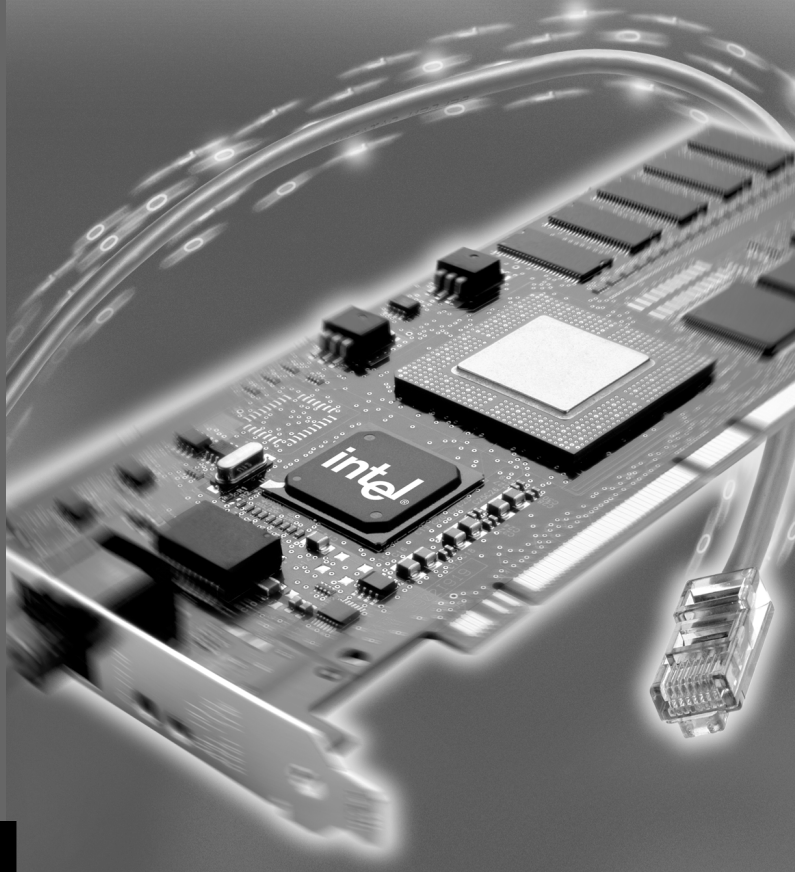


# Intel® PRO/1000 T IP Storage Adapter

*Bringing Gigabit Ethernet to Network Storage*

## Quick Installation Guide

Full Manual  
on CD.  
See inside  
for details.



intel®

# Additional Information

## Online User Configuration Guide

The full *User Configuration Guide* is located on the Intel® PRO/1000 T IP Storage Adapter CD. Use your web browser to view or print topics from the *User Configuration Guide*. The guide covers additional configuration topics and SAN configuration instructions. To view the guide, put the CD in your drive and wait for the Autorun screen to display. Click the *User Configuration Guide* button to access the information.

## Online Services

You can use the Internet to download software updates, troubleshooting tips, installation notes, and more. Online services are on the World Wide Web at: <http://support.intel.com>

## Late-Breaking News

Look for the *Late-Breaking News* document in the box. This document provides useful information about adapter compatibility as well as special installation release notes that were not available at the time the CD was created.

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## How to Use This Guide

The Intel® PRO/1000 T IP Storage Adapter allows companies to build cost-effective Storage Area Networks (SANs) using standard LAN/Ethernet infrastructure. It uses the new, open iSCSI standard to transmit SCSI storage data over native Ethernet networks, dramatically lowering the total cost of ownership for storage networks while still offering increased reliability, availability, scalability, and manageability of stored data. This adapter is designed to optimize PCI server bus architecture with 66 MHz/64-bit performance for high-end storage environments, and connects devices located anywhere on an Ethernet network.

This Quick Installation Guide provides information on how to install the PRO/1000 T IP Storage Adapter, how to download Windows and Linux drivers, and basic adapter configuration information. For complete details on adapter configuration and maintenance, refer to the *PRO/1000 T IP Storage Adapter User Configuration Guide* on the CD-ROM.

# System Requirements

Before installing the Intel PRO/1000 T IP Storage Adapter, check your system for the following minimum configuration requirements:

- One open 32-bit or 64-bit bus master PCI slot
- 64 MB of system memory
- The latest BIOS for your computer
- Microsoft Windows<sup>®</sup> 2000 (SP2 or later), Windows NT<sup>®</sup> 4.0 (SP 6 or later), Linux Red Hat<sup>®</sup> version 7.1 (2.4 kernel)
- Category 5, twisted-pair cabling for 100/1000 Mbps operation, and an 802.3ab-compliant gigabit switch such as the Intel<sup>®</sup> NetStructure™ 480T switch. For best results at 1000 Mbps, use CAT 5e cabling.

<sup>^</sup>You can download the necessary software patches from Microsoft (see below).

## Microsoft Service Packs

Visit the following Microsoft web site for the latest Service Pack information. If this site has changed, go to the main Microsoft site and search for the term, “Service Pack.”

<http://www.microsoft.com/ntserver/>

# Inserting the Adapter in the Computer

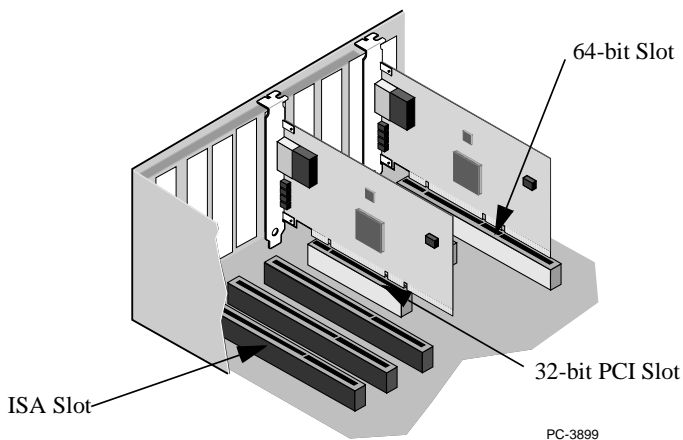
1. Turn off and unplug your computer if it is not a Hot Plug system. For Hot Plug servers, see your server's documentation.
2. Remove the cover from the computer.



**WARNING:** Turn off and unplug the computer before removing the computer cover. Failure to do so could endanger you and may damage the adapter or computer.

3. Remove the cover bracket from the 32-bit or 64-bit PCI bus master slot. A 64-bit slot should be used whenever possible. In a 32-bit PCI slot, the end of the edge connector will be exposed and not connected. Make sure the exposed end does not contact any conducting part of the motherboard (see Figure 1).

**NOTE:** The NIC cards in the PCI bus slots in Figure 1 are for illustration purposes only to show ease of installation. The actual PRO/1000 T IP Storage Adapter card is longer and contains more components than the NICs depicted in Figure 1.



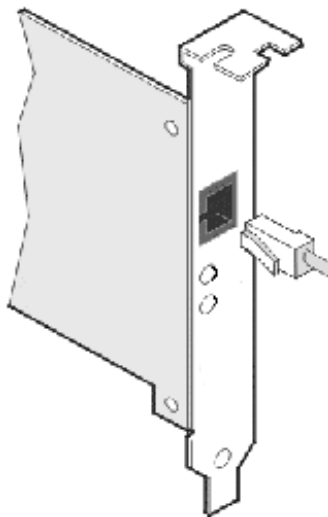
**Figure 1. Adapter card being inserted in PCI bus master slots**

4. Press the adapter into the slot until the adapter is firmly seated. Secure the adapter bracket.
5. Repeat steps 3 and 4 for each adapter you want to install.
6. Replace the computer cover and plug in the power cord.
7. Turn the power on. The computer PCI BIOS automatically assigns resources to the adapter(s). If you receive a PCI configuration error, see “Troubleshooting” in the *User Configuration Guide* on the CD.

# Attaching the Network Cable

## RJ-45 Adapter

Insert the Category 5 twisted pair RJ-45 network cable into the adapter connector, as shown in Figure 2.



**Figure 2. RJ-45 network cable being inserted into an adapter connector**

For 1000Base-T or 100Base-TX, you must use Category 5 network cable (four twisted-pair wiring). If you plan to run the adapter at 1000 Mbps, it must be connected to a compatible 1000 Mbps switch.

**NOTE: Most compatible switches do not support all three speeds (10/100/1000) on a single port. Refer to the switch documentation for details.**

For 10Base-T, use Category 3, 4, or 5 twisted-pair wiring. Residential environments require the use of a Category 5 cable.

# Installing the Drivers

Driver installation procedures are included for Windows 2000, Windows NT 4.0, and Linux Red Hat Version 7.1. You can also install drivers from the accompanying CD.

## Windows\* 2000

After you install the PRO/1000 T IP Storage Adapter in the computer, connect the cable, plug in the power cord, and start the computer. Windows will detect the new PCI device and display the Found New Hardware dialog box, and start the Found New Hardware Wizard.

Using the Wizard, follow this procedure to install the correct driver.

1. Insert the PRO/1000 T IP Storage Adapter CD in the CD-ROM drive.  
If the CD autorun program starts, close this window at this time.
2. On the Wizard Welcome screen, click on “Next” to start.
3. On the next screen, choose the “Search for a Suitable Driver” option, and click on “Next.”
4. Click on the CD-ROM box only on the Locate Driver screen, and click on “Next.”
5. After a few moments, the Search Results will indicate a driver was found on the CD. Click on “Next” to continue.
6. The “Digital Signature Not Found” screen will display. This screen will be deleted when Microsoft certification has been obtained. Click on “Yes”.
7. The necessary files will then be copied to the computer. The Wizard displays a “Completing the Found New Hardware Wizard” message. Click on “Finish.”
8. Navigate to Start/Settings/Control Panel.
9. Double-click on the “Intel® PROSet for IP Storage” icon to begin the configuration process. Refer to the online *User Configuration Guide* on the CD to complete the configuration process.

## Windows NT\* 4.0

The SAN driver supports Windows NT 4.0 servers and workstations. This driver does not support Windows 95, 98, ME, NT 3.51 or earlier versions of NT.

**NOTE:** Prior to installation, review the Service Pack requirements in the **System Requirements** section. If your NT install does not include it, apply Service Pack 6, which can be downloaded from [Microsoft.com](http://Microsoft.com)

Follow this procedure to install the driver:

1. Insert the CD-ROM into the drive. If the CD autorun program starts, close this window at this time.
2. In the Control Panel, double-click on the “SCSI Adapters” icon.
3. From the next screen, select the “Drivers” tab, click on “Add” (the popup message “Creating Driver List” will display).
4. On the next screen, click on “Have Disk” and next to the “Copy files from” field, click on “Browse” or type the path to your CD-ROM drive in the dialog box, and click OK (for example: “<CD-ROM drive>\drivers\NT4”). Follow the instructions to install the drivers. When the adapter is added, it appears in the SCSI adapters list.
5. Click “OK”.
6. Navigate to Start/Settings/Control Panel.
7. Double-click on the “Intel® PROSet for IP Storage” icon to begin the configuration process. Refer to the online *User Configuration Guide* on the CD to complete the configuration process.

**NOTE:** Once the external drive (or drives) has been connected and formatted with driver letter assigned, subsequent system reboots will cause the drive connection to vary; for example, on W2K, the drive letter is automatically assigned, but on NT4, you will need to run the Disk Administrator and assign the drive letter to access the iSCSI target(s).

## Linux Red Hat\* Version 7.1

1. Place the Intel PRO/1000 T IP Storage Adapter CD in the appropriate drive. To install drivers for Linux Red Hat Version 7.1, you can use the Gnome RPM GUI tool, as shown in Figure 3.

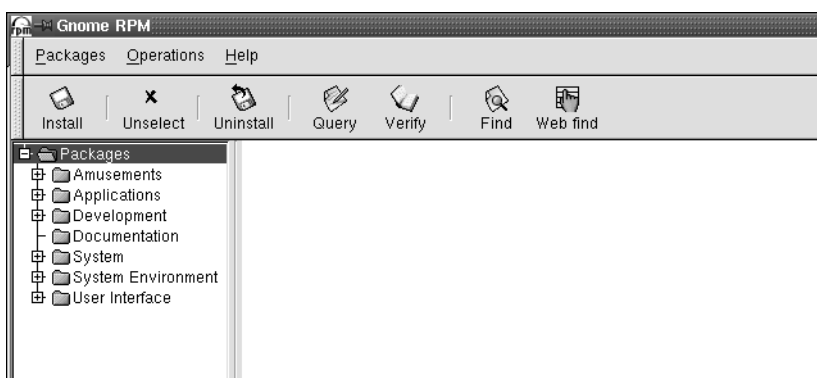
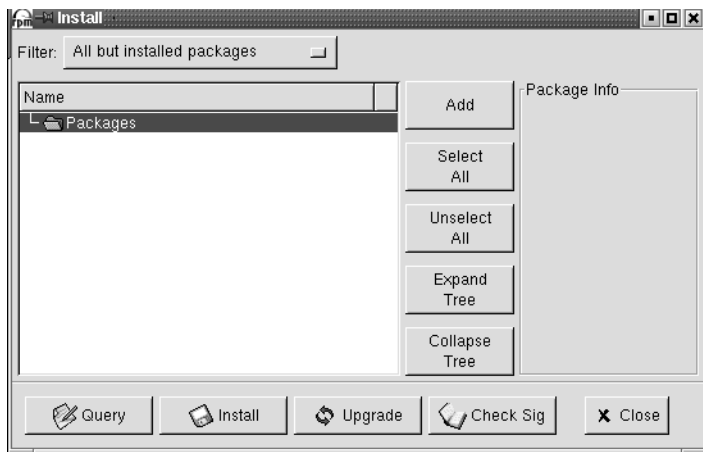


Figure 3. Gnome RPM GUI Tool

2. Click on the Packages folder to open subfolders and view contents.

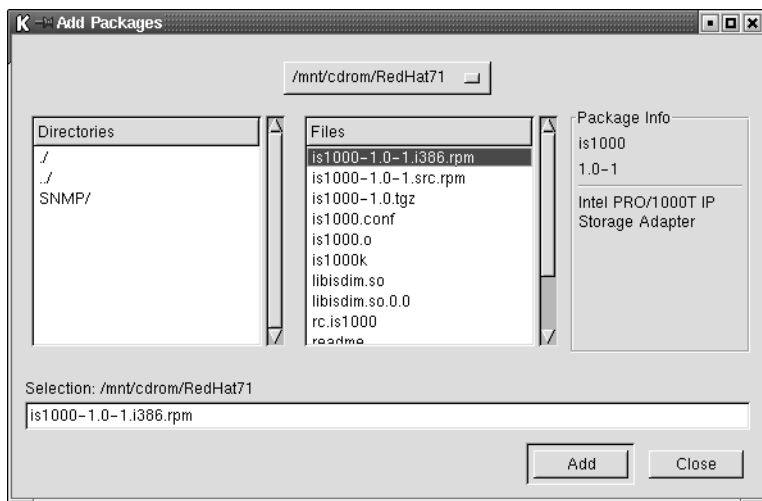


- Click on the Install button on the Gnome RPM applet window (in the toolbar in Figure 3). The Install popup screen will display as shown in Figure 4.



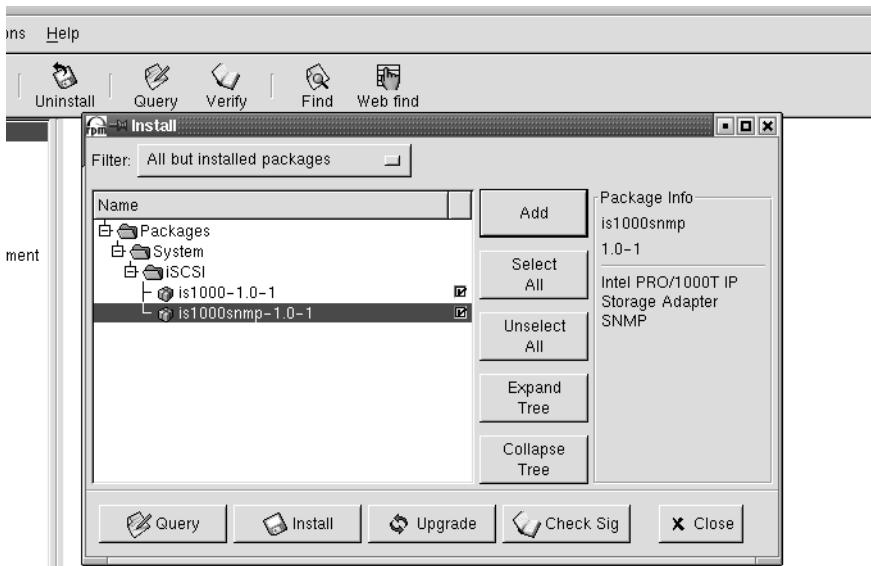
**Figure 4. Install Popup Screen**

- Click on the Add button, which will pop up the screen shown in Figure 5. Highlight the specific package you want to install (the "is1000-1.0-1.i386.rpm" package has been highlighted) and click on the Add button. The screen shown in Figure 6 will display.



**Figure 5. Add Packages screen**

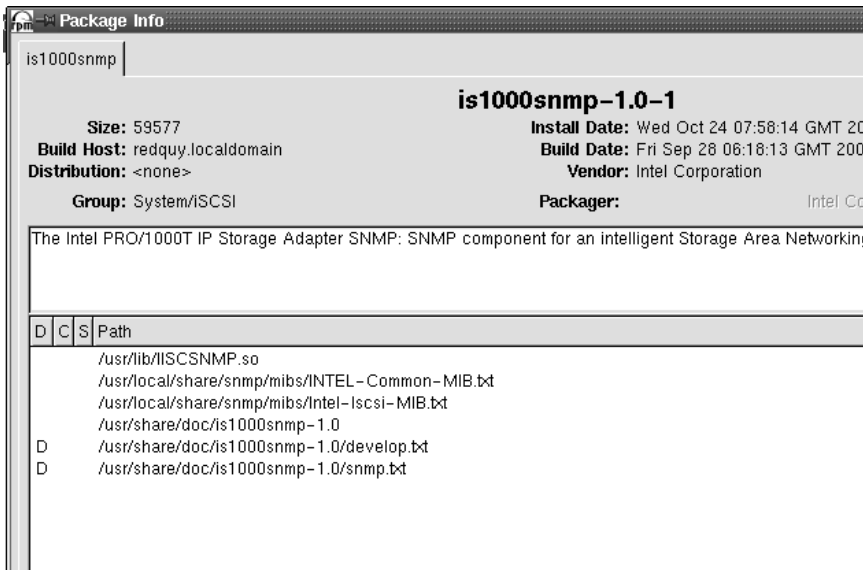
5. Select the package and click on the Install button at the bottom of the screen.



**Figure 6. Install Window Showing Selected RPM Package**

6. After installation, you can view the files in the RPM package that were installed by following this procedure:
  - a. View the Gnome RPM window
  - b. Expand the System folder
  - c. Open the SCSI subfolder
  - d. Highlight the installed RPM package icon
  - e. Click on the Query button at the top of the screen

A pop-up screen (such as that shown within Figure 7) displays the installed files as a result of that query.



**Figure 7. Post-Installation Query of Files Installed**

This completes the Linux Red Hat Version 7.1 driver installation.

## Uninstalling Drivers (Windows)

To uninstall drivers, follow this procedure:

1. Go to Device Manager.
2. Expand SCSI and RAID controllers.
3. Right-click the mouse on “Intel PRO/1000 T IP Storage Adapter” and click on Uninstall.

## Uninstalling Drivers (NT4)

To uninstall drivers, follow this procedure:

1. Go to Control Panel
2. Double click on SCSI Adapters icon
3. Click on the Drivers tab
4. Highlight the “Intel PRO/1000 T IP Storage Adapter”
5. Click the “Remove” button
6. Reboot server

## Uninstalling the Application (Windows)

To uninstall the application, follow this procedure:

1. From Start/Settings, go to Control Panel and double-click on the "Add/Remove Programs" icon.

2. From the pop-up window, select "Change or Remove Programs".
3. Scroll down to the Intel PRO1000 T IP Storage Adapter application and click on the Remove button.

**NOTE: To reinstall the application, you will have to follow the instructions in the *Updating Driver Information (Windows)*.**

## Updating SCSI Drivers (Windows)

To update SCSI driver information, follow this procedure:

1. Go to Device Manager.
2. Expand the SCSI and RAID controllers.
3. Right-click the mouse on "Intel PRO/1000 T IP Storage Adapter" and click on Properties.
4. Click the Driver tab.
5. Click Update Driver button. Walk through the Wizard, and search and select the inf file to complete the process.

## Updating SCSI Drivers (NT4)

For Windows NT 4.0 driver update, please refer to Windows NT 4.0 driver installation section.

## Linux Driver and Application Updates and Uninstall

Linux Red Hat Version 7.1 configuration information is located in the "is1000.txt" file in the Linux Red Hat 7.1 directory on the CD. For detailed information on uninstalling Linux drivers, uninstalling the Linux application, re-installing the Linux application, and updating Linux drivers, refer to the Readme file present in the TAR file.

## Updating the Firmware on the PRO/1000 T IP Storage Adapter

Versions of adapter firmware are tied to a specific version of the iSCSI specification (see the *Late Breaking News* document for complete details). If it is necessary to update the PRO/1000 T IP Storage Adapter firmware, use the "frucmd" command-line utility. The syntax for updating the firmware from the DOS prompt is

**frucmd -d -f ixworks.bin**

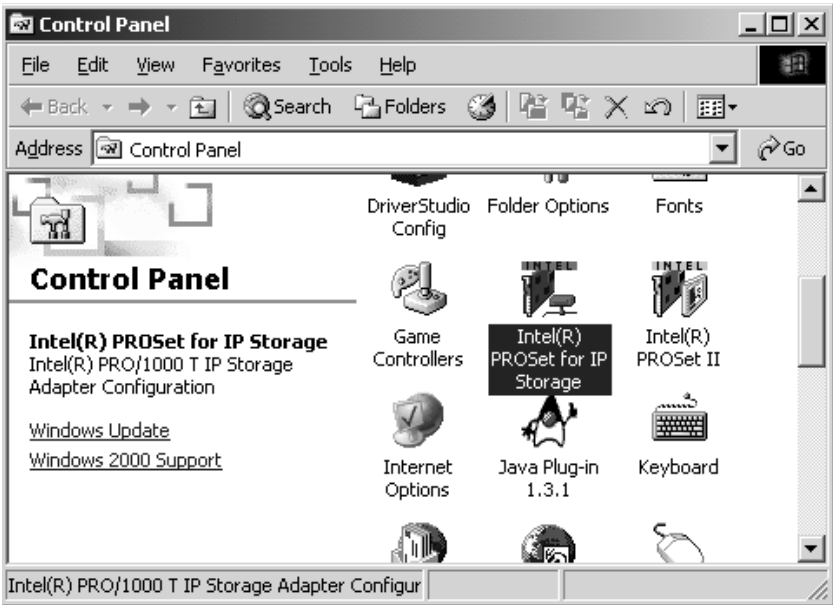
You will have to reboot your Windows or Linux machine for the command to take effect.

# Basic Configuration Information

## iSCSI Configuration: Windows\* 2000

Complete installation and configuration information is available on the CD-ROM. Only initial configuration information is presented in this document.

To begin configuring the PRO/1000 T IP Storage Adapter, go to the Control Panel and double-click the "Intel® PROSet for IP Storage" icon (shown in Figure 8) to begin the configuration process.



**Figure 8. Control Panel Showing the Intel® PROSet for IP Storage Configuration Icon**

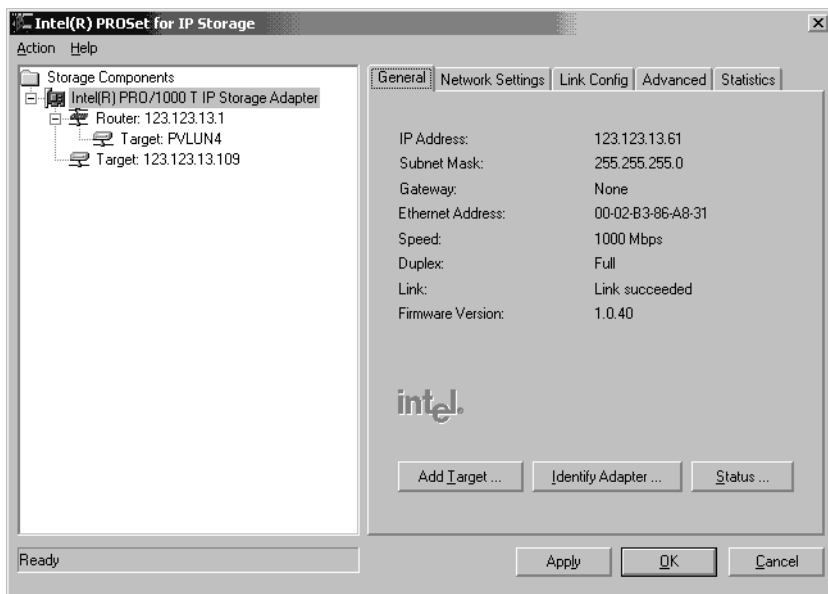
The Intel PROSet for IP Storage Configuration screen will display in a split-screen format (Figure 9).

The General folder screen shown in Figure 9 displays the 5 Property fields (tabbed folders) for the selected storage component. The General folder displays the following parameters:

- Component IP address
- Subnet Mask address
- Gateway address
- Ethernet address
- Connection speed

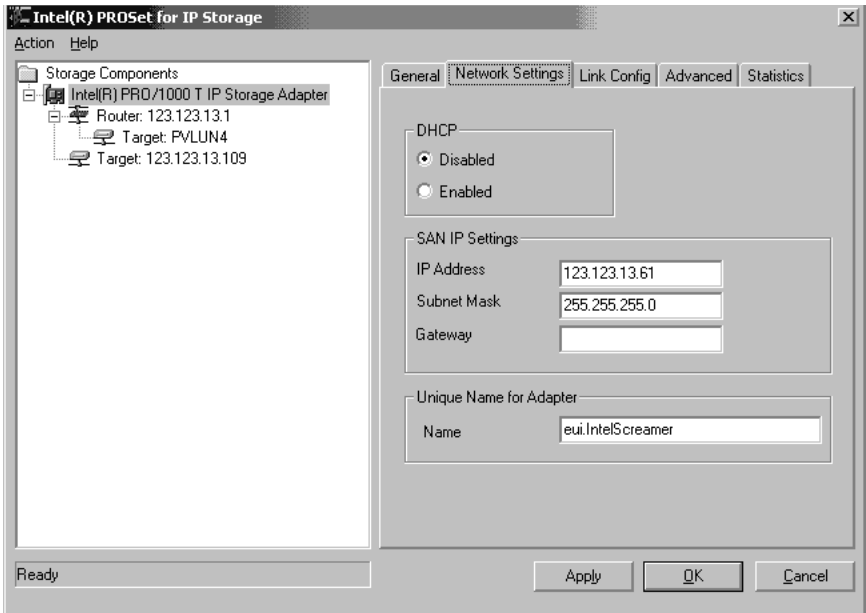
- Duplex mode (Half or Full)
- Link status
- Firmware version

Before you can add Targets to the configuration, you must first configure the network settings.



**Figure 9. Intel® PROSet for IP Storage Configuration Screen**

Click on the “Network Settings” tab to display the Network Settings screen (Figure 10).



**Figure 10. Network Settings Screen**

**Note:** It is important that you enter the **SAN IP settings** before adding any targets. Without the IP settings, you cannot connect to targets.

The Network Settings screen contains three areas. The **DHCP** area shows the Dynamic Host Configuration Protocol status. In this example, it is disabled.

The **SAN IP Settings** area contains 3 fields: *IP Address*, the *Subnet Mask*, and the *Gateway*. If DHCP is enabled, these fields are automatically assigned. If DHCP is disabled, you will have to manually set the *IP Address*, *Subnet Mask*, and *Gateway* fields (with *Gateway* being the only optional field).

The **Unique Name for Adapter** area, where you enter a unique name for the adapter in the *Name* field.

Refer to the *User Configuration Guide* on the CD-ROM for complete configuration details and maintenance information.

# Basic Troubleshooting

If you cannot link to your switch, try the following suggestions.

## **1. Check the LED lights on the adapter**

If the LINK light isn't on, check all connections at the adapter and link partner. Make sure the link partner is set to match the adapter (preferably set to Auto Negotiation Enabled) and the driver is loaded.

## **2. Make sure the cable is installed properly**

The network cable must be securely attached at all connections. If the cable is attached but the problem persists, try a different cable.

## **3. Check the “Common problems” table in the online *User Configuration Guide* and try the recommended solutions**

If none of these works, check the *Late-Breaking News* document that came in the box with the Intel PRO/1000 T IP Storage Adapter, or check the Intel support Web site. See *Intel Automated Customer Support* for information on connecting to Intel's online services.



# Adapter Specifications

<b>CONNECTIONS</b>
IEEE standard/network topology: 10Base-T, 100Base-T, 1000Base-T
Wiring/Connections: CAT-5, 4 pair (1000Base-T)/RJ-45
<b>HOST BUS ADAPTER PRODUCT FEATURES</b>
<ul style="list-style-type: none"><li>• Plug and Play Specification support</li><li>• Auto-negotiation, full duplex capable</li><li>• Power Management (Network Device Class, Power Management Reference Specification 1.0a)</li><li>• 32 MB of external SDRAM for context memory</li><li>• 4 MB Flash</li><li>• Single ported adapter</li><li>• Standard PCI form factor</li><li>• Field upgradeable firmware and software via Flash</li></ul>
PCI v2.2 buses supported: 64/66, 64/33, 32/66, and 32/33
<b>NETWORK MANAGEMENT</b>
<ul style="list-style-type: none"><li>• SNMP manageable</li></ul>
<b>OPERATING SYSTEMS SUPPORT</b>
Microsoft Windows* 2000 (SP2 or higher), NT* 4.0 (SP 6.0 or higher), Linux Red Hat* Version 7.1 (2.4 kernel)
<b>TECHNICAL FEATURES</b>
Data rate(s) supported per port: 10/100/1000 Mbps
External Memory: 32 MB ECC SDRAM; 4 MB Flash
IEEE Support: 802.2, 802.3z, and 802.3ab
Data transfer mode: Bus-master DMA
Controller or processor: Intel® XScale™ 80200
Typical power consumption: 7.8 - 8 Watts
Data path width: 32-bit and 64-bit PCI
MAC on-board memory: 64 KB
Interrupt levels: INTA
IETF Support: iSCSI draft standard 0.6+ (visit <a href="http://www.ietf.org">http://www.ietf.org</a> to download latest standards). See <i>Late Breaking News</i> for instructions on downloading firmware to support later versions of the iSCSI specification.
MAC: Intel® 82544E1
I/O Companion Chip: Intel® 80312
Operating Temperature/Humidity: 0-55 degrees C; 85% at 55 degrees C
Hardware Certifications: FCC B, CE, UL 1950, CSA 950, BSMI, VCCI Class 2
<b>INTEL BACKING</b>
Limited lifetime warranty; 90-day money-back guarantee (U.S./Canada only)

# Intel Automated Customer Support

You can reach Intel's automated support services 24 hours a day, every day at no charge. The services contain the most up-to-date information about Intel products. You can access installation instructions, troubleshooting information, and general product information.

## User Configuration Guide on Your Product CD-ROM

For more information about adapter configuration or other topics, see the online *User Configuration Guide*. To view the guide, insert the Intel CD in your drive and wait for the Autorun to display. Click the *User Configuration Guide* button to view the guide. Note that a web browser is required to view the guide.

## Web and Internet Sites

Support:	<a href="http://support.intel.com">http://support.intel.com</a>
Network Products:	<a href="http://www.intel.com/network">http://www.intel.com/network</a>
Corporate:	<a href="http://www.intel.com">http://www.intel.com</a>

## Customer Support Technicians

US and Canada: 1-916-377-7000 (7:00 - 17:00 M-F PST)

Worldwide access: Intel has technical support centers worldwide. Many of the centers are staffed by technicians who speak the local languages. For a list of all Intel support centers, the telephone numbers, and the times they are open, visit

<http://www.intel.com/support/9089.htm>

## Product Warranty

This product is covered by a Limited Lifetime Warranty. See the online *User Configuration Guide* for details.

## Regulatory Notices

All regulatory notices are provided in the online *User Configuration Guide*.

## Software License Agreement

Software included with this product is protected by a specific Software License Agreement, provided in the online *User Configuration Guide*. By using this software you agree to the provisions in the Software License Agreement.



Support:

<http://support.intel.com>

Network Products:

<http://www.intel.com/network/connectivity>

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