Installation and User's Guide

Regulatory Compliance

FCC Class B Notice. The equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) The device may not cause harmful interference, and 2) This equipment must accept any interference received, including interference that may cause undesired operation.

The 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. The equipment generates, uses and can radiate radio-frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television 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 the equipment and the 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 assistance.

Do not make mechanical or electrical modifications to the equipment.

VCCI Class B Notice. The equipment is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

CE Notice. The CE mark on this equipment indicates that this equipment meets or exceeds the following technical standards: EN50082-1, EN55022, EN60555-2, EN61000-4-1, EN61000-4-2, EN61000-4-3, EN61000-4-4, and EN61000-4-5.

Contents

Preface

This manual describes how to install and use your ACEnic adapter in a Microsoft Windows NT operating environment. The procedures in this manual assume that you are a system or network administrator experienced in installing similar hardware.

How This Manual Is Organized

This manual is organized as follows:

Chapter 1, "About the ACEnic Adapter," describes the features of the ACEnic adapter. This chapter also describes the adapter faceplate and LED indicators.

Chapter 2, "Installing the ACEnic Hardware," lists the hardware and software requirements for adapter installation and use, and provides instructions to physically install the adapter in your system.

Chapter 3, "Installing the ACEnic Driver Software," explains how to install the Gigabit Ethernet software under Microsoft Windows NT.

Chapter 4, "Failover Teaming," describes adapter failover teaming, and provides detailed configuration instructions under Microsoft Windows NT.

Chapter 5, "VLANs," provides an overview of VLANs and explains how to configure the adapter for use with VLANs.

Chapter 6, "Troubleshooting," provides a list of items to check for basic installation and configuration problems.

Appendix A, "Specifications," provides adapter hardware specifications.

Operating System Commands

This manual may not include all necessary hardware procedures or software commands. Instead, it may name specific tasks and refer you to operating system documentation or the hardware handbook that was shipped with your system.

You might need to use supplemental documentation for the following types of information:

- Shutting down the system
- Getting access to the system's PCI slots
- Booting the system
- Configuring devices
- Other basic software procedures

Typographic Conventions

The following table describes the typographic styles used in this book.

Table 1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	This type is used for names of commands, files, and directories used within the text.	View the `readme.txt` file.
	It also depicts on-screen computer output and prompts.	`Main#`
AaBbCc123	This bold type appears in command examples. It shows text that must be typed in exactly as shown.	`Main#` **sys**
AaBbCc123	This italicized type appears in command examples as a parameter placeholder. Replace the indicated text with the appropriate real name or value when using the command.	To establish a Telnet session, enter: `host#` **telnet** *IP-address*
	This also shows book titles, special terms, or words to be emphasized.	Read your *User's Guide* thoroughly.
[ ]	Command items shown inside brackets are optional and can be used or excluded as the situation demands. Do not type the brackets.	`host#` **ls** [**-a**]

Alteon*Web*Systems

Contacting Alteon WebSystems

Use the following information to access Alteon WebSystems support and sales.

- URL for Alteon WebSystems Online:

    http://www.alteonwebsystems.com

    This website includes product information, software updates, release notes, and white papers. The website also includes access to Alteon WebSystems Customer Support for accounts under warranty or that are covered by a maintenance contract.

- E-mail access:

    support@alteon.com

    E-mail access to Alteon WebSystems Customer Support is available to accounts that are under warranty or covered by a maintenance contract.

- Telephone access to Alteon WebSystems Customer Support:

    1-888-Alteon0 (or 1-888-258-3660)
    1-408-360-5695

    Telephone access to Alteon WebSystems Customer Support is available to accounts that are under warranty or covered by a maintenance contract. Normal business hours are 8 a.m. to 6 p.m. Pacific Standard Time.

- Telephone access to Alteon WebSystems Sales:

    1-888-Alteon2 (or 1-888-258-3662), and press 2 for Sales
    1-408-360-5600, and press 2 for Sales

    Telephone access is available for information regarding product sales and upgrades.

CHAPTER 1
About the ACEnic Adapter
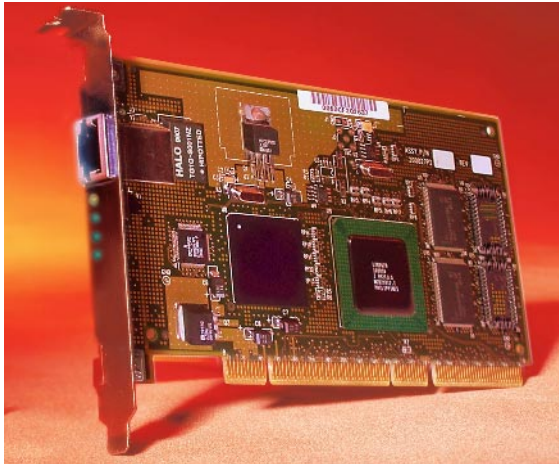
Figure 1 The ACEnic 10/100/1000Base-T Gigabit Ethernet Adapter

The ACEnic adapter connects your PCI-compliant server or workstation to a Gigabit Ethernet network. The adapter incorporates a technology that transfers data at a maximum rate of one gigabit per second—10 times the rate of a Fast Ethernet adapter.

The ACEnic adapter targets the increased congestion experienced at the backbone and server in today's networks, while providing a future upgrade path for high-end workstations that require more bandwidth than Fast Ethernet can provide.

Included with your adapter is the following:

- Anti-static bag (used for protecting the adapter when stored or shipped). Keep the adapter in its packaging until ready for installation.

- CD-ROM with ACEnic adapter driver software and documentation.

Inform your network supplier of any missing or damaged items. If you need to return the adapter, you must pack it in the original (or equivalent) packing material or the warranty will be voided.

Features

Following is a list of the Gigabit Ethernet adapter features:

- Full-duplex Gigabit Ethernet interface (IEEE 802.3-1999)
- Jumbo Frame support (optional 9,000 byte frames for server-to-server traffic)
- VLANs: up to 64 VLANs per adapter using IEEE 802.1Q-1998 tagging
- Interoperability with existing Ethernet and Fast Ethernet equipment
- Standard Ethernet frame size (up to 1,518 bytes)
- Supports 32 multicast addresses
- Adapter Teaming configuration for automatic failover if the network connection is down
- Adapter failover to an Intel 82559 LAN on Motherboard (LOM)
- Adaptive interrupt frequency (maximizes network throughput; adapts to traffic load)
- Dual DMA channels
- 33/66 MHz, 32-bit or 64-bit PCI bus master with adaptive DMA
- PCI Local Bus Rev 2.2 compliant: 17.3 cm x 10.7 cm (6.8" x 4.2")
- ASIC with on-chip MAC and dual RISC processors
- Universal dual voltage signaling (3.3V and 5V)
- Status LEDs

Key Protocols and Interfaces

The ACEnic adapter is interoperable with existing Ethernet equipment assuming standard Ethernet minimum and maximum frame size (64 to 1518 bytes), frame format, and compliance with the following standards and protocols:

- Gigabit Ethernet (IEEE 802.3-1999)
- Logical Link Control (IEEE 802.2)
- Flow Control (IEEE 802.3x)

Jumbo Frames Support

When sending Ethernet traffic at Gigabit speeds, considerable bandwidth is consumed by the overhead of handling a multitude of standard 1,500 byte packets. ACEnic adapters and ACE switches support Ethernet frames of up to 9,000 bytes. Host CPU utilization is significantly reduced and network throughput is enhanced when enabling Jumbo Frames between servers that have ACEnic PCI adapters.

For UDP traffic, an ACEnic adapter can support standard Ethernet frames and Jumbo Frames at the same time. When attached to an Alteon WebSystems switch, Jumbo Frames are sent only between servers that have ACEnic adapters. When attached to a standard Ethernet device, a Jumbo Frames-enabled server may send UDP data in jumbo frames, but when the data reaches the switch, the switch will automatically fragment the data into standard Ethernet frames when sending to all other standard Ethernet devices.

For non-UDP traffic, Alteon WebSystems recommends that both servers support Jumbo Frames.

VLANs Support

Virtual Local Area Networks (*VLANs*) are commonly used to split up groups of network users into manageable broadcast domains, to create logical segmentation of workgroups, and to enforce security policies among logical segments.

Each ACEnic adapter supports up to 64 VLANs, depending on the amount of memory available in your system. With multiple VLANs on an adapter, a server with a single adapter can have a logical presence on multiple IP subnets. For details about planning networks with VLANs, refer to your Alteon WebSystems switch software manual.

Adapter Teaming

Teaming provides redundant adapter operation in the event that a network connection fails. When multiple ACEnic adapters are installed in the same server, they can be paired into *teams*. Up to two teams, each with two adapters, can be configured on the server.

If traffic is not seen on the primary adapter connection in a team because of failure of the adapter, cable, switch port, or switch (where the teamed adapters are attached to separate switches), the secondary team member becomes active, taking the MAC and IP address originally assigned to the primary adapter. Sessions are usually maintained, causing no impact to the user.

Adaptive Interrupt Frequency

The adapter driver intelligently adjusts host interrupt frequency based on traffic conditions, in order to increase overall application throughput. In light traffic, the adapter driver interrupts the host for each received packet, minimizing latency. When traffic is heavy, the adapter issues one host interrupt for multiple, back-to-back incoming packets, preserving host CPU cycles.

Dual DMA Channels

The PCI interface on the ACEnic adapter contains two independent DMA channels for simultaneous read and write operations.

32-bit or 64-bit PCI Bus Master

Compliant with PCI Local Bus Rev 2.2, the PCI interface on the ACEnic adapter is compatible with both 32-bit and 64-bit PCI buses. As a bus master, the adapter requests access to the PCI bus instead of waiting to be polled.

ASIC with Embedded RISC Processor

The core control for the ACEnic adapter resides in a tightly integrated, high-performance ASIC. The ASIC includes dual RISC processors. This provides the flexibility to add new features to the card and adapt it to future network requirements via software download. This also enables the adapter drivers to exploit the built-in host off-load functions on the adapter as host operating systems are enhanced to take advantage of these functions.

Physical Description

1000Base-SX or 1000Base-LX Adapters
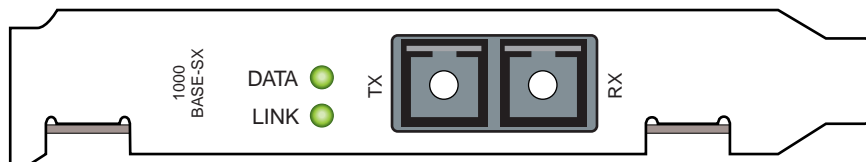
Figure 2 1000Base-SX or 1000Base-LX ACEnic adapter faceplate

Connectors

The faceplate of the ACEnic adapter has one 1000Base-SX or 1000Base-LX fiber-optic connector for connecting the adapter to a Gigabit Ethernet segment.

LEDs

There are two LEDs on the faceplate: one to indicate link status and one for data transfer status. Once the adapter hardware and its driver software have been properly installed on your system, the LEDs will indicate the following adapter states:

Table 2 1000Base-SX/LX ACEnic Port LED Activity

LED	State	Description
Data	Blinking	Data detected on the port.
	On	Data detected on the port.
	Off	No data detected on the port.
Link	Blinking slowly	Port has been disabled by software.
	On	Good link.
	Off	No link; possible bad cable, bad connector, or configuration mismatch.

10/100/1000Base-T Adapters
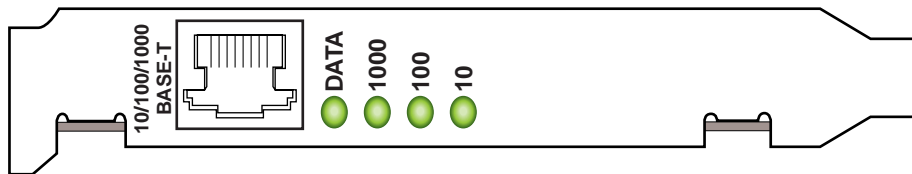
Figure 3 10/100/1000Base-T ACEnic adapter faceplate

Connectors

The faceplate on the 10/100/1000Base-T adapter provides an RJ-45 connector for connecting the adapter to another network device.

LEDs

The faceplate of the ACEnic 10/100/1000Base-T adapter has four LEDs: one for each port speed option (10Mbps, 100Mbps, and 1Gbps), to indicate which link is active, and one LED for data transfer status. Until the driver software is properly installed, all four LEDs will remain lit when the server is powered on.

Once the adapter hardware and its driver software have been properly installed on your system, the LEDs will indicate the following adapter states:

Table 3 10/100/1000Base-T ACEnic Port LED Activity

LED	State	Description
Data	Blinking On Off	Brief bursts of data detected on the port. Streams of data detected on the port. No data detected on the port.
1000	On Off	Good 1000 Mbps (Gigabit) Ethernet link. No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
100	On Off	Good 100 Mbps Fast Ethernet link. No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
10	On Off	Good 10 Mbps Ethernet link No 10 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.

If all four LEDs remain lit simultaneously, the adapter driver software is either missing or improperly installed.

CHAPTER 2
Installing the ACEnic Hardware

The following instructions apply to installing the ACEnic adapter in most systems. Refer to the manuals that were supplied with your system for details about performing these tasks on your particular system.

System Requirements

Before installing the ACEnic adapter, make sure your system meets the requirements listed in the following table:

Table 4 System Requirements

Category	Requirements
Hardware	■ Pentium-based computer that meets Windows NT 4.0 software requirements ■ One open 32-bit or 64-bit PCI slot ■ 128MB RAM (minimum)
Software	
Operating System	Microsoft Windows NT 4.0 (server or workstation) with Service Pack 4 or later
Adapter Software	ACEnic adapter driver software, version 2.3 (or higher) for Windows NT. See the CD-ROM for these files in the `\nt40` directory: ■ `Altndis.sys` (network device driver file) ■ `Altvlan.sys` (intermediate device driver file) ■ `Altdlg.dll` (information used by installation program) ■ `oemsetup.inf` (information file)

Safety Precautions

CAUTION—The adapter is being installed in a system that operates with voltages that can be lethal. Before you remove the cover of your system, you must observe the following precautions to protect yourself and to prevent damage to the system components.

- Remove any metallic objects or jewelry from your hands and wrists.
- Make sure to use only insulated or nonconducting tools.
- Verify that the system is powered OFF and unplugged before accessing internal components.
- Installation or removal of adapters must be performed in a static-free environment. The use of a properly grounded wrist strap or other personal anti-static devices and an anti-static mat is strongly recommended.

Pre-Installation Checklist

1. Check that your server meets the hardware and software requirements listed on Table 4 on page 15.

2. Verify that your system is using the latest BIOS.

3. Review the information in the `readme` file on the CD-ROM for important information not available at the time this manual was created.

   NOTE – If you acquired the adapter software on a floppy disk or from the Alteon WebSystems support website, please check the appropriate source for the most recent information.

4. If your system is active, shut it down.

   If Windows NT is currently up and running, close all applications and select "Start | Shut down | Shut down the computer."

5. When system shutdown is complete, power OFF and unplug your system.

6. Holding the adapter card by the edges, remove it from its shipping package and place it on an anti-static surface.

7. Check the adapter for visible signs of damage, particularly on the card's edge connector. Never attempt to install any damaged adapter.

   If the adapter is damaged, report it to your Alteon WebSystems Customer Support Representative. For more information, see "Contacting Alteon WebSystems" on page 7.

ACEnic Adapter Installation

To install an ACEnic adapter in your system, perform the following procedure.

1. Observe all precautions and pre-installation instructions on page 16.

Before installing the adapter, ensure the system power is OFF and unplugged from the power outlet, and that proper electrical grounding procedures have been followed.

2. Remove the system cover, and select any empty PCI slot.

If you do not know how to identify a PCI slot, refer to your system documentation.

3. Remove the blank cover-plate from the slot that you selected. Retain the screw so that it can be replaced later.

4. Holding the PCI card by the edges, align the adapter's connector edge with the PCI connector dock in the system.

NOTE – The connector dock in a 32-bit PCI slot is shorter than in a 64-bit PCI slot. Although the adapter is designed to fit in either slot type, when installed in a 32-bit PCI slot, part of the adapter's connector edge will remain undocked. This is perfectly normal.

5. Applying even pressure at both corners of the card, push the adapter card until it is firmly seated in the PCI slot.

CAUTION—Do not use excessive force when seating the card, as this may damage the system or the adapter. If the card resists seating, remove it from the system, realign it, and try again.

When properly seated, the adapter's port connectors will be aligned with the slot opening, and its faceplate will be flush against the system chassis.

6. Use the screw removed in Step 3 to secure the adapter in the PCI card cage.

7. Replace the system cover and disconnect any personal anti-static devices.

8. Power the system on.

Once the system returns to proper operation, the adapter hardware is fully installed. You must next connect the network cables (see page 18), and install the adapter driver software (see Chapter 3).

Connecting the Network Cables

This section provides information you'll find useful in attaching a network device to the ACE-nic 1000Base-SX/LX or 10/100/1000Base-T adapter.

1000Base-SX or 1000Base-LX Adapters

The adapter has one SC-type connector used for attaching the server to a Gigabit Ethernet fiber-optic segment. The port is auto-negotiating and supports full-duplex operation.

1. **Prepare an appropriate cable.**

The following table lists cable characteristics required for connecting to 1000Base-SX/LX ports:

Table 5 1000Base-SX/LX Link Characteristics

	Medium Diameter	Frequency	Cable Type	Operating Range
SX	62.5 Microns	Shortwave (850 nanometers)	Multimode fiber	2 to 275 meters (6.5 to 902 feet)
	50 Microns	Shortwave (850 nanometers)	Multimode fiber	2 to 550 meters (6.5 to 1804 feet) (in compliance with IEEE 802.3-1999)
LX	62.5 Microns	Longwave (1300 nanometers)	Multimode fiber	2 to 440 meters (6.5 to 1443 feet)
	50 Microns	Longwave (1300 nanometers)	Multimode fiber	2 to 550 meters (6.5 to 1804 feet)
	9 Microns	Longwave (1300 nanometers)	Single mode fiber	2 to 5,000 meters (6.5 to 16,404 feet)

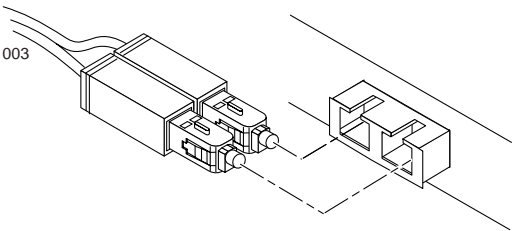2. **As shown in the following diagram, connect one end of the cable to the ACEnic adapter.**

Figure 4 Connecting the network cable to the adapter

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3. **Connect the other end of the cable to a Gigabit Ethernet network port.**

    Attach the cable connector so that the TX (transmit) port on the ACEnic adapter is connected to the RX (receive) port of the device at the other end of the cable.

    NOTE – The adapter port LEDs are not functional (they will not reflect port link or data status) until the adapter driver software is installed. See Table 2 on page 13 for a description of adapter port LED operation. See Chapter 3 for driver installation and configuration instructions.

10/100/1000Base-T Adapter

The adapter has one RJ-45 connector used for attaching the system to an Ethernet copper-wire segment. When automatic link negotiation is disabled, the port can be configured for 10Mbps, 100Mbps, or 1000Mbps signaling and either half-duplex or full-duplex operation.

1. **Prepare an appropriate cable.**

    The following table lists the cable characteristics for connecting to 10/100/1000Base-T ports:

    Table 6 10/100/1000Base-T Cable Specifications

Port Type	Connector	Media	Maximum Distance
10Base-T	RJ-45	Cat. 3, 4, or 5 UTP	100 meters (325 feet)
100/1000Base-T	RJ-45	Cat. 5 UTP	100 meters (325 feet)

    NOTE – 1000Base-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and EIA/TIA-568-A (1995), and tested using procedures defined in TIA/EIA TSB95.

2. **Connect one end of the cable to the ACEnic adapter.**

3. **Connect the other end of the cable to an RJ-45 Ethernet network port.**

    NOTE – The adapter port LEDs are not functional (they will not reflect port link or data status) until the adapter driver software is installed. See Table 3 on page 14 for a description of adapter port LED operation. See Chapter 3 for driver installation and configuration instructions.

CHAPTER 3

Installing the ACEnic Driver Software

A network device driver must be installed before the ACEnic adapter can be used with your Windows NT system. This chapter describes how to perform the following tasks:

- Install the driver software in the Windows NT environment
- Modify driver properties once the adapter is installed
- Update or reinstall the driver software
- Move or remove the driver software

NOTE – To prevent a system abend when using the Windows NT Network Monitor, be sure to upgrade the operating system `bhnt.sys` file to the latest version available.

Installing the Driver Software

The ACEnic adapter must be physically installed in your server or workstation prior to installing the driver software. See Chapter 2, "Installing the ACEnic Hardware" for details.

A network device driver must be installed before the adapter can be used with your Windows NT system. To install the adapter software for Windows NT, perform the following procedure:

1. **Verify that Windows NT is upgraded with Service Pack 4 (or the latest service pack).**

NOTE – If you attempt to install the adapter driver on a newly installed Windows NT system (without Service Pack 4 or the most recent service pack), the driver will not install. The system will display a message indicating that you must exit the installation and first install Service Pack 4 or later. For Backup Domain Controller (BDC) installation, see the readme file on the CD-ROM for more information.

2. **Start your Windows NT system and log in.**

You must have Network Administrator privileges to install the driver software.

3. Open the Control Panel:
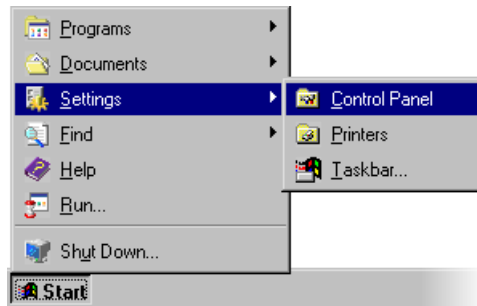
4. In the Control Panel window, double-click the Network icon:

5. When the Network window opens, select the "Adapters" tab.

Any previously installed drivers are listed under Network Adapters:

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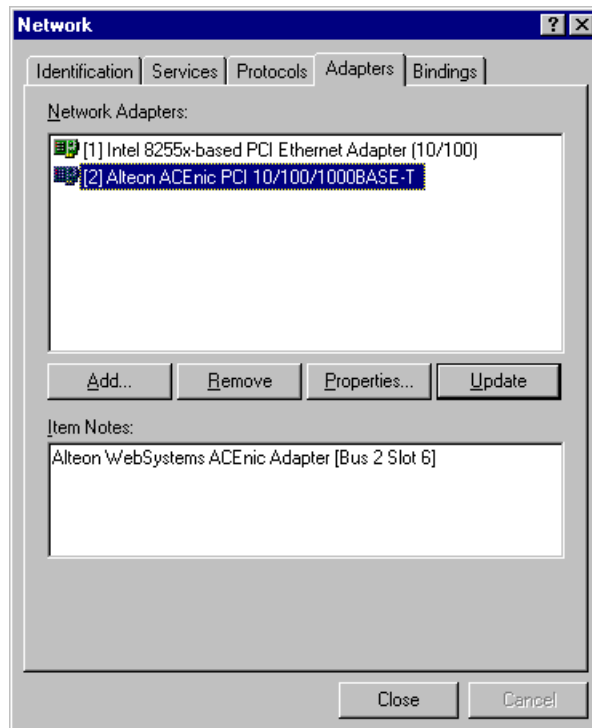
6. **To install the driver software for an ACEnic adapter, click the "Add" button.**

NOTE – For Windows NT Server Enterprise, be sure to use the "Add" button rather than the "Search" button.

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7. **When the Select Network Adapter window opens, click the "Have Disk..." button.**
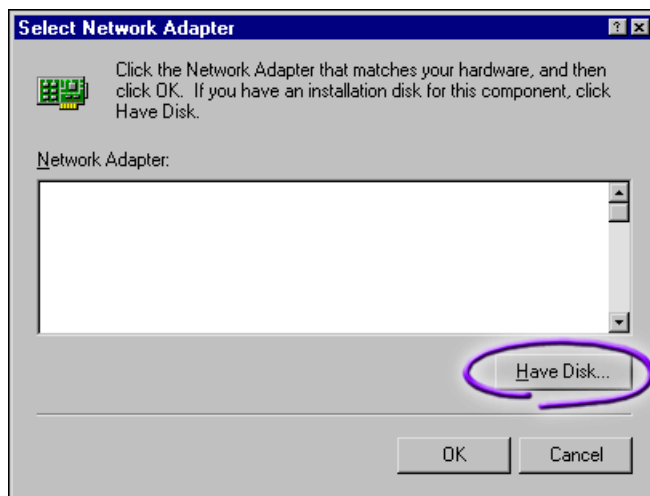
8. **When prompted, insert the ACEnic CD-ROM into your system's CD-ROM drive, type the path to the driver, and select "OK."**

To install the adapter driver software for Windows NT, enter the following path:

   e:`\nt40`

Where "*e:*" is the designation of the CD-ROM drive on your system.
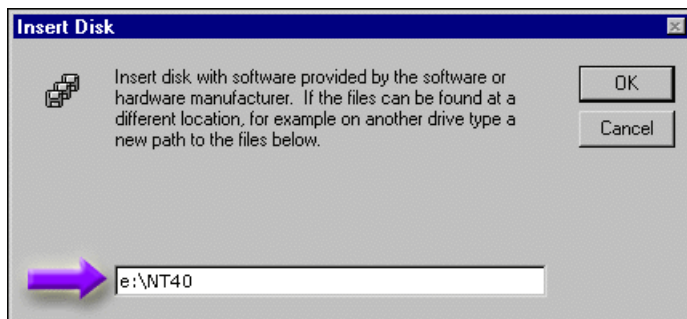
NOTE – If you acquired the adapter software on floppy disk or from the Alteon WebSystems support website, enter the path to where the adapter driver files reside on your system.

When an Intel LAN on motherboard (LOM) and advanced Intel software are installed in your system, the following dialog box is displayed:
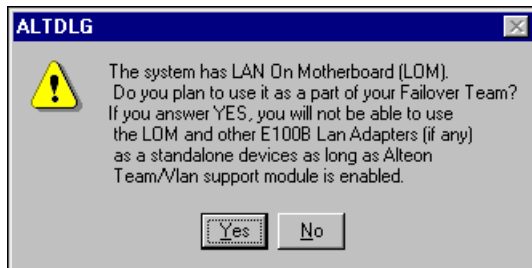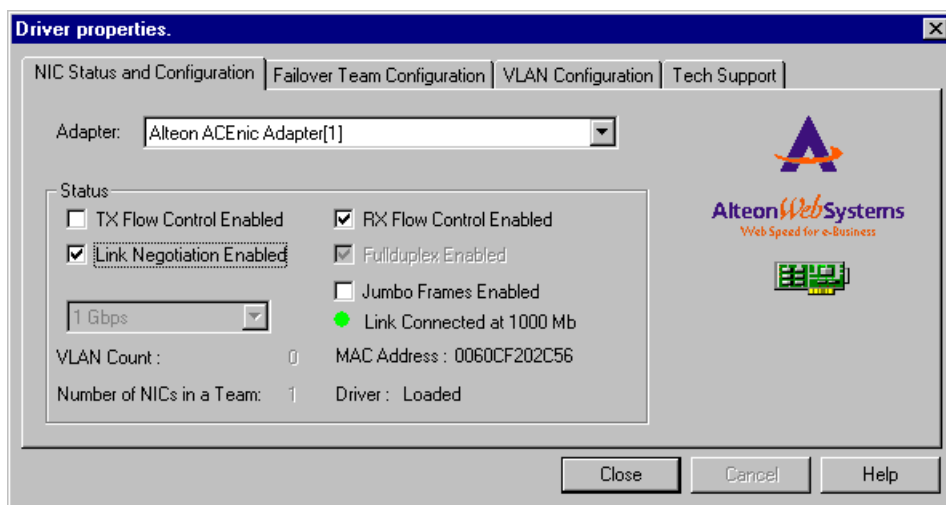
The system will allow only one intermediate driver to be loaded at a time. This means that advanced options, such as failover teaming and VLANs, can be configured for either ACEnic adapters or a stand-alone LOM, but not both. If you click "Yes" in the above dialog box, a LOM can be configured only as a member of a failover team.

NOTE – Before installing the drivers for any new ACEnic adapter, any drivers prior to version 2.2 from previously installed adapters must be removed. If there are no ACEnic adapter drivers displayed in the Network Adapters window, or if the drivers shown are version 2.2 or higher, proceed to the next step. If old ACEnic adapter drivers are present, perform the procedure under "Removing the Driver Software" on page 35. To update adapter versions from 2.2 to the most recent release, perform the procedure under "Updating the Driver Software" on page 33.

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9. **In the Select OEM Option window, "ACEnic Adapter Software Release" will be high-lighted. Click the "OK" button.**
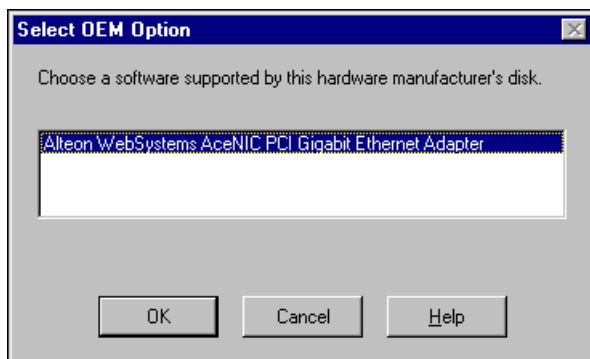
10. **The ACEnic Driver Properties window will open:**

When the properties window appears, the NIC Status and Configuration tab is shown. The options under this tab are used for configuring basic adapter properties. Other tabs may be available for configuring optional properties (such as failover teaming and VLANs). Click on any tab to display its configurable options.

NOTE – When you disable automatic link negotiation while installing an ACEnic 10/100/1000Base-T adapter, the driver properties window will allow you to select 10Mbps, 100Mbps, or 1Gbps port speed and either half-duplex or full-duplex operation.

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11. Configure basic properties under the NIC Status and Configuration tab.

Although the default values should be appropriate in most cases, you may change any of the available options to meet the requirements of your specific system. Ensure that the NIC Status and Configuration tab is shown in the foreground of the Driver Properties window (click the tab if necessary).

The following options should be displayed:

■ Adapter

This field identifies which ACEnic adapter or failover team is being configured. In a system with multiple ACEnic adapters, select this field to access a pull-down list of the available adapters and teams. Each ACEnic adapter installed in the system is labeled with a unique instance number. Typically, the first adapter detected is instance 1, the next is instance 2, and so on.

Adapters which are paired into teams for automatic failover (see Chapter 4, "Failover Teaming") are not listed individually. Instead, the defined team is listed. When a team is selected, the adapters within the team are configured as a group and the configuration parameters of the primary adapter are applied to the team. To configure an individual adapter in a manner different from the team, it must be first removed from the Team.

NOTE – Release 2.3 supports grouping ACEnic adapters with an Intel LAN on motherboard (LOM) into failover teams.

■ Link Negotiation:

□ When checked (default), 802.3-1999 compliant Gigabit Ethernet link negotiation is enabled. All ACEnic adapters use link negotiation by default.

□ When unchecked, link negotiation is disabled and only link signal detection is used. Use this setting when connecting to Ethernet equipment that does not support link negotiation, or if there is a problem establishing a link between the adapter and the connecting device. Unless otherwise specified, the default signaling speed for the Base-SX/LX adapter and the 10/100/1000Base-T adapter is 1Gbps.

When link negotiation is disabled, be sure that the connecting device uses the same duplex and speed settings.

NOTE – When link negotiation is on, the user-configured link speed and duplex settings are ignored in favor of automatically determined settings.

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■ Full Duplex Enabled

When link negotiation is unchecked, this parameter sets the duplex mode. You can select either half-duplex or full-duplex operation.

   □ When checked, full-duplex signaling is used (default).

   □ When unchecked, half-duplex operation is used.

■ Tx Flow Control:

   □ When Tx flow control is checked and link negotiation is enabled, the adapter will negotiate 802.3x transmit flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, Tx flow control will be enabled.

   □ When Tx flow control is checked and link negotiation is disabled, you must check Full Duplex Enabled in order for Tx flow control to work properly. Tx flow control will not function under half duplex operation.

   □ When Tx flow control is unchecked (default), or when Full Duplex Enabled is unchecked, transmit flow control is disabled.

■ Rx Flow Control:

   □ When Rx flow control is checked (default) and link negotiation is enabled, the adapter will negotiate 802.3x receive flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, Rx flow control will be enabled.

   □ When Rx flow control is checked and link negotiation is disabled, you must check Full Duplex Enabled in order for Rx flow control to work properly. Rx flow control will not function under half duplex operation.

   □ When unchecked, or when Full Duplex Enabled is unchecked, receive flow control is disabled.

■ Jumbo Frames:

   □ When checked, Jumbo Frames (up to 9,000 bytes) will be supported by the adapter. This setting can reduce host CPU overhead and increase bandwidth when sending to other devices that support Jumbo Frames. When attached to an Alteon WebSystems switch, Jumbo Frames will be sent only between end-stations that have ACEnic adapters. When sending to standard Ethernet devices, the switch will automatically fragment the Jumbo Frames traffic into standard Ethernet frames.

   □ When unchecked (default), only standard-sized Ethernet frames will be sent. Use this setting when connecting to Gigabit Ethernet equipment that does not support Jumbo Frames.

■ Port Link Speed

When link negotiation is disabled, this parameter sets the port link speed. You can select link speed to be either 10Mbps, 100Mbps, or 1Gbps. When the port link is connected, the selected link speed is indicated to the right of this field.

■ VLAN Count

This field reflects the number of VLANs configured for the selected adapter. When there are no VLANs configured for the selected adapter, VLAN support is disabled. This is an information field and cannot be configured directly through this tab.

NOTE – ACEnic adapters that are members of a failover team can be configured to support VLANs. However, VLANs cannot be configured for a stand-alone Intel LAN on motherboard (LOM) or a failover team that includes a LOM.

■ Number of NICs in a Team

When a failover team is selected in the Adapter list, this field represents the total number of adapters configured for the selected team. This field does not apply when an individual (non-teamed) adapter is selected in the Adapter list. This is an information field and cannot be configured directly through this tab.

12. **Perform any optional configuration, if desired.**

   ■ To configure failover teaming, refer to Chapter 4.

   ■ To configure VLANs, refer to Chapter 5.

   Optional configuration can be performed now, or at any later time when the feature is required.

13. **When configuration is complete, click the "Close" button in the Driver Properties window.**
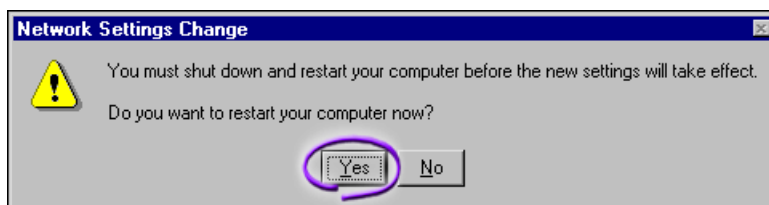
14. **In the Network window, click the "Close" button.**

NOTE – If other adapters in your system use TCP/IP bindings, the TCP/IP Properties window will open.

---

15. **Perform any necessary TCP/IP configuration and click the "OK" button when finished.**

   For help in configuring TCP/IP protocol, consult your Microsoft Windows NT 4.0 documentation.

16. **When prompted to restart your computer, click the "Yes" button.**

The system will restart, using the new configuration settings.

17. **When the system returns to proper operation, verify that the adapter port LEDs operate as described in Table 3 on page 14.**

Modifying Configuration Parameters

Once the adapter driver software has been installed, you can examine and change the configuration options at any time. The following adapter parameters are user-configurable:

■ Basic properties

  □ Tx flow control

  □ Rx flow control

  □ Jumbo Frames

  □ Link negotiation

  □ Full duplex/half duplex operation

  □ Port speed

■ Optional properties

  □ Failover team configuration

  □ VLAN configuration

Use this procedure to access the adapter properties:

1. Open the Control Panel and double-click the "Network" icon.

2. When the Network window opens, select the "Adapters" tab:
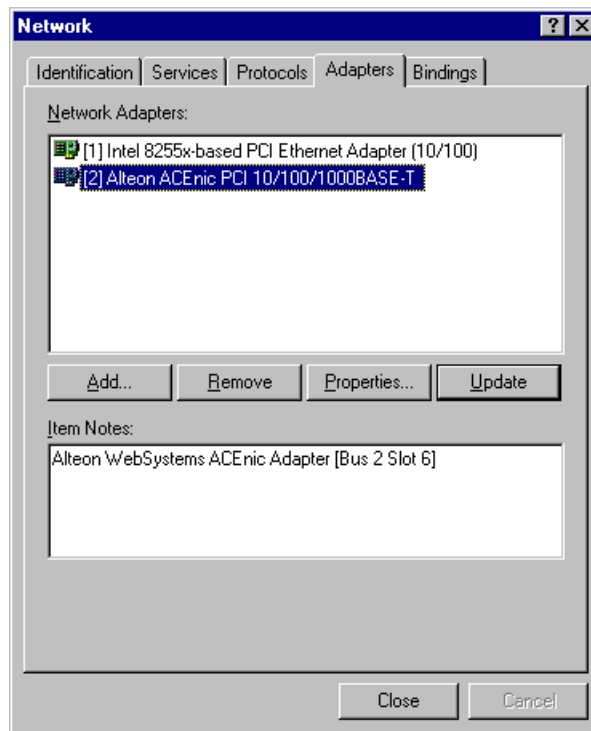
The bus and slot number of the highlighted adapter is listed in the lower part of the window.

3. **Select an ACEnic adapter, LAN on motherboard (LOM), or failover team entry and click the "Properties" button.**

The ACEnic Driver Properties window is displayed:

Each tab near the top of the ACEnic Driver Properties window represents a different set of configurable options:

- NIC Status and Configuration

  The options under this tab are used for configuring basic adapter properties: Tx and Jumbo Frames support, Rx flow control, link negotiation, full duplex or half duplex operation, and port speed. These options are covered in detail under Step 11. "Configure basic properties under the NIC Status and Configuration tab." on page 26.
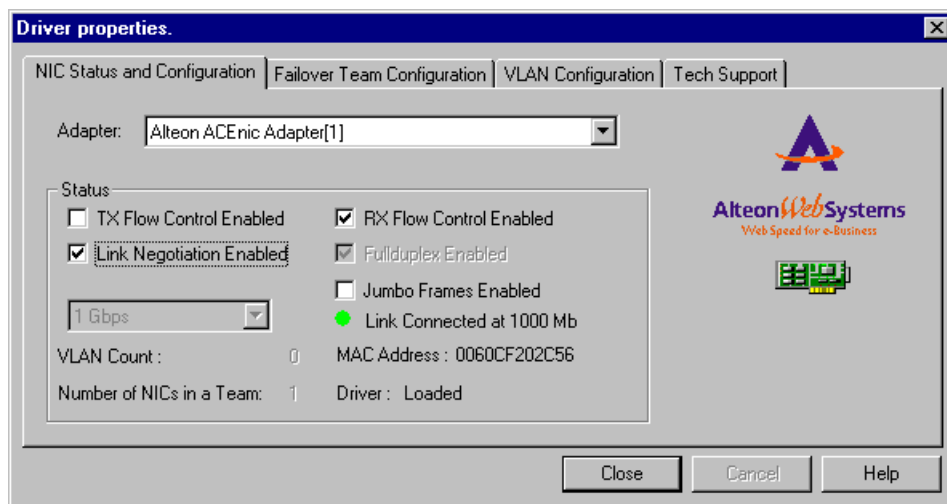
- Failover Team Configuration

  The options under this tab are used for configuring the optional failover teaming feature. For more information about configuring these options, see "Failover Teaming Configuration" on page 38.

- VLAN Configuration

 The options under this tab are used for configuring up to 64 VLANs per adapter. For more information about configuring this option, see "VLAN Configuration" on page 50.

NOTE – ACEnic adapters that are members of a failover team can be configured to support VLANs. However, VLANs cannot be configured for a stand-alone Intel LAN on motherboard (LOM) or a failover team that includes a LOM.

---

4. **In the ACEnic Driver Properties window, click any tab to access its configurable options.**

   If you click the "Failover Team Configuration" tab *but* there are no failover teams or VLANs currently configured, a dialog box similar to the one shown below is displayed:
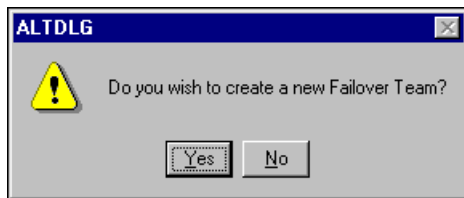
5. **If the dialog box shown above is displayed, click the "Yes" button to continue Failover Team configuration.**

   If there are no teams configured, you will be prompted to confirm that you wish to create a new failover team. Click the "Yes" button to continue, or the "No" button to abort failover team configuration.

6. **When all desired configuration is complete, click the "Close" button to accept the settings.**

7. **In the Network window, click the "Close" button.**

8. **When prompted to restart your computer, click the "Yes" button.**

   The system will restart, using the new configuration settings.

NOTE – If you modify any configuration parameters, you must reboot the system before the changes will take effect. If you make changes and do not reboot, you may experience configuration problems. If no configuration changes have been made, you can click the "No" button to close the configuration session without restarting your system.

Updating the Driver Software

Use the following procedure to replace version 2.2 (or higher) adapter driver software with newer versions as they become available.

NOTE – Do not use the update procedure to overwrite older ACEnic adapter drivers installed prior to version 2.1. If any older drivers from previously installed adapters are on your system, they must be *removed* prior to installing the new drivers (version 2.2 or higher).

---

1. **Start your Windows NT system and log in.**

NOTE – You must have Network Administrator privileges to install the driver software.

---

2. **Open the Control Panel and double-click the Network icon.**

3. **When the Network window opens, select the "Adapters" tab:**

Any previously installed ACEnic driver software is listed under Network Adapters.

4. **Select an Alteon ACEnic adapter and click the "Update" button.**

5. **When prompted, insert the CD-ROM into your system's CD-ROM drive, type the path to the driver that matches your system, and click the "Continue" button.**

    To install the adapter driver software for Windows NT, enter the following path: `e:\`

    Where "`e:`" is the designation of the CD-ROM drive on your system.

    The system will then copy the appropriate adapter files from the CD-ROM.

    ```
    Windows NT Setup                                        ☒

         Please enter the full path for the upgrade/update     ┌──────────┐
         OEMSETUP.INF file. Then choose Continue.              │ Continue │
                                                               └──────────┘
                                                               ┌──────────┐
                                                               │  Cancel  │
                                                               └──────────┘


         ┌──────────────────────────────────────────────────┐
         │ e:\                                                │
         └──────────────────────────────────────────────────┘
    ```
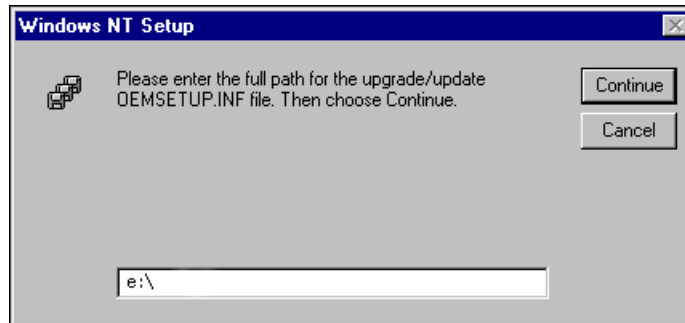
    NOTE – If you acquired the adapter software on a floppy disk or from the support website, enter the path to where the adapter driver files reside on your system.

6. **When the copying process is complete, click the "Close" button in the Network window.**

7. **When prompted to restart your computer, click the "Yes" button.**

    The system will restart, using the new configuration settings.

Moving the Adapter to a Different Slot

To move an ACEnic adapter to a different slot in the same system, you must do the following:

1. **Remove the adapter driver software (see "Removing the Driver Software" on page 35).**

2. **Shut down the system and remove the adapter card from the PCI slot.**

3. **Install the adapter card in its new PCI slot (see "ACEnic Adapter Installation" on page 17).**

4. **When the system is powered on, reinstall the driver software (see "Installing the Driver Software" on page 21).**

Removing the Driver Software

Before physically removing an adapter from your system, first remove the adapter driver software.

1. **Start your Windows NT system and log in.**

NOTE – You must have Network Administrator privileges to remove the driver software.

---

2. **Open the Control Panel and double-click the Network icon.**

3. **When the Network window opens, select the "Adapters" tab:**
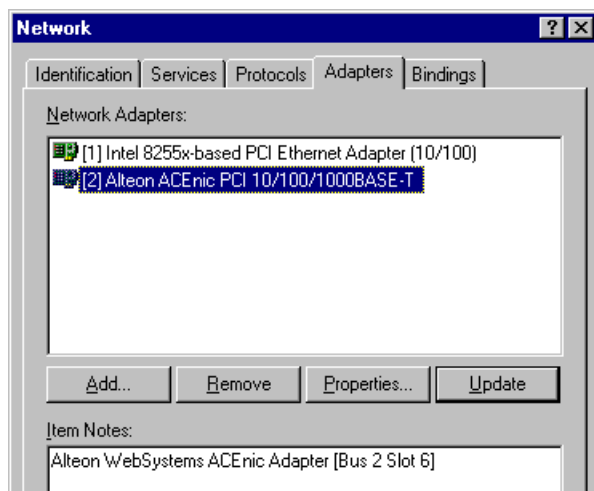
Any previously installed ACEnic adapter will be listed under Network Adapters.

4. **If the adapter has been configured as part of failover team, you must first delete the team.**

If the adapter is not part of a team, you may skip this step. Otherwise, to delete the team, select the adapter you wish to remove and click the "Properties" button. When the Properties window appears, select the Failover Team Configuration tab. This tab allows you to delete the team. For more information, see "Deleting a Team" on page 45.

5. **Individually select each ACEnic adapter you wish to remove and click the "Remove" button.**

6. **Once the appropriate adapters have been removed, click the "Close" button.**

7. **When prompted to restart your computer, click the "Yes" button.**

CHAPTER 4
Failover Teaming

This chapter provides instructions for configuring the adapter's optional failover teaming feature. The following topics are covered:

■ Failover Teaming Overview
■ Configuring Failover Teaming

Overview

Failover Teaming provides redundant adapter operation in the event that a network connection fails. When multiple ACEnic adapters are installed in the same server, they can be paired into *Teams*. Up to two teams, each with two adapters, can be configured.

If traffic is not seen over the primary adapter connection in a team because of failure of the adapter, cable, switch port, or switch (where the teamed adapters are attached to separate switches), the secondary team member becomes active, taking the MAC and IP address originally assigned to the primary adapter. Sessions should be maintained, causing no impact to the user.

Failover Teaming Configuration

Configuring Failover Teaming consists of the following tasks:

- Accessing the failover configuration interface
- Creating teams
- Adding adapters to the teams
- Assigning an IP address to the teams
- Rebooting the system

Each of these tasks is described below, along with how to delete adapters from a failover team and delete a team.

Accessing the Failover Configuration Interface

Use this procedure to access the adapter properties for Failover Team Configuration:

1. Open the Control Panel and double-click the "Network" icon.

2. When the Network window opens, select the "Adapters" tab:

3. **Select any ACEnic PCI Gigabit Ethernet Adapter or Team entry and click the "Proper-ties" button.**

    When an Intel LAN on motherboard (LOM) is installed in your system, the following dialog box is displayed:
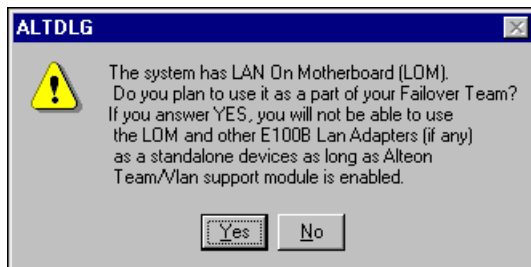

    The system will allow only one intermediate driver to be loaded at a time. This means that advanced options, such as failover teaming and VLANs, can be configured for either ACEnic adapters or a stand-alone LOM, but not both.

    If you click "Yes" in the above dialog box, a LOM can be configured only as a member of a failover team, but not as a member of a VLAN.

    If you click "No", the LOM will not be used as part of a failover team.

4. **In the ACEnic driver properties window, click the Failover Team Configuration tab.**

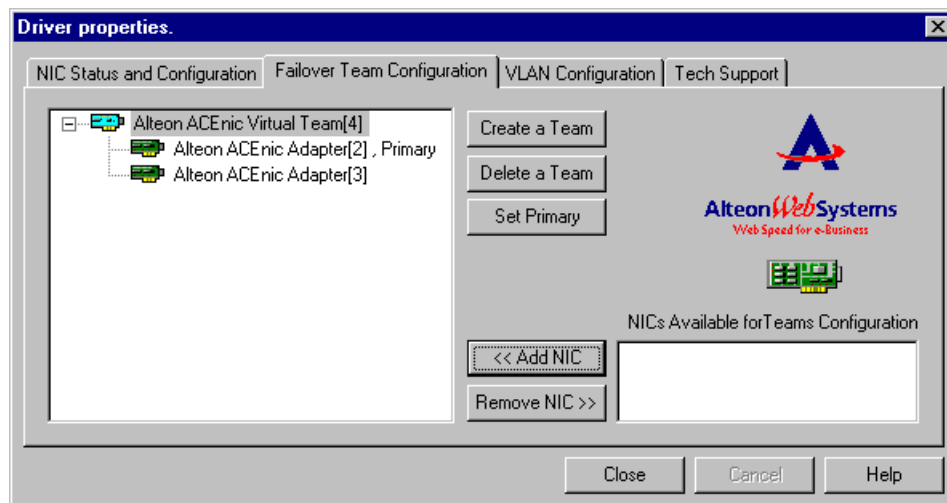   If there are no failover teams or VLANs currently configured, the following dialog box is dis-played:
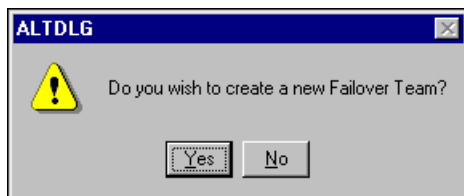
5. **If the dialog box shown above is displayed, click the "Yes" button to continue configura-tion.**

    If there are no teams configured, you will be prompted to confirm that you wish to create a new failover team. Click the "Yes" button to continue, or the "No" button to abort failover team configuration.

If you continue with configuration, the Failover Team Configuration tab is displayed:

Interface components of the Failover Team Configuration tab are described below:

■ Team list

This list displays all the teams that have been created. Each team is identified with a unique instance number. Typically, the first team configured is instance 1, and the next is instance 2.

Below each configured team is a list of the ACEnic adapters that have been placed into the team. You can conceal the team's adapter list by clicking on the minus box immediately in front on the team's icon. The box will contain a "plus" when the team's adapters are concealed. To reveal the adapter list once concealed, click the box again.

■ Control Buttons

There are five control buttons. These buttons are used for creating and deleting teams, for adding or removing adapters to/from the specific teams, and for setting the primary adapter for each team.
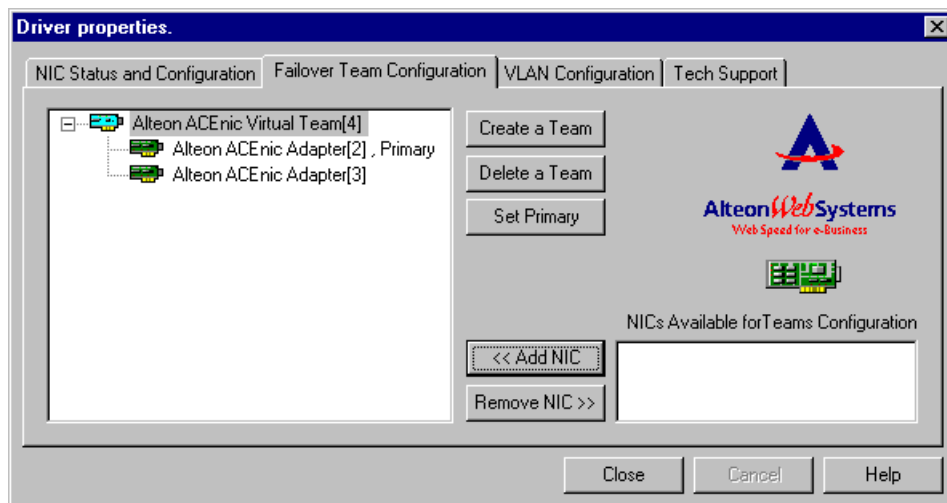
■ NICs Available for Team Configuration

This list displays all of the ACEnic adapters and LOMs that are available to be added to a team. Since each adapter can be added to only one team, the adapter is removed from this list once it has been assigned to a team.

Creating a Team and Assigning Adapters

A failover team comprises two adapters; a primary adapter and a backup adapter. Each adapter can belong to only one team.

To configure a new failover team, perform the following steps in the Failover Team Configuration tab of the ACEnic Driver Properties window:

1. **In the NICs Available list, select the Alteon ACEnic adapter that you want to be the primary adapter for the team.**

   The adapter will be highlighted when your selection is made. The selected adapter's basic configuration (Link Negotiation, Jumbo Frame, and Flow Control settings) will be used as the starting point for the new team's configuration.

   NOTE – Release 2.3 supports grouping ACEnic adapters with an 82559 Intel LAN on motherboard (LOM) into failover teams. However, this release does not support assigning a LOM as a primary adapter (the adapter for which you want to provide failover).

2. **Click the "Create a Team" button.**

   A new team instance will be created in the team list. The selected adapter will be automatically moved from the NICs Available list to the Team list under the newly created team. You can create up to two teams.

NOTE – The newly created failover team inherits all the basic configuration properties (Jumbo Frame support, Flow Control setting, Link Negotiation, Port Speed, and VLANs, when assigned) from the primary adapter. Other adapters added to the team are automatically reconfigured to match the team's configuration. When a team's basic configuration properties are changed using the NIC Status and Configuration tab (see "Configure basic properties under the NIC Status and Configuration tab." on page 26), this changes the configuration of all adapters in the team. However, once an adapter is removed from any failover teams, it will operate according to the parameters set for it before it became a member of a failover team.

3. **Place another adapter into the team.**

■ Each team must comprise two adapters. To add an adapter to a specific team, make sure that the team is highlighted in the Team list. If the desired team is not highlighted, select the team instance in the Team list.

■ Then, in the NICs Available for Team Configuration list, select the adapter to be added and click the "Add NIC" button. The highlighted adapter will be moved from the NICs Available list to the Team list under the highlighted team.

4. **When you are finished configuring failover teams, click the "Close" button to accept the changes.**

■ If any team has fewer than two adapters assigned, you will be prompted to add another adapter or delete the team.

■ If your computer is configured with a LAN on motherboard (LOM) and you have not added that LOM to any team, the following dialog box is displayed when you try to close the Failover Team Configuration tab:


Click the OK button.

■ If you originally chose *not* to use the LOM as part of your failover team (see Step 4 on page 39), the above dialog will not appear.

■ When team configuration has been correctly performed, one "Virtual Team" adapter driver will be created for each configured team and will appear along with the other adapters in the Network window of the Control Panel.

5. **In the Network window, click the "Close" button.**

6. **Configure the Team IP address if necessary.**

    If other adapters in your system use TCP/IP bindings, the TCP/IP Properties window will open. Configure the IP address and any other necessary TCP/IP configuration for the team. Click the "OK" button when finished.

7. **When prompted to restart your computer, click the "Yes" button.**
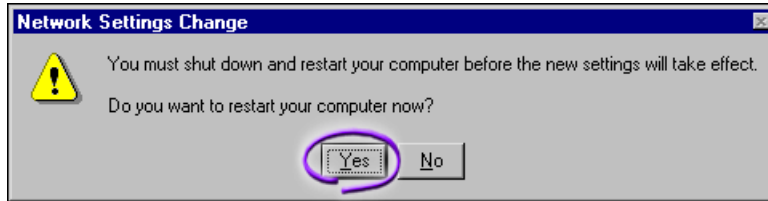
    The system will restart, using the new configuration settings.

NOTE – If you modify any optional configuration parameters (failover team or VLAN), you must reboot the system before the changes will take effect. If you make changes and do not reboot, you may experience configuration problems. If no configuration changes have been made, you can click the "No" button to close the configuration session without restarting your system.

Removing Adapters from a Team

To remove an adapter from its assigned failover team, perform the following steps:

1. **Access the Failover Team Configuration tab.**

2. **Select the adapter in the team list and click the "Remove NIC" button.**

    The adapter will be removed from the team list and will reappear in the NICs Available list.

NOTE – If you remove a LAN on motherboard (LOM) from a failover team, you must also delete the team. If you don't either add the LOM back to the team or delete the team, the system will not allow you to successfully complete adapter configuration.

Each team needs to have two members; if you are removing one of two adapters assigned to a team, the system displays the following message:
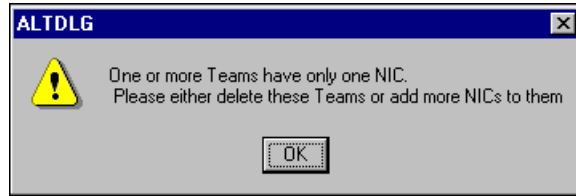
NOTE – Because a failover team requires two adapters to provide failover protection, you will either need to add an adapter to any team with only one adapter, or delete the team before the system will allow you to successfully complete adapter configuration.

3. **If necessary, place another adapter into the team.**

Each team must comprise at least two adapters. To add an adapter to a specific team, make sure that the team is highlighted in the Team list. If the desired team is not highlighted, select the team instance in the Team list.

Then, in the NICs Available list, select the adapter to be added and click the "Add NIC" button. The highlighted adapter will be moved from the NICs Available list to the Team list under the highlighted team.

4. **When you are finished configuring failover teams, click the "Close" button to accept the changes.**

If any team has fewer than two adapters assigned, you will be prompted to add another adapter or delete the team

5. **In the Network window, click the "Close" button to complete the configuration change.**

6. **When prompted to restart your computer, click the "Yes" button.**

The system will restart using the new configuration settings.

NOTE – If you modify any optional configuration parameters (Failover Team or VLAN), you must reboot the system before the changes will take effect. If you make changes and do not reboot, you may experience configuration problems. If no configuration changes have been made, you can click the "No" button to close the configuration session without restarting your system.

Deleting a Team

To delete a configured failover team and release its assigned adapters, perform the following steps:

1. **In the Failover Team Configuration tab, select the team you want to delete from the Team list.**

2. **Click the "Delete a Team" button.**

   The team and all its assigned adapters will be removed from the team list. The released adapters will reappear in the NICs Available list.

   NOTE – Adapters that are part of a failover team inherit all the basic configuration properties of the team, including VLANs associated with the team. If you delete a failover team, any VLANs configured for the ACEnic adapters that are members of that team will also be deleted.

   ---

3. **When you are finished configuring failover teams, click the "Close" button to accept the changes.**

   If any team has fewer than two adapters assigned, you will be prompted to add another adapter or delete the team. When team configuration has been correctly performed, a failover team will be created that will appear along with the other adapters in the Network window of the Control Panel.

   If there are no failover teams or VLANs currently configured for the selected adapter, the following dialog box is displayed:
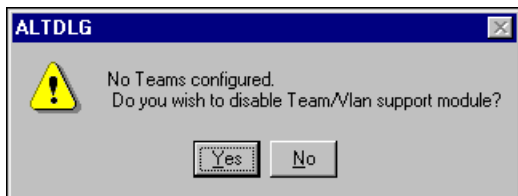
4. **If the dialog box shown above is displayed, you must click the "Yes" or "No" button before the system will allow you to complete adapter configuration.**

5. **In the Network window, click the "Close" button.**

6. When prompted to restart your computer, click the "Yes" button.
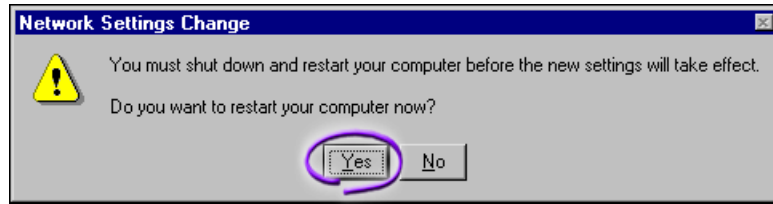
The system will restart, using the new configuration settings.

NOTE – If you modify any optional configuration parameters (failover team or VLAN), you must reboot the system before the changes will take effect. If you make changes and do not reboot, you may experience configuration problems. If no configuration changes have been made, you can click the "No" button to close the configuration session without restarting your system.

CHAPTER 5
VLANs

Your ACEnic adapter can be configured to support Virtual Local Area Networks (VLANs). This chapter provides instructions for configuring optional VLANs for an adapter. The following topics are covered:

- An overview of VLANs
- Configuring VLANs

If you do not want to configure your network to include multiple VLANs, you need only configure the adapter to support the default configuration, as described in Chapter 3, "Installing the ACEnic Driver Software".

NOTE – Adapters that are members of a Failover Team can also be configured to support VLANs. When configuring VLANs for Failover Team adapters, any adapter or LAN on motherboard (LOM) that is a member of a team inherits the configuration of the primary adapter. However, when an adapter or LOM is removed from the team, its original configuration parameters are used.

Overview

VLANs allow you to split your physical LAN into logical subparts, to create logical segmentation of workgroups and to enforce security policies among each logical segment. Each defined VLAN behaves as its own separate network, with its traffic and broadcasts isolated from the others, increasing bandwidth efficiency within each logical group. Up to 64 VLANs can be defined for each ACEnic adapter on your server, depending on the amount of memory available in your system.

Although VLANs are commonly used to create individual broadcast domains and/or separate IP subnets, it is sometimes useful for a server to have a presence on more than one VLAN simultaneously. Alteon WebSystems switches and ACEnic adapters use *VLAN tagging* to support multiple VLANs on a per-port or per-interface basis, allowing very flexible network configurations. VLAN tagging is a format used to identify packets according to membership in a particular VLAN.

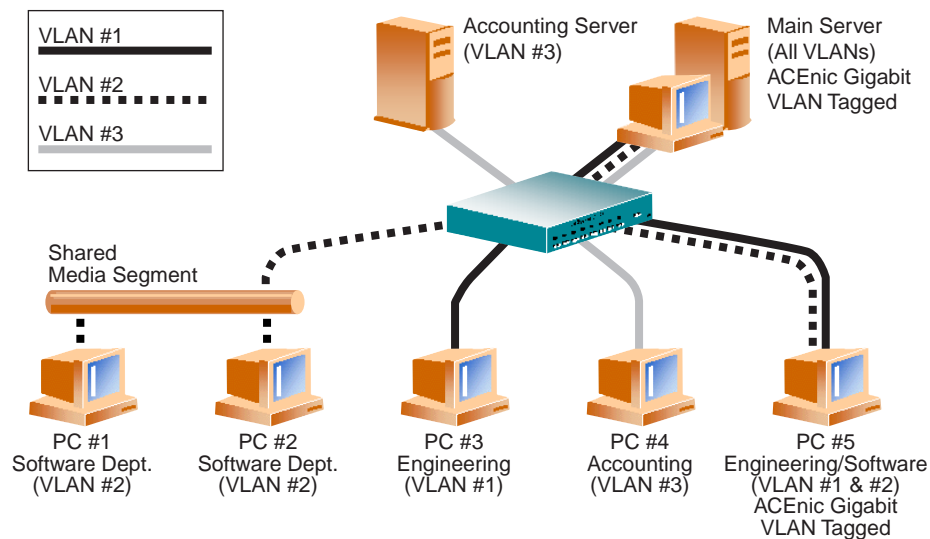Figure 5 shows an example network that uses VLANs with tagging.

Figure 5 Example of Servers Supporting Multiple VLANs with Tagging

Alteon*Web*Systems

In this example network, the physical LAN consists of a switch, two servers, and five clients. The LAN is logically organized into three different VLANs, each representing a different IP subnet. The features of this network are described in Table 7 on page 49.

Table 7 Example VLAN Network Topology

Component	Description
VLAN #1	An IP subnet consisting of the Main Server, PC #3, and PC #5. This subnet represents an engineering group.
VLAN #2	Includes the Main Server, PCs #1 and #2 via shared media segment, and PC #5. This VLAN is a software development group.
VLAN #3	Includes the Main Server, the Accounting Server and PC #4. This VLAN is an accounting group.
Main Server	A high-use server that needs to be accessed from all VLANs and IP subnets. The Main Server has an ACEnic adapter installed. All three IP subnets are accessed via the single physical adapter interface. The server is attached to one of the Alteon WebSystems switch Gigabit Ethernet ports, which is configured for VLANs #1, #2, and #3. Both the adapter and the connected switch port have tagging turned on. Because of the tagging VLAN capabilities of both devices, the server is able to communicate on all three IP subnets in this network, but continues to maintain broadcast separation amongst all IP subnets.
Accounting Server	Available to VLAN #3 only. The Accounting Server is isolated from all traffic on VLANs #1 and #2. The switch port connected to the server has tagging turned off.
PCs #1 and #2	Attached to a shared media hub that is then connected to the switch. PCs #1 and #2 belong to VLAN #2 only, and are logically in the same IP subnet as the Main Server and PC #5. The switch port connected to this segment has tagging turned off.
PC #3	A member of VLAN #1, PC #3 can communicate only with the Main Server and PC #5. Tagging is not enabled on PC #3's switch port.
PC #4	A member of VLAN #3, PC #4 can only communicate with the servers. Tagging is not enabled on PC #4's switch port.
PC #5	A member of both VLANs #1 and #2, PC #5 has an ACEnic adapter installed. It is connected to switch port #10. Both the adapter and the switch port are configured for VLANs #1 and #2 and have tagging enabled.

NOTE – VLAN tagging is only required to be enabled on switch ports that create trunk links to other Alteon WebSystems switches, or on ports connected to tag-capable end-stations, such as servers or workstations with ACEnic adapters.

VLAN Configuration

By default, ACEnic adapters are configured with VLAN support disabled. Up to 64 VLANs can be defined for each ACEnic adapter on your server, depending on the amount of memory available in your system.

Configuring VLANs consists of the following tasks:

- Accessing the VLAN configuration interface.
- Adding VLAN(s) to the adapter(s). This includes assigning a unique identifier and (optional) name to each new VLAN.
- Rebooting the system.

Each of these tasks is described below, along with how to delete VLANs or modify the properties of a configured VLAN.

NOTE – VLANs are not supported on non-ACEnic adapters, including an Intel stand-alone LAN on motherboard (LOM). If a non-ACEnic adapter is a member of a failover team, VLANs will not be supported for that team.
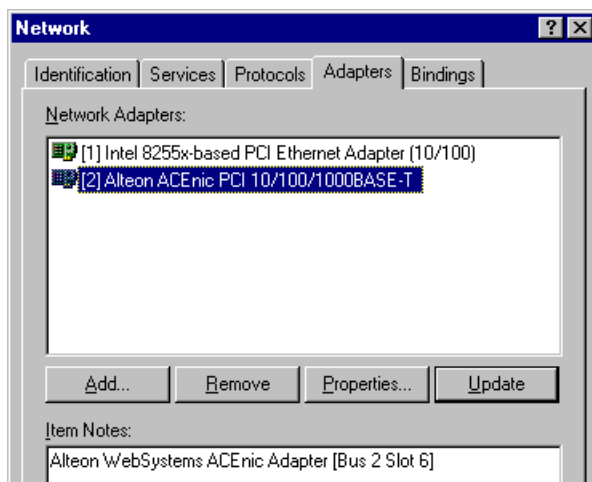
Accessing the Adapter VLAN Configuration Interface

Use this procedure to access the adapter properties for VLAN Configuration:

1. Open your system Control Panel and double-click the "Network" icon.
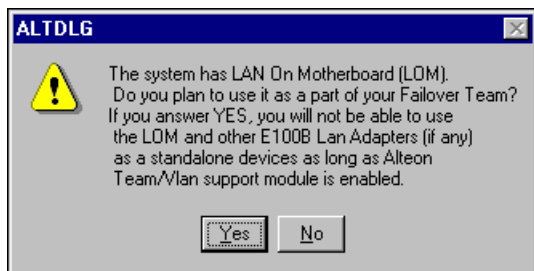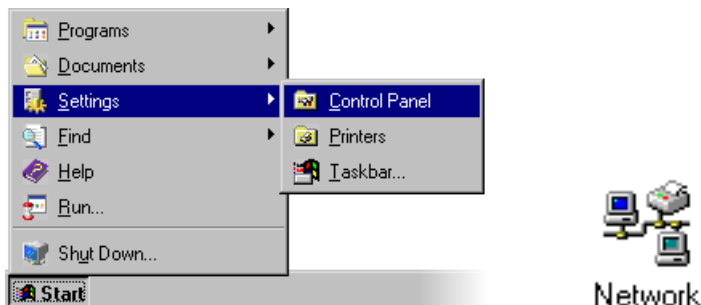

2. When the Network window opens, select the "Adapters" tab:

The bus and slot number of the highlighted adapter is listed in the lower part of the window.

3. **Select any ACEnic PCI Gigabit Ethernet Adapter and click the "Properties" button.**

When an Intel LAN on motherboard (LOM) is installed in your system, the following dialog box is displayed:

The system will allow only one intermediate driver to be loaded at a time. This means that advanced options, such as failover teaming and VLANs, can be configured for either ACEnic adapters or a stand-alone LOM, but not both.

If you click "Yes" in the above dialog box, a LOM can be configured only as a member of a failover team, but not as a member of a VLAN. If you click "No", the LOM will not be used as part of a failover team.

NOTE – VLANs are not supported for LANs on a motherboard (LOM). If a LOM is a member of a failover team, VLANs will not be supported for that team.

---

4. **In the ACEnic driver properties window, click the "VLAN Configuration" tab.**

■ If there are no VLANs or Failover Teams currently configured, the following dialog box is displayed. Click "Yes" to continue configuration.
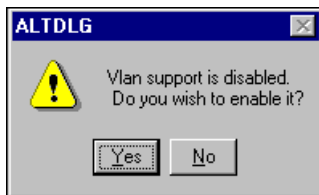
■ If you haven't yet configured failover teams, the following dialog box is displayed:

■ If the above dialog box appears, you need to configure at least one Failover Team before you can configure VLANs. For more information, refer to Chapter 4, "Failover Teaming".

5. **The VLAN Configuration tab is displayed:**

The VLAN Configuration tab lists the installed adapters and the VLANs configured for each adapter or Failover (Virtual) Team, if any. Each VLAN is identified with a unique identifier number and an (optional) name that will only appear in this window.
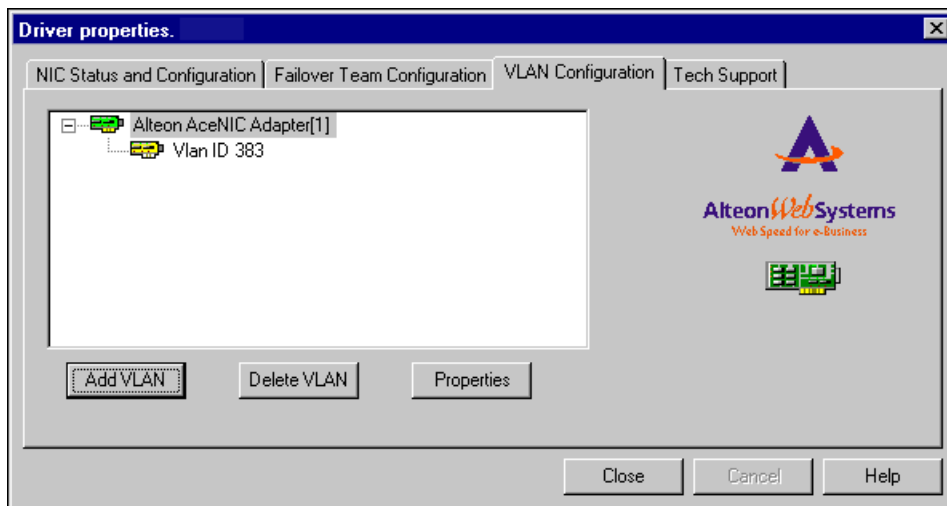
Interface components of the VLAN Configuration tab are described in detail below:

■ Adapter/VLAN list

Below each ACEnic adapter is a list of the VLANs that have been configured for that adapter. You can conceal each adapter's VLAN list by clicking the minus box immediately in front on the adapter's icon. The box will contain a "plus" when the VLANs are concealed. To reveal the VLAN list once concealed, click the box again.
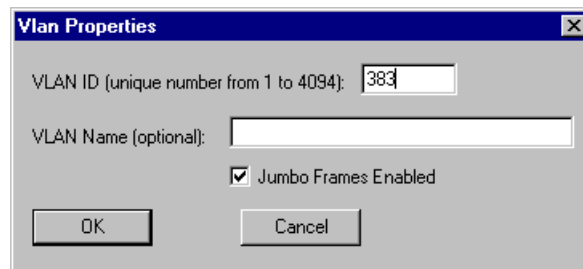
■ Control Buttons

There are three control buttons: "Add VLAN," "Delete VLAN," and "Properties." These buttons are used for creating and deleting VLANs, and for modifying the properties of VLANs already created.

Adding a VLAN

You can define up to 64 VLANs per adapter. To add a new VLAN, perform these steps:

1. **Access the VLAN Configuration tab, as described in the procedure on page 51.**

2. **In the NICs Available list, select the first adapter to which you wish to add a VLAN.**

   The adapter will be highlighted when your selection is made.

3. **Click the "Add VLAN" button.**

4. **In the VLAN Properties window, enter a unique number.**

You must assign a unique identification number to each VLAN you create. Even though the maximum number of VLANs that can be configured on each adapter is 64, any particular VLAN can be assigned an identification number between 1 and 4094.

The VLAN tagging format follows the guidance provided in IEEE 802.1Q-1999. Ensure that there are no spaces, blank lines, or extra characters. The identifier can be entered in decimal (for example, 383), octal (for example, 0577), or hexadecimal (e.g. 0x17F) format.

NOTE – When assigning a number for a VLAN, do not use the default VLAN identifier used by the adapter or the switch. Also, the adapter VLAN configuration should match the configuration on the switch or server; that is, if you've already identified VLANs 383 and 777 on the switch or server, the VLAN IDs for the new adapter(s) should match.

Example: Consider a server with a single adapter. The server is a member of two VLANs, with VLAN identifiers 383 and 777. The unique identifier of the first VLAN added to the adapter would be "383." The ID of the second VLAN associated with the adapter would be "777."
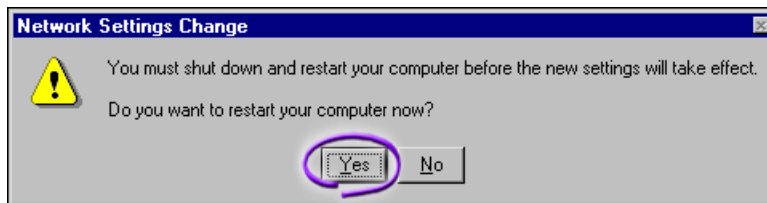
5. **In the VLAN Properties window, enter an (optional) name for the VLAN you're creating.**

6. **If Jumbo Frames will be sent to or received by the adapter VLAN, click the "Jumbo Frames" box.**

7.   **When you are finished adding VLANs to this adapter, click the "OK" button.**

A new VLAN instance will be created in the previously selected adapter list.

> **NOTE –** To maintain optimum adapter performance, your system should have 64MB of system memory for each eight VLANs created per adapter.

8.   **When you are finished configuring VLANs, click the "Close" button in the ACEnic Driver Properties window to accept the changes.**

9.   **In the Network window, click the "Close" button.**

10. **When prompted to restart your computer, click the "Yes" button.**

The system will restart, using the new configuration settings.

> **NOTE –** If you modify any optional configuration parameters (Failover Team or VLAN), you must reboot the system before the changes will take effect. If you make changes and do not reboot, you may experience configuration problems. If no configuration changes have been made, you can click the "No" button to close the configuration session without restarting your system.

Deleting a VLAN

> **NOTE –** Adapters that are part of a failover team inherit all the basic configuration properties of the team, including VLANs associated with the team. If you delete a Failover Team, any VLANs configured for that team will also be deleted.

To delete a configured VLAN, perform the following steps:

1.   **Access the VLAN Configuration tab, as described in the procedure on page 51.**

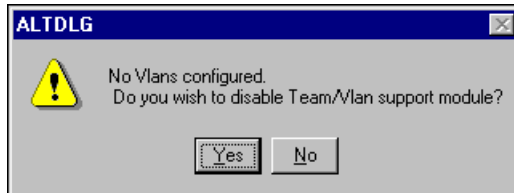2.   **Select the adapter that has the VLAN you want to delete.**

The adapter will be highlighted when your selection is made.

3. **Select the VLAN you want to delete and click the "Delete VLAN" button.**

   The selected VLAN will be deleted from the screen.

4. **When you are finished configuring VLANs, click the "Close" button in the ACEnic Driver Properties window to accept the changes.**

   If there are no VLANs or Failover Teams currently configured, the following dialog appears:

5. **If the dialog box shown above appears, click the "Yes" or "No" button to complete adapter configuration.**

6. **In the Network window, click the "Close" button.**

7. **When prompted to restart your computer, click the "Yes" button.**

   The system will restart, using the new configuration settings.

NOTE – If you modify any optional configuration parameters (Failover Team or VLAN), you must reboot the system before the changes will take effect. If you make changes and do not reboot, you may experience configuration problems. If no configuration changes have been made, you can click the "No" button to close the configuration session without restarting.

Modifying VLAN Properties

To modify the properties of a configured VLAN, perform the following steps:

1. **Access the VLAN Configuration tab, as described in the procedure on page 51.**

2. **In the NICs Available list, select the adapter that has the VLAN you want to modify.**

    The adapter will be highlighted when your selection is made.

3. **Click the "Properties" button. The following dialog box will appear:**

4. **In the VLAN Properties window, you can modify one of the following parameters:**

    ■ **VLAN ID:**

    You must assign a unique identification number to each VLAN you create. Even though the maximum number of VLANs that can be configured on each adapter is 64, any particular VLAN can be assigned an identification number between 1 and 4094.

    The VLAN tagging format follows the guidance provided in IEEE 802.1Q-1998. Ensure that there are no spaces, blank lines, or extra characters. The identifier can be entered in decimal (for example, 383), octal (for example, 0577), or hexadecimal (e.g. 0x17F) format.

    ■ **VLAN Name:**

    This optional identifier appears only in the ACEnic Driver Properties window.

5. **When you are finished modifying this VLAN, click the "OK" button.**

6. **When you are finished configuring VLANs, click the "Close" button in the ACEnic Driver Properties window to accept the changes.**

7. **In the Network window, click the "Close" button.**

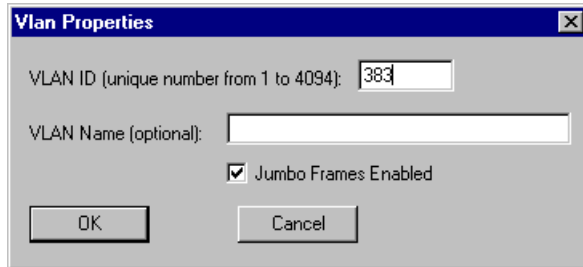**8. When prompted to restart your computer, click the "Yes" button.**

The system will restart, using the new configuration settings.

NOTE – If you modify any optional configuration parameters (Failover Team or VLAN), you must reboot the system before the changes will take effect. If you make changes and do not reboot, you may experience configuration problems. If no configuration changes have been made, you can click the "No" button to close the configuration session without restarting your system.

Troubleshooting

This chapter describes techniques for troubleshooting your ACEnic adapter and correcting some types of problems. The following topics are covered:

- Instructions for performing detailed hardware diagnostics on the adapter
- Behavior of the adapter's status LEDs
- How to resolve some common networking problems
- How to reach Alteon customer service and support

Hardware Diagnostic Utilities

Internal Loopback Test (Windows NT)

The Tech Support tab in the ACEnic Driver properties window displays information about how to contact Alteon's Technical Support and access to the Windows NT-based internal loopback diagnostic test for the adapter. Use the internal loopback test to verify that the adapter firmware is configured and operating correctly.

To perform the internal diagnostic test on an adapter, follow the steps in this section.

1. **Open your system Control Panel and double-click the "Network" icon.**

2. **When the Network window opens, select the "Adapters" tab.**

3. **Select any ACEnic adapter and click the "Properties" button.**

   The ACEnic driver properties window is displayed.

4. **If you want to run internal diagnostics on an adapter, select the NIC Status and Configu-ration tab is selected, then select the ACEnic adapter that will be tested.**

5. **Click the Tech Support tab.**

The Tech Support window is displayed:

This window provides contact information and access to the internal diagnostic test.
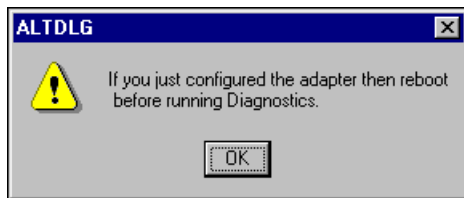
6. **To access the Diagnostics widow, click the "Diagnostics" button.**

7. **When the ACEnic Driver Diagnostics window is displayed, click the "Test" button to run the internal loopback test for the adapter.**

8. To run the internal loopback test for the adapter, click the "Test" button.

If you have not yet rebooted the system after installing the adapter driver, the following dialog box is displayed:

For best results, click the "OK" button to reboot the system prior to running diagnostics.

During this test, packet data is sent across the MAC (Media Access Control) chip to verify that traffic can be sent and received through the adapter. During the test, the Diagnostics window displays messages similar to those listed below, indicating that the test is in progress and the results of the test:

■ Diagnostic firmware loaded OK (when running the test for the first time)
■ Running diagnostic test
■ Test completed OK
■ Normal adapter firmware loaded OK

When the test has been completed, the result (Passed/Failed) is shown in the Internal Loopback Test field.

ALTDIAG Internal/External Loopback Test (MS-DOS)

`ALTDIAG`, an MS-DOS based diagnostic utility, is included on the CD-ROM. This utility is used for verifying that the adapter hardware is functional. It performs internal and external loopback tests and provides resulting pass/fail information. Perform the `ALTDIAG` tests any time you wish to rule out or identify possible adapter hardware problems.

To use the `ALTDIAG` utility, follow this procedure:

1. **Boot your system in clean MS-DOS mode rather than Windows NT.**

   NOTE – `ALTDIAG` *cannot* be used from the Windows NT "Start | Run" command or from "Start | Programs | MS-DOS Prompt." To use `ALTDIAG`, you *must* boot your computer in clean MS-DOS mode, with no other plug-ins, add-ons, or resident programs installed.

2. **Disconnect the network cables on all adapters being tested.**

   The loopback tests will not perform properly if the adapter is left connected to other devices.

3. **Connect a Cat. 5 UTP loopback cable to the adapter's RJ-45 jack.**

   A loopback cable can be constructed by connecting the following pins back to the single connector:

   Category 5 Loopback Cable

Pin 1 ————	**Pin 3**
Pin 2 ————	**Pin 6**
Pin 4 ————	**Pin 7**
Pin 5 ————	**Pin 8**

4. **Place the CD-ROM into your system's CD-ROM drive.**

5. From the MS-DOS prompt, enter the following commands to access the proper directory:

```
>e:
>cd \dosdiags
```

Where "**e:**" is the designation of the CD-ROM drive on your system.

NOTE – If you acquired the diagnostic software on a floppy disk or from the Alteon Web-Systems support website, specify the path to where the files reside on your system.

6. From the MS-DOS prompt, enter the following command to run diagnostics:

```
>dos4gw altdiag [-c card_number] [-l c:log_filename]
```

If more than one ACEnic adapter is installed in your system, the optional $-c$ parameter can be used for specifying the adapter card to be tested. Cards are numbered starting with 0. By default, ALTDIAG tests only the first card (number 0) detected in the system.

The optional $-l$ (letter L for "log") parameter is used for defining a file in which to log the test results. A text copy of the ALTDIAG test results will be placed in the specified file on the specified drive.

Example: To test the second card in a system and store the test results in log.txt in the current directory on the C: drive, the following command could be used:

```
>dos4gw altdiag -c 1 -l c:log.txt
```

7. **Review the test results.**

The test result from the previous example could look like this:

```
Log file created by Development and Diagnostic Test Program v2.3.1
on: Thu Apr  6 10:20:46 2000
-----------------------------------------------
Development and Diagnostic Test Program ( ) v2.3.1

PCI bios found. v0.16.
  HW Mech #1 supported
  Number of PCI buses: 1
ALTEON #0 found in PCI bus 0.
1 Alteon card(s) detected
Current card set to bus 0 Alteon #0.
internal Loopback Test
pkts:0  secs:0pkts:32  secs:1pkts:144  secs:2pkts:256
secs:3pkts:352  secs:4pkts:480  secs:5pkts:576  secs:6pkts:704
secs:7pkts:800  secs:8pkts:912  secs:9  1000 packets transmitted
sucessfully
  1000 packets received sucessfully
     0 errors detected
external Loopback Test
pkts:0  secs:0pkts:96  secs:1pkts:208  secs:2pkts:320
secs:3pkts:432  secs:4pkts:544  secs:5pkts:656  secs:6pkts:768
secs:7pkts:880  secs:8pkts:992  secs:9  1000 packets transmitted
sucessfully
  1000 packets received sucessfully
     0 errors detected
>
```

Both the internal and external loopback example tests show 1000 packets successfully received with 0 errors detected, indicating that the adapter hardware is functioning properly.

If the adapter does not perform as expected, try reinstalling the adapter card or moving it to a different slot or to a different system, then run the ALTDIAG tests again. If the card still fails, contact Alteon WebSystems Customer Support.

Checking the Port LEDs

1000Base-SX and 1000Base-LX Adapters

Two port LEDs are located on the faceplate of the ACEnic 1000Base-SX or 1000Base-LX adapter: one to indicate link status and one for data transfer status (see Figure 2 on page 13). Before the port LEDs can provide troubleshooting information, the adapter must be connected to the network (see Chapter 2), and the network drivers for your particular operating system must be installed (see Chapter 3).

1. **Verify that the adapter driver software has been installed and that the adapter is connected to a network.**

2. **Verify that the adapter status LEDs operate as described in the following table:**

Table 8 1000Base-SX/LX Port LED Activity

LED	State	Description
Data	Blinking	Data detected on the port.
	On	Data detected on the port.
	Off	No data detected on the port.
Link	Blinking slowly	Port has been disabled by software.
	On	Good link.
	Off	No link; possible bad cable, bad connector, or configuration mismatch.

10/100/1000Base-T Adapter

The faceplate of the ACEnic 10/100/1000Base-T adapter has four LEDs: one for each port speed option (10Mbps, 100Mbps, and 1Gbps), to indicate which link is active, and one LED for data transfer status (see Figure 2 on page 13).

Before the port LEDs can provide troubleshooting information, the adapter must be connected to the network (see Chapter 2), and the network drivers for your particular operating system must be installed (see Chapter 3).

1. **Verify that the adapter driver software has been installed and that the adapter is connected to a network.**

2. **Verify that the adapter status LEDs operate as described in the following table:**

Table 9 10/100/1000Base-T ACEnic Port LED Activity

LED	State	Description
Data	Blinking	Brief bursts of data detected on the port.
	On	Streams of data detected on the port.
	Off	No data detected on the port.
10	On	Good 10 Mbps Ethernet link
	Off	No 10 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
100	On	Good 100 Mbps Fast Ethernet link.
	Off	No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
1000	On	Good Gigabit Ethernet link.
	Off	No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.

NOTE – If all four LEDs remain lit simultaneously, the adapter driver software is either missing or improperly installed.

Troubleshooting Checklist

CAUTION—Before opening the cabinet of your system for removing or inserting the adapter, please review all precautions outlined under "Safety Precautions" on page 16.

The following checklist provides recommended actions to take to resolve problems installing the ACEnic adapter or running it in your system.

■ Inspect all cables and connections. Verify that the cable connections at the ACEnic adapter and the switch are attached properly. Make sure that the cable length and rating are compliant with the requirements listed in "Connecting the Network Cables" on page 18.

■ Connect the adapter to a different network port and run the tests again. If the test results reflect that the adapter is functioning properly, the original network port may be defective or improperly configured.

■ Check the adapter installation by reviewing Chapter 2. Make sure that the adapter board is properly seated in a PCI slot. Check for specific hardware problems, such as obvious damage to board components or the PCI edge connector.

■ Check the configuration settings and change them if they conflict with another device.

■ Make sure that your system is using the latest BIOS.

■ Try inserting the adapter in another slot. If the new position works, the original slot in your system may be defective.

■ Replace the failed adapter with one that is known to work properly. If the second adapter works in the slot where the first one failed, the original adapter is probably defective.

■ Install the adapter in another functioning system and run the tests again. If the adapter passed the tests in the new system, the original system may be defective.

■ Remove all other adapters from the system and run the tests again. If the adapter passes the tests, the other adapters may be causing contention.

Alteon WebSystems Support Information

For product support information, software updates, and release notes, see "Contacting Alteon WebSystems" on page 7.

Specifications

1000Base-SX and 1000Base-LX Link Characteristics

	Medium Diameter	Frequency	Cable Type	Operating Range
SX	62.5 Microns	Shortwave (850 nanometers)	Multimode fiber	2 to 275 meters (6.5 to 902 feet)
	50 Microns	Shortwave (850 nanometers)	Multimode fiber	2 to 550 meters (6.5 to 1804 feet) (in compliance with IEEE 802.3-1999)
LX	62.5 Microns	Longwave (1300 nanometers)	Multimode fiber	2 to 440 meters (6.5 to 1443 feet)
	50 Microns	Longwave (1300 nanometers)	Multimode fiber	2 to 550 meters (6.5 to 1804 feet)
	9 Microns	Longwave (1300 nanometers)	Single mode fiber	2 to 5,000 meters (6.5 to 16,404 feet)

10/100/1000Base-T Cable Specifications

Port Type	Connector	Media	Maximum Distance
10Base-T	RJ-45	Cat. 3, 4, or 5 UTP	100 meters (325 feet)
100/1000Base-T	RJ-45	Cat. 5 UTP	100 meters (325 feet)

NOTE – 1000Base-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and ANSI/EIA/TIA-568-A (1995) and tested for additional performance using testing procedures defined in TIA/EIA TSB95.

Performance Specifications

Feature	Specification
PCI clock	66 MHz max
PCI Data/Address	32-bit and 64-bit
PCI data burst transfer rate	132 MB/second (32-bit bus) 264 MB/second (64-bit bus) 528 MB/second (64-bit bus at 66 MHz)
PCI modes	Master/slave
10/100/1000Base-T	10/100/1000 Mbps (full duplex)

Physical Characteristics

Dimension	Measurement
Length	17.3 cm (6.8 in.)
Width	10.7 cm (4.2 in.)

Power Requirements

Specification	Measurement
Operating voltage	+5 V ± 5%
Power consumption	14 Watts 2.8A @ +5VDC

Environmental Specifications

Condition	Operating Specification	Storage Specification
Temperature	0°C to 55°C (+32°F to +131°F)	-40°C to +85°C (-40°F to +185°F)
Relative humidity	5% to 85% (non-condensing) 40°C, 16 hour dwells at extremes	5% to 95% (non-condensing) 10°C/hour
Altitude	Up to 3,048 meters (10,000 ft.)	Up to 10670 meters (35,000 ft.)
Shock	10g, 1/2 sine wave, 11 msec	60g, 1/2 sine wave, 11 msec
Vibration, peak to peak displacement	0.0127 cm. (0.005 in.) max (5 to 32 Hz)	0.2540 cm. (0.1 in.) max (5 to 17 Hz)
Vibration, peak acceleration	0.25g (5 to 500 Hz) (Sweep Rate = 1 octave/min.)	0.25g (5 to 500 Hz) (Sweep Rate = 1 octave/min.)