adaptec

INSTALLATION GUIDE

ASA-7211C/F iSCSI ADAPTER
FOR INITIATOR APPLICATIONS

Regulatory Compliance Statements

Federal Communications Commission Radio Frequency Interference Statement

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. However, if this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

■ Reorient or relocate the receiving antenna.
■ Increase the separation between equipment and receiver.
■ Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
■ Consult the dealer or an experienced radio/television technician for help.
■ Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

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

Adaptec, Inc.	ASA-7211C
	ASA-7211F
FC Tested to Comply With FCC Standards	
FOR HOME OR OFFICE USE	

((European Union Compliance Statement

This Information Technology Equipment has been tested and found to comply with EMC Directive 89/336/EEC, as amended by 92/31/EEC and 93/68/EEC, in accordance with:

■ EN55022 (1998) Emissions

■ EN55024 (1998) Immunity:
   – EN61000-4-2 (1998) Electrostatic discharge: ±4 kV contact, ±8 kV air
   – EN61000-4-3 (1998) Radiated immunity
   – EN61000-4-4 (1995) Electrical fast transients/burst: ±1 kV AC, ±0.5 kV I/O
   – EN61000-4-5 (1995) Surges ±1 kV differential mode, ±2 kV common mode
   – EN61000-4-6 (1996) Conducted immunity: 3 V
   – EN61000-4-11 (1994) Supply dips and variation: 30% and 100%

In addition, all equipment requiring U.L. listing has been found to comply with EMC Directive 73/23/EEC as amended by 93/68/EEC in accordance with EN60950 with amendments A1, A2, A3, A4, A11.

Australian/New Zealand Compliance Statement

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to the Australian/New Zealand standard AS/NZS 3548 set out by the Spectrum Management Agency.

Canadian Compliance Statement

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Japanese Compliance (Voluntary Control Council Initiative)

This equipment complies to class B Information Technology equipment based on VCCI (Voluntary Control Council for Interface). This equipment is designed for home use but it may causes radio frequency interference problem if used too near to a television or radio. Please handle it correctly per this documentation.

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1

Introduction

In this Chapter

The Adaptec® Storage Accelerator (ASA) 7211 iSCSI storage adapter is a PCI Host Bus Adapter (HBA) that enables servers and storage systems to be used in iSCSI SANs using an Ethernet interconnect. The adapter provides efficient, high-performance TCP/IP and iSCSI protocol offload, with throughput up to 2 Gigabits/sec at full duplex.

Read This First

This chapter is an important guide to the rest of the documentation and provides a summary of the hardware and software installation process. Additional chapters describe how to:

■ Install the adapter.

■ Install, remove, or update the device driver.

■ Install the iConfig utility and configure your adapter (an initiator) and targets.

For details to help you monitor your connections, display statistics and event logs, and add and delete targets, see the *iConfig Utility User's Guide*.

Adaptec iSCSI Adapter Features

The Adaptec iSCSI adapter features are summarized below:

■ Full iSCSI and TCP/IP protocol processing

■ PCI 2.2 compliant; compatible with 3.3/5-V, 32/64-bit, 33/66-MHz slots

■ Supports flashable firmware upgrades

■ Available in two connector configurations:

    ■ ASA-7211C—Copper connector

    ■ ASA-7211F—Fibre connector

Kit Contents

Your Adaptec iSCSI kit includes:

■ ASA-7211 adapter card, shown on .

■ Adaptec iSCSI installation CD containing:

    ■ Operating system drivers

    ■ Initiator Configuration (iConfig) utility

    ■ SNMP extension agents

    ■ Readme files

    ■ This *Installation Guide* and the *iConfig Utility User's Guide* in PDF format

■ This *Installation Guide* as a printed document.

    Note: You need a copper (CAT 5 or CAT 6), or fibre, Ethernet cable. The cable is *not* included in the kit.

Adapter Illustrations

The Adaptec iSCSI adapters are illustrated below. Note the difference in external connectors. One adapter has a copper connector; the other, a fibre connector.
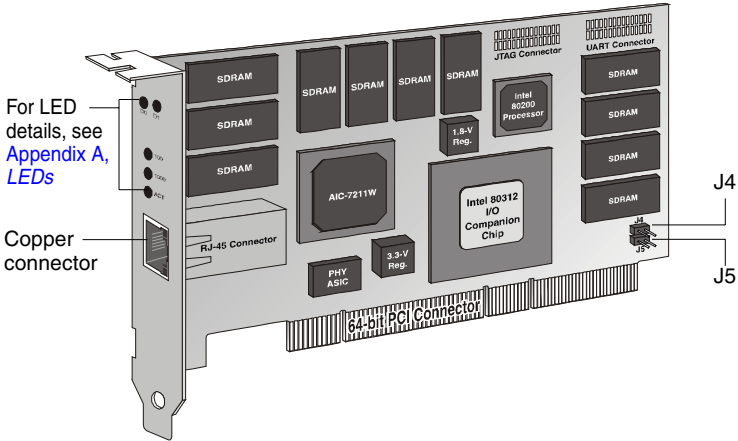
ASA-7211C Adapter Card
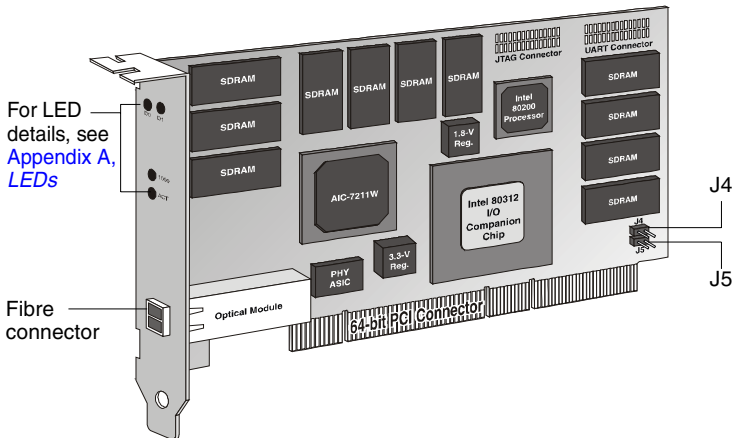
ASA-7211F Adapter Card

Note: Some ASA-7211 adapters are manufactured with jumpers "hanging," but not installed, on jumper connectors J4 and J5. *Do not* install these jumpers.

System Requirements

The following system requirements are discussed:

■ Hardware requirements

■ Supported iSCSI targets

■ Operating system requirements

Hardware Requirements

Your computer must meet the following requirements:

■ Intel Pentium, or equivalent, computer

■ An available PCI slot

■ At least 128 MB of RAM

■ CD-ROM drive

■ Copper (CAT 5 or CAT 6), or fibre, Ethernet cable. (Visit www.adaptec.com for cables.)

Supported iSCSI targets

For the latest support information, refer to www.adaptec.com.

Operating System Requirements

Your computer must have one of the following compatible operating systems:

Windows

■ Windows NT 4.0, Service Pack 6a

■ Windows 2000, Service Pack 3 and above

> **Note:** *Windows 2000 only*—The Adaptec iSCSI adapter does not support power management. If power management is enabled, you must disable it. Refer to Windows Help for details.

Red Hat Linux

■ Version 7.2 with kernel version 2.4.7-10

■ Advanced Server (release 2.1AS) with kernel version 2.4.9-e.3

Using the Adaptec iSCSI Installation CD

The Adaptec iSCSI installation CD contains the device drivers, iConfig utility, user documentation, and SNMP extensions for your Adaptec iSCSI adapter.

You can directly access directories and files on the Adaptec iSCSI installation CD. These include:

■ **Documentation**—Contains the Readme text files and PDF files. See *About the Documentation* on page 1-6 for details.

■ **Drivers**—Provided for each supported operating system.

■ **iConfig Utility**—Provides separate Text User Interface (TUI) iConfig utilities for each supported operating system.

With iConfig, you can view, change, or upgrade your configuration. For example, you can monitor your connections, display MIB statistics and event logs, and add and delete targets.

See the *iConfig Utility User's Guide* for details.

■ **Adaptec SNMP Extension Agents**—Provides Windows and Red Hat Linux SNMP extension agents for simple network management. For details, see the Readme text file in the folder or directory for your operating system.

About the Documentation

The Adaptec iSCSI installation CD provides the following documentation files:

- **readme.txt**—The generic Readme text file in the top-level of the CD file structure summarizes the contents of the installation CD. For specific information, refer to the Readme files in the lower folders (or directories). (The Linux Readme file is inside the rpm file.) These files contain the latest information about the Adaptec iSCSI adapter, important technical information about device compatibility, operating system support, and drivers.

  Visit www.adaptec.com for the latest updates.

  Visit ask.adaptec.com for the latest troubleshooting tips for the adapter, driver, or iConfig utility.

- **ASA-7211 iSCSI Adapter Installation Guide** (This book)— Describes how to install your Adaptec iSCSI adapter, install the driver, install iConfig, and make the initial system configuration. Browse to the Documentation folder on the CD.

- **iConfig Utility User's Guide**—Describes how to monitor your connections, display MIB statistics and event logs, and add and delete targets. Also contains customer support and warranty information. Browse to the Documentation folder on the CD.

To view and print the PDF files, you will need Adobe's Acrobat Reader or Viewer software installed on your system. Acrobat is available from Adobe as a free download. For details, visit www.adobe.com.

Overview of the Installation Process

The following steps provide an overview of the process of installing and configuring the ASA-7211 adapter:

1   Verify that your computer meets the requirements described in *System Requirements* on page 1-4.

2   Gain familiarity with the contents of the Adaptec iSCSI installation CD.

3   Install the Adaptec iSCSI adapter as described in Chapter 2.

4   Install the appropriate driver for your operating system as described in Chapter 3.

5   Connect a Ethernet cable with the appropriate connector type (either copper or fibre) and establish network connectivity between your adapter and your targets.

6   Install the iConfig utility and use it to configure your network, as described in *Chapter 4, Configuring Your iSCSI System*.

2

Installing the Adaptec iSCSI Adapter

To install the adapter in a PCI slot in a computer:

1 Turn off the power to the computer and disconnect the power cord.

2 Before handling the board, discharge any static electricity from your body by touching a grounded metal object such as the exposed metal parts on the back of your computer.

3 Remove the cover from the computer case. If necessary, refer to the instructions in your computer documentation.

4 Locate an unused and unobstructed 64-bit or 32-bit PCI expansion slot and remove the expansion slot cover. Save the slot cover screw for use in the next step.
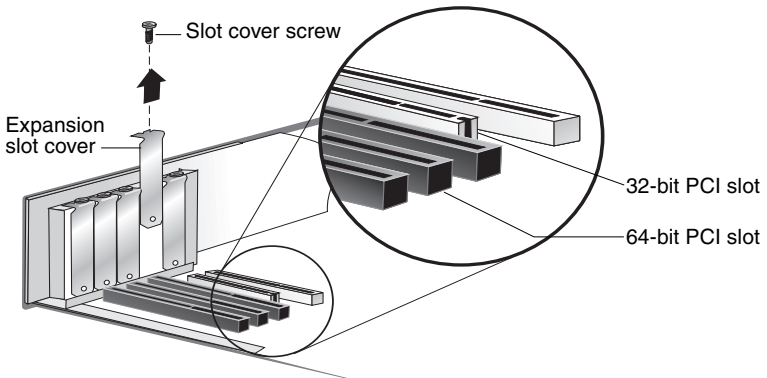
5 Insert the adapter in the PCI expansion slot. Press the board firmly into the slot until it clicks into place. Replace the slot cover screw.

> **Note:** Some ASA-7211 adapters are manufactured with jumpers "hanging," but not installed, on jumper connectors J4 and J5. *Do not* install these jumpers.

6 Close the computer cabinet and reattach the power cord.

Next, install the appropriate software driver for your operating system. See Chapter 3, *Installing the Initiator Mode Driver*.

3

Installing the Initiator Mode Driver

In this Chapter

Now that you have installed the adapter in the computer, you are ready to install the driver. When you are finished installing the driver, proceed to Chapter 4, *Configuring Your iSCSI System*.

Windows 2000

The following driver installation scenarios are described:

■ *Installing the Driver in Windows 2000*

■ *Updating the Driver in Windows 2000*

Installing the Driver in Windows 2000

To install the driver:

1 Install your Adaptec iSCSI adapter according to the instructions in Chapter 2.

2 Start Windows and log in with administrative privileges.

The Windows Found New Hardware Wizard automatically detects the new hardware.

The adapter is identified as a PCI Memory Controller. Later, it will be identified as a SCSI and RAID controller in the Device Manager.

3 Click **Next**.

4 Select **Search for a suitable driver for my device (recommended)** and then click **Next**.

5 On the Locate Driver Files window, select **CD-ROM drives**.

6 Insert the Adaptec iSCSI installation CD and then click **Next**.

7 On the Driver Files Search Results window, select **Next** and follow the on-screen instructions to install the driver.

8 If the Digital Signature Not Found window displays, click **Yes** to continue.

9 On the Completing the Found New Hardware Wizard window, click **Finish**.

10 After the driver installation is finished, the Found New Hardware Wizard window displays a second time, requesting that you install the Adaptec ASAMGMT Processor Device. Click **Yes**.

The driver has been installed. The system does not require rebooting. To verify the driver installation, open the **Device Manager** and view the driver, as shown below.

ASA-7211 adapter
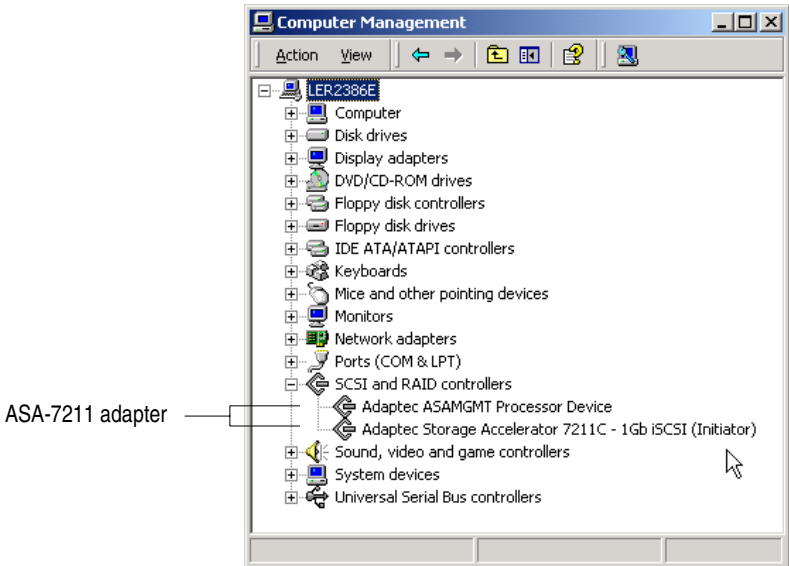
Updating the Driver in Windows 2000

To update the driver:

1 Open the Windows Device Manager.

2 Expand **SCSI & RAID controllers**.

3 Right-click the controller identified as an **Adaptec Storage Accelerator 7211** and choose **Properties**.

4 Select the **Driver** tab.

5 Click **Update Driver** and then click **Next**.

6 Click **Display a list...** and then click **Next**.

7 Click **Have Disk**.

8 Click **Browse** and browse to the Win2000 driver folder on the CD.

9 Click **Open** and then click **OK**.

10 Choose the appropriate driver (**7211C** or **7211F**) for your adapter and click **Next**.

11 Click **Next** again.

12 If you see the Digital Signature Not Found window, click **Yes** to continue.

13 Click **Finish**. No reboot is required.

The driver has been updated. To verify the driver installation, open the **Device Manager** and view the driver, as shown on .

Note: If you have multiple adapters in your computer, you need to update each of them separately (including the ASAMGMT Processor Device) to show the correct driver version for each device.

Windows NT 4.0

The following driver installation scenarios are described:

■ *Installing the Driver in Windows NT 4.0*

■ *Updating the Driver in Windows NT 4.0*

Installing the Driver in Windows NT 4.0

To install the driver:

1 Install your Adaptec iSCSI adapter according to the instructions in Chapter 2.

2 Start Windows and log in with administrative privileges.

3 Insert the Adaptec iSCSI installation CD.

4 Open the Windows **Control Panel**.

5 Double-click **SCSI Adapters**.

6 Click the **Drivers** tab.

7 Click **Add**.

8 Click **Have Disk**.

9 Click **Browse** and then browse to WinNT40 driver folder on the installation CD.

10 Click **Open**.

11 Click **OK**.

12 Click **Adaptec Storage Accelerator 7211 (NT 4.0)**.

13 Click **OK** and follow all Windows instructions. Windows will prompt you to reboot your computer.

Updating the Driver in Windows NT 4.0

To update the driver, you must first remove the driver. To remove the driver:

1 Open the Windows **Control Panel**.

2 Double-click **SCSI Adapters**.

3 Click the **Drivers** tab.

4 Choose the appropriate driver from the list box.

5 Click the controller identified as an **Adaptec Storage Accelerator 7211**.

6 Click **Remove** and follow all Windows instructions. Windows will prompt you to reboot your computer.

7 After the system reboots, follow the instructions in *Installing the Driver in Windows NT 4.0* to install the latest driver.

Red Hat Linux

This section contains the following procedures for Version 7.2 with kernel version 2.4.7-10 and Advanced Server (release 2.1AS) with kernel version 2.4.9-e.3:

■ *Installing the Red Hat Module*

■ *Removing the Red Hat Module* on page 3-8

■ *Enabling Multi-LUN Support in Linux* on page 3-9

For additional Linux functionality, such as dynamically adding and removing devices, refer to the Linux Readme file located on the CD inside the RPM file.

Installing the Red Hat Module

To install the asa72xx module:

> **Note:** Linux is case-sensitive; keep this in mind when entering commands.

1 Login as root.

2 Verify that the correct Linux kernel and kernel source is installed in the system before installing the module. See *Operating System Requirements* on page 1-4.

3 To mount the Adaptec iSCSI installation CD, enter:

```
mount /dev/cdrom /mnt/cdrom
```

4 To change to the cdrom directory, enter:

```
cd /mnt/cdrom/Drivers/Linux
```

5 To unpack the module package, enter:

```
rpm -Uhv asa72xx.rpm
```

6 To change to the /usr/src/asa72xx directory, enter:

```
cd /usr/src/asa72xx
```

7 To unmount the Adaptec iSCSI installation CD, enter:

```
umount /mnt/cdrom
```

8 To run the configure script, enter:

```
./configure
```

For Red Hat Linux 7.2, the following command works:

```
./configure --tree=/usr/src/linux-2.4.7-10
```

If the kernel source is not under /usr/src/linux-2.4.7-10, run the configure script with the following option:

```
./configure --tree=<path to source tree>
```

9 To copy the module to /lib/modules/<*kernel version*> and start the module automatically on reboot, enter:

```
make install
```

10 To start the module now, enter:

```
./S06asa72xx
```

The module installation is complete. You do not need to reboot the computer.

Removing the Red Hat Module

To remove the asa72xx module:

1 Verify that no devices are being used by the adapter.

2 Unmount all volumes from the adapter.

3 If the asa72xx module is loaded, use rmmod or modprobe to unload the module. Enter:

```
rmmod asa72xx
```

or enter:

```
modprobe -r asa72xx
```

4 To change to the /usr/src/asa72xx directory, enter:

```
cd /usr/src/asa72xx
```

5 To run the remove script, enter:

```
sh asa72xx_remove
```

6 To remove the RPM, enter:

```
cd ..
```

and then enter:

```
rpm -e asa72xx
```

7 To remove the asa72xx directory, enter:

```
rm -rfv asa72xx
```

The module is now removed from the system.

Enabling Multi-LUN Support in Linux

The default Linux kernel settings allow a maximum of 40 SCSI devices. However, you must enable multiLUN support to see more than one LUN, and when you do so, you can increase the maximum number of devices to 110. To enable multi-LUN support:

1 To change to the linux source directory, enter:

```
cd /usr/src/linux-2.4.7-10
```

2 To configure the kernel:

   a Enter make menuconfig

   b Select **SCSI Support** and press **Enter**.

   c Select **Probe all LUNs on each SCSI device**. Then, press **Y**. (If selected, an asterisk (*****) shows.)

   d *Optional*—Select **Maximum number of SCSI disks that can be loaded as modules** and increase the number from 40 to the desired value, up to 110. Then, choose to load SCSI as a module.

   e Press **Esc** twice to exit menuconfig.

   f Select **Yes** when asked to save the kernel configuration

3 To make a new kernel, enter:

```
make dep
make bzImage
cp /usr/src/linux-2.4.7-10/arch/i386/boot/bzImage
   /boot/vmlinuz-ml
make modules
make modules_install
depmod -ae
mkinitrd /boot/initrd-2.4.7-10custom.img 2.4.7-10custom
```

4   To modify the boot-loader configuration, use the appropriate procedure.

> ◢ **Note:** When you type the text shown below, replace *<boot_device>* with the relevant parameter.

■   If you use Grub as your bootloader, edit /etc/grub.conf and add the following lines:

```
title Red Hat Linux (2.4.7-10custom) linux-ml
root (hd0,0)
kernel /boot/vmlinux-ml ro root=<boot_device>
initrd /boot/initrd-2.4.7-10custom.img
```

■   If you use LILO as your bootloader, edit /etc/lilo.conf and add the following lines:

```
image=/boot/vmlinux-ml
label=linux-ml
initrd=/boot/initrd-2.4.7-10custom.img
read-only
root=<boot_device>
```

5   Exit the editor, saving changes.

6   If you use LILO, enter `/sbin/lilo -v`

7   Select **linux-ml** to boot Linux using the newly configured kernel.

4

Configuring Your iSCSI System

In this Chapter

Now that you have installed your Adaptec iSCSI adapter and driver, you need to establish Ethernet connectivity between your adapter and your targets. Then, run iConfig and use it to configure your iSCSI system.

iConfig has an easy-to-use Express Setup that prompts you for the information your system needs to configure it for the first time.
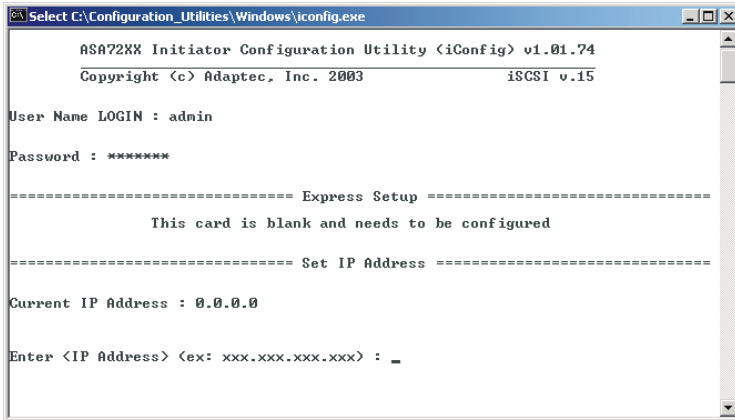
Once your system is setup, you can use iConfig to view, change, or upgrade your configuration. For example, you can monitor your connections, display MIB statistics and event logs, and add and delete targets.

Running iConfig on Windows

To start using iConfig to configure your system:

1 Insert the Adaptec iSCSI installation CD and copy the Windows iconfig.exe file to your local hard drive.

2 From your local hard drive, double-click **iConfig.exe**.

3 At the login prompt, enter the default user ID, admin.

4 At the password prompt, enter the default password, adaptec.

The iConfig Express Setup is displayed.

```
Select C:\Configuration_Utilities\Windows\iconfig.exe                    _ □ ×

          ASA72XX Initiator Configuration Utility (iConfig) v1.01.74
          Copyright (c) Adaptec, Inc. 2003                  iSCSI v.15

User Name LOGIN : admin

Password : *******

============================= Express Setup =============================
              This card is blank and needs to be configured

============================= Set IP Address =============================

Current IP Address : 0.0.0.0


Enter <IP Address> (ex: xxx.xxx.xxx.xxx) : _
```

> ✓ **Note:** To change your password, see *Changing Your iConfig Password* on page 4-5.

Now that you have started iConfig, proceed to *Using Express Setup to Configure Your iSCSI Adapter* on page 4-4.

Running iConfig on Red Hat Linux

1 Login as root.

2 To mount the Adaptec iSCSI installation CD, enter:

```
mount /dev/cdrom /mnt/cdrom
```

3 To change to the Linux directory on the CD, enter:

```
cd /mnt/cdrom/"Configuration Utilities"/Linux
```

4 To copy the utility to your local hard drive, enter:

```
cp -v iconfig /sbin
```

5 Enter `iconfig`

6 At the login prompt, enter the default user ID, `admin`

7 At the password prompt, enter the default password, `adaptec`

The iConfig Express Setup instructions are displayed.

Now that you have started iConfig, proceed to *Using Express Setup to Configure Your iSCSI Adapter* on page 4-4.

Using Express Setup to Configure Your iSCSI Adapter

Now that you have started iConfig, you are ready to run iConfig Express Setup to configure your adapter (initiator).

> **Note:** In any menu, press **Esc** to get back to the previous menu.

When you run iConfig for the first time, you automatically enter Express Setup, and you are prompted to enter the following information for the initiator:

■ IP address

■ Subnet mask

■ Gateway address

■ iSCSI initiator name

Now that your initiator is configured, you can choose from these options:

■ **Allow iConfig to discover your targets automatically**—iConfig locates and configures targets and displays target information.

■ **Enter target information manually**—You are prompted to enter the following information for each target:

  ■ Target DNS name or IP address

  ■ Port number

  ■ iSCSI target name

After you enter this information, save your settings. The Main Menu is displayed as shown below.
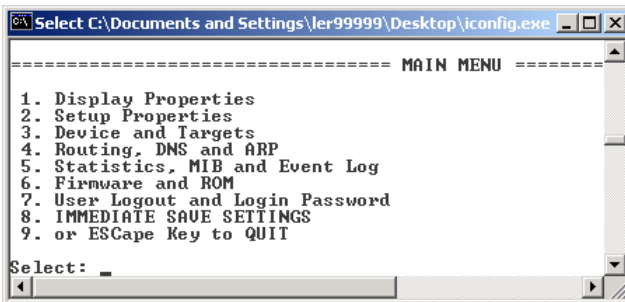
Changing Your iConfig Password

The default user ID is `admin`. The default password is `adaptec`. To change the default password:

1 From the Main Menu, select **User Logout and Login Password**. For details, see the Main Menu illustration on page 4-4.

2 Select **User Password Change**.

3 To complete the change, follow the iConfig instructions.

Configuration Tasks

The following table summarizes the configuration tasks you can perform using iConfig. The menu options all appear in the Main Menu illustration on page 4-4.

To perform this task...	Use this Menu Option...
➤ View controller and target info	➤ 1. Display Properties
➤ View and set controller, Ethernet, SLP, and ISNS properties ➤ View and set login parameters	➤ 2. Setup Properties
➤ View, add, edit, delete, and rescan targets	➤ 3. Device and Targets
➤ View, add, and delete routing, DNS, ARP, and Host table entries.	➤ 4. Routing, DNS, and ARP
➤ View port transmission statistics, event messages, initiator login, iSCSI session statistics and iSCSI node portal info	➤ 5. Statistics, MIB, and Event Log
➤ Erase or save ROM settings ➤ Upgrade firmware	➤ 6. Firmware and ROM
➤ Logout ➤ Change your password	➤ 7. User Logout and Login Password
➤ Save settings	➤ 8. Immediate Save Settings

For additional information, refer to the *iConfig Utility User's Guide*.

A

LEDs

You can use the adapter LEDs to diagnose problems during system startup and as speed indicators during normal system operation.

The following table describes LED diagnostic indications.

D0	D1	Indication
Off	Off	Power-on Self Test (POST) failed.
Flashing	Off	POST is in progress.
On	Off	POST is complete.
On	On	Initialization is complete.

The following table describes the LED functionality for the ASA-7211C only.

Label on Bracket[1]	Reference Designator[2]	Function	LED Description	Color
100	DS2	Rate indicator	When lit, indicates a valid 100-Megabit/sec connection.	Green
1000	DS3	Rate indicator	When lit, indicates a valid GbE (1000 Megabit/sec) connection.	Green
ACT	DS4	Activity status	When flashing, indicates an incoming signal or outgoing traffic.	Yellow

[1] See the appropriate figure on page 1-3.
[2] When both DS2 and DS3 are off and DS4 is on, a 10-Megabit/sec connection is indicated.

The following table describes LED functionality for the ASA-7211F only.

Label on Bracket[1]	Reference Designator	Function	LED Description	Color
1000	DS3	Rate indictor	When lit, indicates a valid GbE (1000 Megabit/sec) connection.	Green
ACT	DS4	Activity status	When lit, indicates an incoming signal or outgoing traffic.	Yellow

[1] See the appropriate figure on page 1-3.