Installing a Policy Accelerator 100 Board

(PA1002PCI)

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About This Guide

This guide describes how to install an Intel® Policy Accelerator 100 board (PA1002PCI) into a personal computer (PC) and how to add memory and daughter cards to the Policy Accelerator.

Audience

This guide is intended for individuals who are installing a Policy Accelerator or its memory or daughter cards. It assumes that you are familiar with the PC hardware into which the Policy Accelerator is to be installed.

In This Guide

This guide includes the following chapters and appendices:

- **Chapter 1, "Installing the Intel Policy Accelerator,"** presents an overview of a Policy Accelerator, provides instructions for installing a Policy Accelerator (including memory), and provides instructions for installing daughter cards on a Policy Accelerator.
- **Chapter 2, "Troubleshooting the Policy Accelerator,"** provides troubleshooting information in case you have a problem with a Policy Accelerator.
- **Appendix A, "Policy Accelerator Specifications,"** provides technical specifications for a Policy Accelerator.

Other Sources of Information

This guide is part of the Intel® IX-API SDK documentation set, which also includes:

- *Installing the IX-API SDK*, which describes how to install both the run-time and the development versions of the IX-API SDK

- *IX-API SDK Reference*, which lists and describes the components of the Intel IX-API SDK (software development kit), including both the standard host API (application programming interface) for supported operating systems and the API for the Policy Accelerator, which consists of the Action Services Library (ASL) and the Network Classification Language (NCL™)
- *Developing Applications Using the IX-API SDK*, which provides programmers with conceptual descriptions and instructions on writing network policy-enforcement applications using the IX-API SDK
- *IX-API SDK Release Notes*, which lists information about the latest software release
- *Customizing a NIC Driver Using the ODX Protocol*, which describes how to use the optimal data exchange (ODX) protocol to customize your standard NIC driver for communication with the Policy Accelerator through a direct PCI bus interface

In addition, the Intel Web site provides valuable information on products, support, and the company. See "Contacting Intel" on page vii.

Typographic Conventions

This document uses the following typographic conventions to help you locate and identify information:

Italic text	Used for new terms, emphasis, and book titles; also identifies arguments in syntax descriptions.
Bold text	Identifies keywords and punctuation in syntax descriptions.
`Courier font`	Identifies file names, folder names, and text that either appears on the screen or that you are required to type.

NOTE: Provides extra information, tips, and hints regarding the topic.

CAUTION: Identifies important information about actions that could result in damage to or loss of data or could cause the application to behave in unexpected ways.

WARNING! Identifies critical information about actions that could result in equipment failure or bodily injury.

Contacting Intel

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.

Web and Internet Sites

You can use the Internet to download software updates, troubleshooting tips, installation notes, and more.

- General online support services are on the World Wide Web at:

  `http://support.intel.com`

- Online support services for the Policy Accelerator 100 are at:

  `http://support.intel.com/support/network/adapter/pa/pa100/`

For specific types of information and services, go to the following Web and Internet sites:

- **Corporate:** `http://www.intel.com`
- **Networking products:** `http://www.intel.com/network/`
- **Intel IXA information:** `http://developer.intel.com/design/ixa/`
- **IX-API SDK:** `http://developer.intel.com/design/ixa/software/`
- **Policy Accelerator developer site:** `http://developer.intel.com/design/ixa/pa100/`
- **IXE 100 ASIC:** `http://128.11.21.45/scripts/mardev/product/ixe100.asp`
- **FTP host:** `download.intel.com`
- **FTP directory:** `/support/network/adapter`

Customer Support Technicians

- **United States and Canada:** 1-916-377-7000 (7:00 - 17:00 M-F Pacific Time)
- **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, their telephone numbers, and the times they are open, go to:

  `http://support.intel.com/support/9089.htm`

Chapter 1
Installing the Intel Policy Accelerator

Introduction

The Intel® Policy Accelerator 100 is a component in a family of products that compose the Intel Internet Exchange™ architecture—a platform on which high-performance policy-enforcement applications run. Applications are available from independent software vendors (ISVs) or, with the Intel IX-API software development kit (SDK), you can develop your own custom applications for the Policy Accelerator.

This chapter describes how to install the hardware for the Policy Accelerator into a personal computer (PC). The chapter has the following sections:

- "System Requirements" on page 2
- "Before You Begin Installation" on page 3
- "Installing Memory on the Policy Accelerator" on page 4
- "Attaching the Serial Cable to the Optional Debug Card" on page 6
- "Installing a Policy Accelerator in Your PC" on page 7
- "Installing Daughter Cards on the Policy Accelerator" on page 9

System Requirements

The following table lists the minimum system requirements for a PC into which you will install a Policy Accelerator.

Type	Minimum Requirement
Hardware	■ 233 megahertz (MHz) Intel Pentium® II processor
Cooling	■ A booster fan required in a standard ATX chassis
Operating Environment	Either: ■ Windows NT 4.0 operating system with Service Pack 4 or 5 ■ BSD/OS 4.01
Software	■ The IX-API SDK (for development) or ■ An IX-API SDK application ■ The IX-API SDK run-time software
Cables	■ TIA/EIA-568A Category 5 twisted-pair Ethernet cables

Before You Begin Installation

WARNING!

The Policy Accelerator is shipped in antistatic packaging to protect it during shipment. To avoid damaging the Policy Accelerator, touch the metal chassis of your PC to reduce your body's static electricity before handling it.

To further protect the Policy Accelerator, Intel strongly recommends that you wear an antistatic wrist strap attached to a known ground such as an antistatic lab mat while removing the Policy Accelerator from its packaging and handling it.

To remove the Policy Accelerator from the packaging:

1. Open the shipping carton and carefully remove the cardboard insert that contains the Policy Accelerator.
2. Unfold the sides of the insert to flatten it.

   The clear plastic protector loosens and the ends open.
3. Slide the Policy Accelerator out from either end of the insert.
4. Remove the Policy Accelerator from its antistatic bag.
5. Check the Policy Accelerator for any visible signs of damage.
6. If the Policy Accelerator is delivered without memory installed, see "Installing Memory on the Policy Accelerator" on page 4.
7. Optionally install daughter cards as described in "Installing Daughter Cards on the Policy Accelerator" on page 9.

   For example, the cryptographic daughter card is required for applications that perform encryption.
8. Ensure that the PC has adequate ventilation.

WARNING!

The PC **must** contain a booster fan to prevent the Policy Accelerator from overheating. If a booster fan is not properly installed, it could cause serious damage to the Policy Accelerator and, potentially, to the PC.

Installing Memory on the Policy Accelerator

If memory is not already installed on the Policy Accelerator board, you must install a 128-megabyte (Mbyte) unbuffered 144-pin SO DIMM on the board before installing the board into your PC.

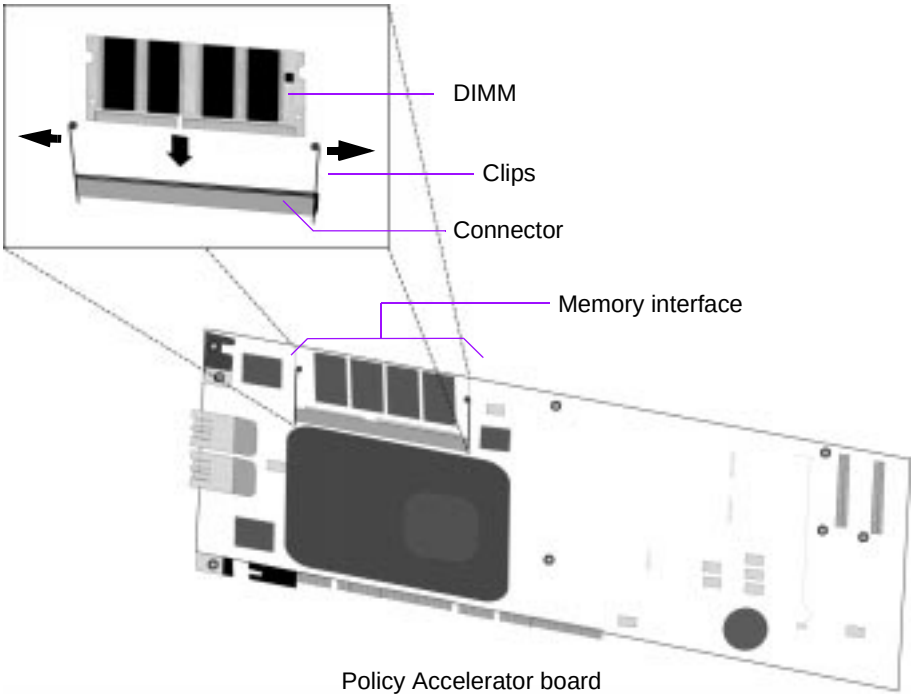
CAUTION: To ensure reliable operation, use only DIMMs that have been qualified by Intel.

Qualified DIMMs include the following:

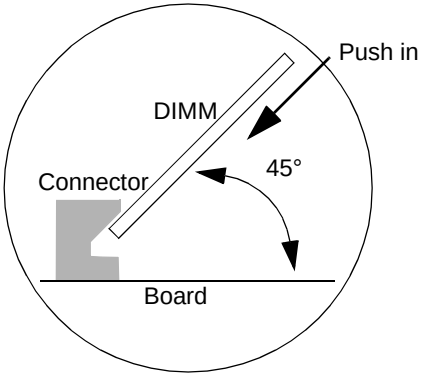
DIMM Size	Supplier	Part Number
128 Mbyte	Crucial	CT16M64S6W8.E8T

To install a DIMM on the Policy Accelerator:

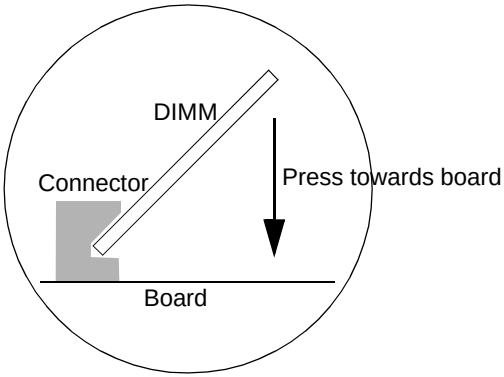
1. If the Policy Accelerator is already installed in your PC, remove it as described in “Removing a Policy Accelerator” on page 9.
2. Locate the memory interface on the Policy Accelerator board as shown in the following figure.



3. To remove an existing DIMM, push the clips on both sides away from the DIMM. The DIMM pops up to a 45-degree angle from the board. Pull the old DIMM out of the connector, maintaining the 45-degree angle.
4. Align the new DIMM with the connector, at about a 45-degree angle from the board, and push it firmly into the connector as shown in the following side view.



5. Press the DIMM towards the board; the clips lock themselves into place when the DIMM is properly seated.



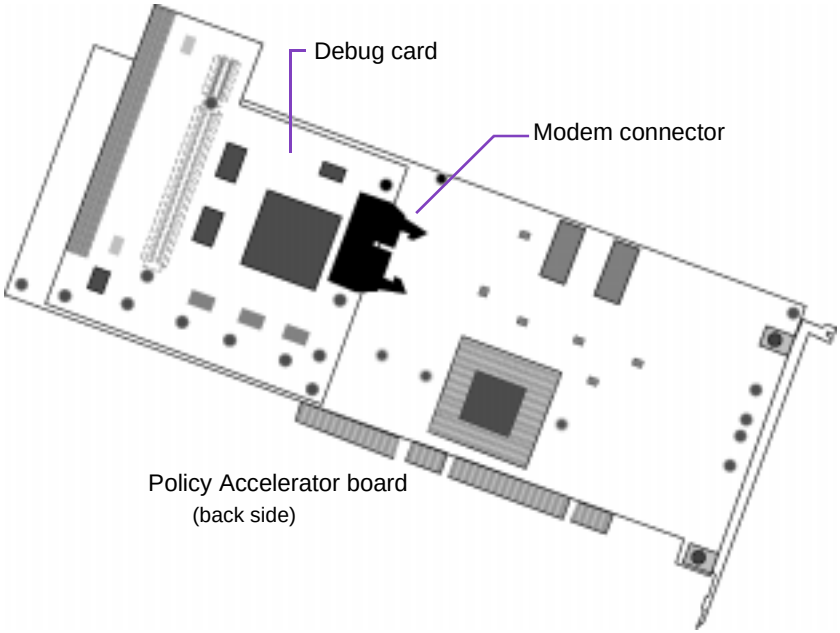
Attaching the Serial Cable to the Optional Debug Card

If your Policy Accelerator contains a debug card, as shown in the following figure, you must connect the following cables that are included with your package:

- A flat DB9 serial cable
- A standard DB9 null-modem cable

Connect the cables as follows:

1. Connect one end of the flat serial cable to the modem connector on the debug card, as shown in the following figure.



2. Connect one end of the null-modem cable to the free end of the serial cable.

Installing a Policy Accelerator in Your PC

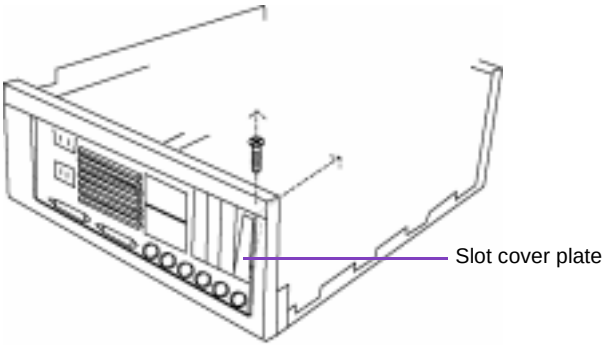
After installing memory (and daughter cards, if desired, as described in "Installing Daughter Cards on the Policy Accelerator" on page 9) on the Policy Accelerator, install the Policy Accelerator into a PC as follows:

1. Unplug the PC and all attached devices from power sources.
2. Remove the PC's cover following the manufacturer's instructions.
3. Select a PCI card slot in which to install the Policy Accelerator.

NOTE: If you are installing the Policy Accelerator in a low-profile desktop PC (such as an Intel NLX style), you must use the lower PCI card slot only. Because of the physical design of this style of PC, the Policy Accelerator does not support the upper PCI card slot.

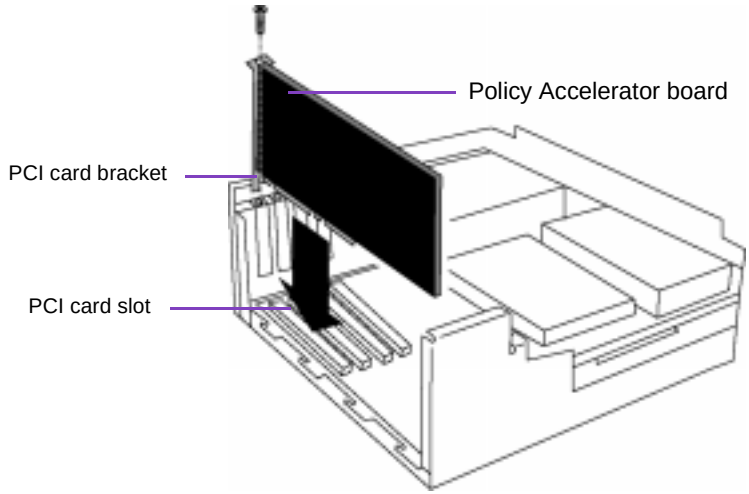
NOTE: The Policy Accelerator must be installed in a PCI slot that supports bus mastering. Most PCI slots in most systems do; however, a few do not. Check with the motherboard manufacturer.

4. Remove the screw that secures the slot's cover plate to the rear panel of the PC, and remove the cover plate.



5. Line up the Policy Accelerator visually with your PCI card slot as shown in the following figure.

   If you do not know how to identify a PCI card slot, check with your system administrator.



6. Slide the flat outside edge of the board under the bracket closest to the system board and align the PCI card bracket with the card support on the rear panel of the PC.
7. Insert the Policy Accelerator into the PCI card slot and push firmly to properly seat the board in the slot.
8. Secure the board to the PC with the screw you removed earlier.
9. If your Policy Accelerator has a debug card as described in "Attaching the Serial Cable to the Optional Debug Card" on page 6, connect the other end of the DB9 null-modem cable to a COM port on your PC.
10. Replace the PC's cover following the manufacturer's instructions.

    If you are using a debug card with a null-modem cable, note that you might not be able to completely close the PC while the cable is in place unless you put the null-modem cable through an open slot on the back of your PC.
11. Connect appropriate Ethernet cables to the Policy Accelerator's network ports.

    See "System Requirements" on page 2 for cable requirements.
12. Reconnect all other peripherals to the PC and reconnect it to a power source.

Installing Daughter Cards on the Policy Accelerator

If the Policy Accelerator is already installed in your PC, you must remove it from the PC before adding a daughter card:

> **WARNING!** The Policy Accelerator is shipped in antistatic packaging to protect it during shipment. To avoid damaging the Policy Accelerator, DIMM, or daughter cards, touch the metal chassis of your PC to reduce your body's static electricity before handling it.
>
> To further protect these electronic parts, Intel strongly recommends that you wear an antistatic wrist strap attached to a known ground such as the chassis of your PC while installing the Policy Accelerator.
>
> Avoid touching components as much as possible and hold the card by its edges.

Removing a Policy Accelerator

To remove the Policy Accelerator from your PC:

1. Unplug the PC and all attached devices from power sources.
2. Remove the PC's cover following the manufacturer's instructions.
3. Remove the screw that secures the Policy Accelerator to the rear panel of the PC and pull the Policy Accelerator straight out of the slot.
4. Place the Policy Accelerator on a flat, static-free surface.

Installing a Daughter Card

You can add optional daughter cards to a Policy Accelerator. Daughter cards provide added functionality and extended processing power for specialized applications and development tasks.

This section describes adding the following daughter card available from Intel:

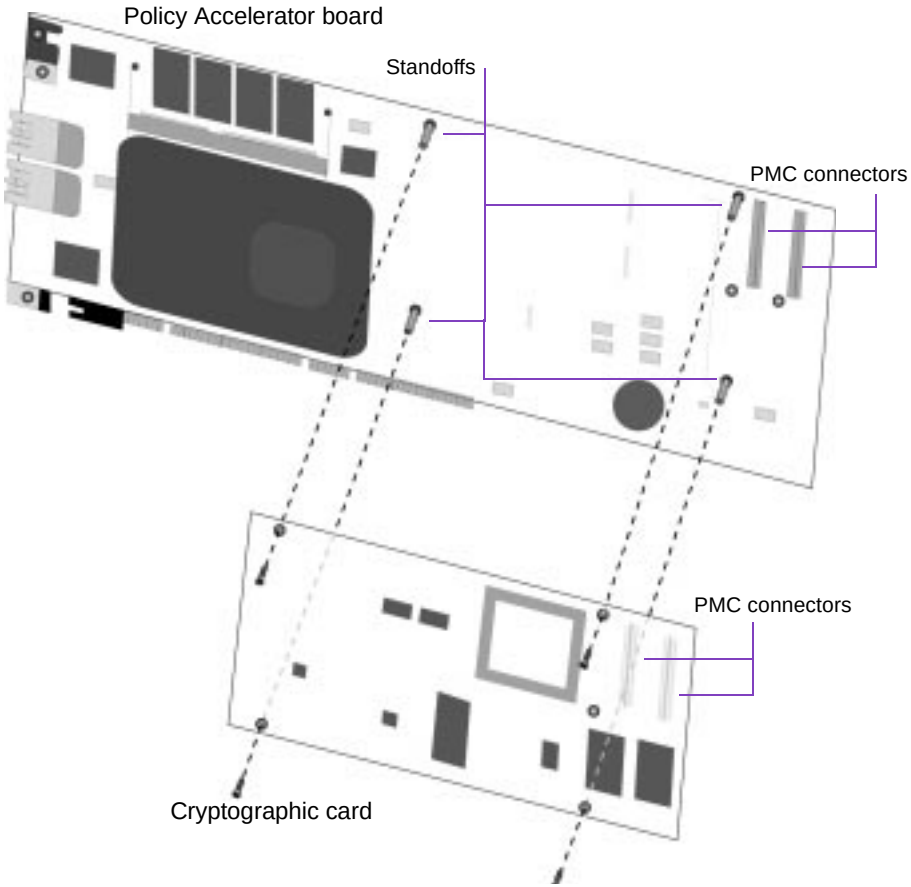
- The cryptographic card for cryptographic operations

Installing the Cryptographic Card

To install the cryptographic daughter card on the Policy Accelerator:

1. Install the four standoffs (supplied with the daughter card) into the holes in the daughter card's corners.
2. Locate the daughter card PMC connectors on the Policy Accelerator board.

3. Align the daughter card with the PMC connector and align the standoffs on the card with the standoff holes on the Policy Accelerator, then push the daughter card into place.



4. Tighten the standoff screws.
5. Reinstall the Policy Accelerator in the PC as described in “Installing a Policy Accelerator in Your PC” on page 7.

Chapter 2
Troubleshooting the Policy Accelerator

This chapter provides information on how to diagnose and correct installation problems or hardware problems in the Policy Accelerator 100. It contains the following sections:

- "Verifying Installation" on page 11
- "Post-Installation Troubleshooting" on page 13

Verifying Installation

To verify that the Policy Accelerator 100 installation was accomplished correctly and that the board operates properly, run the diagnostic tool `pa100diag`. Before you can use the tool, you must install the driver software (this occurs automatically as part of the installation of the IX-API SDK).

After you install the IX-API SDK, the diagnostic tool is available at the following location:

```
$NBPATH/diagnostics/pa100diag
```

NOTE: You cannot use the diagnostic tool after the Resolver has started. Run the tool after rebooting, and before starting the Resolver.

Execute the `pa100diag` command in a command shell. The script runs a number of hardware tests. If any test fails, the script terminates. At the end of testing the script displays the final result in the command shell. If all tests pass, it displays the message:

```
******** TEST RESULTS ********
******* serial_number PASSED DIAGNOSTICS TEST ******
```

If any test fails, it displays the message:

```
******** TEST RESULTS ********
******* serial_number FAILED DIAGNOSTICS TEST ******
```

Testing Interfaces

To test the board's MAC interfaces, connect the A and B interfaces with a CAT4-compliant Ethernet crossover cable, then run the diagnostic utility with the `-loopback` option. Execute the following in a command shell:

```
pa100diag -loopback
```

When you specify this option, the script runs additional tests for traffic in both directions between the interfaces.

Testing Multiple Boards

When multiple Policy Accelerators are installed, use the `-pa` option to specify which Policy Acceleratorto test. The default is `nbhwpe0`. For example, to test the second installed board, execute the following in a command shell:

```
pa100diag -pa nbhwpe1
```

Diagnostic Logs

Each time you run the diagnostic tool, it writes a log file of the test results to the current working directory. The text log file, named *`serial_number`*`.log`, contains messages about the results of each individual test.

If the diagnostic tests fail and your troubleshooting actions do not resolve the problem, return the board to the manufacturer along with the diagnostic log file.

Diagnostic Failures

If any of the diagnostic tests fail, the problem might be that the Policy Accelerator board or memory is not properly seated. Push the board or DIMM firmly into place, or remove and reinstall it, then rerun the diagnostic utility.

If the tests fail when you are running with the `-loopback` option, the cable between interfaces might not in place, or might be improperly connected or faulty. Verify that the cable is of the correct type and is properly connected, or try a different cable, then rerun the diagnostic utility with the `-loopback` option.

If the tests still fail, return the Policy Accelerator 100 board to the manufacturer along with the diagnostic log.

NOTE: If you have a non-standard board configuration or testing environment, contact Intel Technical Support for additional information on using this tool. See "Contacting Intel" on page vii.

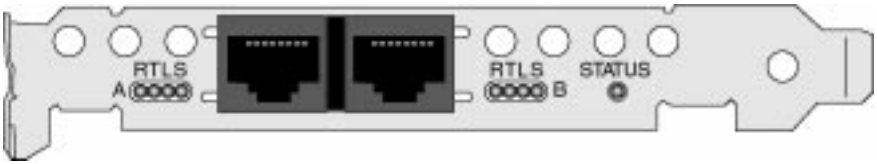
Post-Installation Troubleshooting

Use the following guide for actions you can take to identify and correct any hardware problems that occur after the initial installation of the Policy Accelerator 100.

Symptom	Possible Solutions
Policy Accelerator board is overheating.	Install a booster fan.
LED indicators on the front of the Policy Accelerator board do not light as expected. See “LED Indicator Lights” on page 13.	■ Ensure that the Policy Accelerator board, memory, and daughter cards are properly seated. Run the diagnostic utility to verify that all parts are properly installed. See “Verifying Installation” on page 11. ■ The Policy Accelerator board has not yet been initialized by the PC. Wait for the PC to initialize the board. ■ The Policy Accelerator must be installed in a PCI slot that supports bus mastering. Most PCI slots in most systems do; however, a few do not. Check with the motherboard manufacturer.
There is a conflict with one or more installed PCI card(s).	Check Intel’s Web site for a possible solution as described in “Contacting Intel” on page vii.
The PC does not recognize the Policy Accelerator board.	Check to be sure that the Policy Accelerator board, memory, and daughter cards are all properly installed, as described above. If the PC still does not recognize the Policy Accelerator board, check Intel’s Web site for a possible solution as described in “Contacting Intel” on page vii.
Data is not being received by your PC.	Ensure that the network cables are TIA/EIA-568A Category 5 twisted-pair Ethernet cables and are properly installed.

LED Indicator Lights

The Policy Accelerator includes the following green LEDs to indicate status:



- Two banks of four lights each; each bank indicates the status of one port’s:
  - **R**eceive
  - **T**ransmit
  - **L**ink

- **S**peed

  These lights, which are standard for any network interface card (NIC), are lit when the indicated activity occurs on the port.

- Board status indicator

  This green light is lit approximately 100 times a second after the Policy Accelerator's system software is initialized, and indicates that the system software is running normally.

Appendix A
Policy Accelerator Specifications

Part Number	■ PA1002PCI
Processors	■ Intel ASIC ■ 233 megahertz (MHz) StrongARM
Main Memory	■ 128 megabyte (Mbyte) 144 pin SO DIMM
Expansion Bus	■ Local bus for coprocessor addition
PCI Interface	■ 64/32-bit PCI bus at 33 MHz (PCI 2.1-compliant) ■ Universal PCI card edge
Network Interface	Two 10/100 megabit per second, 100BaseTX (RJ-45) Ethernet interfaces (IEEE 802.3u-compliant)
Operating Systems Supported	■ Windows NT 4.0 with Service Pack 4 or 5
Software Required	■ Intel IX-API SDK or an application written using the IX-API SDK
Environmental Operating Range	■ Temperature: 10°C to 55°C ■ Relative humidity: Up to 95% noncondensing ■ Maximum altitude: 10,000 feet ■ Minimum airflow: 150 LFM (booster fan required in standard ATX chassis)
Storage Range	■ Temperature: -4°C to 70°C ■ Relative humidity: Up to 95% noncondensing
Power Consumption (Typical)	■ Policy Accelerator: 3.6 amps at 5.0V ■ Daughter cards: up to 1.4 amps at 5.0V each

Dimensions	■ Single-slot PCI ■ 4.2 inches (in.) high x 11.0 in. long (10.6 centimeters (cm) high x 28.9 cm long)
Agency Approvals	■ FCC, CE, VCCI, AUSTEL 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 when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, might cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which you can determine by turning the equipment off and on, try to correct the interference by one or more of the following measures: ■ Reorient or relocate the receiving antenna. ■ Increase the separation between the equipment and receiver. ■ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. ■ Consult the dealer or an experienced radio/TV technician for help.

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