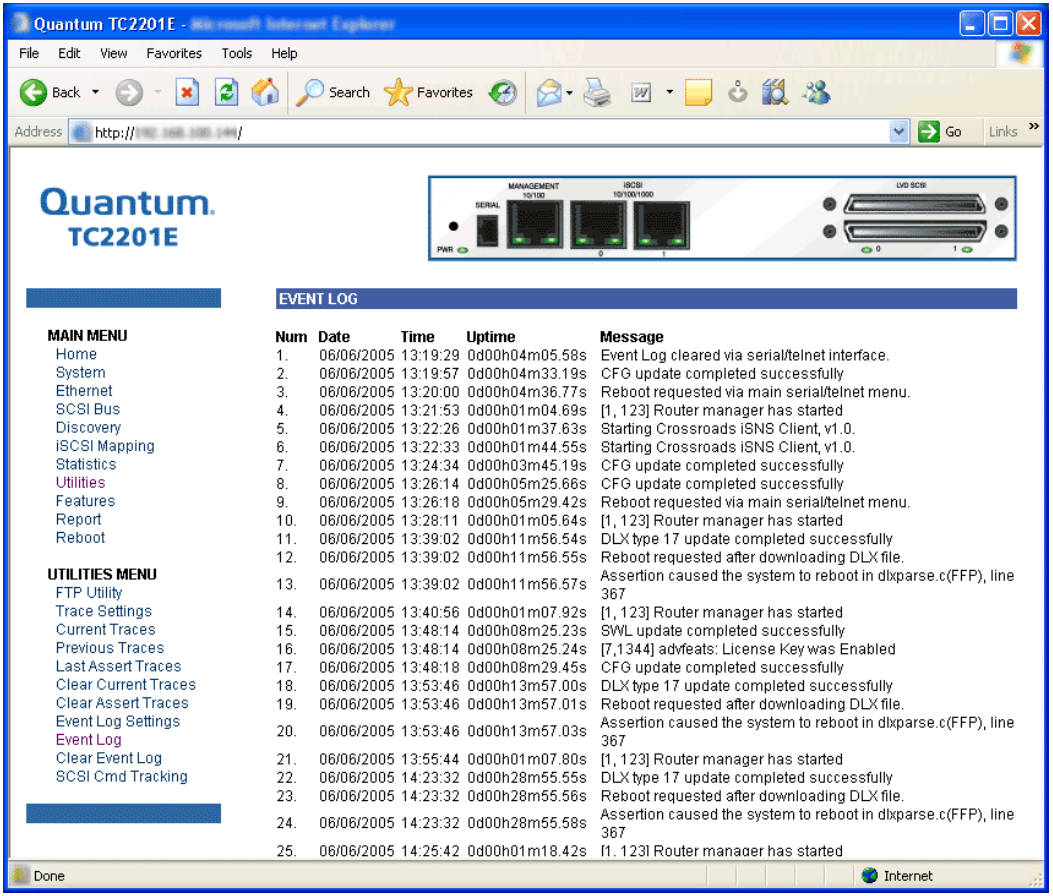
and then starts overwriting the log when full. The default setting is All Events Logged.

Note: So that event logging is accurate, be sure to correctly set the clock and date in the Real Time Clock Configuration menu.

Main Menu > **Utilities** > **Event Log**

This page displays the Event Log.

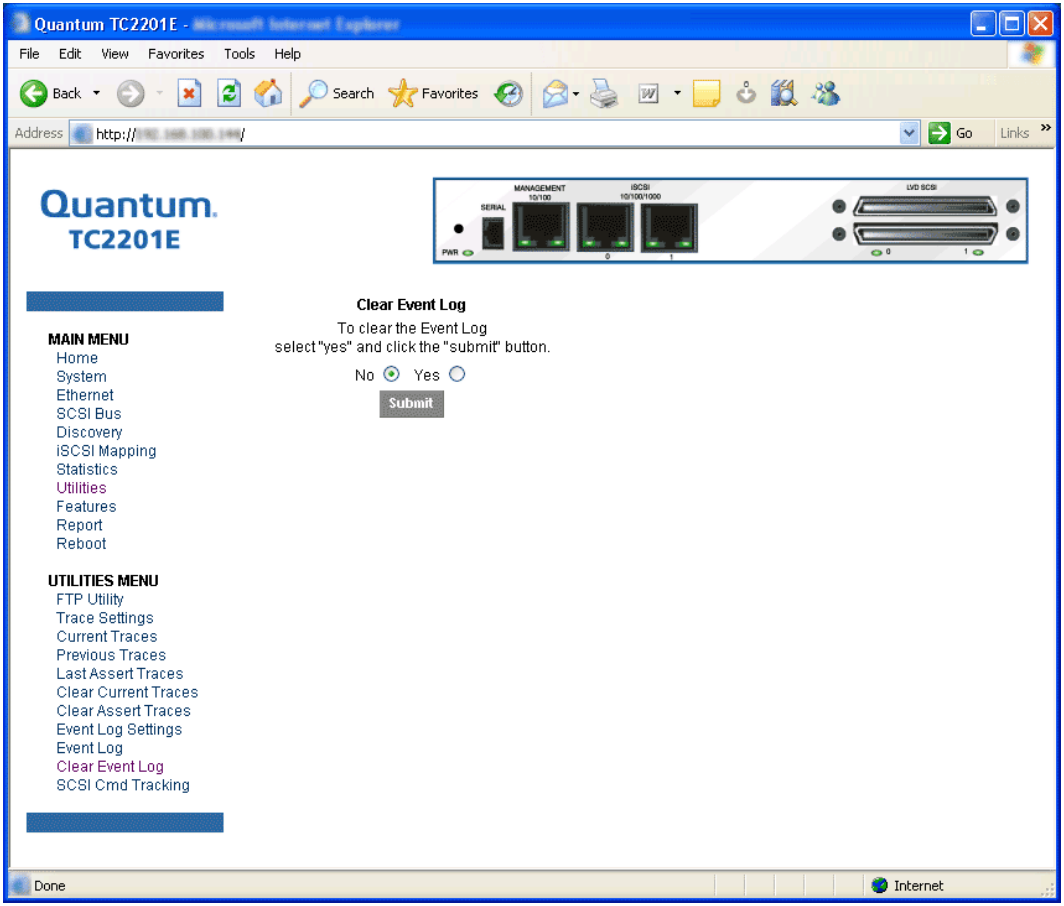
Figure 54 Display Event Log Page



Main Menu > **Utilities** > **Clear Event Log**

This page allows the event log to be cleared.

Figure 55 Clear Event Log Page



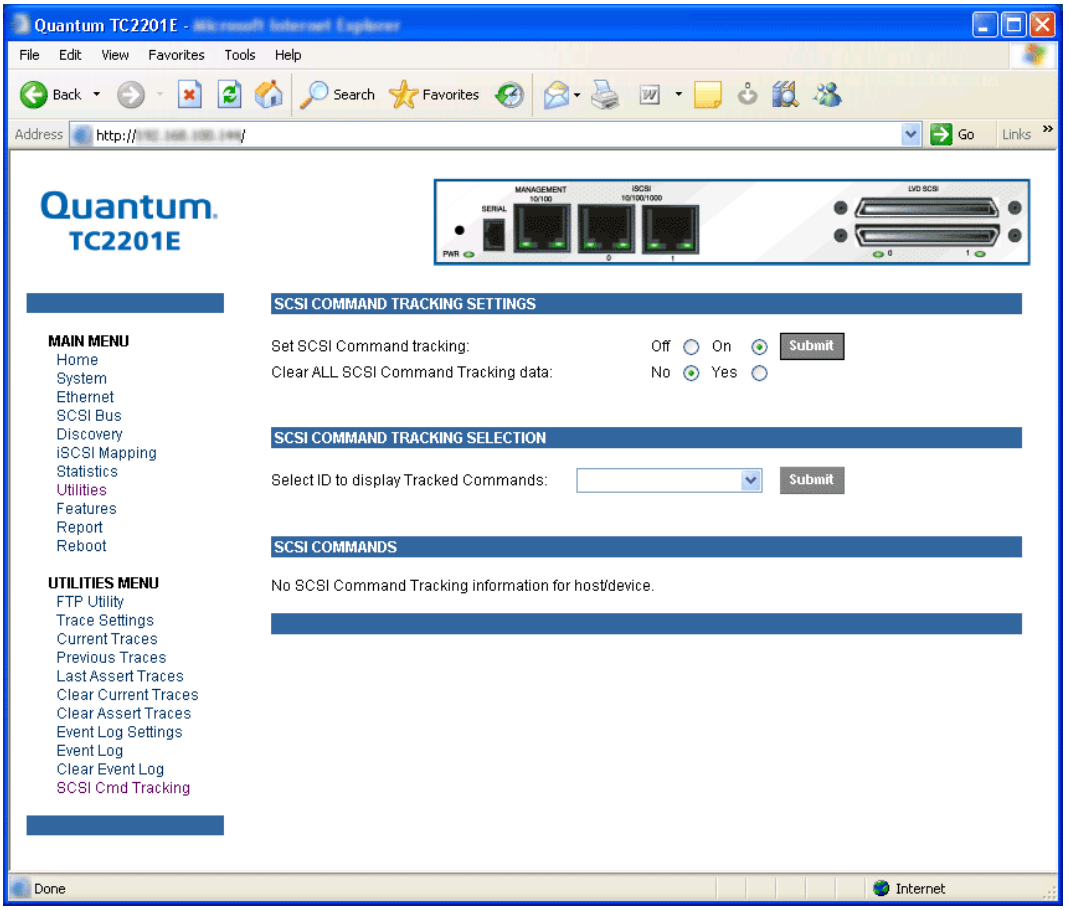
When this option is selected, a confirmation message will appear to verify the selection. If a response of Yes is given to the confirmation message, the unit will clear the event log. Current TC2201E activities will *not* be disrupted by this operation. Select the **Submit** button to finalize your choice.

Main Menu > Utilities > SCSI CommandTracking

This page provides options for setting up and logging SCSI commands that are received or transmitted by the TC2201E. Results are displayed in the Host/Device ID Table.

While the TC2201E's current, previous, and last assert trace data does provide a complete summary of events in a chronological fashion, SCSI Command Tracking adds the ability to filter the trace data to show only the information related to the processing of specific SCSI commands.

Figure 56 SCSI Command Tracking



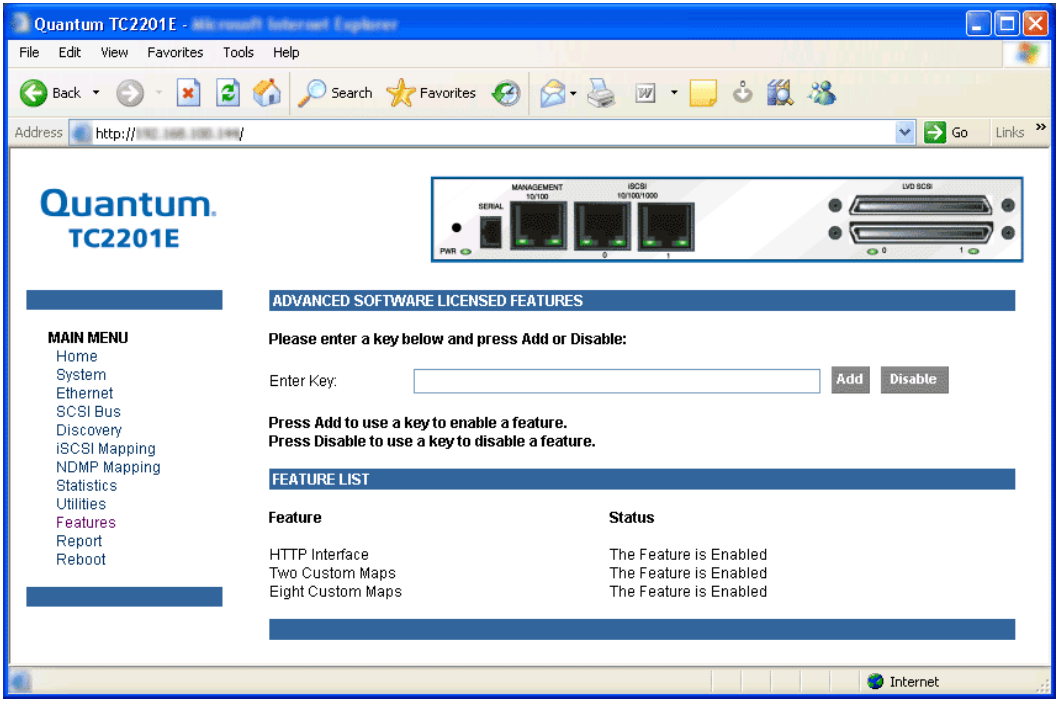
- SCSI Command Tracking can be toggled to ON or OFF. When toggled ON and Submitted, all SCSI commands received or transmitted to or from the TC2201E are then logged in the SCSI Commands section shown on this screen. When set to OFF (and Submitted), no SCSI commands are logged.
- Previous entries for SCSI Command Tracking can also be cleared. Toggling the clear option to the ON position and selecting the Submit button will clear all previous entries.

The settings for the Host/Device ID Table are used to filter the trace data such that a sub-set of the total logged information is displayed under the SCSI Commands section. Logged data can be defined according to the Protocol (FC, Other, or ALL), Type (Device, Host, or ALL), and Value (ID or ALL). For the ID, this can be a specific FC LUN or Switch ID (S_ID) or some other specific value. Selecting the Submit button activates the settings for Protocol, Type, and Value.

Main Menu > **Features**

The features page is where advanced software licensed features can be enabled.

Figure 57 Features Page



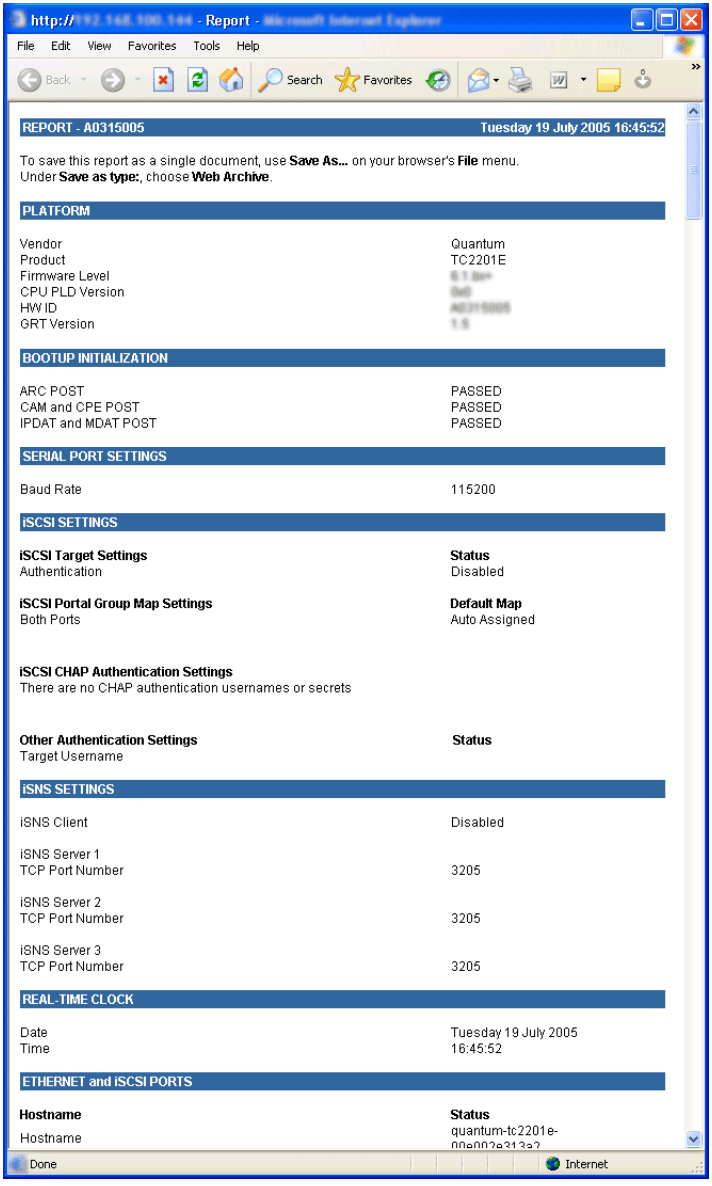
To enable an advanced software licensed feature, enter a key number in the field and select the **Add** button. To remove an advanced software licensed feature, enter the key number and select the **Disable** button.

Currently, advanced software licensed features include features which are licensed by default (HTTP Interface, Two Custom Maps, and Eight Custom Maps).

Main Menu > Report

The report page presents a consolidated view of all system information.

Figure 58 Report page



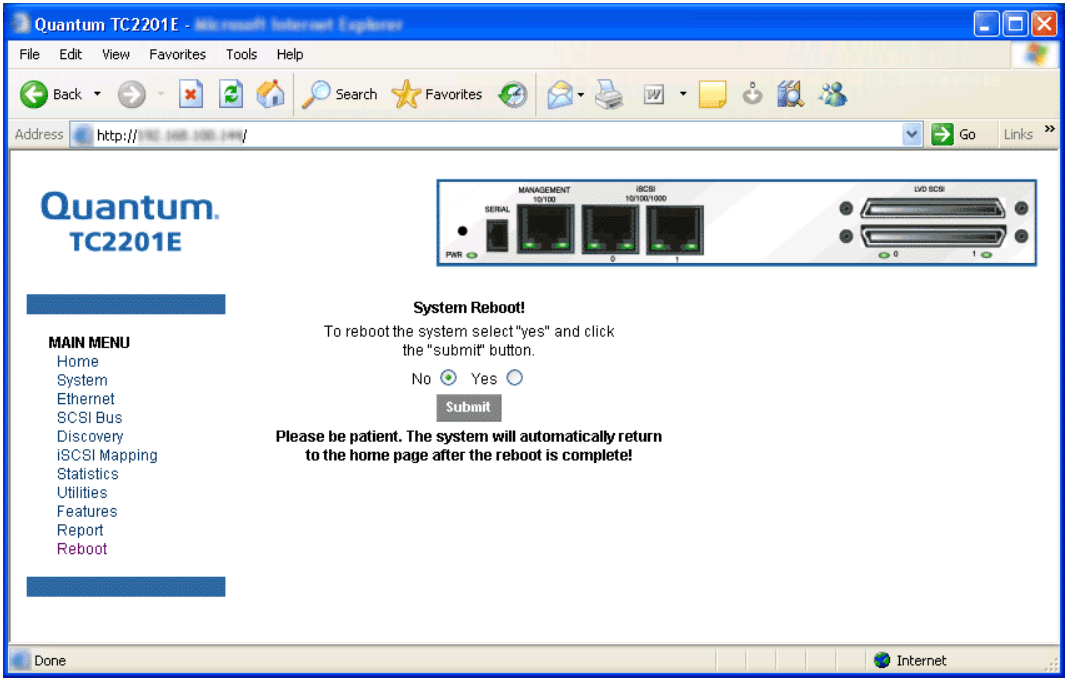
From your web browser, it is also possible to save a copy of the Report Page. It is recommended to save the page as a **.txt* file. Refer to the user documentation for your specific web browser for details.

> **Note:** It may be necessary to disable popup blocking from your browser in order to view the Report Page.

Main Menu > Reboot

When this option is selected, a confirmation message will appear to verify the selection. If a response of **Yes** is given to the confirmation message, current TC2201E activities will be disrupted while the unit restarts itself. The last submitted configuration changes will also take effect after the TC2201E powers on again. Select the **Submit** button to finalize your choice.

Figure 59 Reboot Page



Chapter 4

Troubleshooting

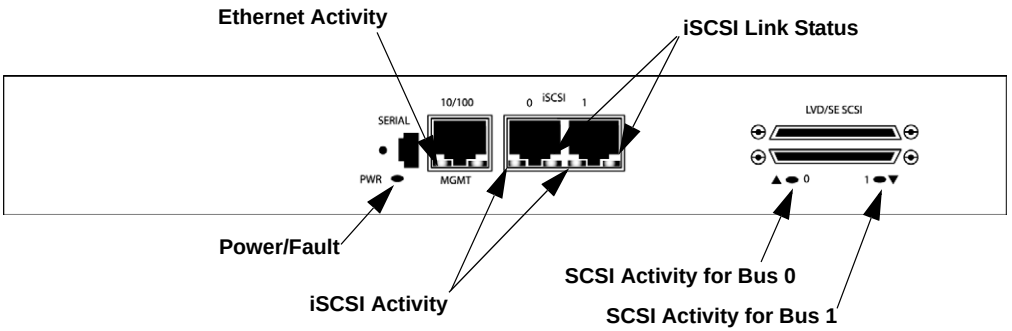
Various problems can arise when configuring and using the TC2201E. This section is provided to help guide the user through some of the basic methods of identifying faults in the setup and configuration of the unit.

Most problems are found in the initial installation. In general, it is wise to check all connections and review the configuration before proceeding with further trouble analysis. Simplify the installation if possible, reducing it to the most basic configuration then adding elements one at a time and verifying the operation at each step.

Indicators

The TC2201E is equipped with rear panel LED indicators for monitoring overall unit status.

Figure 60 TC2201E LEDs



The LED functionality of the TC2201E is detailed below:

- *Power and Fault (Pwr)*—This indicator is a bi-color LED. When green, this indicator shows that power is currently active. Lack of power indication suggests that the unit is turned off, a problem with the power supplied to the unit, or an internal problem with the unit. When this indicator is amber, this indicator shows that the TC2201E detects a fault condition. Faults can occur as a result of Power On Self Test (POST) failure or operational failures. It is normal for this indicator to flash on when the unit is powered up or reset. If the fault indicator stays lit, contact your product support representative.
- *iSCSI (Lnk/Act)*—When lit green, the upper indicator signifies a good iSCSI link on the port. When lit green, the lower indicator signifies iSCSI port activity. If the Link indicator fails to light at all, or if the Activity indicator stays continually lit without corresponding SCSI bus activity, there may be a problem with the iSCSI configuration. Verify the iSCSI configuration.
- *SCSI Bus (0, 1)*—When lit, these green indicators signify SCSI activity on the bus corresponding to the number of the indicator. Activity should be indicated only occur briefly during power up or configuration, and relatively often when the unit is transferring data. If an Activity indicator stays continually lit without corresponding target device activity, there may be a problem with the SCSI bus configuration. Verify the SCSI bus configuration.
- *Ethernet (10/100)*—When lit, these green indicators signify Ethernet link status and activity. If either of these indicators fail to flicker, or stay continuously lit, there may be a problem with the network

connection or configuration. Verify the network connection and configuration. The port must be connected to a 10/100BaseT Ethernet network to function properly.

Basic Verification

Serial Port Problems

If you experience trouble communicating with the serial port, verify the configuration of the host terminal or terminal emulation program. The TC2201E requires the baud rate to be set correctly,
8 data bits, 1 stop bit, and no parity. Flow control should be set to none or XON/XOFF, and may cause problems if set to 'hardware'. Some terminal programs may not support baud rates higher than 19200, so a lower baud rate may be required. If problems persist, you may want to check the cabling or try a different host. Be sure the Scroll Lock key on the keyboard of the host computer is not enabled. If a valid Ethernet IP address is configured, serial configuration settings can also be set via telnet.

Verify SCSI Bus Configuration

Problems with SCSI bus configuration are common. Basic operation of a SCSI bus can be checked by using the configuration menu to view attached SCSI devices. See "Chapter 7 for more information. Other conditions to look for include:

- Termination—Problems with termination can cause intermittent or hard failure. A SCSI bus must be terminated on both ends, and only both ends. Termination issues when both narrow and wide devices are on the same bus are common. Check to make sure that there are no loose terminators. All terminators should be firmly attached.
- Bus Type—The SE and LVD devices can be connected to the same SCSI bus, however on power up, if at least one SE device is detected, the LVD devices must convert to SE mode, and SE mode will be used. Only the LVD interface is being specified for the Fast/40 and higher rates.
- Device ID—Each device on a SCSI bus must have a unique ID. Also check the configured ID's for the TC2201E to verify these are not in use by other devices on the same SCSI bus.

- Cabling—Check SCSI cables to verify they are functional. SCSI rules for total length, distance between devices, and stub length must be adhered to. Connections should also be checked and reseated if necessary.
- SCSI Devices—Verify that the SCSI devices on a particular SCSI Bus can be seen in the by the TC2201E. Check the Discovery page to verify visibility of devices. If the TC2201E can not see the devices, verify SCSI configuration, cabling, and termination.

Even if the SCSI devices are displayed, they are not accessible unless the mapping mode is auto-assigned or another non-empty map is used.

Verify iSCSI Connection

If SCSI devices are recognized on the SCSI buses, but do not appear to the iSCSI host, it may be that the iSCSI link is not properly established. Most switches have link indicators, showing link status. When the TC2201E is connected and powered-on, this link
indicator should show a good link. If it does not, check the cabling or connections. As a means of verifying link integrity when connected to a functional host, disconnecting then reconnecting the Ethernet cable should cause momentary activity of this indicator as the link itself re initializes. Also verify that the media type of the TC2201E and attached switch are of corresponding types.

Verify SCSI Devices in Windows NT

Open the NT Control Panel, select “SCSI Adapters,” and double click on the iSCSI HBA. The SCSI devices should be listed.

If no devices are listed, verify the TC2201E configuration, iSCSI HBA configuration, and cabling.

If devices are listed, verify iSCSI HBA mapping mode and device addresses on the TC2201E.

Verify Configuration

A number of configuration changes may result in an invalid configuration. If you are in doubt about the configuration, restore the TC2201E to the factory default configuration and proceed to configure the unit a step at a time, verifying the functionality of the configuration as changes are made.

Verify Mapping

Verify that all desired devices have been discovered and mapped. If using Indexed mapping, try swapping to Auto-assigned to see if this solves the problem.

Verify Devices

It may be useful to connect the SCSI target devices you are attempting to use to the native SCSI interface to verify that the devices are functional. SCSI target devices can be connected to a host SCSI bus to verify they are functional.

Verify Host Configuration

In some cases, it may be that the iSCSI host bus adapter or host device driver may not be working properly. Check the configuration of these elements. It may be useful to check the release notes for the driver provided to see if there are any specific issues or required configuration. It may also be useful to ensure that you are using a current version of the host bus adapter driver.

Verify HBA Device DriverInformation

Check the HBA device driver **Readme.txt** file for configuration specifics. HBAs typically come with utility programs to view or change their configurations.

CustomerSupport

If you are unable to resolve an issue, contact your authorized service representative and ask for customer support.

Appendix A

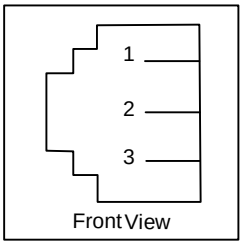
3-Pin to DB-9 Serial Pin Assignments

The pin assignments given for the 3-pin serial connection are in reference to the serial receptacle on the rear panel of the TC2201E. Use an RS-232 null modem cable to connect the TC2201E to the host system.

Table 1 RJ-11 Pin Assignments

Pin No.	Function
Pin 1	Receive Data to TC2201E
Pin 2	Serial common (Ground)
Pin 3	Transmit Data from TC2201E

3-pin modular receptacle pin assignments



In conjunction with the pin assignments provided for the 3-pin receptacle on the rear panel of the TC2201E, following are the corresponding pin out assignments for a DB-9 serial connector used to connect the other end of the serial cable to a terminal, or a computer running terminal emulation software.

The pin assignments given in Figure A-2 for the DB-9 serial connection are in reference to the serial connector at the end of the cable. Use an RS-232 null modem cable to connect the TC2201E to the host system.

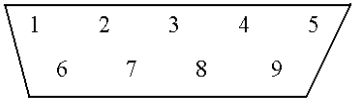
Note: To connect the Interface Controller to a host system, use the RS-232 Serial 3-Pin-to-DB-9 cable included in the shipping container for this product.

Table 2 Corresponding Pin Outs of DB-9 Connector

Pin No.	Function
Pin 1	No Connection
Pin 2	RX data (Receive)
Pin 3	TX data (Transmit)
Pin 4	No Connection

Pin 5	Signal Ground
Pin 6	No Connection
Pin 7	RTS (Request to Send), not used
Pin 8	CTS (Clear to Send), not used
Pin 9	No Connection

DB-9 modular receptacle pin assignments



RJ-45 Ethernet Pin Assignments

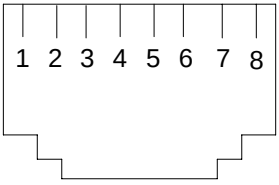
The pin assignments given for the RJ-45 Ethernet connection are in reference to the Ethernet receptacle on the back panel of the TC2201E. The TC2201E Ethernet connection supports the IEEE specifications for 10BASE-T and 100BASE-TX Ethernet standards.

Table 3 RJ- 45 pin Assignments

Pin No.	**Function**
Pin 1	Transmit Out +
Pin 2	Transmit Out -

Pin 3	Receive In +
Pin 4	No Connection
Pin 5	No Connection
Pin 6	Receive In -
Pin 7	No Connection
Pin 8	No Connection

RJ-45 modular receptacle pin assignments



Appendix B

Inband SCSI-3 Commands

The TC2201E supports a set of SCSI-3 commands that can be received inband over iSCSI. When received by the TC2201E, these commands are then executed by the TC2201E itself.

When using SCSI-3 commands to access general management features, the commands can be sent to device LUNs that are mapped through the TC2201E.

The following is a list of the SCSI-3 commands that are supported by the TC2201E. Complete definitions of SCSI-3 commands can be found in the SCSI-3 standard available from the American National Standards Institute (ANSI).

General Commands

- REPORT LUNS
- INQUIRY

General Commands

Following is a description of a general-use SCSI-3 command. For more information about the other general-use commands, please contact your service representative.

Report LUNs Command

The TC2201E supports the Report LUNs command. The Report LUNs command will return a list of Logical Unit Numbers (LUNs) that can receive commands. The format of the report LUNs command is shown in Table B-1.

Table 4 Format of Report LUNs Command

Bit Byte	7	6	5	4	3	2	1	0
0	Operation Code (0xA0)							
1	Reserved							
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							
6	(MSB)							
7	Allocation Length							
8								
9	(LSB)							
10	Reserved							
11	Control Byte							

The TC2201E returns the LUN Parameters as defined in B-2.

Table 5 Report LUNs Parameter List

Bit Byte	7	6	5	4	3	2	1	0
0	(MSB)							
1	LUN list length							
2								
3	(LSB)							
4	Reserved							
5	Reserved							
6	Reserved							
7	Reserved							

LUN list	
0-7	First LUN
	:
0-7	Last LUN

Note: The LUN list length is the number of LUNs times 8.

All LUNs are reported and will appear in the host's map.

Inquiry Command

The format of the Inquiry Command is shown in Table B-3.

Table 6 Format of LUN Inquiry Command

Bit Byte	7	6	5	4	3	2	1	0
0	Operation Code (12h)							
1	Reserved							EVPD
2	Page Code or Operation Code							

3	Reserved
4	Allocation Length
5	Control

The TC2201E returns the LUN Inquiry Data as defined in Table B-5.

EVPD Page 0x80

If the EVPD bit is set and the Page Code is 0x80 the *unit serial number page* is returned. The format of this page is shown in table 7.

Table 7 Format of EVPD Page 0x80

Bit Byte	7	6	5	4	3	2	1	0
0	Device Type (0ch)							
1	Page Code (80h)							
3	Reserved							
4	Page Length							
5 … 20	Serial Number							

The serial number field is a sixteen-byte left justified ASCII string.

Device Identification Page 0x83

If the EVPD bit is set and the Page Code is 0x83 the *device identification page* is returned, as described in SPC-2 section 8.4.4.

Table 8 TC2201E LUN Inquiry Data

Item	Value
Peripheral Qualifier	0x00
Peripheral Device Type	0x0C - Indicates Router/Router function

RMB	0x00
Device Type Qualifier	0x00
ISO Version	0x00
AENC	0x00
TrmIOP	0x00
Response Data Format	0x02 - SCSI-2 Inquiry Data Format
Additional Length	0x20
RelAdr	0x00
Wbus32	0x00
Wbus16	0x00
Sync	0x00
Linked	0x00
CmdQue	0x00
SftRe	0x00
Vendor ID	“CROSSRDS”
Product ID	“TC2201E router”
Revision Level	“XXXXX”

The TC2201E will only reply to a SCSI Inquiry when using 8-byte LUN field of 0x00's.

Note: The Revision Level comes from the last four characters of the build string, which appears in the headings for most menu screens.

Vendor Unique Commands

The TC2201E supports a set of vendor unique commands. Table 9 below provides an overview of these commands. For more information about these vendor unique commands, please contact your service representative.

Table 9 Vendor Unique Commands

Command	Description	Device Type
E7	Initialize Element Status	Tape / Medium Changer
B8	Read Element Status	Tape / Medium Changer / Communications
2E	Write and Verify	Disk / Write Once, Read Multiple / Optical Memory
2F	Verify	Disk / Write Once, Read Multiple / CD-ROM / Optical Memory
A5	Move Medium	Tape /Medium Changer / Sequential Access / CD-ROM

Appendix C

Using the Command Line Interface

This chapter describes specific configuration options available from the Command Line Interface (CLI).

The TC2201E allows the user to access many configuration settings through the CLI. Among these settings are:

- Baud rate of the serial port
- Ethernet IP and MAC addresses
- Device Mapping
- Trace level settings

All of the above settings may be changed and saved.

Note: Unless otherwise indicated, configuration changes take effect when the unit next powers on or reboots.

Power Up Messages

When you press the TC2201E's power switch to the 'ON' position (marked with a 'I' symbol), a series of messages similar to the following appear on the terminal or terminal emulation program for the serial port (See "Chapter 2, , Setting Up Serial Port Communications") or the Telnet utility for Telnet sessions.

A series of power-up self tests are performed while the TC2201E starts (which can take up to 2 minutes), and messages related to these tests will be visible from the serial port. If completed successfully, the main menu will appear, as shown in Figure 7-1.

Note: The illustrations in this chapter use Xs to represent numeric values for certain data fields, such as the product release version and the revision of firmware.

Note: For the serial port, if you do not see messages over the Command Line Interface, you may need to re-check your computer's serial port settings.

The main menu appears as follows:

Table 10 Main menu

```
                    Quantum TC2201E Router
                X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                      07/26/2005  18:37:08

1) Perform Configuration
2) System Utilities
3) Display Trace and Assertion History
4) Reboot
5) Advanced Software Licensed Features
6) Download a New Revision of The Firmware

Command >
```

The main menu allows for various operations to be performed on the TC2201E.

- Select **1** to access TC2201E configuration settings. This option is described later in this chapter.
- Select **2** to access system utilities information and settings. This option is described later in this chapter.
- Select **3** to display trace and assertion history. This option is described later in this chapter.
- Select **4** to reboot the TC2201E. A confirmation message will appear verifying you want to do this. If you enter **N** for No, you are returned to the System Utilities menu. If you enter **Y** for Yes, the TC2201E will restart. This option is further described later in this chapter.
- Select **5** to access the Advanced Software Licensed Features menu. This option is described later in this chapter.
- Select **6** to download a new revision of the firmware. A confirmation message will appear verifying you want to do this. If you enter **N** for No, you are returned to the Main menu. If you enter **Y** for Yes, the TC2201E begins accepting firmware data from the serial port. This option is further described later in this chapter.

Perform Configuration

The Perform Configuration menu allows the administrator to configure the various options on the TC2201E. For most configuration changes to take effect, you must reboot the TC2201E.

Note: Menus are not case sensitive. You can enter uppercase and lowercase characters interchangeably whenever menus indicate letters as choices.

Table 11 Configuration menu

```
                        Configuration Menu
                  X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                        07/26/2005  08:56:22

1) User Settings
2) Baud Rate
3) Ethernet
4) iSCSI
5) Parallel SCSI
6) Parallel SCSI Buffered Tape Write
7) Device Mapping
8) Trace and Event Log Settings
9) Real-Time Clock

A) Save Configuration
B) Restore Last Saved Configuration
C) Reset and Save Configuration to Factory Defaults

X) Return to main menu
```

User Settings Configuration

This menu changes security settings, including the user name and password. User names and passwords should be unique and kept confidential and it is recommended to use a combination of letters and numbers when creating user names and passwords. The default values are “root” for user name and “password” for password.

Table 12 User Settings Configuration Menu

```
                User Settings
       X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
              07/26/2005  08:56:22

Current Username   : root

1) Change Username
2) Change Password
X) Return to previous menu
```

Note: In the event that either or both the user name and password are forgotten, it is possible to reset the user name and password to their default values by resetting the TC2201E to factory defaults. Note that resetting to factory defaults from the serial port will also reset all other configuration settings to factory defaults, as well as erase all current maps. It is recommended to capture a copy of the system report (available from the System Utilities Menu) in order to make reconfiguration easier. If a backup configuration file was previously saved (as described in Chapter 8), this file can also make the reconfiguration process much easier.

Baud Rate Configuration

This menu changes the baud rate used on the serial port. Select 1 through 5 for the appropriate baud rate setting. The default setting for the baud rate is 115200.

Table 13 Baud Rate Configuration Menu

```
          Baud Rate Configuration Menu
       X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
             07/26/2005  08:56:22

1)   9600   2)   19200
3)   38400  4)   57600
5) * 115200

X) Return to previous menu
```

Note: The asterisk (*) symbol indicates the current setting for the baud rate.

Ethernet Configuration

This option allows for setting up the Ethernet network settings for the management port including DHCP configuration, IP address, subnet mask, gateway, Ethernet MAC address, DNS settings, and Ethernet MTU size.

Table 14 Figure 7-5: Ethernet Configuration Menu

```
                    Ethernet Configuration Menu
                  X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                        07/26/2005  08:56:22

Port Type                       : 10-100 Ethernet
IP Address                      : 192.168.100.159 [DHCP Enabled]
Subnet Mask                     : 255.255.255.0
Gateway(s)                      :
MAC Address                     : 00:E0:02:E3:13:94
Ethernet Mode                   : 10/100Mbps (Auto-Neg)
Ethernet MTU Size               : 1500

1) Toggle DHCP Configuration
2) Change IP Address
3) Change Subnet Mask
4) Change Gateway
5) Change Ethernet MAC Address
6) Change DNS Settings
7) Change Ethernet MTU Size

X) Return to previous menu

Command, <enter> for next port >
```

Select the **Enter** key to toggle to the next Ethernet port, such as to configure settings for one of the iSCSI ports.

- Select **1** to toggle the DHCP setting. This setting enables/disables support for Dynamic Configuration Protocol. When enabled, the TC2201E will retrieve a dynamic IP address from a DHCP server located on the Ethernet network that the TC2201E is connected to. Once DHCP is enabled, it is necessary to **save** the current configuration and **reboot** the TC2201E before an IP address will be requested from the DHCP server. Use the following four steps:

1. Select **X** Return to previous menu
2. Select **A** Save Configuration
3. Select **X** Return to previous menu
4. Select **4** Reboot

After the TC2201E finishes rebooting, the Main Menu will appear on the serial port but, for Telnet, a new session will need to be opened to continue configuring the TC2201E. DHCP status can be verified from the Ethernet Configuration Menu where DHCP Configuration is indicated as "Enabled" if DHCP has been successfully activated. Note that the IP address may also appear different than the former non-DHCP IP address.

Note: To use the DHCP feature, a DHCP server must be operational on the Ethernet network used by the TC2201E. If the DHCP feature is used when there is no DHCP server, the standard for DHCP requires that the TC2201E wait three minutes for a response from a DHCP server before timing out.

Your DHCP server may allow you to set up a lease reservation for an IP address by providing the server with the Ethernet MAC address of the TC2201E. This sets the DHCP server to always provide the same IP address to the TC2201E. This setup can be useful for remote management of the TC2201E via Telnet or Visual Manager. Because the method of setting up a lease reservation varies depending on the DHCP server being used, it is recommended you contact your Network Administrator for assistance.

For more information about configuring DHCP, see Appendix D of this manual.

- Select **2** to change the IP address of the TC2201E. The default setting for the Ethernet port is 1.1.1.1. The default setting for iSCSI Port 0 is 169.254.1.1. The default setting for iSCSI Port 1 is 169.254.1.2.
- Select **3** to change the IP subnet mask for the TC2201E. The default for this setting is 255.255.255.0.
- Select **4** to change the gateway for the Ethernet network of the TC2201E.
- Select **5** to change the Ethernet physical address, or MAC address, of the TC2201E. Ethernet physical addresses are always assigned to Ethernet adapters by the manufacturers.

- Select **6** to open the Change DNS Settings Menu. When DHCP is disabled, this menu can be used to assign the DNS server IP address and DNS domain.

Table 15 Change DNS Settings Menu

```
                    Change DNS Settings Menu
                X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                      07/26/2005  08:56:22

DNS Configuration - Port 1

    DNS Server IP Address : XXX.XXX.XXX.XXX
    DNS Domain            : server.company.com

    1) Change DNS Server IP Address
    2) Change DNS Domain

    X) Return to previous menu
```

  - Select **1** to change the DNS Server IP Address. The IP address should be similar in form to XXX.XXX.XXX.XXX where each XXX represents an integer in the range of 1 to 255.
  - Select **2** to change the DNS Domain. The text "server.company.com" shown above is an example of how a DNS Domain name could appear.

- Select **7** to change the Maximum Transmission Unit (MTU) for Ethernet. This setting can be configured for 1500 or 9000 byte frames. The Ethernet Management port is permanently set to 1500 and cannot be changed. The default setting for the iSCSI ports is also 1500 but a value of 9000 can be configured for jumbo frame support for iSCSI frames.

iSCSI Configuration

This menu allows for setting the iSCSI configuration.

Table 16 iSCSI Configuration Menu

```
                    iSCSI Configuration Menu
                 X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                       07/26/2005  08:56:22

    Authentication                      : Enabled
    iSNS Client Option                  : Disabled

1) Toggle Authentication
2) Authentication Setup
3) Toggle iSNS Client
4) Change iSNS Server Settings
5) Portal Group Configuration

Command, <enter> for next iSCSI Port >
```

- Select **1** to toggle authentication between Enabled and Disabled. The default setting is Disabled. When set to Enabled, CHAP authentication for iSCSI is enabled.
- Select **2** to configure CHAP authentication. This menu item appears when menu item 3 above is toggled to Enabled. When this menu item is selected, the names and secrets for CHAP authentication can be configured. These settings must match the same settings on hosts that need to log into the target devices. Host settings can be set in the Microsoft iSCSI Initiator for Windows systems, or from the iSCSI initiator available in Linux or other operating systems.

Table 17 Authentication CHAP Records Configuration Menu

```
            Authentication CHAP Records Configuration Menu
                  X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                        07/26/2005  08:56:22

Target CHAP name               : <none>


1) Display Records
2) Add Record
3) Delete Record
4) Change Record
5) Delete all Records
6) Setup Target CHAP name

X) Return to previous menu
```

- Following are descriptions for each of the settings:
- Select **1** to display the current list of devices setup for CHAP authentication, including all CHAP names and initiator/target secrets.
- Select **2** to add a device to the CHAP authentication list. CHAP names are 1 to 255 characters and secrets are 12 to 16 characters.
- Select **3** to delete a device from the CHAP authentication list.
- Select **4** to change the settings for a device currently using CHAP authentication.
- Select **5** to delete all records for CHAP authentication.
- Select **6** to setup a Target device CHAP name. Target CHAP names are 1-18 characters.

- Select **3** to toggle the iSNS client between Enabled and Disabled. The default setting is Disabled. When enabled, the TC2201E will function as an iSNS client and will initiate transactions with iSNS servers using the iSNSP. The iSNS client is a process that is co-resident in the TC2201E, and which can register device attribute information with the iSNS server. The capability is used for automated device discovery.
- Select **4** to change iSNS server settings. iSNS servers maintain information about iSCSI clients and will respond to iSNS protocol queries and requests, and initiate iSNS protocol State Change Notifications. Selecting this menu option opens the iSNS Server Configuration menu.

Note: iSNS is used for automated device discovery.

Table 18 iSNS Server Configuration Menu

```
                    iSNS Server Configuration Menu
                  X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                        07/26/2005  15:00:28

iSNS Server 1

    iSNS Server IP Address or DNS Name    : <empty>
    iSNS Server TCP Port                  : 3205

1) Change IP Address or DNS Name of this iSNS Server
2) Change TCP Port of this iSNS Server
3) Restore Default iSNS Configuration

X) Return to previous menu
```

Following are descriptions for each of the settings:

- Select **1** to change the IP address or DNS name of this iSNS server. This setting specifies the network location of the iSNS server. The default setting is empty.
- Select **2** to change the TCP port of this iSNS server. This setting specifies the appropriate TCP port of the iSNS server. The default setting is 3205.
- Select **3** to restore the default iSNS configuration, as shown in the sample menu above.

- Select **5** to setup or change Portal Group configurations. By default, the TC2201E is set to use one Portal Group for both ports, which effectively enables failover capability between the two iSCSI ports.

Table 19 iSCSI Portal Group Configuration Menu

```
                  iSCSI Portal Group Configuration
                 X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                       07/26/2005  15:00:37

    Number of Portal Groups                       : 1
    Default Map for Portal Group: Both Ports      : Auto Assigned

1) Use one Portal Group for both ports
2) Use separate Portal Groups for each port
3) Change Default Map Value

X) Return to previous menu
```

Following are descriptions for each of the settings:

- Select **1** to use one Portal Group for both ports. The default setting, this option enables failover capability between the two iSCSI ports.
- Select **2** to use separate Portal Groups for each port. This option disables the failover capability between the two iSCSI ports, so that each port can be separately mapped.

- Select **3** to change the default map value for a Portal Group. This option enables selecting between auto-assigned or indexed mapping for the iSCSI port(s).

Parallel SCSI Configuration

This menu allows for setting up SCSI attributes.

Table 20 Parallel SCSI Configuration Menu

```
          Parallel SCSI Configuration Menu
         X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
               07/26/2005  08:56:22

Current SCSI Configuration - Bus 0

    Initiator ID           : 07
    Discovery              : Enabled
    Bus Reset on Boot      : Enabled
    Discovery delay time   : 2 seconds

1) Edit Initiator Settings
2) Enable/Disable SCSI Discovery
3) Enable/Disable SCSI Reset on Boot
4) Set Discovery Delay Time
5) Edit SCSI Target Override Settings

X) Return to previous menu

Command, <enter> for next SCSI bus >
```

Press the **Enter** key to toggle the current menu to the next SCSI bus.

- Select **1** to edit the SCSI Initiator menu settings, described later in the chapter.
- Select **2** to enable/disable SCSI Discovery.

- Select **3** to enable/disable SCSI Bus Reset on Boot. When enabled, the TC2201E will automatically reset SCSI buses after initial power up and after reboots.
- Select **4** to set the discovery delay time for SCSI devices. This is the time the TC2201E waits after a power-up or reboot before starting to discover SCSI devices. This value should be set to no less than 250ms, according to the SCSI standard for Reset-to-Selection Time. Quantum recommends you set the value to at least 2 seconds to ensure all SCSI devices complete their individual power-ups. With Discovery enabled, the Discovery Delay will lengthen the time taken by the TC2201E to reboot.
- Select **5** to edit the SCSI Target override settings. After selection of this option, a prompt appears to choose the particular Target ID (0 through 15) to edit. Select the appropriate Target ID and then the SCSI Override Configuration Menu will appear.

Note: Normally, override settings should not be changed except when directed to do so by an authorized Quantum technician.

SCSI Initiator Menu

This option allows for setting up the SCSI Initiator.

Table 21 SCSI Initiator Menu

```
                    SCSI Intiator Menu
               X.XX.XXXX  XXXXXX  XXXXXXXXXXXXX
                     07/26/2005  08:56:22

Current Initiator Configuration - Bus 0

Initiator ID         : 07

1) Select primary SCSI Initiator ID
2) Enable/Disable alternate SCSI ID
   (The “alternate” ID is used to enhance the performance
    of status (“agent”) commands that are being issued to a
    serial device. To use this feature enable the alternate
    ID and pick an ID that is currently unused on this bus.)
3) Select alternate SCSI Initiator ID
X) Return to previous menu
```

Following are descriptions for each of the settings:

- Select **1** to select the primary SCSI Initiator ID. This is the ID for the SCSI device that request operations from other SCSI devices known as targets. This should be a unique ID on the bus. The default setting is 7. The user must enter a integer value in the range of 0-15 prior to saving the configuration to the TC2201E.
- Select **2** to enable/disable an alternate SCSI Initiator ID.
- Select **3** to select an alternate SCSI Initiator ID. This should be a unique ID on the bus. The default value is 6. This option is used to enhance the performance of status (“agent”) commands issued to a serial device.

SCSI Target Overrides Menu

This option allows for setting the SCSI Target Overrides. Prior to this menu, a prompt appears to choose the particular Target ID (0 through 15) to edit. Select the appropriate Target ID and then the SCSI Override Configuration Menu will appear.

> **Note:** Normally, override settings should not be changed except when directed to do so by an authorized Quantum technician.

Table 22 SCSI Target Overrides Menu

```
            SCSI Parameter Override Configuration Menu
                 X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                       07/26/2005  08:56:22

Bus 0, Target 0 Current Configuration:

Wide Negotiation                Enabled
Synchronous Negotiation         Enabled
Alternate Block Size Override   Disabled
Ultra SCSI 3 Negotiation        Enabled

1) Toggle Wide Negotiation
2) Toggle Synchronous Negotiation
3) Toggle Alternate Block Size Override
4) Toggle Ultra SCSI 3 Negotiation

X) Return to previous menu
```

Following are descriptions for each of the settings:

- **Wide Negotiation** enables/disables the option for negotiation on a wide SCSI bus.

- **Synchronous Negotiation** enables/disables the option for synchronous negotiation on the SCSI bus.
- **Alternate Block Size** enables/disables block sizes of 520 bytes each, which is the common block size used in AS/400 environments.
- **Ultra SCSI 3 Negotiation** enables/disables Ultra SCSI 3 support for the selected Target ID. This feature is useful for solving certain compatibility issues in mixed vendor environments, where, for example, there may be a device that cannot handle automatic negotiation of the bus speed, or possibly where there is a device that does negotiate to use Ultra SCSI-3 but somehow cannot actually handle the speed.

Parallel SCSI Buffered Tape Write Configuration Menu

This menu allows for setting up buffered tape writes.

Table 23 Parallel SCSI Buffered Tape Write Configuration Menu

```
      Buffered Tape Write Configuration Menu
         X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
               07/26/2005  08:56:22

Current Buffered Tape Writes Configuration

    Buffered Tape Writes              : Enabled
    Maximum Writes Outstanding        : 3
    Maximum Bytes Outstanding         : 1024 KB

1) Enable/Disable Buffered Tape Writes
2) Set Maximum Writes Outstanding
3) Set Maximum Bytes Outstanding

X) Return to previous menu
```

- Select **1** to toggle Buffered Tape Writes to enabled or disabled. The default setting is enabled. Buffered Tape Writes is an option designed to enhance system performance. By returning status on consecutive write commands prior to the tape device receiving data, Buffered Tape Writes remove the latency of waiting for responses from the tape device. In the event that data does not transfer correctly for any reason, the router will return a check condition on a subsequent command.

  Commands other than Write(6) are not issued until status is received for any pending write. Also, status is not returned until the device completes the command. For instance, when a synchronizing command is sent to a drive, such as sending a Write File mark, a good status means all prior commands have been successfully completed and data has been successfully written to the medium. This is appropriate for such tasks as file backup/restore.

> **Note:** If an application requires confirmation of individual blocks being written to the medium, such as audit trail tapes or log tapes, Buffered Tape Writes should be disabled.

- Select **2** to set Maximum Writes Outstanding. This setting determines the maximum number of writes that can be buffered. Any additional writes beyond the maximum level allowed will be sent to the storage device without using buffering, but these writes may also be subsequently buffered when completion notices for earlier writes are received.
- Select **3** to set Maximum Bytes Outstanding. This setting determines the maximum number of write bytes (shown in units of kilobytes) that can be buffered. Any additional writes beyond the maximum level allowed will be sent to the storage device without using buffering, but these writes may also be subsequently buffered when completion notices for earlier writes are received.

Device Mapping

This option allows the user to manipulate maps and associate selected host with a particular map. Each physical port/bus on the system has at least an *Indexed* map and *Auto Assigned* map. Each map has a unique name and map ID. User may rename all maps, except for 'Indexed' and 'Auto Assigned'. The map that is set to be current must always contain valid information, since many of the operations on the map menu are executed against this map.

Table 24 Device Mapping Main Menu

```
                    Device Mapping Main Menu
                X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                      07/26/2005  08:56:22

Current Default Map for iSCSI Both Ports - Name 'Auto Assigned'

1) Select Current Map
2) Display Current Map
3) Add Map
4) Remove Current Map
5) Edit Current Map
6) Clone Current Map
7) Edit Host List
8) Display Device List

S) Save and Activate Mapping Changes
X) Return to previous menu

Command, <enter> for next portal group >
```

- Changing Ports: When the iSCSI Portal Groups setting is configured to use Both Ports, pressing the **Enter** key will have no effect on this menu. When the iSCSI Portal Groups setting is configured to use separate ports, pressing the **Enter** key will toggle between iSCSI Port

0 and iSCSI Port 1. For additional details on iSCSI Portal Group settings, see the iSCSI Portal Group Configuration Menu as described earlier in this Chapter.

- Select **1** from the 'Device Mapping Main Menu' to display all the maps defined by the system for the current protocol/port and to choose one of the maps from the list to make it a "current" map. The map selected from this list will be the one used by the TC2201E to direct data to the appropriate targets and initiators.

Table 25 Select Current Map

```
                        Select Current Map
                  X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                        07/26/2005  08:56:22

Current Map for iSCSI Port - 'Indexed'
+-------+------------+------+--------------------------------+
| MAP # |  Protocol  | Port |      Map Name                  |
+-------+------------+------+--------------------------------+
|     1 |    iSCSI   |   0  |                        Indexed |
|     2 |    iSCSI   |   0  |                 Auto Assigned  |
+-------+------------+------+--------------------------------+
Page # 1 out of 1 pages.
Total Number of Maps = 2
Enter(N=Next, P=Prev, Number=Select, X=Exit) >
```

Note: Because the entire list of Maps may not fit on one screen, select 'N' or 'P' to go back and forth between screens displaying more maps. Select 'X' to return to the 'Device Mapping Main Menu'.

Enter the number from the column on the left side of the table to select a map and make it 'Current'. For example, entering '2' from the picture above would select map named 'Auto Assigned' on iSCSI Port 0 and make it a 'Current' map.

- Select **2** from the 'Device Mapping Main Menu' to display the content of the 'Current' map. This option displays all the entries in the map. Information in the local part of the address(left) depends on the type of protocol for which the map is defined. The specific device address information depends on the protocol/port where the device resides. Mapping a device to the same port where it resides is not allowed. (i.e. you can not map a disk on iSCSI Port 0 to an address on iSCSI Port 0.)
- Select **3** from the 'Device Mapping Main Menu' to add a map. This option allows adding a new map for the current protocol/port or bus. Once the map is created it becomes the 'current' map.

Table 26 Add a Map

```
                        Add Current Map
                  X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                        07/26/2005  08:56:22

Create iSCSI Map for Portal Group: Both Ports

Enter New Map Name (X=Cancel) > New Map

Created Map: 'New Map' for iSCSI Portal Group: Both Ports with ID=3
```

- Select **4** from the 'Device Mapping Main Menu' to delete current map. The screen will ask for confirmation before deleting the map. After the map has been deleted, the default map for the current port becomes the current map. Maps with names 'Auto Assigned' may not be removed.

Table 27 Delete Current Map

```
This will delete current map - 'New Map', ID=3.
Are you sure (y/n)? > y

Map: 'New Map' with ID=3 was deleted
```

- Select **5** from the 'Device Mapping Main Menu' to edit current map. This option displays the **Map Edit Menu** and allows user to edit the name of the map, change content of the map, clear, and fill the map. Editing an 'Auto Assigned' is not allowed.

Table 28 Map Edit Menu

```
                          Map Edit Menu
                 X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                       07/26/2005  08:56:22

Current Map: iSCSI Portal Group: Both Ports - 'Indexed'

1) Edit Name
2) Edit Map Entries
3) Clear Map
4) Fill Map

X) Return to previous menu

Command >
```

Note: Enter the number of one of the available selections or enter 'X' to exit to the Device Mapping Main Menu.

- Select **1** from the 'Map Edit Menu' to edit the name of the current map. The name of the Indexed map may not be changed. Map name also cannot be left empty.

Table 29 Edit Map Name

```
Current Name: New Map

Enter New Name (X=Cancel) > Newer Map

Map Name Changed to: 'Newer Map'
```

- Select **2** from the 'Map Edit Menu' to edit entries in the current map. This screen allows the user to navigate up and down the map entries and create or remove entries. Device lists are also available to the user to make it easier to identify the device to be mapped. Mapping device to its native port/bus is not allowed. The information needed to create entries is protocol/port dependent.

Note: Control of the editing process is done with simple single letter commands. 'N' and 'P' controls allow scrolling up and down the map entries. Select 'X' to return to the Map Edit Menu. Select 'A' to add a new entry to the map or 'D' to delete an already existing entry in the map. Select 'R' to get rid of the gaps in the map.

Adding an Entry

To add a new entry the user must enter the desired Index. If the selected Index is already present in the map, the user will be asked to confirm the override or enter different address information. Next, the operator will be prompted for the protocol and port at which a device selection list is generated. (Devices may not be mapped to their native port).

The following is an example of adding an entry for an iSCSI map:

Table 30 Adding An iSCSI port Entry

```
Enter desired index > 1

Select SCSI Bus Number: (0-1, X=Cancel) and Enter > 0
```

The following is an example of a Device List generated for an iSCSI port:

Table 31 Device List for iSCSI Port

```
                          Device List
                X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                      07/26/2005  08:56:22
SCSI Bus 0 Device List:
+-----+-----------+-----+------+---------+--------------------------+
| Num | Target ID | LUN | Type |  State  | Description              |
+-----+-----------+-----+------+---------+--------------------------+
|   1 |         2 |   0 | TAPE |  ONLINE | QUANTUM  DLT8000    023C |
+-----+-----------+-----+------+---------+--------------------------+
Page # 1 out of 1 pages.
Number of entries in the device table = 1

Enter(Number=Select, N=Next, P=Prev, X=Exit) >
```

Select number from the left column '#' to add a device to the map. If the selected device is already mapped, an error message will appear to warn the user about adding a duplicate device. 'N' and 'P' controls allow scrolling up and down the device list. 'X' will bring the user back to the 'Edit Map Entries' display table.

Creating an Entry

The user can create an empty map or use an existing map to pre-enter devices that are not yet online. To perform this operation, the user has to

know all the essential information about the device. A series of questions will be asked to guide the user through the process. The questions will vary based on the 'Current' map protocol. The user will be asked to select the Index for a device, then the protocol/port on which device will reside, then the Name for the device (which can be left empty), then the type of device:

Note: If the device being added is a SCSI device, the user will also be asked to enter Target ID and LUN ID for the device. Target ID must already be defined in the SCSI Configuration. Otherwise, adding a device will not be permitted.

Note: When creating a device that does not exist, it will be displayed with 'Down' status.

Remove Gaps

This option removes any incremental gaps in the sequence of LUNs listed in the table.

Deleting an Entry

The user selects a LUN ID.

Table 32 Deleting an Entry

```
Select Idx to delete (X=Cancel, D=DeleteMultiple) > 1

Are you sure you want to delete Idx 1? (Y=Confirm, X=Cancel) > y
```

Select **D** to delete multiple LUNs:

Table 33 Deleting Multiple LUNs

```
Select Idx to delete (X=Cancel, D=DeleteMultiple) > d
Enter comma delimited Idxs to delete > 1
Are you sure you want to delete Idx 1? (Y=Confirm, X=Cancel) > y
```

Note: When deleting multiple LUNs, the user can list the LUNs to delete in a comma or space delimited format.

- Select **3** from the 'Map Edit Menu' to clear (i.e. remove all entries from) the current map. The user is prompted for confirmation.

Figure 61 Clear all Entries from Current Map

```
This will clear all entries from iSCSI map 'Newer Map'
for Portal Group: Both Ports.

Are you sure (Y=Confirm, X=Cancel) > y

iSCSI map 'Newer Map' for Portal Group: Both Ports was cleared.
```

- Select **4** from the 'Map Edit Menu' to fill the current map. This selection scans the device list and appends all unmapped devices at the end of the 'current' map. Devices marked as 'DOWN' will not be mapped. After this operation completes, the Edit Map Entries screen will appear.

Table 34 Fill Current Map

```
Select fill priority (B=Bus/Target, T=Target/Bus, X=Cancel) > b

Fill Map function found 6 Unmapped Devices and mapped them to iSCSI
map 'Newer Map' for Portal Group: Both Ports.
```

- Select **6** from the 'Device Mapping Main Menu' to clone 'Current' map. This option allows the user to make an exact copy of already existing map complete with all entries. Cloning of 'Auto Assigned' is not allowed. The new map must have a unique map id and name. Once cloning is complete, the newly created map becomes 'Current' map. The purpose of this option is to create a base for a new map that is similar to an already existing map.

Table 35 Clone Current Map

```
                        Clone Current Map
                  X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                        07/26/2005  08:56:22

CClone Map: iSCSI Portal Group: Both Ports - 'Newer Map'

Enter New Map Name (X=Cancel) > CloneMap
```

Select **7** from the 'Device Mapping Main Menu' to edit the host list for the current port/protocol. The 'Current' map can be associated with hosts available in the host list on the same port where the map is defined. Initially all hosts are associated with an Auto Assigned map.

The following is an example of an iSCSI host list:

Table 36 iSCSI Host List

```
                        Host List Edit Display
                    X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                          07/26/2005  08:56:22

Current Map: iSCSI Portal Group: Both Ports - 'Indexed'

iSCSI Portal Group: Both Ports Host List:
+-----+-------------------------------------------------------------+
| Idx |                        Initiator iSCSI Name                 |
+-----+-------------------------------------------------------------+
|   1 | iqn.1986-03.com.hp:hpfcs214.2000853943                      |
+-----+-------------------------------------------------------------+
Page # 1 out of 1 pages.
Total Number of Hosts = 1
Select Host Number index to view host information
Enter (N=Next, P=Prev, A=Add, D=Delete, E=Edit, X=Exit) >
```

Because the entire list of hosts may not fit on one screen, select ‘N’ or ‘P’ to see any additional pages showing the list of hosts. Select ‘X’ to return to the ‘Device Mapping Main Menu’. Select number from the column on the left to associate host with the ‘Current’ map. At this point the user can edit, delete, or change name for the host.

Entering a host number index opens the iSCSI Host Info Display, where the selected host can be associated with the current map.

Table 37 iSCSI Host List
t

```
                        iSCSI Host Info Display
                    X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                          07/26/2005  08:56:22

Current Map: iSCSI Portal Group: Both Ports - 'Auto Assigned'

iSCSI Name :  iqn.1991-05.com.microsoft:iscsitc3win
Host Name  :  Host01
Map Name   :  Auto Assigned

1) Associate Host with Current Map

X) Return to previous menu
```

- Select **1** to associate the selected host with the current map. To change the associated map, simply select a different "current map" from the Device Mapping Menu.

Adding a Host

Select 'A' to add a host to the list. The user will be prompted to enter the desired Host Name and iSCSI Initiator Name. Duplicate hosts won't be added to the list.

Table 38 Adding a iSCSI Host

```
Enter desired Host Name > HostName

Enter iSCSI Initiator Name > iqn.1991-05.com.microsoft:iscsitc3win

Host was successfully added to the host list!!!
```

For the iSCSI initiator name, use an iSCSI-Qualified Name (IQN) for the host being added. This information is available from the iSCSI Initiator. For additional details, see the user documentation included with the iSCSI Initiator software.

Note: The Quantum TC2201E does not include iSCSI Initiator software. For additional details, contact the operating system provider.

An IQN can be used by any organization that owns a domain name. According to IETF RFC 3720, an iSCSI qualified name string consists of:

- The string "iqn.", used to distinguish these names from "eui." formatted names.
- A date code, in yyyy-mm format. This date MUST be a date during which the naming authority owned the domain name used in this format, and SHOULD be the first month in which the domain name was owned by this naming authority at 00:01 GMT of the first day of the month. This date code uses the Gregorian calendar. All four digits in the year must be present. Both digits of the month must be present, with January == "01" and December == "12". The dash must be included.
- A dot "."
- The reversed domain name of the naming authority (person or organization) creating this iSCSI name. For example, if the domain name were “example.com”, then the reverse domain name would be “com.example”.

- An optional, colon (:) prefixed, string within the character set and length boundaries that the owner of the domain name deems appropriate. This may contain product types, serial numbers, host identifiers, or software keys (e.g., it may include colons to separate organization boundaries). With the exception of the colon prefix, the owner of the domain name can assign everything after the reversed domain name as desired. It is the responsibility of the entity that is the naming authority to ensure that the iSCSI names it assigns are worldwide unique. For example, "Example Storage Arrays, Inc.", might own the domain name "example.com".

An example of an iSCSI-qualified name string is as follows:

iqn.1986-03.com.hp:hpfcs214.2000853943

With the successful addition of the host, the host list will then be displayed again and the user can confirm that the host information is correct.

Deleting a Host

Select 'D' to delete a host from the host list. The operator will be asked to enter an index for the host, as is displayed in the very left column of the table. A confirmation prompt will also appear.

Table 39 Deleting a Host

```
Select Host to delete (X=Cancel) > 1
Are you sure you want to permanently remove Host 1? (Y=Confirm,
X=Cancel) > y
```

Editing a Host

Select 'E' to edit host information. Old information will be displayed on the screen, and the user will be asked to enter information to replace it, or just hit **Enter** to keep old information. All of the information entered by the user will be validated.

The following is an example of editing a host list for an iSCSI Port:

Table 40 Editing Host List for iSCSI Port

```
                        Host List Edit Display
                   X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                         07/26/2005  08:56:22

Current Map: iSCSI Portal Group: Both Ports - 'Indexed'

iSCSI Portal Group: Both Ports Host List:
+-----+-------------------------------------------------------------+
| Idx |                        Initiator iSCSI Name                 |
+-----+-------------------------------------------------------------+
|   1 | iqn.1991-05.com.microsoft:iscsitc3win                       |
+-----+------------------------------------------- -------------+
Page # 1 out of 1 pages.
Total Number of Hosts = 1
Select Host Number index to view host information
Enter (N=Next, P=Prev, A=Add, D=Delete, E=Edit, X=Exit) >

Select Host to edit (X=Cancel) > 1
Old Host Name:
Enter desired new name (<enter> = use old name) > NewHost

Old host's iSCSI Initiator name: iqn.1991-05.com.microsoft:iscsitc3win
Enter desired new iSCSI Initiator name (<enter> = use old name) >
iqn.1986-03.com.hp:hpfcs214.2000853943
```

- Select **8** from the ‘Device Mapping Main Menu’ to display the entire device list. Because the entire device list may not fit on one screen, select ‘N’ or ‘P’ to go back and forth between screens displaying more maps. Select ‘X’ to return to the ‘Device Mapping Main Menu’.

- Select **S** from the Device Mapping menu to activate port mapping changes.

Caution: Before activating any port mapping changes, it is strongly recommended that the user verify there are not any command or data operations occurring in conjunction with devices affected by the mapping changes. For example, deleting a LUN or device from a map may disrupt I/O transfers with that device. It is the user's responsibility to ensure that no operations will be negatively impacted due to the activation of mapping changes.

Note: All current Mapping Settings will take effect immediately! If another management interface has made unsaved mapping changes, those changes will be lost.

Note: If the Activate Port Mapping Changes option is not selected, the mapping changes will not take effect unless the TC2201E is rebooted.

Note: After the TC2201E reboots, the Configuration Menu will appear.

Trace and Event Settings Configuration

This option allows set up of trace and events settings.

Table 41 Utility Settings

```
                Trace and Event Log Settings
              X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                    07/26/2005  08:56:22

1) Trace Settings
2) Event Log Settings

X) Return to previous menu
```

- Select **1** to edit the trace settings configuration.
- Select **2** to edit the event settings configuration.

Trace Configuration

This option allows trace levels to be set. These settings should not be modified in normal operation, as performance degradation may result. There are two pages of trace levels.

Table 42 Trace Settings

```
                    Trace Settings
              X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                    07/26/2005  08:56:22

        0) Flash File Parser            (FFP) :  0 - Minimum
        1) Router Flash Download Driver (FFD) :  0 - Minimum
        2) Router Ethernet Driver       (ETH) :  0 - Minimum
        3) Router Network Utilities     (NET) :  0 - Minimum
        4) System Utilities - Kernel    (SUK) :  0 - Minimum
        5) System Utilities - User      (SUU) :  0 - Minimum
        6) Management - Common          (CMM) :  0 - Minimum

A) Set All Trace Levels
U) Update Current Operating Trace Levels
X) Return to previous menu

Enter the trace level index, <enter> for next page >
```

Enter a level number from the Trace Settings that are shown. This toggles the current setting to one of the following trace levels:

0 - Minimum (default setting)
1- Unknown
2 - Emergency
3 - Alert
4 - Critical
5 - Errors
6 - Warnings
7 - Notify
8 - Info
9 - Debug
10 - All

The higher the trace level setting, the broader the range of notifications that will be received. The lower the trace level setting, fewer notifications will be received.

Select **U** to update current operating trace levels. This option forces the currently displayed trace settings to become effective immediately, without requiring a reboot or power cycle.

> **Note:** Be sure to set the clock and date in the Real Time Clock Configuration menu so trace logging is accurate.

If the Enter key is selected, the next page of trace levels appears.

Table 43 Trace Settings, Page 2

```
                    Trace Settings
              X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                    07/26/2005  08:56:22

        0) Management - Async           (ASY) :  0 - Minimum
        1) Management - HTTP            (WWW) :  0 - Minimum
        2) Management - SLP             (SLP) :  0 - Minimum
        3) Management - iSNS            (SNS) :  0 - Minimum
        4) Router Supt Library - Kernel (RSK) :  0 - Minimum
        5) Router Supt Library - User   (RSU) :  0 - Minimum
        6) Routing Layer - Manager      (RLM) :  0 - Minimum

A) Set All Trace Levels
U) Update Current Operating Trace Levels
X) Return to previous menu

Enter the trace level index, <enter> for next page >
```

Table 44 Trace Settings, Page 3

```
                        Trace Settings
                X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                      07/26/2005  08:56:22

        0) Routing Layer - Kernel       (RLK) :  0 - Minimum
        1) Routing Layer - User         (RLU) :  0 - Minimum
        2) Routing Layer Mapping - Kern (RMK) :  0 - Minimum
        3) Routing Layer Mapping - User (RMU) :  0 - Minimum
        4) SCSI - Driver                (PSD) :  0 - Minimum
        5) SCSI - Transport             (PST) :  0 - Minimum
        6) SCSI - Management            (PSM) :  0 - Minimum

A) Set All Trace Levels
U) Update Current Operating Trace Levels
X) Return to previous menu

Enter the trace level index, <enter> for next page >
```

Table 45 Trace Settings, Page 4

```
                        Trace Settings
                X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                      07/26/2005  08:56:22

        0) iSCSI - Driver               (ISD) :  0 - Minimum
        1) iSCSI - Transport            (IST) :  0 - Minimum
        2) iSCSI - Management           (ISM) :  0 - Minimum
        3) iSCSI - PL                   (ISP) :  0 - Minimum
        4) iSCSI - RMI                  (ISR) :  0 - Minimum
        5) iSCSI - HAL                  (ISH) :  0 - Minimum
        6) iSCSI - SCBI translator      (IXT) :  0 - Minimum

A) Set All Trace Levels
U) Update Current Operating Trace Levels
X) Return to previous menu

Enter the trace level index, <enter> for next page >
```

Table 46 Trace Settings, Page 5

```
                      Trace Settings
              X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                    07/26/2005  08:56:22

        0) LSCSI - Driver               (LSD) :  0 - Minimum
        1) LSCSI - Transport            (LST) :  0 - Minimum
        2) LSCSI - Management           (LSM) :  0 - Minimum

A) Set All Trace Levels
U) Update Current Operating Trace Levels
X) Return to previous menu

Enter the trace level index, <enter> for next page >
```

If the Enter key is selected, the first page of trace settings will appear again.

Enter a level number from the Trace Settings that are shown.

Select **U** to update current operating trace levels. This option forces the currently displayed trace settings to become effective immediately, without requiring a reboot or power cycle.

Note: Be sure to set the clock and date in the Real Time Clock Configuration menu so trace logging is accurate.

Event Configuration

This option allows selecting the Event Threshold for filtering event logging. The asterisk denotes the current setting.

Table 47 Event Filter Settings

```
              Event Log Filter Settings
          X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                07/26/2005  08:56:22

   1)  Disable Event Logging  6)  Warning events
   2)  Emergency events       7)  Notify events
   3)  Alert events           8)  Info events
   4)  Critical events        9)  Debug events
   5)  Error events           0)* Log all events

A)  Toggle Reservation/Release Events Logging: Enabled

U) Update Current Operating Event Setting
X) Return to previous menu

Enter event threshold <0-9> >
```

- Enter **1** to disable event logging.
- Enter **2** through **9** to log the specified events or higher.
- Enter **0** to log all events.
- Select **A** to toggle reservation/release events logging. The default setting is Enabled.
- Select **U** to send event configuration changes to the TC2201E now.

Event logging captures over 2000 events and then starts overwriting the log when full.

Note: Be sure to correctly set the clock and date in the Real Time Clock Configuration menu so that event logging is accurate.

Real-Time Clock Configuration

When this option is selected from the Perform Configuration menu, the System Clock Setup Menu appears.

Table 48 System Clock Setup Menu

```
              System Clock Setup Menu
         X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                07/26/2005  12:48:42

Date: MONDAY, 07/26/2005, Time: 12:48:42

1) Set clock

X) Return to previous menu
```

Select **1** to set the clock. A series of three prompts will appear allowing set up of 24 hour time (hh:mm:ss) and current date (mm/dd/yyyy). For time, it is not necessary to enter the seconds, i.e. hh:mm is an acceptable format. For the date, the month and day can be entered as single digits, for instance “6” instead of “06”.

Save Configuration

This option saves the current configuration state in FLASH, which updates the saved previous configuration state. Saved changes are retained across future device resets or power cycles.

Restore Last Saved Configuration

This option restores the most recently saved configuration. This can be useful when configuration changes are made, but the user wishes to return to the previously saved configured state. The changes take effect after the TC2201E has rebooted.

Reset and Save Configuration to Factory Defaults

This option resets all current configuration options to the factory defaults and saves those options to FLASH memory as the current configuration. The changes take effect after the TC2201E has rebooted.

Caution: Resetting to factory defaults from the serial port will affect ethernet connectivity. User configured values for the IP address, gateway, and subnet mask, and as well the user name and password are not retained after the TC2201E resets. The handles resets differently, as described in the note below.

Note: Resetting to factory defaults from the Telnet interface will not affect ethernet connectivity. User configured values for the IP address, gateway, and subnet maskare retained after the TC2201E resets. Note that user names and passwords are NOT retained.

Note: Settings are not reset to factory defaults until the TC2201E is rebooted.

System Utilities

Table 49 Sysem Utility Menu

```
                System Utility Menu
        X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
               07/26/2005  08:56:22

1) System Statistics Menu
2) Event Log
3) View Report
4) SCSI Command Tracking

X) Return to main menu
```

- Select **1** to display the System Statistics Menu, described later in this chapter.
- Select **2** to display the Event Log Menu, described later in this chapter.
- Select **3** to display a detailed report of settings and statistics about the TC2201E.
- Select **4** to display the SCSI Command Tracking menu, described later in this chapter.

System Statistics

Table 50 Sysem Status/Statistics Menu

```
          System Status/Statistics Menu
        X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
              07/26/2005  08:56:22

1) Display Parallel SCSI Protocol Status

X) Return to main menu
```

- Select **1** from the System Status/Statistics Menu to display Parallel SCSI Protocol Status.

Table 51 Parallel SCSI Protocol Status Menu

```
       Parallel SCSI Protocol Status Menu
        X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
              07/26/2005  08:56:22

1) Display SCSI Statistics
2) Display Attached SCSI Devices
3) Display SCSI Resource Status

X) Return to previous menu
```

- Select **1** from the Parallel SCSI Protocol Status Menu to display SCSI statistics.
- Select **2** from the Parallel SCSI Protocol Status Menu to display attached SCSI devices.

Table 52 SCSI Device Display Menu

-

```
                    SCSI Device Display Menu
                X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                      07/26/2005  08:56:22

 1) Perform Manual Discovery for All Buses
 2) Perform Manual Discovery for Selected Bus
 3) Perform Manual "Boot" Discovery (Includes Resets and Delays)
 4) Display All Local Devices
 5) Display Local Devices on Specified Bus

X) Return to previous menu
```

  - Select **1)** to issue discovery for all SCSI buses.
  - Select **2)** to issue discovery for the selected SCSI bus.
  - Select **3)** to issue boot discovery (includes resets and delays).
  - Select **4)** to display all local SCSI devices.
  - Select **5)** to display local devices on the specified SCSI bus.
- Select **3** from the Parallel SCSI Protocol Status Menu to display SCSI Resource Status.

Table 53 SCSI Resource Display

```
                        SCSI Resource Display
                   X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                         07/26/2005  08:56:22

          psActiveInitiatorFreeQ: 1023
          psCmdFreeQ:               0
          psLocalDeviceFreeQ:     249

          psLocalHostFreeQ:        16
          psManFreeQ:              15
          psNotifyFreeQ:           16

          psPendingFreeQ:        2048
          psRmiRetryFreeQ:       2048
          psTaskFreeQ:           2048

(Please hit any key to continue)
```

Event Log

When this option is selected from the System Utilities menu, the Event Log Menu is displayed.

Note: To get a copy of any of the event log, see Chapter 8, Using the FTP Interface.

Table 54 Event Log Menu

```
                Event Log Menu
      X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
             07/26/2005  08:56:22

1) Display event log
2) Clear event log

X) Return to previous menu
```

- Select **1** to display the event log.

Example of an event log entry:

```
Num     Date       Time     sysUpTime       Message
45    07/26/2005 11:21:30 0d07h37m42.18s  Starting Quantum
                                          iSNS Client, v1.0.
```

- Select **2** to clear the event log of all old entries and start over with an empty list.

Note: Event logging captures over 2000 events and then starts overwriting the log when full.

View Report

When this option is selected from the System Utilities menu, the View Report Menu is displayed.

When selected, the following prompt appears:

```
Pause after each Report Section?

(Press 'n' for no pause, any other key to pause)
```

The report includes detailed information about the hardware platform, bootup initialization, serial port settings, iSCSI settings, iSNS Settings, real-time clock settings, Ethernet settings, SCSI bus settings, discovery information, mapped hosts, active maps, SCSI statistics, trace settings, current traces, previous traces, assert traces, event log settings, event log, and a list of enabled features.

SCSI Command Tracking

When this option is selected from the System Utilities menu, the SCSI Command Tracking Menu is displayed.

Table 55 SCSI Command Tracking Menu

```
          SCSI Command Tracking Menu
       X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
              07/26/2005  15:05:45

1) Turn SCSI Command Tracking OFF
2) Display Available Hosts & Devices
3) Display Command Tracking Info
4) Clear ALL Command Info
X) Return to previous menu
```

- Select **1** to toggle SCSI Command Tracking ON or OFF. When toggled ON, all SCSI commands received or transmitted to or from the TC2201E are logged. When OFF, these commands are not logged. When set to ON, menu options 2 thru 4 are also available from this menu.
- Select **2** to display the SCSI Command Tracking information for all selected hosts and devices.
- Select **3** to set the data to be displayed in terms of Type (Device, Host, ALL), Protocol (FC, Other, ALL), and Specific (ID or ALL). If ID is selected for Specific, this ID can be an FC LUN, Switch ID (S_ID), or other ID.
- Select **4** to clear the log of all previously recorded results.

Display Trace and Assertion History

When this option is selected from the main menu, the Trace Dump Menu is displayed. Trace options are set up in the Trace Settings Configuration menu.

Note: To get a copy of any of the trace buffers, see appendix D on page 155.

Table 56 Trace Dump Menu

```
                Trace Dump Menu
        X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
              07/26/2005  08:56:22

1) Display Trace For Current Boot Cycle
2) Display Trace From Previous Boot Cycle
3) Display Trace From Last Assertion Failure
4) Clear Current Trace Buffer
5) Clear Last Assert Trace Buffer

X) Return to previous menu
```

- Select **1** to display trace history for the current boot cycle.
- Select **2** to display trace history from the previous boot cycle.
- Select **3** to display trace history from the last assertion failure.
- Select **4** to clear the current trace buffer. If cleared, then the **Display trace from current boot cycle** option will not show any data.
- Select **5** to clear the assert trace buffer. If cleared, then the **Display trace from last assertion failure** option will not show any data.

Reboot

When this option is selected, a confirmation message will appear to verify the selection. If a response of **Y** (yes) is given to the confirmation message, current TC2201E activities will be disrupted while the unit restarts itself. The last saved configuration changes will also take effect after the TC2201E powers on again.

Advanced Software Licensed Features

When this option is selected from the main menu, the Advanced Software Licenses Features menu is displayed.

Table 57 Advanced Software Licences Menu

```
          Advanced Software Licenses Menu
        X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
              07/26/2005  08:56:22

1) Add License Key
2) Disable License Key
3) Display Status of Advanced Licensed Features

X) Return to previous menu
```

- Select **1** to add a license key.
- Select **2** to disable a license key.
- Select **3** to display the status of advanced licensed features. Advanced software licensed features include features which are licensed by default (HTTP Interface, Two Custom Maps, and Eight Custom Maps).

Table 58 Advanced Licensed Features Menu

```
                Advanced Licensed Features
             X.XX.XXXX  XXXXXX  XXXXXXXXXXXXXX
                   07/26/2005  08:56:22

Feature                            State
HTTP Interface                     The Feature is Enabled
Two Custom Maps                    The Feature is Enabled
Eight Custom Maps                  The Feature is Enabled

Press a key to continue >
```

Download a New Revision of the Firmware

When this option is selected, a confirmation message will appear to verify the selection. If a response of **Y** (yes) is given to the confirmation message, current TC2201E activities will be interrupted while the unit begins accepting the new firmware from the serial port. Also see the *Update Firmware* section of this chapter.

To download firmware using a terminal or terminal emulator connected to the serial port of the TC2201E:

1. From the Main menu, select the **Download a New Revision of The Firmware** option to start the download procedure.
2. When you confirm you want to download, the TC2201E will start the download process.
3. Use the **Transfer** → **Send File** option in the terminal emulator utility.
4. Select the location of the firmware. Use the **Browse** button, if you need help finding it.
5. Make sure you select XMODEM as the transfer protocol.

6 Press the **Send** button.

7 The firmware will begin to download to the TC2201E.

When the download process is complete, the system verifies that the firmware image was successfully written to the FLASH memory and then reboots the TC2201E. Upon reboot, the TC2201E detects that there is a newly downloaded firmware image and copies that image to the boot sector of the FLASH and then boots with that image. At that point the TC2201E is using the new firmware.

The following figure shows what you might see on your terminal when you download a new revision of the firmware:

Table 59 Download Firmware Menu

```
                    Download Firmware Menu
                X.XX.XXXX  XXXXXX  XXXXXXXXXXXXX
                      07/26/2005  08:56:22


This will replace the current revision of the firmware.
A reboot will also be performed as part of this process.

Are you sure (y/n)? y

Please begin xmodem file transfer...
§§§§§§§§

D O W N L O A D   C O M P L E T E


 **********************************

...* Start System Cold Reboot!!
```

Appendix D

Using the FTP Interface

This chapter describes specific management options available from the FTP interface.

Backup/Restore Configuration Settings

The TC2201E supports backup and restore of configuration settings over FTP. This allows users to maintain multiple setting configurations externally from the TC2201E and to be able to restore any of the configurations as needed. When backing up, configurations are saved from flash to a binary file.

Configuration Backup Procedure

To backup the configuration file:

1. Connect the TC2201E to the ethernet network used by your computer.
2. Start your FTP program using the TC2201E's IP address:

   ftp <*IP address***>**

The default IP address is **1.1.1.1**.

> **Note:** If the TC2201E is to use a static IP address, the default IP address 1.1.1.1 should be changed to an address that is appropriate for the IP network it will reside on. Note that the default IP address can be used in a direct connection between the TC2201E and the host computer via a crossover Ethernet cable.

> **Note:** You may also need to specify the directory location on your computer or network where your FTP program will store the backup file.

3. Enter the user name and password. The default values for user name and password are **root** for the user name and **password** for the password.
4. Specify binary mode:

   bin
5. Specify the filename (**.cfg** file) with the **get** command:

   get ***filename*****.cfg**

   (where "filename.cfg" can be any name for the configuration file.)

The file will transfer to the current directory specified on your computer's FTP utility. If running FTP from a DOS or Linux command line, the destination directory can be set using the lcd command (ex. **lcd c:\myCfg**).

> **Note:** World Wide Name (WWN) values and Ethernet physical address (MAC address) values will not be saved. Because user defined values for these settings are not retained in the configuration backup file, they must be re-entered after the configuration is restored. See the Configuration Restore Procedure later in this chapter for more information.

Configuration Restore Procedure

To restore a configuration file:

1. Connect the TC2201E to the ethernet network used by your computer.
2. Start your FTP program using the TC2201E's IP address:

   ftp <*IP address***>**

   The default IP address is **1.1.1.1**.

> **Note:** If the TC2201E is to use a static IP address, the default IP address 1.1.1.1 should be changed to an address that is appropriate for the IP network it will reside on. Note that the default IP address can be used in a direct connection between the TC2201E and the host computer via a crossover Ethernet cable.

3. Enter the user name and password. The default values for user name and password are **root** for the user name and **password** for the password.
4. Specify binary mode:

   bin

5. Specify the configuration's path and filename (**.cfg** file) with the **put** command:

   put <*path:filename***.cfg>**

The file will transfer and the TC2201E will reboot. The TC2201E will then be using the configuration.

> **Note:** World Wide Name (WWN) values and Ethernet physical address (MAC address) values will revert to the factory default settings. Any user defined values for these settings are not retained and must be re-entered after a configuration is restored. See the Configuration Backup Procedure earlier in this chapter for more information.

> **Note:** You should confirm the new configuration by checking that the settings are correct.

Get a Copy of Trace Buffer or Event Log

Using the following procedure, you can save copies of the trace buffers or the event logo over FTP.

1. Connect the TC2201E to the ethernet network used by your computer.
2. Start your FTP program using the TC2201E's IP address:

   ftp <*IP address***>**

   The default IP address is **1.1.1.1**.

> **Note:** You may also need to specify the directory location on your computer or network where your FTP program will store the trace file.

> **Note:** If the TC2201E is to use a static IP address, the default IP address 1.1.1.1 should be changed to an address that is appropriate for the IP network it will reside on. Note that the default IP address can be used in a direct connection between the TC2201E and the host computer via a crossover Ethernet cable.

3. Enter the user name and password. The default values for user name and password are **root** for the user name and **password** for the password.
4. Specify Bin mode:

   bin

5. Specify the filename (***.txt*** file) with the **get** command.

   For the current trace buffer, use **get curtrace.txt**.

   For the previous trace buffer, use **get prvtrace.txt**.

   For the assert trace buffer, use **get assertlog.txt**.

   For the current event log, use **get eventlog.txt**.

The file will transfer to the current directory specified on your computer's FTP utility. If running FTP from a DOS or Linux command line, the

destination directory can be set using the lcd command (ex. **lcd c:\myCfg**).

Update Firmware

Using the following procedure, FTP can be used to update the TC2201E firmware.

1. Connect the TC2201E to the Ethernet network used by your computer.
2. Start your FTP program using the TC2201E's IP address:

   ftp <*IP address***>**

   The default IP address is **1.1.1.1**.

> **Note:** If the TC2201E is to use a static IP address, the default IP address 1.1.1.1 should be changed to an address that is appropriate for the IP network it will reside on. Note that the default IP address can be used in a direct connection between the TC2201E and the host computer via a crossover Ethernet cable.

3. Enter the user name and password. The default values for user name and password are **root** for the user name and **password** for the password.
4. Specify binary mode:

   bin

5. Specify the firmware's path and filename (**.dlx** file) with the **put** command:

   put <*path:filename***.dlx>**

The file will transfer and the TC2201E will reboot. The TC2201E will then be using the new firmware.

> **Note:** You may want to confirm the new firmware level by checking the reboot messages on the TC2201E through the serial port.

Appendix E

How to Change Block Sizes

The following procedures are provided in this document to assist you in changing the block size configured in your backup application:

- Procedure A: EMC Legato NetWorker
- Procedure B: Veritas NetBackup
- Procedure C: Veritas Backup Exec
- Procedure D: CA Brightstor ARCserve
- Procedure E: Bakbone NetVault
- Procedure F: HP Data Protector
- Procedure G: CommVault Galaxy

Note: The block size configured within backup applications is limited to what tape drives will support.

Procedure A: EMC Legato NetWorker

1 Start the Windows Registry Editor program (as shown in figure 62) as follows:

a a. Select `Start>Run`.

b b. Enter the following value in the Open text box: `regedt32`

c c. Press [Enter].

> **Note:** You can also open this program at the following location:
>
> %SystemRoot%\Winnt\System32\regedt32.exe

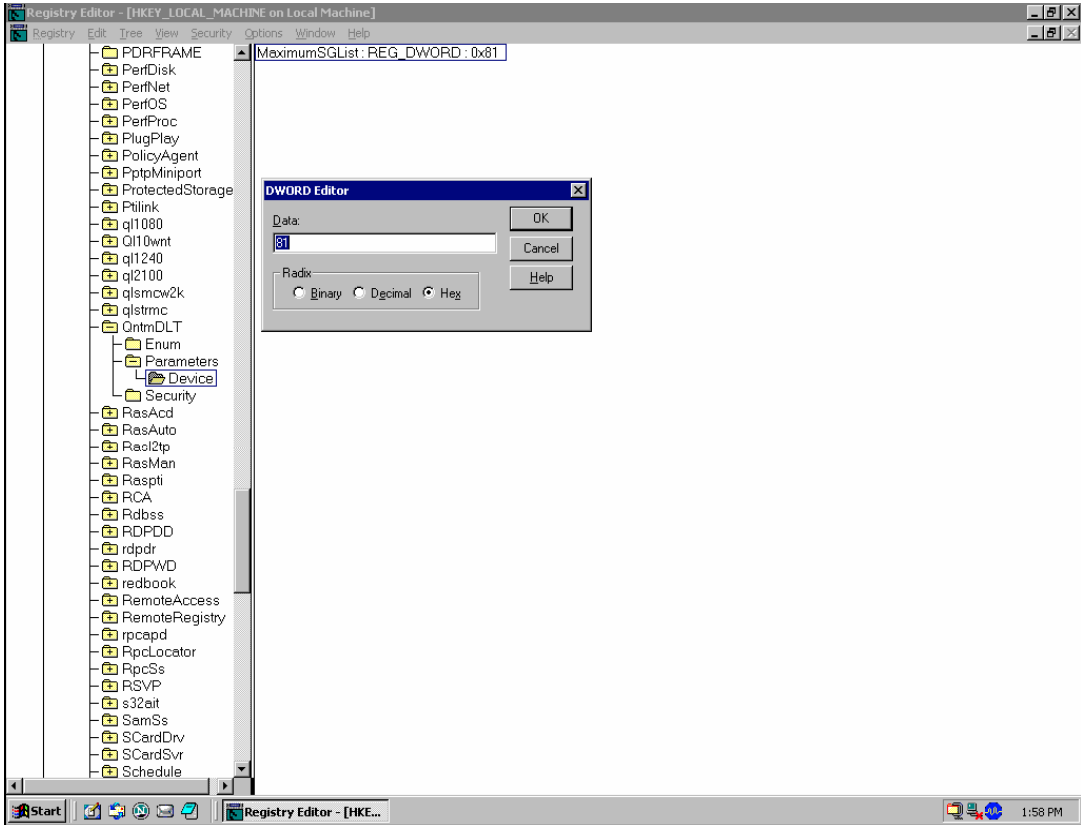
2. Select `Window> HKEY_LOCAL_MACHINE> System> CurrentControlSet> Services> QntmDLT` (or depending on tape device being tested) to make that window active.
3. Select `Edit>Add Key` and enter Parameters for Key Name to create a key named `Parameters`, if one does not exist.
4. To create a key named Device, open the Parameters key by selecting `Edit>Add Key` and enter `Device` for Key Name.
5. To create a DWORD named MaximumSGList, open the Device key by selecting `Edit>DWORD` and entering `MaximumSGList` for DWORD Name.
6. Open the `MaximumSGList Value Name` and replace the existing Value Data in Decimal with a number at least as large as the block size you need for the device.

To calculate the value, use the following equation:

(Block_Size / 4) + 1 = Value

> **Note:** Block Size Decimal Value Hex Value:
>
> 64k 17 decimal 11 hex
>
> 96k 25 decimal 19 hex
>
> 128k 33 decimal 21 hex
>
> 256k 65 decimal 41 hex
>
> 512k 129 decimal 81 hex

Figure 62 Registry Editor



Procedure B: Veritas NetBackup

Note: The largest bock size support by NetBackup 5.1 for Windows is 128K or 131072 decimal bytes.

1 Create a file called C:\Program Files\Veritas\NetBackup\db\config\SIZE_DATA_BUFFERS.

2 Enter the block size in decimal bytes on a line by itself, such as 131072, which is 1024*128 in decimal bytes.

3 Run the backup process.

Procedure C: Veritas Backup Exec

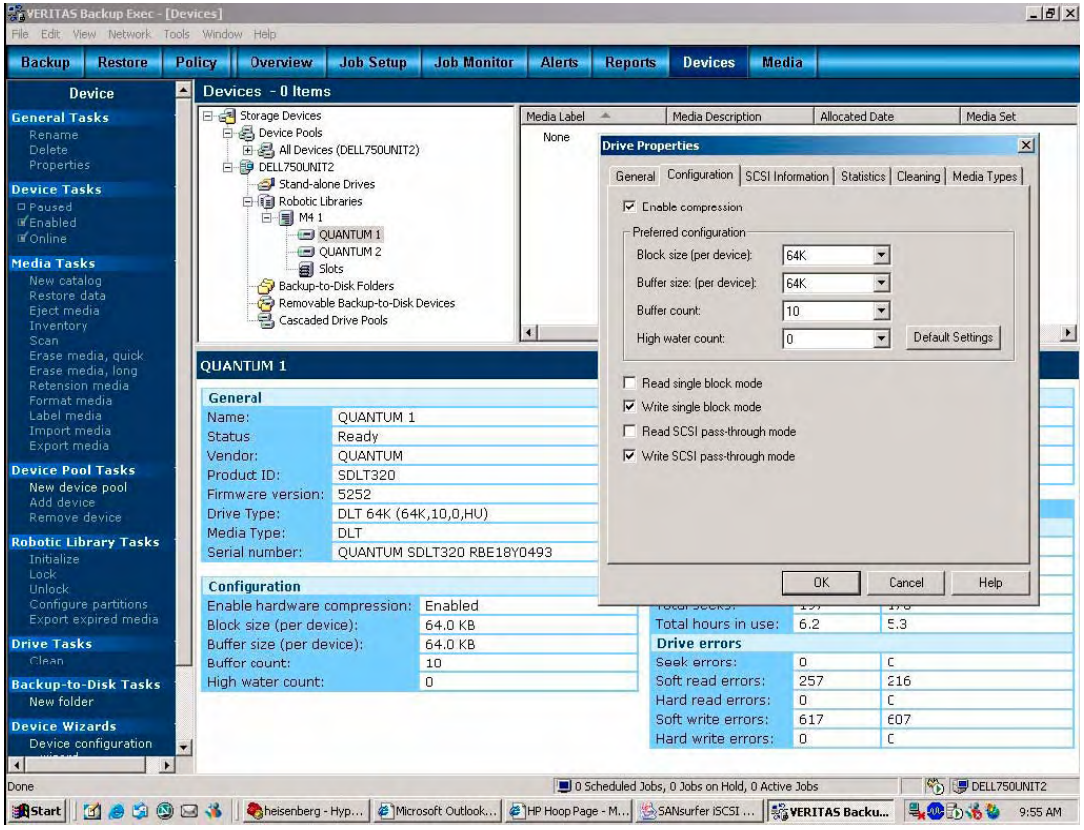
1 Within Backup Exec application (as shown in figure 63), click on the Devices tab.

2 Right click on one of the tape drives detected and select `Properties`.

3 When the Drive Properties box appears, select the `Configuration` tab.

4 Specify the Block Size to be tested. The default is 64k.

Figure 63 Veritas Backup Exec



Procedure D: CA Brightstor ARCserve

1 Determine the correct block size. For BrightStor ARCserve Backup 11.0/11.1 for Windows, the block size of tape drive can be found in:

HKEY_LOCAL_MACHINE \SOFTWARE \ComputerAssociate\BrightStor ARCserve Backup\Base\TapeEngine\Device\Device#

Note: You need to confirm the appropriate Device# from the Device Manager in Brightstor.

ValueName = DefaultBlockFactor

Data type = Reg_Dword

0 = 512 1 = 1,024 (1 KB) 2 = 2,048 (2 KB) 3 = 4,096 (4 KB) 4 =8,192 (8 KB) 5 = 16,384 (16 KB 6 = 32,768 (32 KB) 7 = 65,536 (64 KB)

The maximum block size you can set is 64KB.

2 Run a test backup/restore, and analyze the performance to determine/set the appropriate block size.

Procedure E: Bakbone NetVault

1 When the library is configured, click on `NetVault Device Management` (as shown in figure 64).

2 Click on the `Devices` tab and then highlight the drive to configure.

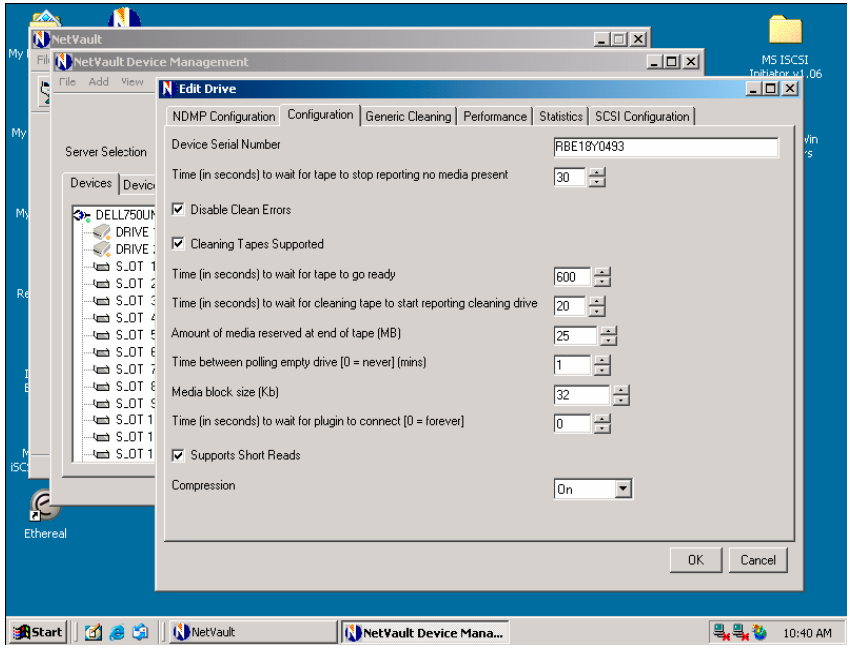
3 Right click on the drive and select `Configure`.

4 From the Edit Drive dialog box, select the `Configuration` tab.

5 Set the Media block size to the desired level. Click `OK` when finished.

> **Note:** Default is 32KB and the maximum is 2048 KB.

Figure 64 Netvault Device Management



Procedure F: HP Data Protector

In order to increase the maximum block size on a Windows Media Agent client, you must first modify its Registry. After modifying the Registry, restart the computer. Drivers read MaximumSGList at boot time. The actual formula that a Windows class driver uses to determine the maximum transfer size is:

maximum size = ((number of supported scatter/gather elements - 1)* 4096)

For the typical aic78xx case, it renders the following:

((17-1) * 4096) = 64k (which corresponds to 56k usable data for Data Protector)

Windows provides a mechanism to support more scatter/gather elements via the Registry.

6. Start the regedit32 and add a DWORD value in the following Registry key:

   \\HKEY_LOCAL_
   MACHINE\SYSTEM\CurrentControlSet\Services\aic78
   xx\Parameters\Device0\MaximumSGList

7. Use the following formula to calculate the value of the MaximumSGList:

   MaximumSGList = (BlockSize/4096)+1

   For example, the MaximumSGList value for a 256k block size is 65, as follows:

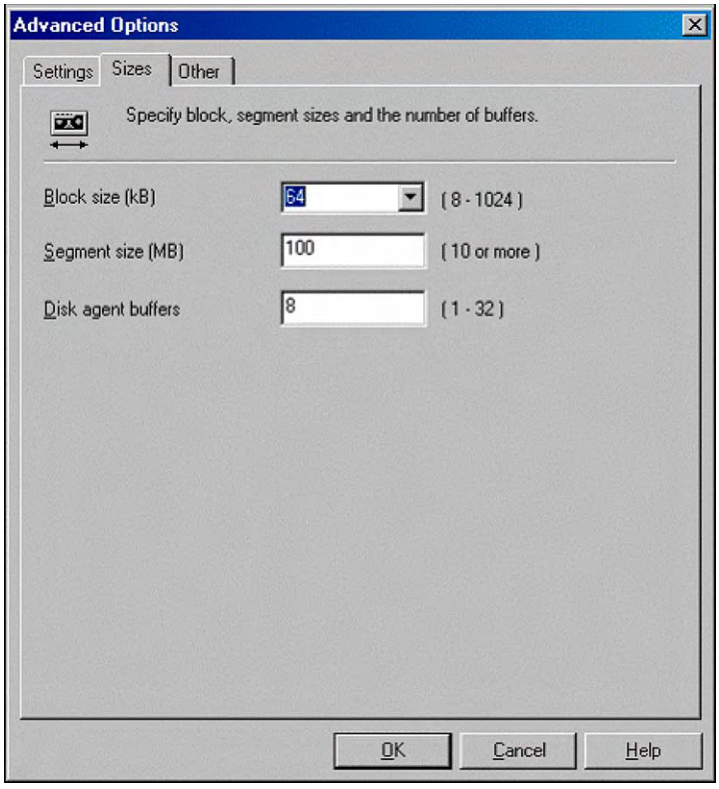
   MaximumSGList = (265k/4k) + 1 = 64 + 1 = 65

   If you have, for example, three aic78xx based SCSI channels on your system, change the appropriate ...\Device0, ...\Device1 or ...\Device2 value. If you want to set all adapters at the same time, specify MaximumSGList for ...\Device\.... Omitting the numerical reference sets the value for all aic78xx adapters.

The block size can also be changed using the Data Protector management interface.

1. To do this, select the Devices & Media option from the drop down list.
2. Right click on a discovered tape device and select Properties.
3. Select the Settings tab and then click on the Advanced button.
4. Select the Sizes tab and from here the block size can be modified as shown in figure 65 below.

Figure 65 HP Data Protector (Advanced Options)



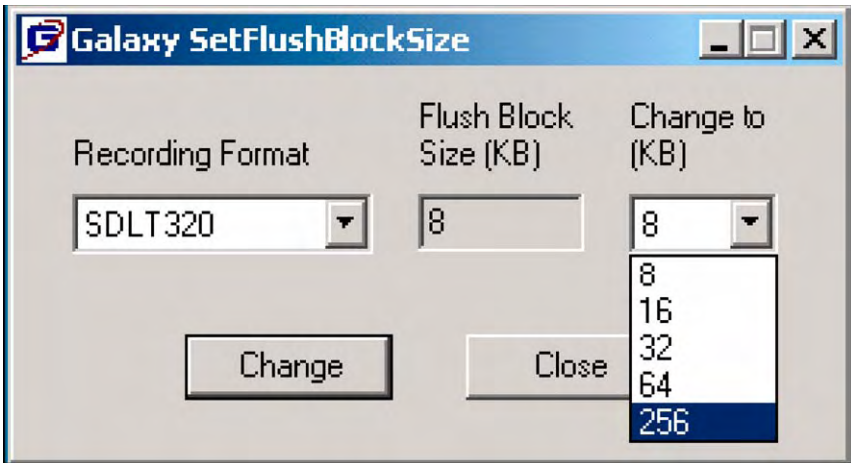
Procedure G: CommVault Galaxy

To increase block size, do the following.

1. Using the CommVault Resource Pack CD, navigate to the folder titled setFlushBlockSize.
2. Copy SetFlushBlockSize executable to the <Galaxy Commserver install directory>\Base directory.
3. Navigate to this program SetFlushBlockSize.exe and double click to run.

4 Select the desired Recording format and change the Flush Block Size using the drop down list (as shown in figure 66) of values - 8 KB, 16 KB, 32 KB, 64 KB, 256 KB.

Figure 66 CommVault Galaxy



To increase chunk size, do the following.

Note: The default chunk size that galaxy uses for granular backups is 2 Gb. The size for database backups is 8.

Higher chunk size will give you better throughput. Recommended values are: 8 Gb, 16 Gb or 32 Gb.

For Galaxy 5.0 Users:

1 Using the CommVault Resource CD, navigate to the folder titled SetChunkSize.

2 Copy SetChunkSize executable to the <Galaxy Commserver install directory>\Base directory.

3 Run the executable from the command line or navigate to SetChunkSize.exe using Windows Explorer.

4 Select an application type from the first drop-down list. The list provides selection for All AppTypes and the appTypes installed in the CommCell.

5 Select a chunk size from the second drop down list. The list provides selections of 128 MB, 256 MB, 512 MB, 1 GB, 2 GB, 4 GB, 8 GB, 16 GB, 32 GB; by default, it shows the current value for the selected appType.

For Galaxy 5.9 Users:

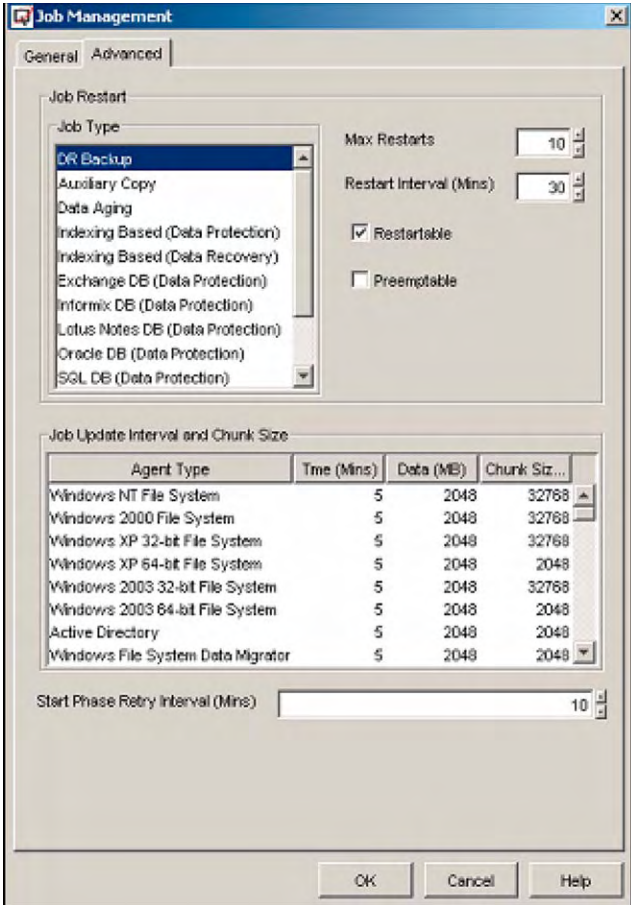
1 Open the CommCell Console For Java GUI.

2 Open Control Panel and then click on Job management.

3 Click on the Advanced tab (as shown in figure 67).

4 Modify the chunk size for different application types and click OK to confirm changes.

Figure 67 CommVault Galaxy (Advanced Tab)



Glossary

A

adapter	A printed circuit assembly that translates data between the iSCSI host processor's internal bus and a different bus, such as SCSI.
address	See SCSI Addressing.
addressing mode	Used to create a mapping table that maps devices on the SCSI bus to Fibre Channel logical units.
area	The second byte of the N_Port Identifier.
authentication	A process of identification, usually based on a username and password.
auto-assigned mapping	A menu item. The auto-addressing option creates a mapping table using devices discovered upon powering up or resetting the TC2201E, that is not otherwise retained by the TC2201E.

B

baud	A unit of signaling speed, expressed as the maximum number of times per second the signal can change the state of the transmission line or other medium (units of baud are sec^{-1}). Note: With Fibre Channel scheme, a signal event represents a single transmission bit.
bus	A means of transferring data between modules and adapters or between an adapter and SCSI devices. For a SCSI bus definition, see SCSI Bus.

C

channel	A general term for a path on which electronic signals travel.
CHAP	Challenge Handshake Authentication Protocol, a security access control protocol networks.
clusters	Two or more computers sharing the same resources on a communication link.

D

device	See iSCSI Device or SCSI Device.
differential	An electrical signal configuration using a pair of lines for data transfer. The advantage of differential compared to single-ended configuration is a relative high tolerance for common-mode noise and crosstalk when used with twisted pair cables. In layman’s terms, this means longer distance.

E

Ethernet MTU	Maximum Transmission Unit, the largest physical packet size, measured in bytes, that a network can transmit. Any messages larger than the MTU are divided into smaller packets before being sent.
exchange	A iSCSI term for the basic mechanism used for managing an operation. An exchange identifies information transfers consisting of one or more related nonconcurrent sequences that may flow in the same or opposite directions, but always in half duplex mode. An exchange is identified by an OX_ID and an RX_ID.

F

fabric	An iSCSI term that includes iSCSI Arbitrated Loop, Switched Fabric, and Point-to-Point.
fault LED	During power up and self test, the TC2201E Fault LED comes on. After self test, if this LED remains on or comes on, the TC2201E has a problem with one of its components. During normal operation, this LED should be off.
fiber	A fiber optic cable made from thin strands of glass through which data in the form of light pulses is transmitted (LASER, LED). It is often used for high-speed transmission over medium (200m) to long (10km) distances but it can be used for short distances (<200m).
Fixed Interval Marker (FIM)	Fixed interval markers (FIMs) provide a synch and steering mechanism that is recommended for certain high-speed iSCSI implementations.
ftp	File Transfer Protocol

H

host bus adapter (HBA)	See iSCSI Adapter.
HVD	High Voltage Differential

I

ID	Numerical identifier
indexed addressing	A menu name. It allows for generic Fibre Channel host bus adapters to access SCSI devices attached to the TC2201E using a table which is indexed by sequential LUN values.
initiator	A device (usually a host system) that requests an operation to be performed by another device known as a target (usually a peripheral).
initiator mode	Configuration mode of the TC2201E in which a Fibre Channel initiator requests operations to be performed by a SCSI target device.
IP	Internet protocol
iSCSI (Internet SCSI)	iSCSI is Internet SCSI (Small Computer System Interface), an Internet Protocol (IP)-based storage networking standard for linking data storage resources, developed by the Internet Engineering Task Force (IETF). By carrying SCSI commands over IP networks, iSCSI is used to facilitate data transfers.
iSCSI Portal Groups	A Portal Group defines a set of Network Portals within an iSCSI Network Entity that collectively supports the capability of coordinating a session with connections spanning these portals. Not all Network Portals within a Portal Group need participate in every session connected through that Portal Group. One or more Portal Groups may provide access to an iSCSI Node. Each Network Portal, as utilized by a given iSCSI Node, belongs to exactly one portal group within that node.

iSNS	iSNS allows the administrator to go beyond a simple device-by-device management model, where each storage device is manually and individually configured with its own list of known initiators and targets. Using iSNS, each storage device subordinates its discovery and management responsibilities to the iSNS server. The iSNS server thereby serves as the consolidated configuration point through which management stations can configure and manage the entire storage network.

L

link	For Fibre Channel, it is a connection between two nodes, each having at least one N_Port (or the other end could be an F-Port), interconnected by a pair of optical or copper links, one inbound and one outbound.
LUN	Logical Unit Number or Logical Unit; a subdivision of a SCSI target. For SCSI-2, each SCSI target supports up to sixteen LUNs (LUN-0 to LUN-15). Using LUNs, the iSCSI host can address multiple peripheral devices that may share a common controller.
LVD/SE	Low Voltage Differential/Single-Ended

M

management information base (MIB)	A structured set of data variables, called objects, in which each variable represents some resource to be managed. A related collection of resources to be managed.
mapping table	A table which is indexed by sequential LUN values, indicating selected BUS:TARGET:LUN devices. It is used by the TC2201E to perform Fibre Channel-to-SCSI operations by default.
MB	megabyte. (There are 8 bits in a byte.)
MIB	See Management Information Base.

motherboard	The main PCA of the TC2201E that provides a physical and logical connection between Fibre Channel and SCSI devices.
multiplexer	A device that allows two or more signals to be transmitted simultaneously on a single channel.

O

offline	Taking the TC2201E offline indicates that all SCSI and iSCSI adapters in the TC2201E are offline. Taking a SCSI adapter offline means ending inputs/outputs and suspending all transactions going from the TC2201E to the specified SCSI devices. The SCSI adapter is no longer active or available for access. Taking a iSCSI adapter offline means ending inputs/outputs and suspending all transactions going from the TC2201E to the specified iSCSI device.
online	For the TC2201E, online indicates that at least one adapter in the TC2201E is active and available for access. For a SCSI adapter, online indicates the SCSI adapter is active and available for access and input/output processing. For a iSCSI adapter, online indicates the iSCSI adapter is active and available for access and input/output processing.

P

point-to-point	One of three existing topologies, in which two ports are directly connected by a link with no fabric, loop, or switching elements present.
post	See Power On Self Test.
power on self test (POST)	A group of tests run when the TC2201E is powered on.

processor	Contains the arithmetic and logic, control, and internal memory units that control the TC2201E.

R

reset SCSI	For a specific SCSI bus, the host clears all inputs and outputs and then resets the bus and all the devices connected to it.
router	An intelligent device within the SAN (storage area network) infrastructure that can handle multiple protocols, such as Fibre Channel and SCSI. The routing decision is based on paths between address mappings among dispersed initiators and targets.
router-to-router	Configuration involving at least two routers where one router is in Initiator Mode and another in Target Mode.

S

SAN	Storage Area Network
SCSI	Small Computer System Interface. An industry standard for connecting peripheral devices and their controllers to an initiator.
SCSI adapter	A 16-bit fast/wide SE or Differential or LVD or 8-bit narrow single-ended physical connection between the TC2201E and the SCSI devices. Each SCSI adapter supports up to sixteen (for fast/wide) or eight (for narrow) SCSI devices, including itself.

SCSI addressing	A SCSI adapter supports up to 16 devices, including itself. Each device has its own unique SCSI address. The SCSI address of a device dictates the device's priority when arbitrating for the SCSI bus. SCSI address "7" has the highest priority. The next highest priority address is "6" followed by 5, 4, 3, 2, 1, 0, 15, 14, 13, 12, 11, 10, 9, 8, with "8" being the lowest priority address. The narrow SCSI adapter is factory set to address 7. A narrow SCSI adapter supports up to eight devices, including itself. SCSI address "7" has the highest priority followed by 6, 5, 4, 3, 2, 1, and 0.
SCSI bus	The means of transferring SCSI data between SCSI devices. It is an 8-bit or 16-bit bus that supports up to eight or sixteen devices (including itself), in any mix of initiators and targets, with the limitation that at least one initiator and one target must be present.
SCSI device	A single unit on the SCSI bus, identifiable by a unique SCSI address. A SCSI device can act as an initiator or target. For SCSI-3, each SCSI device supports up to sixteen LUNs.
SCSI port	An opening at the back of the TC2201E providing connection between the SCSI adapter and the SCSI bus.
SCSI status	A menu name used to show the number of SCSI devices on the bus.
synch and steering layer	A function of iSCSI Fixed Interval Markers (FIMs) used for synchronization and steering of iSCSI Protocol Data Units (PDUs) especially in regards to high-speed iSCSI implementations.

T

TCP	Transmission Control Protocol

target	A device (usually a peripheral) that responds to an operation requested by an initiator (usually a host system). Peripherals are targets, but for some commands (for example, a SCSI COPY command), the peripheral may need to act temporarily as an initiator.
terminator block/ termination	An electrical connection at each end of the SCSI bus composed of a set of resistors (or possibly other components). Its function is to provide a pull-up for open collector drivers on the bus, and also impedance matching to prevent signal reflections at the ends of the cable. The SCSI bus requires termination at both ends of the bus. One end of the SCSI bus is terminated by the SCSI adapter's internal termination. The other end should have a terminator placed on the SCSI connector on the last SCSI peripheral. If this device is not terminated, data errors may occur.
topology	The physical or logical layout of nodes on a network. FC topologies include Point-to-Point, FC-AL, and Fabric.
trap	In the context of SNMP, an unsolicited message sent by an agent to a management station. The purpose is to notify the management station of some unusual event.

V

view node name	A status type in the FC Status Menu showing the identification of the node.
view port name	A status type in the FC Status Menu showing the identification of the port.