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PowerEdge 1550 Self-Study Guide

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Introduction to the Self Study Guide

Description

The purpose of this self-study is to prepare Dell Service Providers (DSPs) to service the Dell PowerEdge 1550. It does so in various sections. The first section identifies the target markets and the needs of those markets. Then it describes the features that allow the Dell PowerEdge 1550 to serve the needs of those markets

The next section describing how the Dell PowerEdge 1550 integrates into a rack and how to remove/replace each field replaceable unit.

This is followed by an overview of the Dell Service provider (DSP) program, the requirements of a DSP, and how to perform DSP specific tasks such as changing the service tag number of a system board.

The final section, Technical Appendix, contains more in depth information about the features of the PowerEdge 1550. Familiarity with this information will aid the technician in servicing the PowerEdge 1550.

Goals

The goal for this document is to prepare Dell Service Providers (DSPs) to service the Dell PowerEdge 1550. Servicing the PowerEdge 1550 requires an understanding of how the components of the system interconnect and how the user interface of the disk subsystem works.

Understanding the target market of the system and how the system can communicate failures can also enhance service offerings. This document provides information that will allow DSPs to understand the kind of environment to expect when servicing the PowerEdge 1550 and to take advantage of the features of the PowerEdge 1550 during service calls.

Objectives

After completing this self-study guide, participants will be able to:

- Understand the marketing position of the PowerEdge 1550.
- Understand the features of the PowerEdge 1550.
- Disassemble and reassemble all major FRUs in the PowerEdge 1550.
- Understand the RAM configurations.
- Understand the type and number of expansion card connectors and where specific cards must be installed.
- Understand the number of hard-disk drives that can be mounted in the hard-disk drive bays.

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- Understand the SCSI offerings with both integrated and optional cards with their configurations.
- Understand the service procedures differences and enhancements.

Prerequisites

Before working with the Dell PowerEdge 1550, participants must have:

- A DCSE Associates Servers V 3.0 certification.
- Experience with the basic procedures for installing operating systems and drivers in a server environment.

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PowerEdge 1550 Overview

Introduction

This section provides information about the customer to which the PowerEdge 1550 is designed to appeal. It also provides a description of the feature set that allows the PowerEdge 1550 to serve the needs of those customers.

The information contained in this section is helpful because it can provide the DSP with a clear picture of the types of environments to expect when servicing the PowerEdge 1550. It also provides the right information for a DSP to be able to answer simple questions that the customer may have or to understand error messages, error lights, or error codes that the system may display.

Product Positioning

The PowerEdge 1550 is a general-purpose (GP) ultra rack-dense 1U (1.75-inch) server targeted to support Internet and network infrastructure applications, including gateways, DNS servers, and DHCP servers. The PowerEdge 1550 provides unprecedented levels of performance, availability, and scalability in a 1U form factor, including dual Pentium III processors (up to 1 GHz), a new chipset (ServerWorks HE SL) that supports dual 64-bit/66 MHz PCI slots on separate PCI buses for maximum I/O throughput, up to three hot-pluggable 1-inch SCSI hard drives, embedded Ultra3 SCSI, and up to 2 GB of RAM (4 GB when 1 GB DIMMs become generally available on the market).

The explosive growth of the Internet has fueled the need for rack dense servers as service providers (ISPs/ASPs), dot-coms, enterprise customers, or any organization leveraging Internet technologies all struggle with the same fundamental issue – data center space. Data center space is either scarce, expensive, or both for most organizations so whether customers build their own data centers or lease space from a service provider, companies must maximize their return by deploying as many servers as possible in the smallest space possible. These factors have made 1U servers extremely attractive.

Traditionally, common product segmentation divided server products into workgroup, departmental, and enterprise systems. This classification tied a product's features with its price point. With the growth of the ultra rack dense server market, including products such as the PowerEdge 1550 and PowerEdge 2450, a new thin server segment has emerged. While these servers can cut across all of the traditional segments, 1U servers are primarily deployed in the front end (first tier) of the traditional 3-tier architecture where rack density is the most critical.

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Product Features

The Dell PowerEdge 1550 does not replace any existing product. Instead it is Dell's first entry into the 1U rack mountable general purposes server space.

Features

The PowerEdge 1550 features are:

- Support for up to two (2) Pentium III (FC-PGA 370 socket) processors (up to 1 GHz).
- Four (4) SDRAM DIMMs with support for up to 2 GB SDRAM.
- Two 64/66 PCI slots (1 full length card and 1 short card with 1 processor, two short PCI cards with 2 processors).
- Two integrated Intel 82559 10/100 Mbit NIC.
- One integrated U160 dual channel SCSI controller (AIC-7899).
- RAID support with an optional PERC3/DCL card.
- 4 Mb Flash for system BIOS, video BIOS, SCSI BIOS, and ISA/PCI configuration.
- Integrated PCI video (ATI Rage XL) with 4 MB SDRAM.
- PS/2 compatible mouse port.
- PS/2 compatible keyboard port.
- One (1) 9-pin serial port.
- Two USB ports on the back.
- Integrated hardware monitoring circuitry, similar to the PowerEdge 1400.
- Three (3) hot-plug drive bays.
- Embedded rail on the cover.
- One (1) slim floppy and 1 slim IDE CD-ROM.
- One (1) 220 W power supply.
- Four (4) cooling fans.
- *Dell Server Assistant* CD included.
- *Dell OpenManage* Software included.

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CPU

The PowerEdge 1550 supports an Intel Pentium III "Coppermine" processor. This level of Pentium III is designed entry to mid-range markets. Features of the processor include:

- Up to 2-way Symmetric Multiprocessing.
- 133-MHz system bus support.
- Support for 133-MHz memory.
- Internal cache operating at full core frequency.

BIOS

The PowerEdge 1550 BIOS has support for the following:

- System BIOS.
- System Setup.
- Onboard Video BIOS.
- Integrated SCSI BIOS.
- PCI 2.1.
- PCI-to-PCI Bridge 1.0.
- Plug and Play BIOS 1.0a.
- Plug and Play ISA 1.0a.
- ESCD 1.02a.
- Multiprocessor 1.4.
- System Management BIOS 2.3.1.
- Universal Serial Bus 1.0.
- Dell Server Assistant 6.x.
- Utility Partition.
- I2O v.15.
- BIOS Boot Specification v1.01.
- El Torito CD-ROM Boot 1.0.
- Wake-On-LAN Redirection Support.
- Console Redirection Support.
- ACPI 1.0.

Select features are explained in the Technical Appendix.

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System Chipset

The PowerEdge 1550 uses the ServerWorks Enterprise ServerSet™ III HE –SL chipset. The constituent chips of this chipset are:

- NCB20HE-SL – North Bridge
- OSB4 – South Bridge
- CIOB20 – Champion IO Bridge

The features of this chipset are discussed in the technical appendix.

Integrated SCSI

The PowerEdge 1550 uses an onboard Adaptec AIC-7899. This is the same chip as used in the AHA®-2940UW/OF and AHA-2944UW/OF Host Controllers.

The features of this chip are:

- 64-bit, 66-MHz PCI support.
- Dual independent SCSI busses.
- Full Ultra160/m and Ultra3 SCSI Domain Validation and CRC support.
- Enhanced Logical Unit Number (LUN) supports up to a maximum of 32 LUNs.
- Support for a combination of 16-bit Ultra160/m, Ultra3, Ultra2, Ultra, and standard SCSI devices including disk drives, disk arrays, tape drives, CD-ROM and CD-R drives, jukeboxes, removable drives, scanners, and printers.

  Microsoft® PC99 compliant.
- Microsoft Cluster Server compatible.
- PCI Hot-Plug compatible.
- Fully compatible with the AIC-3860 for single-ended device connection.

RAID

The PowerEdge 1550 will support two RAID options: PERC 3/DCL at RTS and PERC 3/DC in Q1 ’01 in conjunction with support of external storage. PERC 3/DCL is a new short (vs. full length) RAID controller that will only be offered on the PowerEdge 1550. The PERC 3/DC will be offered across the Dell product line.

The “3” represents Ultra3 SCSI technology (160 MB/s), “DC” stands for dual channel, and “L” stands for light (vs. the standard DC controller). The primary differences between PERC 3/DCL and PERC 3/DC are that the standard PERC 3/DC will support more memory (128 MB vs. 64 MB),

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battery back-up (vs. no battery back-up), and have cluster support (vs. no cluster support). The table below lists the features of each.

Feature	PERC 3/DCL	PERC 3/DC
PCI	64-bit/66MHz	64-bit/66MHz
SCSI	2 channel Ultra3 SCSI	2 channel Ultra3 SCSI
Connectors	2 total: 1 internal	2 total: 1 int./1 ext. or 2 ext.
Cluster Capable	No	Yes
Cache	64 MB	128MB
ECC Cache	Yes	Yes
Battery Backup	No	Yes
Backup Time	N/A	48-72 hours
S.M.A.R.T.	Yes	Yes
Online Capacity Expansion & RAID Level Migration	Yes	Yes
RAID Levels Supported	0, 1, 5	0, 1, 5
OS Driver Support	Windows 2000 Server, Windows 2000 Advanced Server, MS NT 4.0, Red Hat Linux 6.2 and 7	Windows 2000 Server, Windows 2000 Advanced Server, MS NT 4.0, Red Hat Linux 6.2 and 7
Compatibility	Data compatible with PERC 2/SC, PERC 2/DC, PERC 3/DC, and PERC 3/QC	Data compatible with PERC 2/SC, PERC 2/DC, PERC 3/DC, and PERC 3/QC

The PERC 3/DCL has other capabilities that are discussed in the technical appendix.

Integrated Network Interface

The Integrated Intel EtherExpress Pro/100+ (82559) supports:

- Advanced Configuration and Power Interface (ACPI) 1.20A based power management.
- Wake on Magic Packet.
- Wake on interesting packet.
- Advanced System Management Bus (SMB) based manageability.
- Wired for Management (WfM) 2.0 compliance.
- IP checksum assist.
- PCI 2.2 compliance.
- Microsoft PC 98, PC 99, and Server 99 compliance.

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More in depth information can be found in the technical appendix at the end of this document.

Integrated Video

The video controller used on the PowerEdge 1550 is an ATI-Rage XL connected to the PCI bus with 4 MB of video RAM. Since the chips are not installed in sockets and there are no empty sockets the amount of video memory cannot be upgraded.

System Board Ports, Slots, and Indicators

The system has the following user accessible ports and connectors:

Internal

- Four (4) PC133 SDRAM DIMM sockets.
- Three (3) drive bay SCSI Hot plug backplane.
- One (1) floppy drive.
- One (1) IDE.
- Two (2) FC-PGA Socket 370 for processors. If the system has only one processor installed then there must be a terminator in the other socket.
- Two (2) 64-bit/66 MHz PCI slots.
- One (1) 68-pin SCSI connector.

External - Back

- One (1) PS/2 keyboard connector.
- One (1) PS/2 mouse connector.
- Two (2) 10/100 network connectors.
- Two (2) USB connectors.
- One (1) VGA connector.
- One (1) serial connector.
- One (1) high density SCSI connector



NOTE: Between the USB ports and the Attention LED on the back of the system is a secondary power switch. This can be useful for

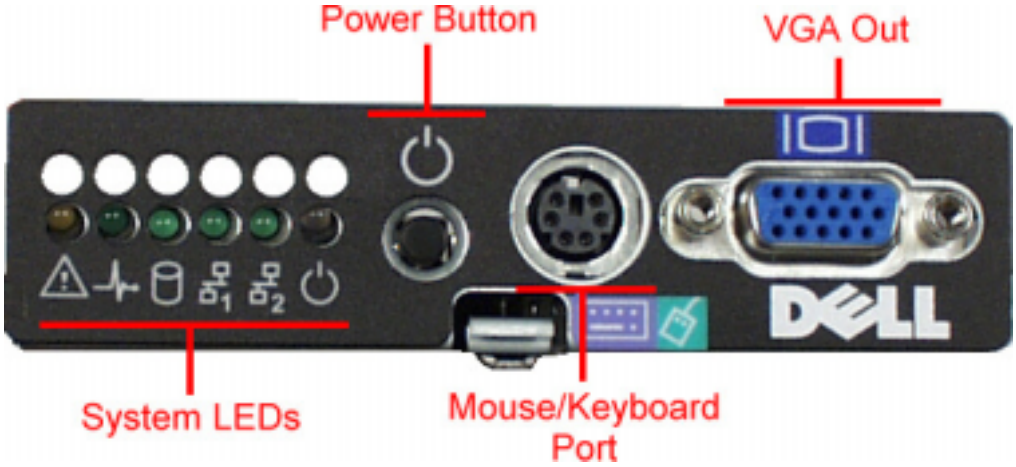
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troubleshooting purposes as it will work regardless of the status of the control panel.

External - Front

- One (1) combined keyboard/mouse connector
- One (1) VGA connector.

The front of the system has three accessible ports, a combined keyboard/mouse connector and a VGA connector. The combined keyboard/mouse uses a Y-cable that combined the signals of a keyboard and a mouse into one connector. The front connections become active and disable the rear connections when a monitor is connected to the VGA connector on the front of the system.



System LED Indicators

Icon	Indicator and Meaning
	Fault (Amber): • Off: system operational, no fault. • Blinking: system in degraded state (fans, thermal, voltages, chassis intrusion, etc.).
	Attention (Green): • Solid: system all okay. • Blinking: user interaction required.
	Hard Drive LED Indicators (Green): • On: Power is being supplied to the drive.
	Ethernet 1 and 2 LED Indicators (Green): • Blinking: Network activity.

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	Power-on LED: • On green solid: powered and running. • Amber blinking: sleep state.

Hard Drive LED Operation

When used in conjunction with a PowerEdge Expandable RAID Controller, the backplane supports enhanced LED patterns to inform the user of drive activity. The following functions (taken from Backplane Firmware Specification) are implemented:

- IDENTIFY

  The IDENTIFY condition is the highest priority condition of the indicated conditions. This condition can apply to both populated and empty slots. The online/fault LED is flashing green on for 125 ms, off for 125 ms and so on.

  The IDENTIFY status condition is terminated when another status condition is set using the SAF-TE "perform slot operation" command, when a drive is inserted into or removed from the Identified slot, or after thirty seconds have elapsed.

- SLOT DEVICE BEING PREPARED FOR REMOVAL

  This pattern is displayed during the 30-second drive spin-down period. The online/fault LED is flashing green on for 250msec, off for 250msec and so on.

  (For all additional status conditions, the activity led is used only to indicate drive activity.)

- SLOT DEVICE BEING PREPARED FOR OPERATION

  This pattern is displayed during the 3-second drive power up period. The online/fault LED is green on.

- SLOT EMPTY

  The online/fault led and the activity led (since there is no drive present) are off.

- SLOT READY FOR DRIVE INSERTION OR REMOVAL

  The online/fault led and the activity led are all off.

- DRIVE FAILED

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The online/fault LED is amber on for 125msec, off for 125msec

- DRIVE REBUILDING

  The online/fault LED is flashing green on for 500msec, off for 125msec and so on

- DRIVE PREDICTED FAILURE

  The online/fault led is green on for 500 ms, amber on for 500 milliseconds, and off for 1000ms.

- DRIVE ONLINE (No other displayable status).

  The online/fault led is green on.

Chassis

The PowerEdge 1550 is a 1U system. The term "U" is a unit of measure in rack mountable components. A U is 1.75". This unit of measure describes the height of a product and therefore the Dell PowerEdge 1550 is 1.75 inches high.

At 1U the PowerEdge 1550 is half the height of a PowerEdge 2450. More PowerEdge 1550 systems can fit into a rack than PowerEdge 2450 systems.

Dell Open Manage Array Manager

Dell OpenManage Array Manager is a user interface for installing and managing RAID storage environments that are independent of an underlying hardware RAID controller.

This gives users a consistent look and feel regardless of the actual RAID controller being used.

Over time, Array Manager will be integrated with all of Dell storage products:

- The earliest releases focused on host-based RAID controllers only.
- Subsequent releases have added external RAID systems and validation with Dell SAN configurations.
- Future releases will include interoperability with an integrated product strategy for Dell SAN Management.

  Array Manager hides the differences between these tools by unifying them through a consistent look and feel. This is accomplished by providing users with a single GUI, built on a common API through which each vendor's RAID or host bus adapter is accessed.

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In addition, Array Manager extends the value of the vendors' tools by enabling them to be run from a central console that is not necessarily co-located with the devices being configured and managed.

More information including installation and basic usability is located in the technical appendix at the end of this document.

Racking hardware for Dell Four Post Racks

Rails

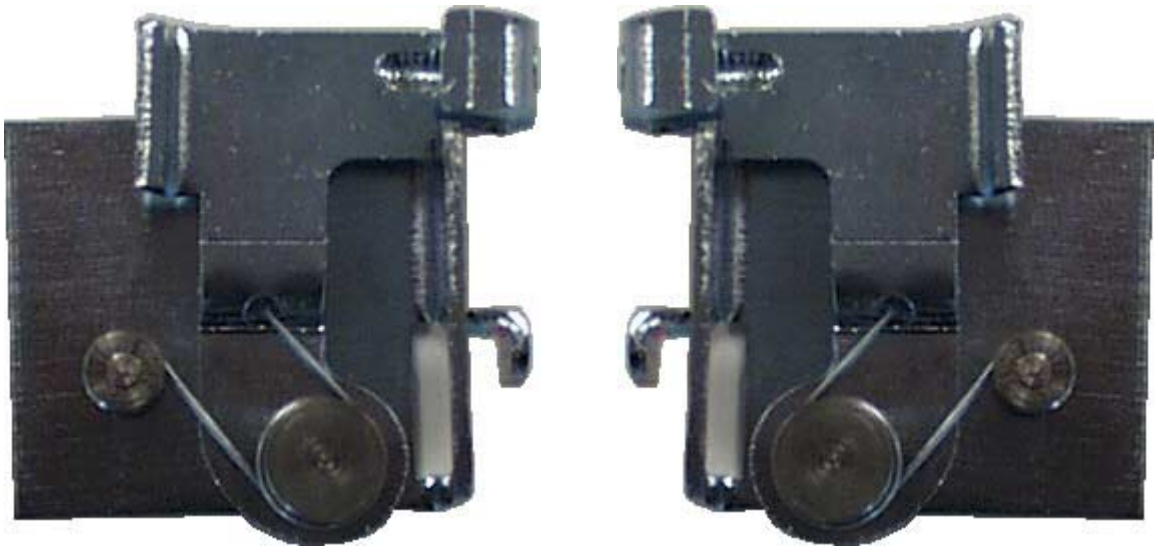
The Dell PowerEdge 1550 uses a new rail design that does not rely on the cage nuts for mounting the racking hardware. There are two rails and they are not interchangeable. The proper orientation of the rail can be determined by locating the screw holes on the rails. There is one hole in the front and one on the side. The images that follow are close-up views of the front the rails as if you were looking at the rails from the front. The rail shown on the left would be on your left side looking at the front and the rail shown on the right would be on your right side looking at the front.





The screw hole at the top of the rail shows through a square cutout in the rack and the hooked tab hooks into another square cutout just below. The screw hole has been circled in the preceding pictures. The tab that has the screw hole is mounted on a pivot with a tension spring. The spring is visible in the picture on the left. It is designed to pivot back providing room for the bracket to be installed at an angle allowing the hook to properly hook into the square cutout on the rack.

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The screw holes are bored into separate pieces that can pivot. The images above show the placement of these pieces and the tension springs that cause them to fall back into place. In these pictures the tension springs are not flexed. The images below are of the same portion, just with the tension springs flexed.



The rear of the rails are designed in the same manner except the top of the rails do not have screw holes, they are just pegs that poke through the square holes in the racks.

Cross Brace

A third piece of hardware used for placing the PowerEdge 1550 into a rack is a cross brace that sits in the back of the rack. The brace has two sets of interlocking pieces for its connection to the mounting rails.

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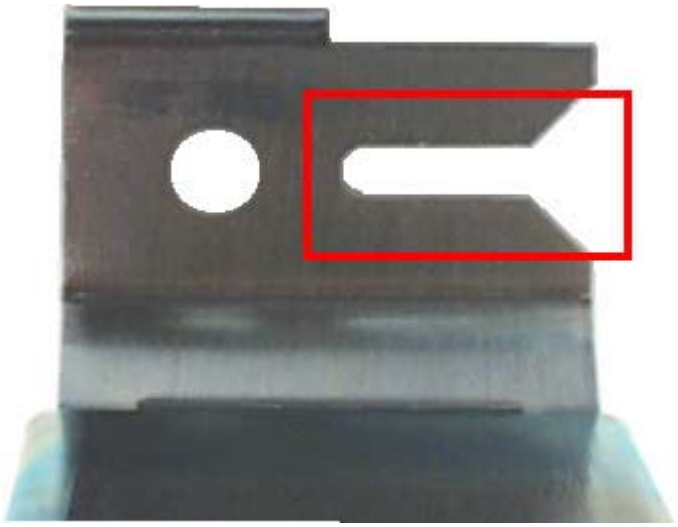
At the back of both mounting rails is a notch that the brace rests on. This notch is indicated in the picture that follows by a red rectangle.



There is a hook on both sides of the brace that rest in the notches on the rails. This is indicated in the following picture by the red circle.



There is also a peg on the rails that notches in the brace fits onto a notch. The brace is indicated in the following picture by a red rectangle. The image is a close-up from the inside of the rail.



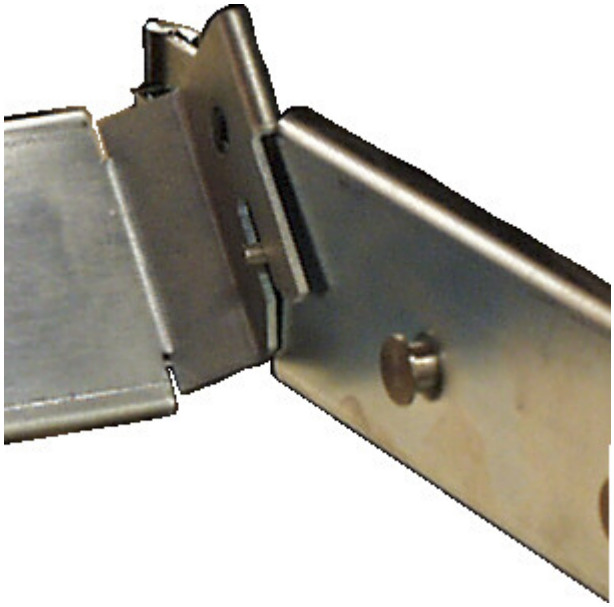
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The peg that the notch fits into is indicated in the picture below by a red circle.



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When placing the brace on the rails it should be first inserted at and angle, as the picture that follows depicts, and then rotated back down so the hooks slide onto the notches.



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Dell Service Strategy

Dell is an industry leader in providing Customer Support, and as you can see, Dell has grown to be a large, successful organization. Dell's growth and success can be attributed to several unique ways of doing business, one of which is the Dell Service Strategy.

Here is a snapshot of Dell's Services Businesses:

Dell's direct model positions Dell to deliver the best end-to-end customer service.

Dell is the single point of contact and is accountable.

Virtual Integration and the DSP Program

Dell's Service Strategy is based on Virtual Integration and Dell's Service Provider (DSP) Program.

Virtual Integration is focused on the Customer. It includes every point in the customer interaction (the End-to-End service process). Virtual Integration is the relationship within the Service Technician team:

Dell Tech Support and the Field Service Technician

As a team, we are all expected to share and live the Customer Service initiative together beginning with Order and Delivery, through Installation and, of course, Service and Support.

When the customer experiences a problem, they call Dell Tech Support. The Service Technician diagnoses the problem and assists the customer.

85% of all calls are resolved the first time the customer calls in, while the customer is on the phone.

Dell Tech Support has total accountability for the resolution of the customer problem.

- If the customer's issue cannot be resolved on the phone, the Dell Tech Support Technician initiates a call to the assigned Dell Service Provider.
- Calls to Dell Tech Support are managed in real time so all customer's calls are handled quickly and efficiently.
- Information is transferred to Field Service Technicians via a secure Electronic Data Interface (EDI) transaction.
- Information is available via the Internet to Field Service Technicians as well as to customers.
  - Technicians can access Dell HelpTech.
  - Customers can access Service Call Status.

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The key to success of this model is the link between Dell Tech Support and the Field Organization. The Customer Experience should be seamless, so that the customer sees nothing but a smooth transition from the Dell Tech Support Technician to the Field Service Technician.

If the process is not well integrated, the customer experience will not meet Dell standards. Our service is only as good as your execution in three areas: People, Processes, and Technology.

People

Dell Tech Support and the Field Service Technicians are a team. All of us are part of the Dell organization, and each technician is expected to be responsible for correcting the customer situation. Own It!

Field Service Technicians are an extension of Dell. They are the eyes and ears of Dell at the customer location.

Field Service Technicians should have the same passion for customer service that Dell has.

Field Service Technicians should:

- Be responsive to the customer.
- Have a sense of urgency about delivering service.
- Notify Dell of any customer issues so they can be handled immediately.
- Understand that service is one of several aspects of Dell that differentiates Dell from the competition.

Processes

Processes were developed jointly so there would be seamless integration between companies. You are expected to recognize that the Dell Service Model is different from your own company's procedures and to follow the Dell servicing procedures.

Technology

Systems were designed with secure EDI transactions and web-based tools. If you do not close the call correctly, the information does not get to Dell Tech Support and the customer does not get the correct updated information.

Virtual Integration Benefits Dell

The model enables Dell to provide its customers with well-trained experienced technician support. Using Internet technology and Dell Tech Support Technicians to solve problems for customers helps keep the costs at a minimum.

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Virtual Integration Benefits the Customer

Real-time, over-the-phone fixes – 85% of the service calls that come into Dell Tech Support are resolved over the phone, getting customers' systems working as fast as possible. This means that you see only 15% of the customer issues that are called into Dell Tech Support.

Internet access to solution status – This reflects Dell's commitment to communicate quickly and directly.

Virtual Integration Benefits

Dell saves money. Customers are happier. You may ask, "What is in this for me?" There is a lot in it for you. Here are your benefits:

- Access to Dell's Technical Support staff
- Access to Dell's Web-based Support tools:
- Tech Tips.
- Ask Dudley™.
- Online service call status.
- Self-diagnostic tools.
- Downloading capabilities.

Time to market is one of Dell's foundations. As a result, your access to new technologies is faster.

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DSP Support

Introduction

This section contains information pertaining to your role in service support to Dell customers. Each DSP has a procedure manual that defines the processes and procedures required for the delivery of services that a DSP provides to support the DELL customers. Some of the information contained in your PM is unique to your DSP organization. If you have any questions regarding your DSP's services, contact your manager.

The procedure manual (PM) is provided to your management to achieve the following goals:

- Maintain consistency throughout the operations.
- Ensure that roles and responsibilities are clearly understood.
- Provide the users with a document that clearly states the goals and objectives of the companies providing the contracted services.
- Maintain focus on customer satisfaction.

In addition to your manager, the Dell Support Web pages provide you the latest service documentation. Visit the site at www.dell.com/support.

This module provides information on the following topics:

- Key service and support terms.
- Service and support territory DSPs cover.

Services available to DELL customers.

General DELL and DSP responsibilities.

General Dell and DSP Responsibilities

Upon receiving a call from a customer requesting service, the DELL and the DSP perform standard troubleshooting steps to either correct the problem or determine if a part(s) needs to be replaced.

What DELL Provides the DSP

For each service call, DELL provides the DSP with the following information:

- Customer name, address, phone number, and contact name.
- Contracted product and serial number (TAG).

Type of service (cost center for time and materials billed to Dell).

- Five-digit, alphanumeric service tag number.

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- Advisory diagnosis/parts advisory.
- Type of operating system.
- Airbill and parts numbers.
- Special instructions or alternate contacts.

How the DSP Responds to a Service Request

For each service request, DSP completes several key tasks. The tasks are covered in the following sections.

DSP Management Tasks

Within 15 minutes of receiving the call, the DSP electronically confirms that the call was received. Then the DSP assigns the call an SRMS call number and provides the call number to the DELL.

NOTE: The CRE is not responsible for completing these two tasks.

DSP CRE Tasks

The DSP CRE completes the following tasks:

Next Business Day Service

By 12:00 noon the day the DSP receives a call, the CRE provides the customer and the DELL an estimated time of arrival (ETA).

Two-hour and Four-hour Service

Preliminary ETA

Within one hour of the time the DSP receives a call, the CRE provides an ETA to the customer and to DELL.

Final ETA

Within one hour, the CRE calls the customer with the final ETA.

NOTE: DSP tracks every service call and escalates each call to DELL Technical Support or management for assistance, expedited handling, or remedial procedures as soon as any problem is noted on the call.

Details of DSP Response Procedures

The following sections provide details about selected DSP services. Ask your manager for more information about services your DSP provides to DELL customers.

Response Policies

Familiarize yourself with the following policies regarding how DSP responds to DELL customer calls.

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Response Time

The DSP responds to the customer's call at the customer's location within the prescribed service time to perform the required services. (See your DSP's PM for details of covered services.) The DSP performs these services for each contract product and contract system, and the DSP verifies that the system is in working order and is properly functioning at the customer's location as described below.

Virus Scanning

At the beginning and end of the call, the DSP CRE performs a virus check on the system being serviced. Any virus detected at the beginning of the call is immediately brought to the attention of the customer and DELL for resolution. If the customer requests that DSP remove the virus, DELL quotes the price to the customer based on the time-and-material rate and issues a new service request. DSP uses software provided by the customer or provided by DELL to perform virus checks.

IMPORTANT: The DELL and the DSP agree that if a customer refuses to permit a virus check, the virus-scanning obligations noted above do not apply.

Diagnostic Tests

The DSP submits the contract products/systems to Dell's standard diagnostic tests as communicated by Dell during product training or through other written (including electronic) communications to the DSP. Those communications are contained in your PM. See your manager for details.

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Acceptance Certificate

The Acceptance Certificate is used for installation and upgrade services. DSP obtains the customer's acceptance of the contract products/system by returning to Dell an acceptance certificate completed by the DSP in the form shown in the PM (as amended from time to time) and signed by the customer. If the contract products/systems are not in working order following the installation and upgrade services or if the customer refuses acceptance, the DSP escalates the call to Dell in accordance with the PM. If the DSP completes the installation, Dell pays the DSP the applicable fee even though the customer refused acceptance, provided the DSP followed the escalation and other procedures set forth in the PM.

Change in Scope or Unforeseen Problems

If the customer requests a change in scope while the DSP CRE is on-site, or if the DSP discovers that the service cannot be completed due to circumstances beyond the DSP's control (for example, equipment DOA, cabling not completed, hardware or software not available), the DSP escalates the call to Dell for guidance as how to proceed. A trip charge or any other associated activity out of scope is charged to Dell on a time-and-material basis.

Liability for Customers' Data

The DSP does not accept liability for customers' data. Customers must ensure that a full backup is performed before the DSP CRE arrives to perform the service requested.

Hardware and Software

All hardware and associated software (including licenses) are provided by Dell or the customer and are made available at the customer site before the DSP CRE arrives. The DSP does not enter into any activity that conflicts with copyright laws.

Bill Rates

Any services requested that are out of scope are billed hourly at the then current labor rates or will be priced separately on a case-by-case basis. The customer contacts Dell to request such services.

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Next Business Day Service

The DSP completes the following procedure to provide Next Business Day (NBD) service for DELL customers.

#	Procedure
1.	DELL Technical Support performs call screening with the user (CONUS and OCONUS) and verifies that the customer is entitled to NBD service.
2.	DELL Technical Support determines required action during the on-phone diagnosis.
3.	The DELL notifies the DSP electronically each time NBD is required and provides the following details: • Customer name, address, phone number, zip code, and contact. • System and model type. • Type of service. • Five-digit alphanumeric service tag number. • Part(s) to be replaced and Airbill. • DPS number. • Type of operating system.
4.	DSP confirms the receipt of the call by assigning an SRMS call number and providing that call number to the DELL. The DELL service request must be dispatched and received by DSP by 5:00 p.m. customer local time to qualify for NBD service.
5.	The DELL ships (or specifies OCONUS federal parts) the necessary parts to the DSP to arrive the morning of the next business day after the customer called.
6.	By 12:00 noon on the day the DSP receives the call, the CRE provides the customer and the DELL an ETA.
7.	If the CRE is unable to arrive at the customer's location within the applicable arrival time, the DSP management promptly advises the customer and the DELL of revised arrival times.
8.	DSP assigns a CRE who will arrive at the customer's location during the PPM.
9.	When the CRE arrives at the customer's location, the CRE performs a pre-service virus scan, runs Dell diagnostics, and confirms the DELL advisory diagnosis.
10.	The CRE makes repairs and replaces parts as necessary.
11.	The CRE validates the repairs and corrective actions and restores the system to proper operating condition within four hours after arriving at the customer's location.
12.	The CRE performs a post-service virus check.
13.	If necessary, the CRE works beyond the PPM for a reasonable period (normally not exceeding one hour) to restore the system to proper operating condition, at no extra charge to DELL or the customer.

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#	Procedure
14.	If the CRE is unable to restore the system to proper operating condition within two hours to the customer's satisfaction, the DSP management immediately contacts DELL Technical Support and arranges to complete the work to the customer's satisfaction.
15.	If the DSP is unable to solve a customer's problem because the DELL delivered the wrong spare part, the DSP agrees to provide on-site diagnosis for one hour to determine the appropriate spare part(s) to solve the customer's problem. This diagnosis is provided at no extra charge.
16.	If the DSP is unable to complete the diagnosis within one hour because of the complexity of the customer's problem, DSP notifies DELL Technical Support.
17.	DELL Technical Support either advises DSP to discontinue the diagnostics or authorizes DSP to remain on-site to continue the diagnostics until the problem has been found and the appropriate replacement spare part(s) has been identified. This becomes a billable situation between the DSP and the DELL or between the DSP and the customer, at the DELL's discretion.
18.	When the system has been restored to proper operating condition, the DSP CRE closes the call within one hour via SRMS, and the DSP management notifies the DELL electronically that the work has been completed to the customer's satisfaction.
19.	The call closure information is as follows: DELL call number. • DSP SRMS call number. • Time and date of call closure. • Part number(s) and quantity used. DELL serial number. • Return waybill number (RMA number). • Unused parts return documentation.

Whole Unit Dispatch

Typically, no dispatch is placed with the DSP for Whole unit replacement. However, in unique situations, a dispatch may be placed.

From time to time, DELL and DSP will agree on the system components that can be easily connected and disconnected and can therefore be subject to Whole Unit Dispatch. The service outlined below will be available in all locations eligible for standard NBD or 3rd Business Day service. Delivery will be on a NBD/3rd Business Day basis after the dispatch is placed with the DSP. The Whole Unit Dispatch components are:

- Monitor.
- Keyboard.
- Mouse.
- External speakers.

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- External tape backup unit.
- External zip backup drive.

The procedure for Whole Unit Dispatch is as follows:

#	Procedure
1.	The DELL notifies the DSP each time a Whole Unit Dispatch is required and provides the following details: • Customer's name and location • Customer's phone number • Item to be replaced and five-digit, alpha-numeric service tag number of system • Response time required (for example, NBD or 3rd Business Day)
2.	The DSP may decline response times other than NBD, and in such an event the DELL will provide expedited shipment to enable the DSP to provide NBD response.
3.	The DSP confirms that it received the call by assigning a call number and providing that call number to the DELL.
4.	The CRE arrives at the customer's location during the PPM and within the required arrival time.
5.	The CRE disconnects the system/component to be replaced and connects the replacement.
6.	The CRE tests the system to determine if it functions properly after replacement.
7.	After completing the service, the DSP provides call closure information in SRMS.

NOTE: The DSP is not required to diagnose or repair faults. If the system does not function properly after replacement, the DSP escalates the call to DELL.

Out of Warranty Repairs (OWR)

If the DSP CRE determines that the required fix is not covered under warranty, the DSP must immediately contact DELL Technical Support and escalate the issue. DELL will inform the customer that the service is not covered under the warranty. DELL will work with the customer and the DSP to find the best possible solution to the problem.

Defective Parts Returns

The DSP must return all parts from each service call to the DELL designated carrier within two business days.

The following information is required with a defective part returned to Dell:

- Dell RMA number (same as the Dell DPS number).
- Dell part description.
- Call reference number.

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- Logistics area/site.
- DSP part number.
- Date of failure.
- Failure detail (clear description of the failure as opposed to a reported symptom).
- CRE's name/organization and assignment number.

  NOTE: Below the CRE's name, the CRE should include the CRE's Dell service identification number.

  Dell cabinet serial number (TAG) (the five-digit, alpha-numeric number located on the back of the system)

Return type

"Did Not Consume" forms for any part not installed and returned to Dell in good working condition

NOTE: Dell verifies tags for quality of information being reported.

Escalation Process

Description

Escalations are situations that require a transfer of responsibility from the Dell Service Provider (DSP) to the Dell Marketing Limited Partnership (DELL) or vice versa. Escalations are coordinated by product to the Dell Technical Support Service Group and to the DSP on-site Program Office. This module provides an overview of the escalation process. Dell has provided your manager a procedure manual that addresses escalation processes unique to your region.

The DELL Technical Support or Service Alliance Manager is the contact point for DSP escalation. The DSP PMO or Call Center Operations is the contact point for DELL escalation.

You can find details of each DSP-specific process in the DSP Procedure Manual (PM) which defines the processes and procedures required for delivery of services to be performed by the DSP to support DELL customers. Your manager has a copy of the PM and can answer questions pertaining to your DSP process.

Typical Reasons for Escalation

A number of situations warrant escalation. The DSP and DELL work to provide the customer a resolution to the escalation. Typical instances for escalation include the following:

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DELL provides incorrect information in a DSP service request (phone number, contact name, zip code, or address).

- DSP is unable to contact a customer by 12:00 noon on the same day the call is received.
- DSP is unable to meet the required response time for the requested service.
- The customer does not have Dell Diagnostic diskettes to enable testing.
- Technical assistance is needed to complete the service request.
- DSP is unable to resolve the issue to the customer's satisfaction.
- DSP is unable to successfully diagnose the problem within two hours after arrival on site.
- Parts used on a service call are defective.
- Dell sent the wrong part.
- Customer satisfaction is below an acceptable level after service is complete.
- DSP is unable to resolve the issue within four hours after arrival on site.

  The customer escalates the issue to DSP or DELL.
- During an on-site visit, DSP discovers that the contract products/systems have been damaged as a result of fault or neglect on the part of the customer.

  In addition, normal DSP field-operation management escalations may apply.

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Escalation Procedures

A service call problem is subject to the escalation policy when the problem affects the customer's business and/or the problem has not been solved within a reasonable timeframe. This built-in escalation procedure ensures that the appropriate technical expertise or management attention is applied to a problem. The DSP works with the Customer Resource Engineer (CRE) to offer specific resources, skills, and experience to handle the exceptions and expedite problem resolution.

The CRE assigned to the service call must meet the following requirements before contacting the DSP:

- The CRE must be trained/certified on specified equipment before servicing any Dell computer.
- The CRE must provide the Dell equipment service tag number (serial number) and Dell incident number.
- A similar process is used for both telephone support and logistics, and may be modified to meet the requirements.

If the CRE needs to escalate the call to the DSP, the following procedure must be completed:

#	Escalation Procedure
20.	Call Dell Technical Support or the phone number listed in the text of the call log.
21.	Provide the Technical Support person with a description of the equipment (OEM Incident #), DSP number, serial number (service tag number), and model.
22.	Provide exact details of the problem(s) and the troubleshooting steps that have been taken.
23.	Ensure that the call STOP CODE information is updated properly through the Service Provider Support Center.

If the estimated time of arrival (ETA) cannot be established within one hour, the following procedure must be completed:

#	Escalation Procedure
1.	The CRE notifies the on-site Support Manager.
2.	The Customer Support Center (CSC) monitors the ETA Monday through Friday, 8:00 a.m. to 6:00 p.m. local time, and pages the Service Manager. The CSC monitors calls 24 × 7 and pages the appropriate Service Provider duty manager.
3.	The CRE notifies the customer of any changes to the ETA.
4.	The CRE notifies Dell Technical Support of any ETA changes.
5.	The provider's dispatch system is updated with the change.
6.	The CRE notifies the on-site Support Manager again.

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If the CRE cannot meet the established ETA within the specified period, the following procedure must be completed:

#	Escalation Procedure
1.	The CRE contacts the customer to re-establish the ETA.
2.	The CRE contacts the support center to update the call.
3.	The CRE notifies Dell Technical Support of any ETA changes.
4.	The CRE contacts the on-site Support Manager.

If the CRE cannot reach the customer (Customer Delay), the following procedure must be completed:

#	Escalation Procedure
24.	The CRE updates the call with the proper STOP CODE and electronically notifies Dell.
25.	The CRE notifies the on-site Support Manager.
26.	The CRE notifies Dell after four unsuccessful attempts over four days to contact the customer.
27.	If the CRE cannot contact the customer, the CRE closes the call.
28.	Dell closes the call.

If the CRE does not have the proper part in stock to take the call (Part Delay), the following procedure must be completed:

#	Escalation Procedure
1.	The CRE calls the Logistics Resource Center.
2.	The CRE notifies Dell electronically, updating the call with the proper STOP CODE.
3.	The CRE notifies the on-site Support Manager.
4.	The on-site Support Manager calls the Priority Desk for escalation and status of parts shipment.

If a CRE spends approximately two hours on site and believes that the problem cannot be solved within the specified timeframe, the CRE escalates the call to local field management and Dell Technical Support.

If the problem is not solved during the first on-site visit, the CRE notifies Dell Technical Support.

If customer satisfaction is below an acceptable level upon completion of service, the CRE must notify the on-site Support Manager and Dell Technical Support.

If the ETA has expired, the DSP Customer Support Center analyst pages the CRE and telephones the appropriate DM/SOS for resolution. The CRE notifies the on-site Support Manager.

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If the customer contacts Dell Technical Support because expected timeframes have not been met, the technician should complete the following procedure:

#	Escalation Procedure
1.	Check service provider status in DSP.
2.	Check parts status, if needed.
3.	Contact service provider, if needed.
4.	Update customer on status.
5.	Escalate the call to the U.S. DSP mailbox.

Asset Tag Utility

The Asset Tag utility allows a technician to enter an asset tag number for the system.

NOTE: The Asset Tag utility works only on systems running MS-DOS and therefore requires a boot disk when used with servers.

Using the Asset Tag Utility

To create the Asset Tag utility diskette and boot the system, perform the following steps:

#	Creating the Asset Tag Utility diskette
1.	There are no prerequisite steps to creating the asset tag utility diskette.
2.	Create the asset tag utility diskette: • If you have not already done so, create a bootable Asset Tag Utilities with CD-ROM diskette from the Dell OpenManage Server Assistant CD using the Create Diskettes option. • Insert the diskette into the diskette drive and reboot the system.

NOTE: The Asset Tag utility diskette contains CD-ROM drivers that provide access to the CD-ROM drive when you boot from the diskette.

After you boot the system with the Asset Tag utility diskette, you can use the Asset Tag utility to enter an asset tag number that you or your organization assigns to the system. You can also use the Asset Tag utility to reenter the system's service tag number if that becomes necessary.

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Assigning and Changing an Asset Tag

An asset tag number can have up to ten characters; any combination of characters, excluding spaces, is valid.

#	Assigning or Changing an Asset Tag
1.	Do the following before Assigning or Changing an asset tag: • Perform the steps in "Using the Asset Tag Utility."
2.	Assign or change an asset tag number: Type asset and a space followed by the new number. For example, type the following command: • asset 1234567890 • Press **<Enter>**. • When you are prompted to verify the asset tag number, type y and press <Enter>. • The system then displays the new or modified asset tag number and the service tag number.

Assigning and Changing an Asset Tag

The asset tag number can be deleted without assigning a new one.

#	Deleting an Asset Tag
1.	Do the following before deleting an asset tag: • Perform the steps in "Using the Asset Tag Utility."
2.	Assign or change an asset tag number: • Type asset /d. • Press **<Enter>**.

Getting Help on the Asset Tag Utility

The asset tag utility has a help screen.

#	Getting Help on the Asset Tag Utility
1.	• Do the following before getting help on the asset tag utility: • Perform the steps in "Using the Asset Tag Utility."
2.	Assign or change an asset tag number: • Type asset /?. • Press **<Enter>**.

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Disassembly and Re-assembly of the PowerEdge 1550

Goals

The following are the goals for this exercise.

- Disassemble the PowerEdge 1550 to the FRU level.
- Recognize the FRUs for the PowerEdge 1550.
- Recognize the FRU replacement dependencies of the PowerEdge 1550.
- Reassemble the PowerEdge 1550 to the point of ready to power up.

Description

This section provides the information required for disassembly and re-assembly of the PowerEdge 1550. It enumerates the necessary tools and provides a list of parts that can be replaced. Then it provides instructions for removal of all the field replaceable units (FRU) and then addresses the specific issues relevant to re-assembly of the PowerEdge 1550. More detailed instructions for disassembling each component are available in the technical documentation and/or on Dell's web site.

Tools/Aids/Materials

The following tools/aids/materials are required to disassemble and re-assemble the system.

- Flat Blade screw driver.
- Electro-static discharge wrist strap.

Disassembly/Re-assembly Overview

The procedures in this section are organized in a manner that allows a technician to locate instructions on removing a part. Replacing a part, as advised in the reassembly section, is the reverse procedure of removing a part. Included in the instructions for part removal is a list of dependencies to that task. This makes the procedures more manageable and advises the technician what tasks must be done in preparation for part removal.

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FRU List

The following items are the FRUs for the PowerEdge 1550.

FRU	Description
Planar to Control Panel Cable Assembly	Cable to connect the control panel to the system board.
High Density Cable	40-pin cable connecting the system board to the backplane that provides a pathway for FDD, CD-ROM, and control panel signals.
System Power Cord	A standard grounded power cable.
CD-ROM	Slimline form factor CD-ROM drive.
CD-ROM Interposer Board	Printed wiring assembly to transfer IDE signals from a small form factor IDE connector to a standard 40-pin desktop form factor IDE connector
CD-ROM cable	Short 40-pin IDE cable.
Floppy Drive and cable	Slimline floppy disk drive and slim line floppy disk drive cable.
Hard Disk Drive	A SCSI hard disk drive, manufacturer may vary.
1x3 SCSI Backplane printed wiring assembly	SCSI backplane that conveys power from the power supply to the hard disk drives and SCSI signals between the SCSI hard disk drives and the SCSI controller, either the on-board SCSI controller or the RAID controller. It also designates the SCSI Ids.
Hard Disk Drive Carrier	Mounting unit for securing hard disk drives in the hard disk drive bays.
Hard Disk Drive Carrier Blank	Hard disk drive carrier with a plastic front to be placed in a drive bay in lieu of a hard disk drive.
Keyboards and Mice	Standard keyboards and mice.
Intrusion Switch Assembly	Rocket switch near front of system that integrates with the system BIOS to detect when the case has been opened.
Front Bezel Assembly	Front bezel of system.

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FRU	Description
Long Card Bracket	Bracket mounted at front for securing full length PCI cards in the system.
Fan Bracket	Long plastic bracket at the front of the system that holds the system fans.
System Fan	Active cooling device located in the front of the system housed in the fan bracket. The system contains four.
2-Post Rack Mounting Kit	Rail kit for mounting the system into a two-post rack.
4-Post Rack Mounting Kit	Rail kit for mounting the system into a four-post rack.
Memory	Temporary storage modules.
Monitors	Standard video output device connected to the VGA port of the computer.
Network Controllers	Add-in network adapter.
202 W Non - Redundant Power Supply	Single power supply that does not afford fault-tolerant power to the system.
Control Panel printed wiring assembly	Control panel board that conveys signals from the control panel cable to the switch. It provides information about the system via LEDs and also provides Keyboard, video, and mouse access through the front of the system.
Riser Card	Printed wiring assembly that adapts vertical PCI slots to an horizontal orientation.
System board	ATX form factor system board.
Pentium III Processor	Standard Intel Xeon "Coppermine" processor.
Heat Sink	Passive cooling extension for the processor.
Heat Sink Clip	Clip that secures the heat sink to the processor by clipping to the processor socket.

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Safety Considerations

Before performing any installation or break/fix procedures involving disassembly/re-assembly, all safety precautions should be observed.

- Turn off the server and any attached peripherals.
- Disconnect the server and any attached peripherals from AC power sources.
- Disconnect any telephone or telecommunications lines from the server.

Many of the server's internal components are subject to ESD damage. Dell recommends that you use a wrist grounding strap and mat when working inside any computer system.

Flea Power

Many Dell products should be completely unplugged before opening the case because of "Flea Power." Systems that incorporate Flea Power are essentially powered, even when apparently turned off. The internal power allows the systems to be remotely turned on (wake on LAN), suspended into a "sleep" mode, and have other advanced power management features.

Techniques similar to a Flea Power are commonly used in modern remote-controlled electronic devices (televisions, VCRs, etc.).

After unplugging the system, allow the charge to drain from the circuits by waiting approximately 30 to 45 seconds before removing components.

All of the Dell PowerEdge midnight gray (x5x0 series) srvers incorporate Flea Power.

ESD

Electrostatic discharge (ESD) is a major concern when handling components, especially expansion cards and the system board. Very slight charges can damage circuits in ways that may not be obvious. Intermittent problems or a shortened product lifespan can also result.

Static electricity can harm delicate components inside your computer. To prevent static damage, use a wrist grounding strap. If a strap is not available, then discharge static electricity from your body before you touch any of your computer's electronic components, such as the microprocessor. You can do so by touching an unpainted metal surface on the computer chassis.

As you continue to work inside the computer, periodically touch an unpainted metal surface to remove any static charge your body may have accumulated. In addition to the preceding precautions, you can also take the following steps to prevent damage from electrostatic discharge:

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Figure 9: ESD Wrist Strap

Use an ESD wrist strap that is properly grounded.

Handle all sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.

When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component in your computer. Just before unwrapping the anti-static packaging, be sure to discharge static electricity from your body.

When transporting a sensitive component, first place it in an anti-static container or packaging.

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Installing the PowerEdge 1550 rack mounting hardware

Installing the Mounting Rails

Follow this procedure to install the PowerEdge 1550 mounting rails into the rack.

#	Installing the Mounting Rails
3.	There are no prerequisite steps to perform before installing the mounting rails.
4.	Perform the following steps to installing the mounting rails: • Starting either from the front or from the back, bend the pivoting portion of the rail (as discussed earlier in the text) and place the hook below into a square hole in the rack.
5.	• Release the pivoting portion of the rail and let it go into the square cutout just above the one the hook is through.
6.	• Repeat the previous step for the other side of the rail making sure that the two ends are even.
7.	• Repeat the previous two steps for the other rail.

Installing the Cross Brace

Follow this procedure to install the PowerEdge 1550 cross brace into the rack.

#	Installing the Cross Brace
8.	Before installing the cross brace you must install the mounting rails.
9.	Perform the following steps to installing the cross brace: • Place the cross brace at an angle over the rails so that the slots in the brace can slip over the thin posts on the rails.
10.	• After fitting the cross brace over the pegs on the rails rotate it back while lowering it so that the hooks can slide over the notches in the rails.

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#	Installing the Cross Brace
11.	• When the brace has been properly placed the hole just behind the notch that rests in the peg should line up with a screw hole in the rail. Secure the brace to the left hand rail (from the point of view of the technician while in the back of the rack) with one of the supplied screws. 

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Installing the Cable Management Arm

Follow this procedure to install the PowerEdge 1550 cable management arm into the rack.

#	Installing the Cable management Arm
12.	Before installing the cross brace you must install the following: • Mounting rails. • Cross brace.
13.	Perform the following steps to installing the cable management arm: • Locate the screw hole in the right hand side of the support bracket; this is where one of the thumbscrews on the cable management arms secures. It is shown in the picture that follows by a red circle. 

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#	Installing the Cable management Arm
14.	• The following picture shows a close-up of the support bracket with the cable management arm attached. The side that is completely square connects to the rail. 

Removing the PowerEdge 1550 rack mounting hardware

To remove the PowerEdge 1550 rack mounting hardware follow the steps for installing it in reverse.

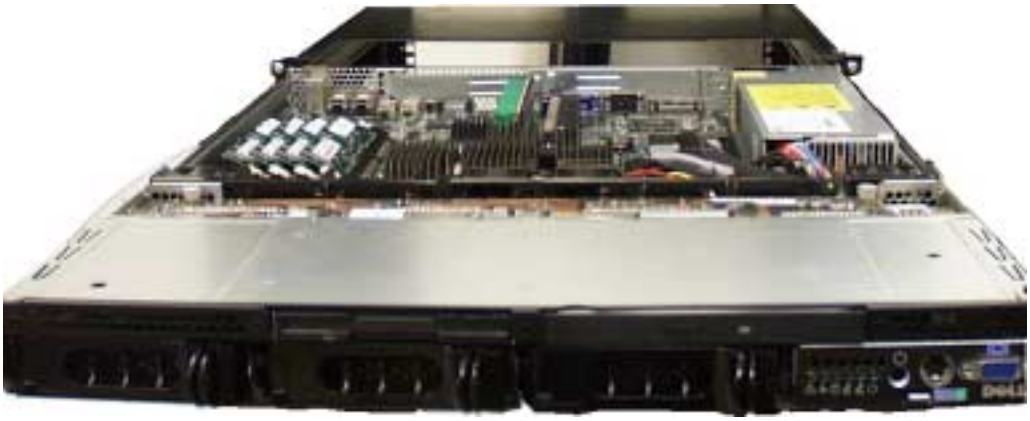
Removing the PowerEdge 1550 from a rack

There are two different but similar procedures that are performed for different reasons. The PowerEdge 1550 is designed to provide access to every field replaceable unit while the system is in the rack. The first procedure, Extending the PowerEdge 1550 in the Rack, indicates how to make the field replaceable units accessible for service. Occasionally, such as migrating the system from one rack to another, the system may need to be removed from the rack altogether. The second procedure shows how to do this.

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Extending the PowerEdge 1550 in the Rack

Follow this procedure to extend the PowerEdge 1550 in the Rack.

#	Extending the 1550 in the rack
1.	There are no prerequisite steps to perform before removing the front bezel.
2.	To extend the PowerEdge 1550 in the rack, perform the following steps: • Remove the front bezel. The image that follows shows the bezel on the PowerEdge 1550 in the rack. The steps to remove the bezel are enumerated in the procedure Removing the Front Bezel in the Disassembly section. 
3.	• After removing the front bezel loosen the thumbscrews. 
4.	• Pull the PowerEdge 1550 forwards out of the rack. Part of the way back it will catch at two leaf springs, one on each side. They are shown in the image that follows.  NOTE: All of the field replaceable units (FRUs) are accessible when the PowerEdge 1550 is fully extended yet still racked. A fully extended PowerEdge 1550 is shown in the image that follows. 

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Removing the PowerEdge 1550 from the rack

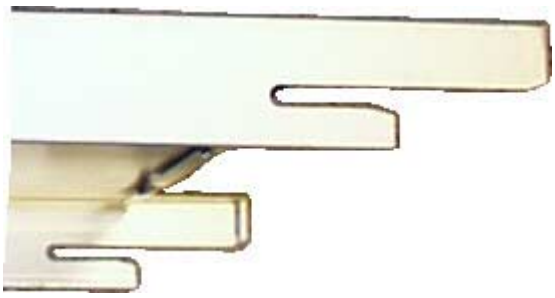
Follow this procedure to remove the PowerEdge 1550 from the rack.

#	Removing the PowerEdge 1550 from the rack
5.	There are no steps required prior to removing the PowerEdge 1550 from the rack.
6.	To remove the PowerEdge 1550 from the rack, perform the following steps. • Unscrew the thumbscrew securing the cable management arm to the rear of the system. 
7.	• Perform the steps outlined in **Extending the PowerEdge 1550 in the Rack**.
8.	• Press the leaf springs (shown in the image that follows) and pull the unit free from its top cover in the rack. 

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Removing the PowerEdge 1550 Top Cover from the Rack

Follow this procedure to remove the PowerEdge 1550 Top Cover from the rack.

#	Removing the PowerEdge 1550 Top Cover from the Rack
9.	Before removing the PowerEdge 1550 Top Cover from the rack you must: • Remove the PowerEdge 1550 Front Bezel. • Remove the PowerEdge 1550 from the rack.
10.	To remove the PowerEdge 1550 Top Cover from the rack, perform the following steps: • Remove the screws in the front securing the PowerEdge 1550 Top cover in the rack. 
11.	• Pull the PowerEdge 1550 Top cover forward out of the rack. NOTE: The rear of the PowerEdge 1550 Top Cover has slots that fit over pegs on the mounting hardware that secures the rear of the PowerEdge 1550 Top cover in the rack. 

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Mounting the PowerEdge 1550 into a rack

To mount the PowerEdge 1550 into a rack follow the steps for removing it from the rack in reverse.

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Disassembly of the Dell PowerEdge 1550

Follow these procedures to disassemble the PowerEdge 1550.

Removing the Front Bezel

Follow this procedure to remove the front bezel.

#	Removing the Front Bezel
12.	There are no prerequisite steps to perform before removing the front bezel.
13.	To remove the front bezel, perform the following steps: • Press the latch on the right side of the bezel so that the locking tabs disengage. 
14.	• Rotate the front bezel to the left so the tabs on the left side of the bezel disengage. 
15.	• Pull the bezel directly off the system.

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Extending the PowerEdge 1550 in the Rack

Follow this procedure to extend the PowerEdge 1550 in the Rack.

#	Extending the 1550 in the rack
16.	There are no prerequisite steps to perform before removing the front bezel.
17.	To extend the PowerEdge 1550 in the rack, perform the following steps: • Remove the front bezel. The image that follows shows the bezel on the PowerEdge 1550 in the rack. The steps to remove the bezel are enumerated in the procedure Removing the Front Bezel in the Disassembly section. 
18.	• After removing the front bezel loosen the thumbscrews. 
19.	• Pull the PowerEdge 1550 forwards out of the rack. Part of the way back it will catch at two leaf springs, one on each side. They are shown in the image that follows.  NOTE: All of the field replaceable units (FRUs) are accessible when the PowerEdge 1550 is fully extended yet still racked. A fully extended PowerEdge 1550 is shown in the image that follows. 

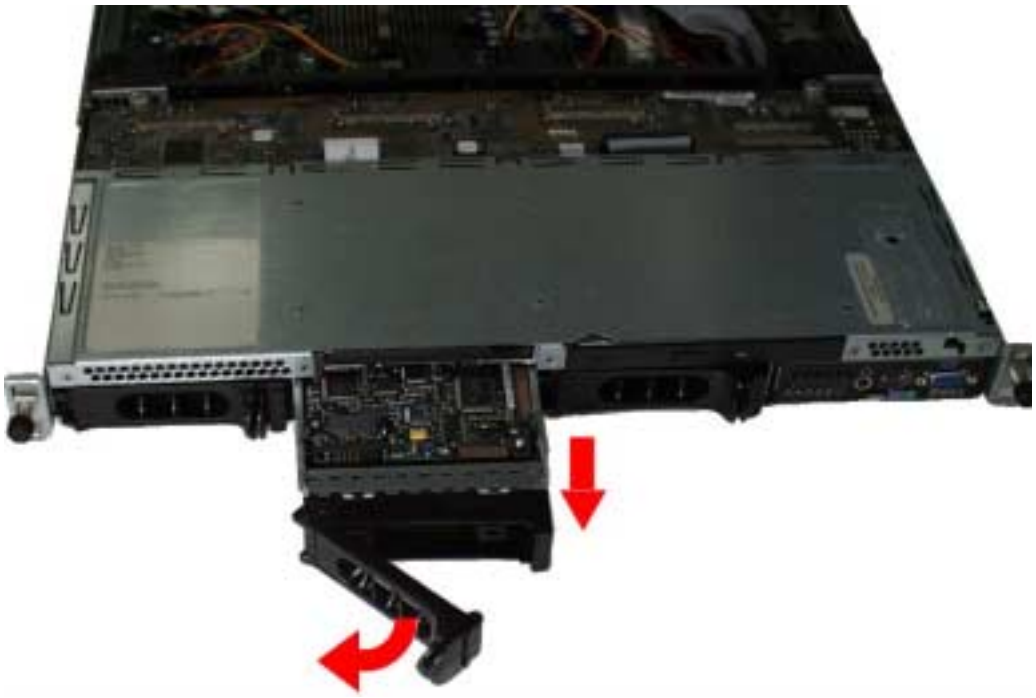
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Removing the Hard Disk Drives

Follow this procedure to remove the hard disk drives.

#	Removing the Hard Disk Drives
20.	Before removing the hard disk drives you must remove the front bezel.
21.	To remove a hard disk drive, perform the following steps: • Grasp the handle of the hard-disk drive carrier, press on the latch, and rotate the handle to the left. 

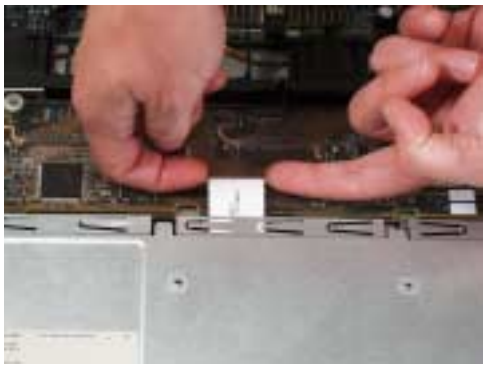
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#	Removing the Hard Disk Drives
22.	• Pull the carrier from the bay and set it on a static-free surface. 
23.	• Repeat the above steps for all hard disk drives in the system.

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Removing the Floppy Disk Drive and CD-ROM Drive

Follow this procedure to remove the floppy disk drive and CD-ROM drive.

#	Removing the Floppy Disk Drive and CD-ROM drive
24.	Before removing the floppy drive and CD-ROM drive you must remove: • The top cover. • The front bezel.
25.	To remove the floppy drive and CD-ROM drive, perform the following steps: • Disconnect the floppy drive and CD-ROM cables from the backplane; there are two different cables, each with a picture that follows.   NOTE: To disconnect the floppy drive cable place your thumbnails under the lip on either side of the LIF (low insertion force) connector and pull up.
26.	• Press the lever behind each device 

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#	Removing the Floppy Disk Drive and CD-ROM drive
27.	• Pull each unit forward out of the system. 

Removing the Backplane

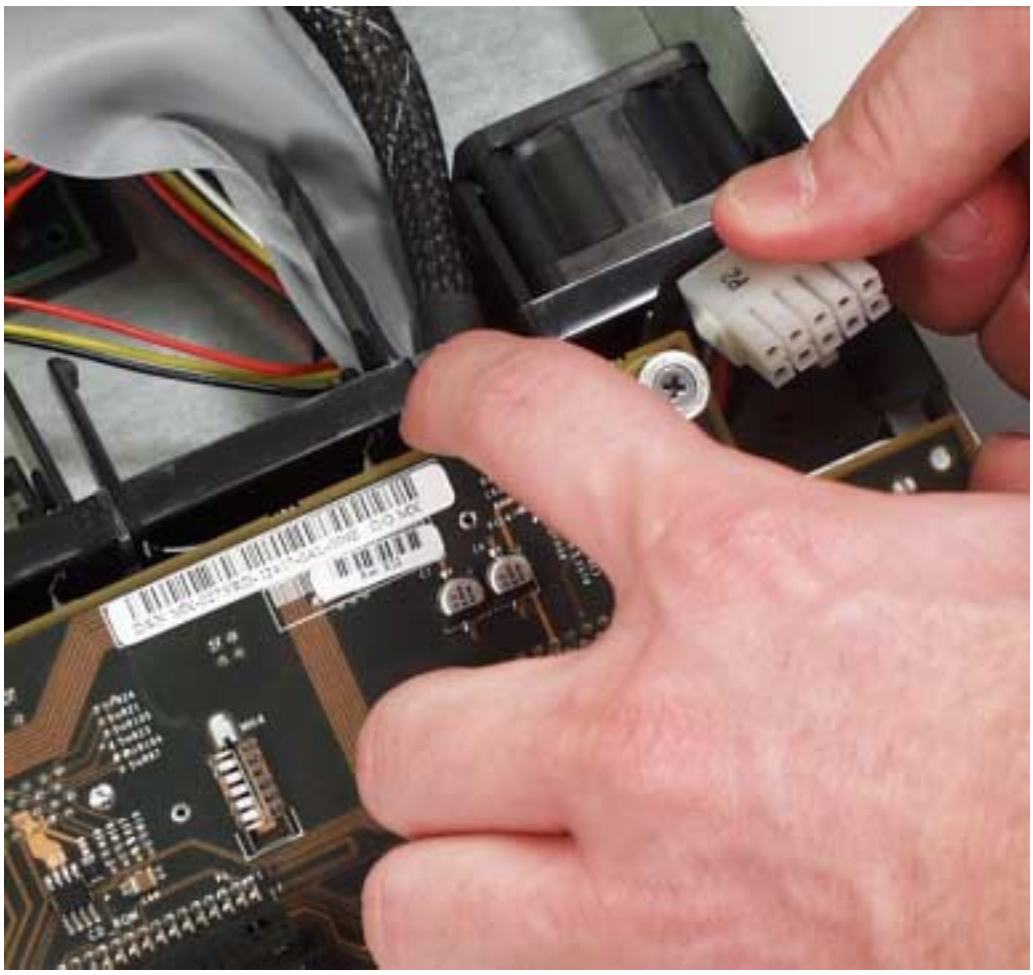
Follow this procedure to remove the backplane.

#	Removing the Backplane.
28.	Before removing the backplane you must remove the top cover.
29.	To remove the backplane, perform the following steps: • If the floppy drive cable and the CD-ROM cable are still attached disconnect them.

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#	Removing the Backplane.
30.	• Loosen the two thumbscrews on the backplane. 
31.	• Slide the backplane towards the front of the system disengaging the backplane from the grounding clips.
32.	• Tilt the back of the backplane up exposing the power connector.
33.	• Disconnect the power connector.

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#	Removing the Backplane.
	
34.	• Rotate the backplane further exposing the SCSI and high-density cable. Disconnect them.
35.	• Complete rotation of the backplane and disconnect the control panel cable.
36.	• Remove the backplane. 

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Removing the Control Panel

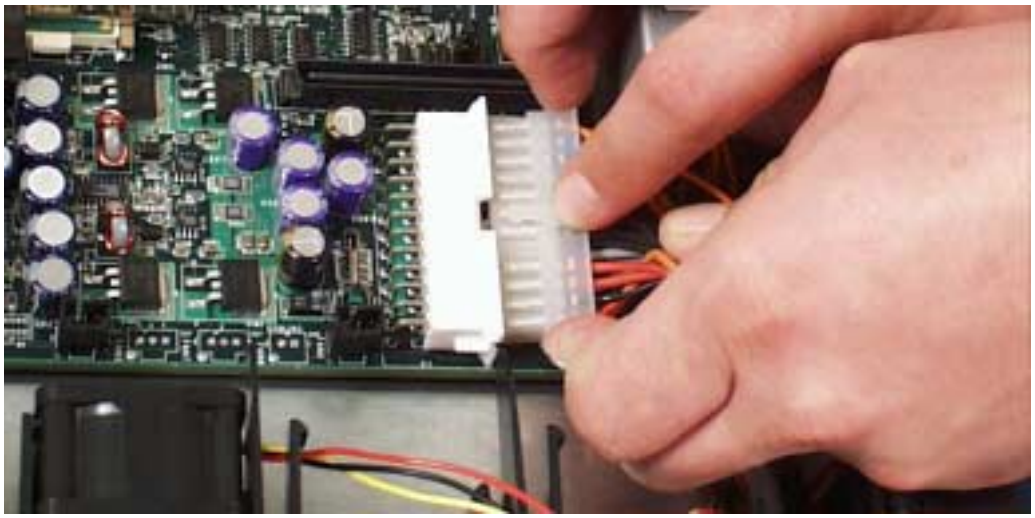
Follow this procedure to remove the control panel.

#	Removing the Control Panel.
37.	Before removing the backplane you must remove the following: • The top cover. • The backplane.
38.	To remove the control panel, perform the following steps: • Locate the hook underneath the control panel carrier.
39.	• Pull the carrier forward to expose the chassis intrusion switch cable. 
40.	• Disconnect the chassis intrusion switch cable and the control panel cable.
41.	• Continue pulling the control panel forward until it is out of the computer.

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Removing the Power Supply

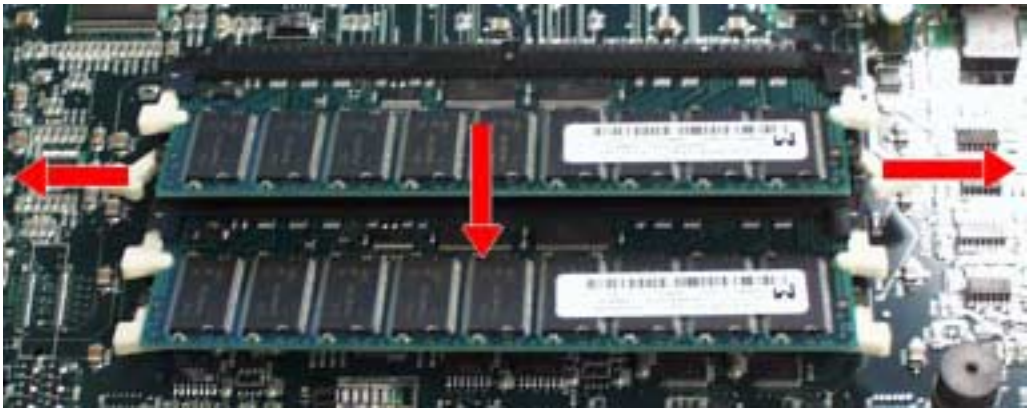
Follow this procedure to remove the power supply.

#	Removing the Power Supply.
42.	• Before removing the power supply you must remove the top cover
43.	To remove the power supply, perform the following steps: • Disconnect the power cable from the system board. 
44.	• If it is connected, disconnect the power cable from the backplane. NOTE: There are several steps involved in disconnecting the power connector from the backplane; they are enumerated in the procedure for removing the backplane.
45.	• Loosen the thumbscrew and slide the power supply towards the front of the unit and remove it from the system. 

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Removing the Memory

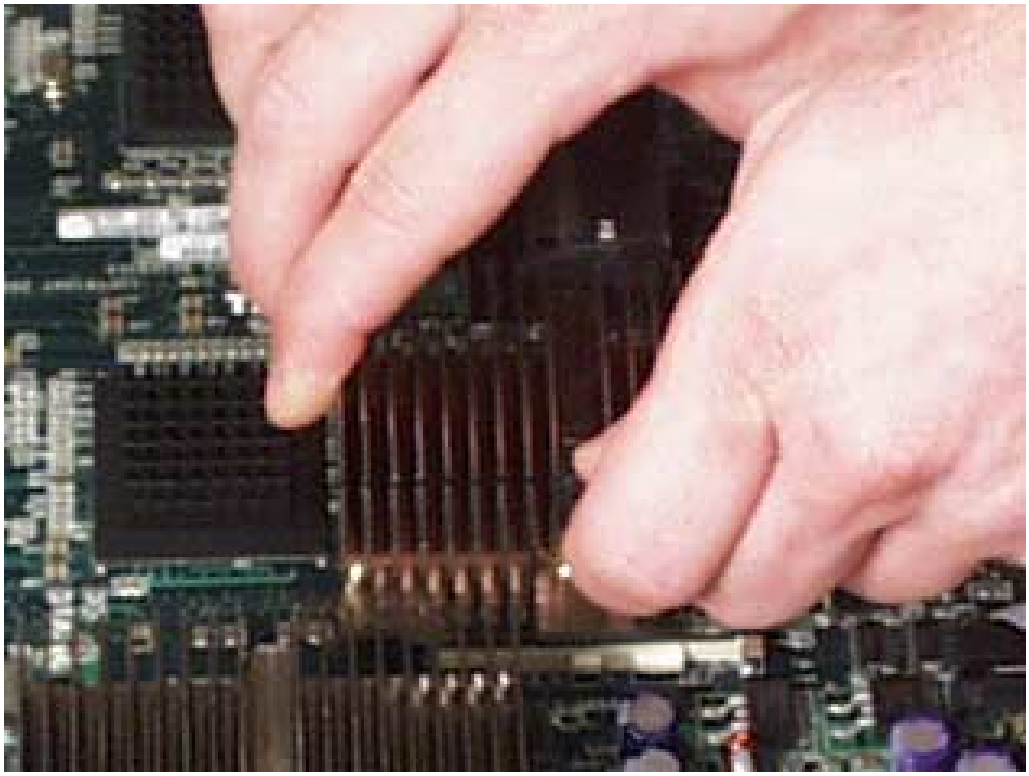
Follow this procedure to remove the memory.

#	Removing the Memory.
46.	• Before removing the memory you must remove the top cover
47.	• The memory is incorporated using standard DIMM sockets. Rotate the side levers out disengaging the memory and then remove the memory. 

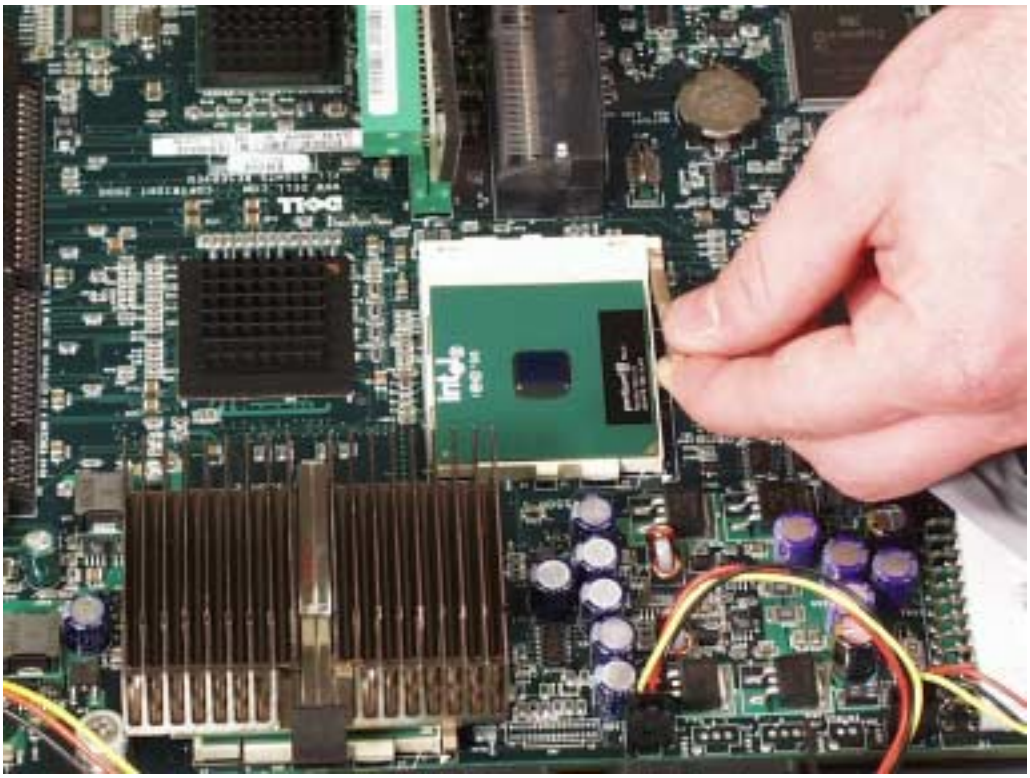
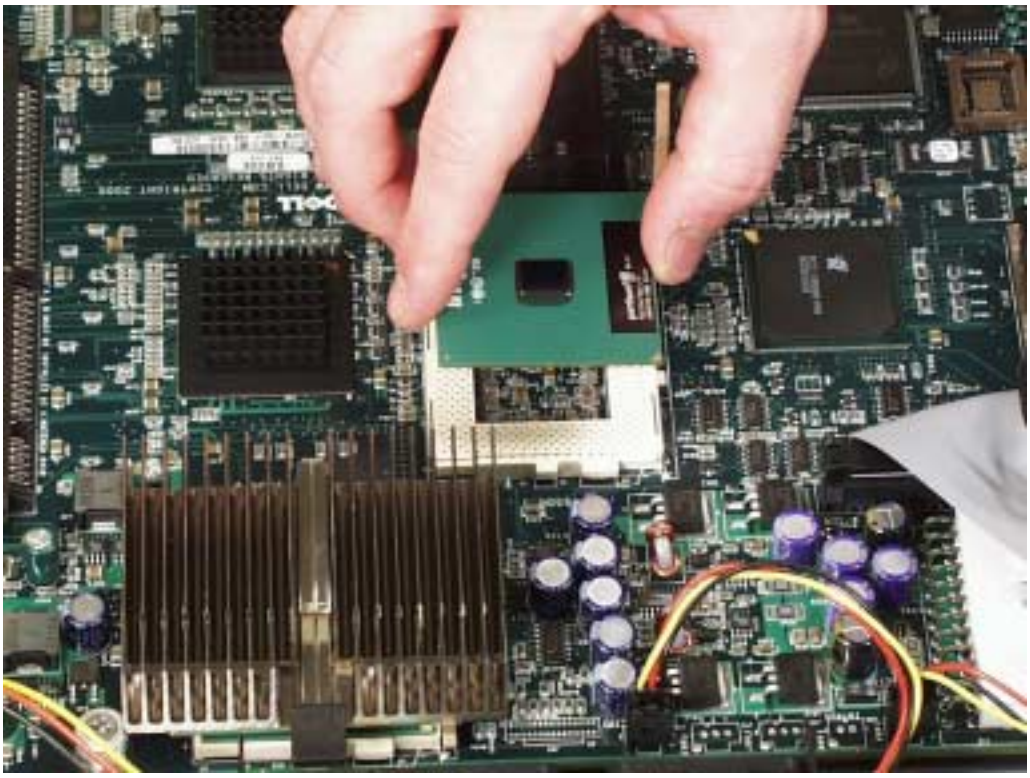
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Removing a Processor or a Terminator

Follow this procedure to remove a processor or a terminator.

#	Removing a Processor or a Terminator.
48.	Before removing the backplane you must remove the top cover
49.	To remove a processor or a terminator perform the following steps: • Press down on the black tab on the heat sink clip and release the heat sink clip. NOTE: There is no heat sink on a terminator. 
50.	• Lift the heat sink clip off the heat sink.
51.	• Lift the heat sink off the processor package.
52.	• Grasp the lever on the side of the processor socket and press outward to disengage it from the tab.

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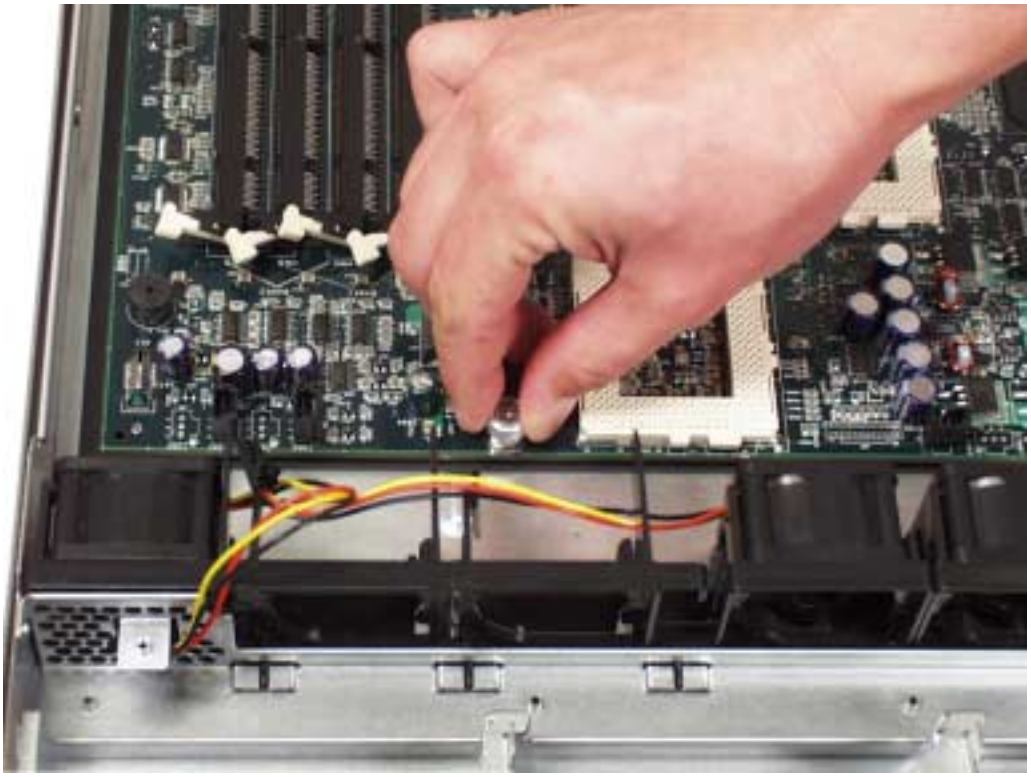
#	Removing a Processor or a Terminator.
53.	• Rotate the lever up disengaging the processor. 
54.	• Lift the processor from its socket. 

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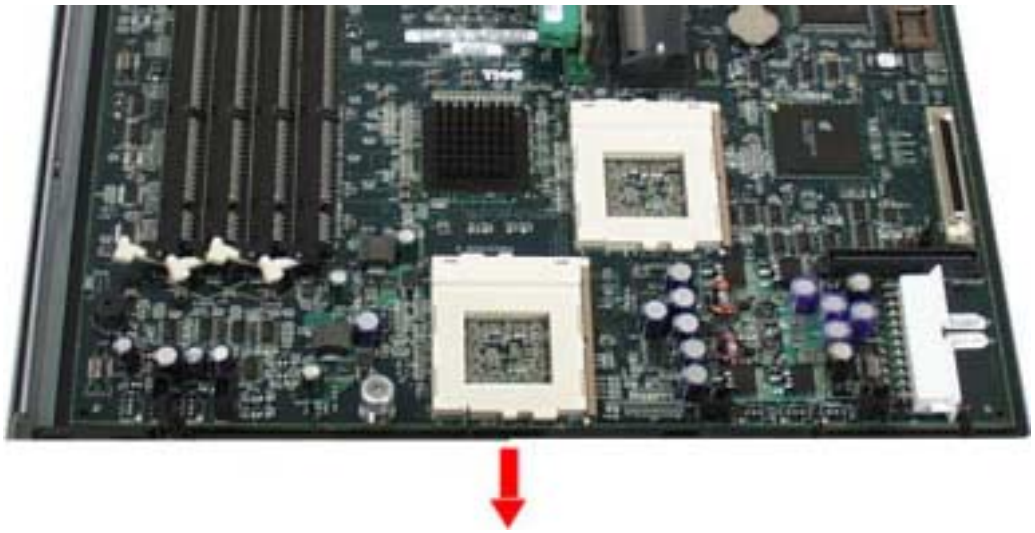
#	Removing a Processor or a Terminator.
55.	• Repeat this procedure for the second processor or the terminator if applicable.

Removing the System Board

Follow this procedure to remove the system board.

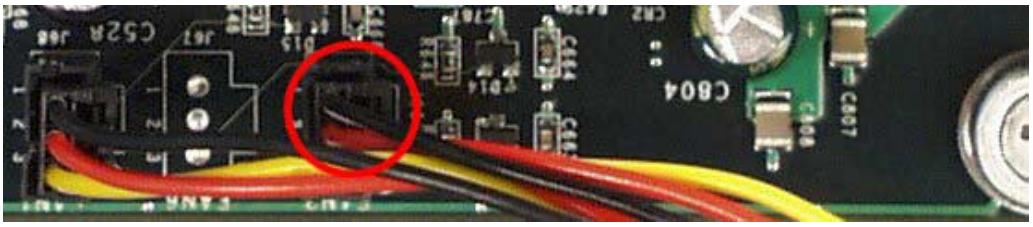
#	Removing the System Board.
56.	Before removing the system board you must remove the following: • The top cover. • The memory. • The processor(s).
57.	To remove the system board, perform the following steps: • Disconnect any wires that are connected to the system board.
58.	• Loosen the thumbscrew. 

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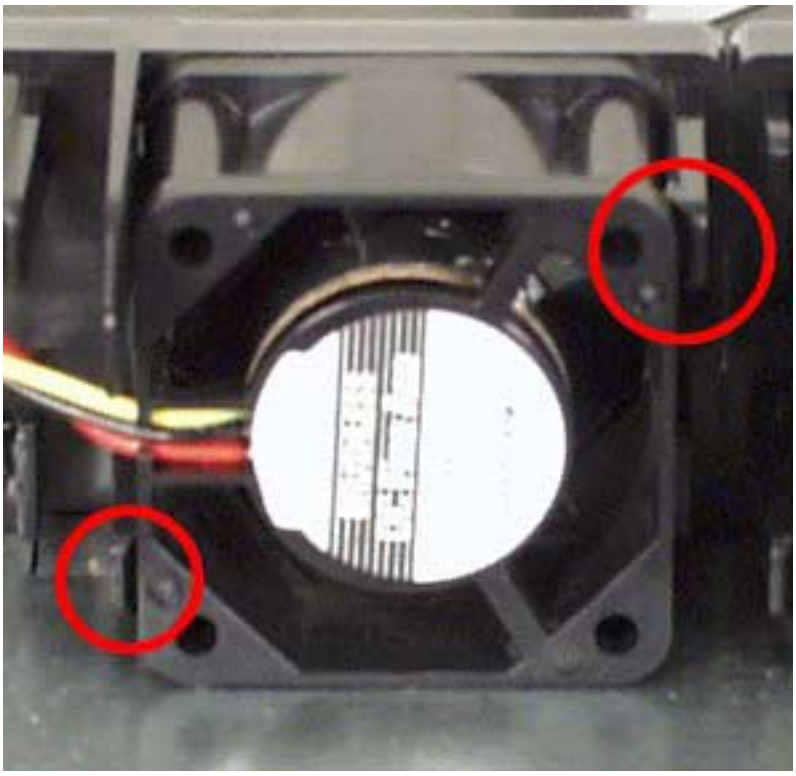
#	Removing the System Board.
59.	• Slide the system board towards the front of the system to disengage it from the grounding clips. 
60.	• Lift the system board out of the chassis.

Removal of a Cooling Fan

Follow this procedure to remove a cooling fan.

#	Removal of a Cooling Fan.
61.	• Before removing a cooling fan you must remove the top cover
62.	To remove a cooling fan, perform the following steps: • If the system board is in the system then disconnect the cable from its header on the system board. 

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#	Removal of a Cooling Fan.
63.	• Use a flat blade screwdriver to loosen the locking tabs on the corners of the fan. 
64.	• Work the fan out of it's retaining clips and remove it from the system.

Re-assembly of the PowerEdge 1550

To re-assemble the PowerEdge 1550 follow the disassembly steps in reverse order.

Full Length PCI Card Guide

The Dell PowerEdge 1550 can support one or two processors. In a dual processor configuration both PCI slots can use short PCI cards; this is the most common form factor for PCI cards. There are some PCI cards however which are full-length PCI cards, an example of one is the Dell Remote Assistant Card or DRAC. Although Dell will not support the DRAC with the PowerEdge 1550 there are after market cards a customer may install. If a customer wants to install a full-length card in a uni-processor system then the full length PCI card guide must be installed in the system as well.

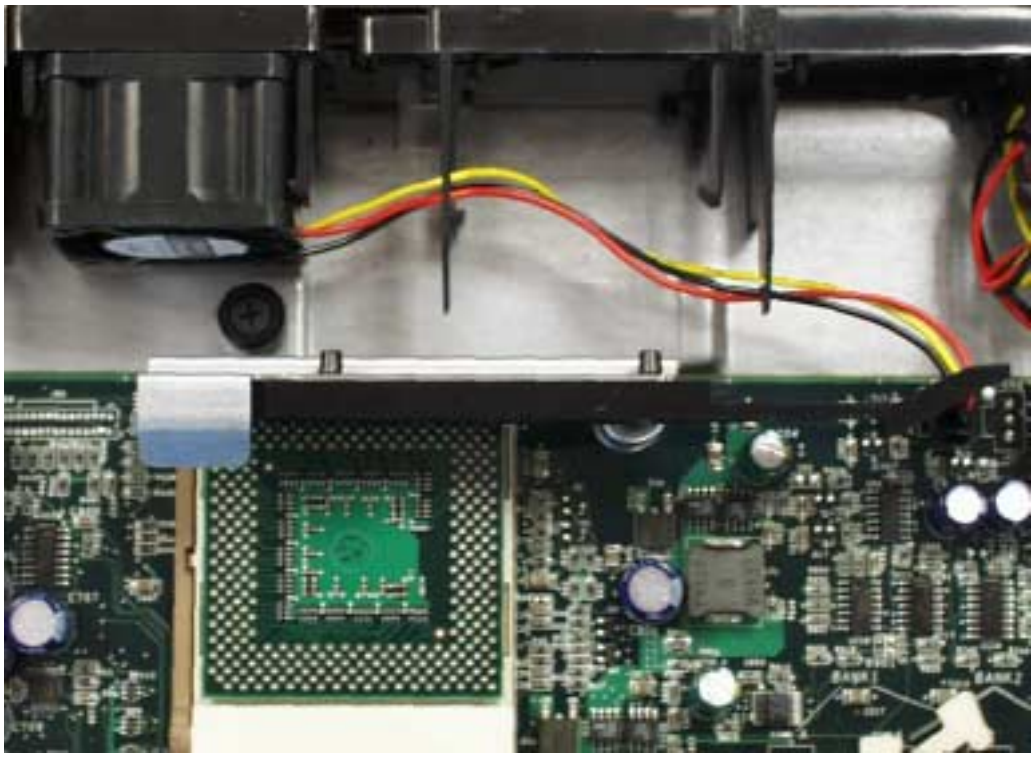
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Installing the Full Length PCI Card Guide

Follow this procedure to install the full length PCI card guide.

#	Installing of the Full Length PCI Card Guide.
65.	Before removing a cooling fan you must extend the PowerEdge 1550 in the rack.
66.	To remove a cooling fan, perform the following steps: • Identify the location to place the full length PCI Card Guide. The thumbscrew secures into the screw hole identified by the red circle in the image that follows and the tab on the guide fits into the slot indicated by the red square in the image that follows. 
67.	• Fit the tab into the slot as indicated by the text above that advises the proper orientation of the guide and tighten the thumbscrew. A number 2 Phillips screwdriver may be required for this task. NOTE: An image showing the insertion of the full length PCI card guide has not been included because it would have been obscured.

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#	Installing of the Full Length PCI Card Guide.
68.	• The image that follows shows the full length PCI card guide properly installed. 

Removing the Full Length PCI Card Guide

To remove the full length PCI card guide follow the instructions for installing it in reverse order.

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Technical Appendix

Features

BIOS

The PowerEdge 1550 BIOS supports mainstream BIOS features. Some of these are described here.

PnP 1.02a

PnP is an acronym for Plug and Play. The PnP specification presents a mechanism to provide automatic configuration capability to *Industry Standard Architecture* (ISA) cards thus enabling full Plug and Play in the PC. The essential elements of Plug and Play ISA are:

- Isolate the ISA card
- Read the card's resource data
- Identify the card and configure its resources
- Locate a driver for the card

In order for a system to be PnP compliant it must have a PnP compatible BIOS, PnP compatible devices, and a PnP compatible operating system. The PnP 1.02a specification details how a PnP BIOS, PnP devices, and a PnP operating system operate together to allow automatic configuration of the devices.

ESCD 1.02a

The ESCD 1.02a specification provides an extension for the PnP BIOS in which to store the PnP information.

MP 1.4

The MP (MultiProcessor) 1.4 specification defines how Intel processors can be used to design IBM PC compatible systems that utilize the resources of more than one processor.

The MP specification includes the following features:

- MP compatible systems will run all uni-processor compiled binaries without recompiling.
- Support for symmetric multiprocessing with one or more processors that are Intel architecture instruction set compatible.
- Support for symmetric I/O interrupt handling with the APIC, a multiprocessor interrupt controller.

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- Flexibility to use a BIOS with minimal MP-specific support.
- An optional MP configuration table to communicate configuration information to an MP operating system.
- Incorporation of ISA and other industry standard buses, such as EISA, MCA, VL and PCI buses in MP-compliant systems.
- Requirements that make secondary cache and memory bus implementation transparent to software.

SMBIOS 2.3.1

The Desktop Management Interface (DMI) is a method of managing computers in an enterprise. The main component of DMI is the Management Information Format Database, or MIF. This database contains all the information about the computing system and its components. Using DMI, a system administrator can obtain the types, capabilities, operational status, installation date, and other information about the system components.

The Desktop Management Interface Specification and its companion MASTER.MIF define “manageable attributes that are expected to be supported by DMI-enabled computer systems”. Many of these attributes have no standard interface to the management software, but are known by the system BIOS. The System Management BIOS Reference Specification provides that interface via data structures through which the system attributes are reported.

Processor

The processor has 256-KB Level 2 cache running at the internal frequency and sits in a socket 370 FC-PGA (Flip Chip Pin Grid Array) socket. The term Flip Chip refers to the location of the processor chip itself in relation to the package. On previous socketed processors the chip was on the underside of the package (the side facing the socket). On the FC-PGA package the chip sits on top of the package (the side with the heat sink). This is intended to more efficiently conduct the heat away from the chip.

On the "Coppermine" processor the Floating Point Unit (FPU) can pass data to the processor 256 bytes at a time. This is a four-fold increase over the previous "Katmai" processor. Changing from 4-way set associative cache architecture to 8-way set associative also increased L2 Cache efficiency. The buffers were increased which further increased efficiency.

Onboard SCSI-3

The AIC-7899 supports the Ultra160/m SCSI-3 specification providing for up to 160MB/s maximum theoretical throughput per channel. The system board will make use of both channels providing two (2) LVD (Low

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Voltage Differential) SCSI connectors internal to the system. Channel A can be used (in non-RAID systems) to connect to SCSI hard disk drives. The SCSI B channel will be used to connect a SCSI tape backup unit. No SCSI channels from this chip are externally accessible.

This chip is connected to the 66-MHz, 64-bit PCI bus. This will prevent the slower 33-MHz, 32-bit PCI bus from slowing it down.

PERC 3/DCL

During the POST sequence when the system loads add in BIOS' the PERC 3/DCL presents users with the following:

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Press <Ctrl><M> to Run Configuration Utility

Or press <Ctrl><H> for WebBIOS

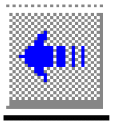
Configuration Utility

The configuration utility accessed through <**CTRL**><**M**> is the same as previous AMI based PERCs (PERC II, PERC 2/DC, and PERC 2/SC).

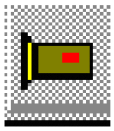
WebBIOS

The WebBIOS accessed through **<CTRL><H>** is a newer interface. It is not actually a web accessible BIOS interface. It runs locally. It is a GUI interface with mouse support.

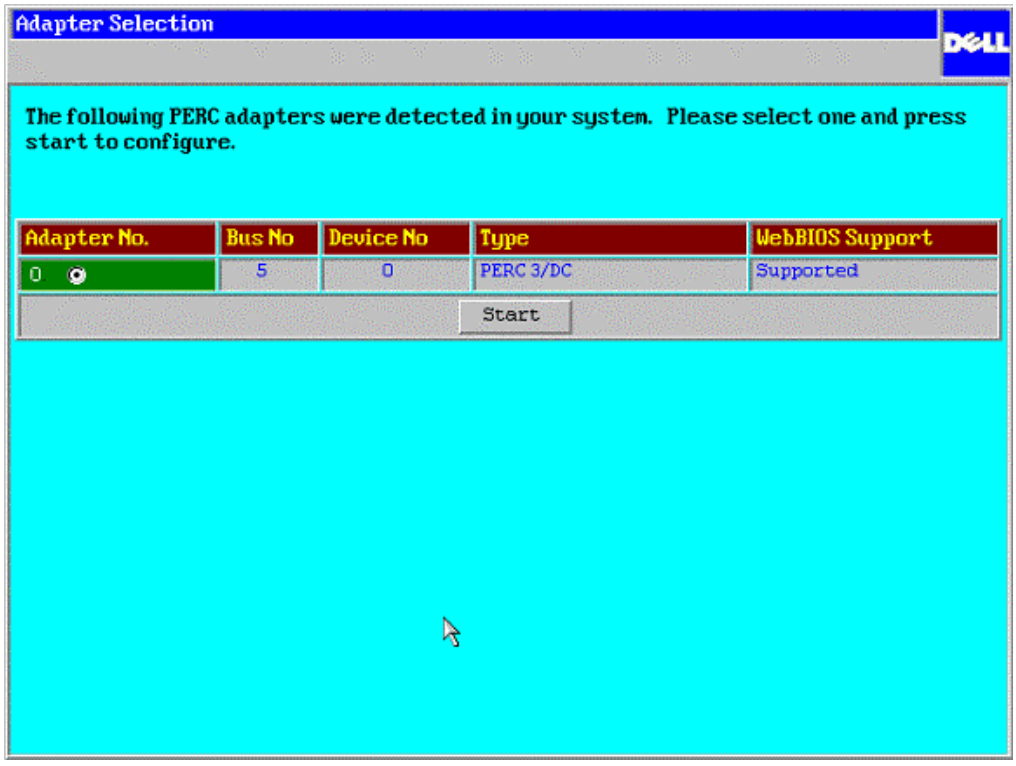
There is a toolbar the top of every screen. The icons, from left to right, are:

Icon	Function
	Go to Home Page; click this icon to return to the main screen.
	Go to Previous Page; click this icon to return to the page you accessed immediately before the current page.
	Exit RAID Configuration Utility; click on this icon to exit the WebBIOS program.
	Adapter selection; click on this icon to scan for controllers connected to your system.
	Scan for Adapters; click this icon to scan the system for any adapters installed into the system. Devices attached to the adapters will also be scanned.

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Icon	Function
	Controller Properties; click on this icon to display the propertied if the controller, such as the firmware version, BIOS version, RAM size, and initiator ID.
	Configure Controller; click on this icon to enter the Configuration Wizard.
	Silence the Alarm; Click on this icon to turn off the sound on the alarm.
	Go to Ctrl-M, click on this icon (on the right side at the top of the screen) to go from the WebBIOS Configuration Utility to the text based Configuration Utility. NOTE: This icon will not appear on every screen.

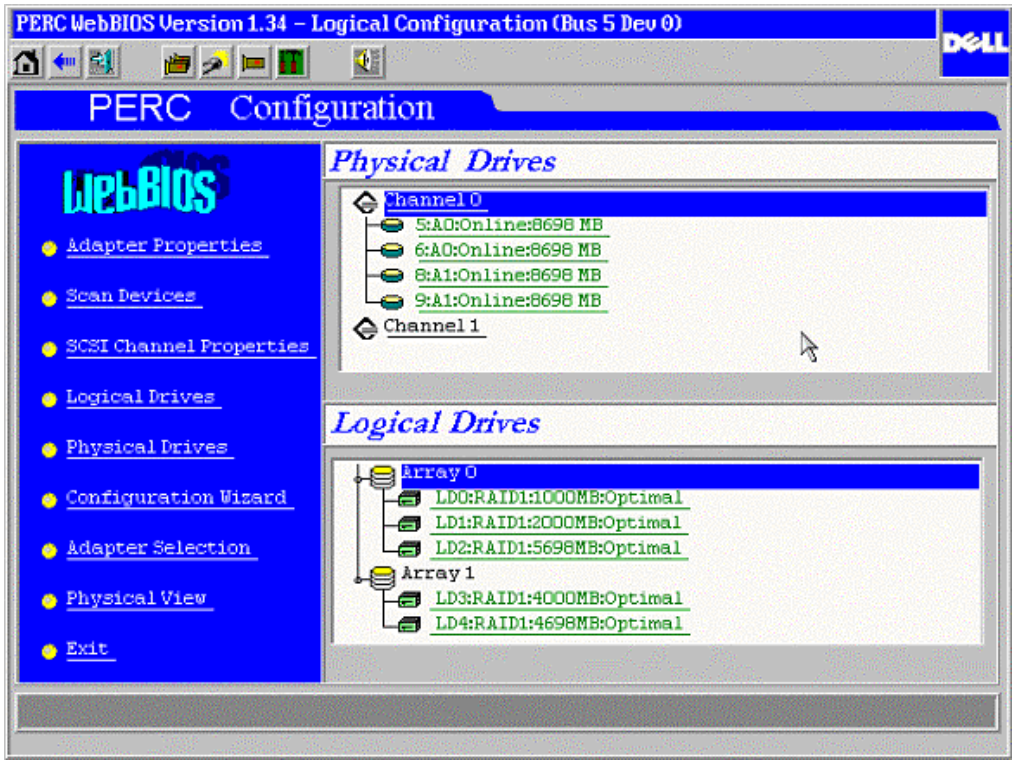
Adapter Selection



The first screen it shows is the controller selection screen. It displays a list of the installed controllers. Click in the radio button next to the controller you wish to configure and click the **Start** button. If you wish to use the older text based interface then click the **Control-M** button.

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Main Screen



When you select a controller the main screen is displayed. The information is displayed in three distinct panes, all underneath the toolbar. One pane covers the left side of the screen. It contains links to other screens or commands. The right side of the screen is divided into two horizontal panes, one over the other. The top pane shows the physical drives connected to the controller and the lower pane shows the logical drives that are currently configured. A short description of the links is followed by a more detailed explanation of the usage of each screen.

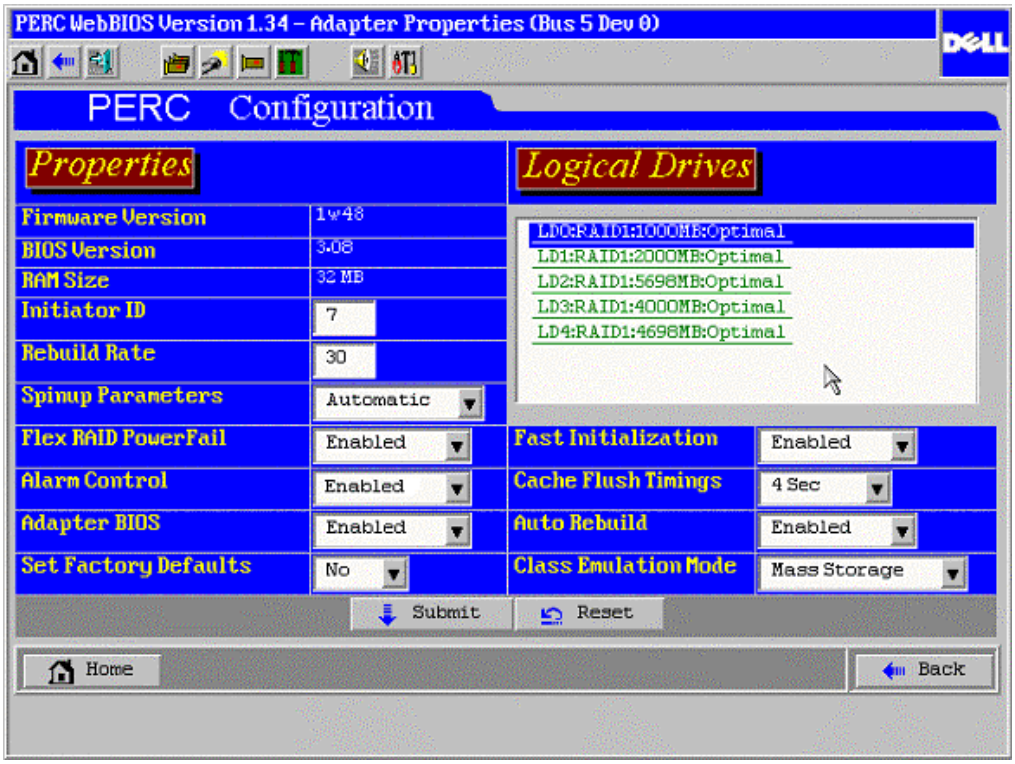
The links on the left side are:

- **Adapter Properties**: Displays information about the controller and also allows configuration of the controller.
- **Scan Devices**: Initiates a scan of the channels on the controller.
- **SCSI Channel Properties**: Displays information about the channel the selected logical drive is on and the logical drive and also allows configuration of both.
- **Logical Drives**: Provides an interface to view information about and perform actions on a logical drive.
- **Physical Drives**: Provides an interface to view information about and perform actions on a physical drive.

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- **Configuration Wizard**: Provides a user-friendly interface for creation of a logical drive.
- **Controller Selection**: Lists the Dell RAID controllers in the system that are compatible with the WebBIOS and allows changing current focus from one controller to another.
- **Physical View/Logical View**: Allows toggling between viewing the hard disk drive resources on the controller through the logical device view or the physical device view.

Adapter Properties



The Controller Properties screen displays the following data:

- Firmware version of the controller.
- BIOS version of the controller.
- Quantity of memory on the controller.

It also allows configuration of the following:

- **Initiator ID**: The ID of the controller. The ID can be any ID from 0 to 15 however, for general purposes the default of 7 should be maintained.
- **Rebuild Rate**: The rebuild rate of the drives in the system. This is used to determine how much of the controllers resources are devoted to rebuilding a failed drive when replaced with a new drive.

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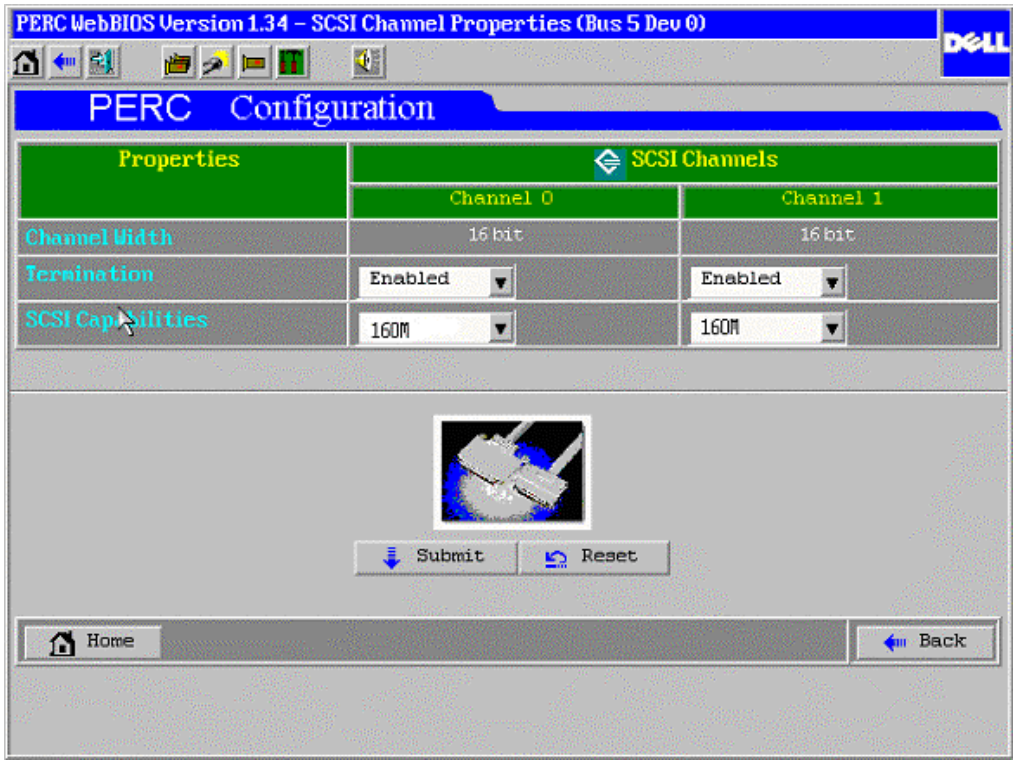
- **Spinup Parameters**: Sets the timing for spinning up the hard disk drives attached to the controller. The options are: automatic, 2 per second, 4 per second, or 6 per second.
- **Flex RAID PowerFail**: Enable or disable Flex RAID PowerFail. When enabled this option allows a drive reconstruction to continue after a power failure.
- **Alarm Control**: Enable, disable, or silence the onboard alarm.
- **Adapter BIOS**: Enable or disable the BIOS on the controller.
- **Set Factory Defaults**: Return the configuration of the controller to the factory default settings.
- **Cache Flush Timings**: This option sets the time between cache flushes. A cache flush is when the data in the cache is flushed from the cache on the adapter to the logical drive. More frequent cache flushes minimize the potential for catastrophic data loss if a system loses power during a write but it takes up more bandwidth on the SCSI bus.
- **Fast Initialization**: When enabled the controller writes zeros to the first sector of the logical drive during initialization so that initialization completes more rapidly. When disabled the controller writes zeros across all sectors of the logical drive during initialization.
- **Cluster Mode**: Enables the controller to or disabled the controller from participating in a cluster. When cluster mode is enabled the BIOS is automatically disabled.
- **Auto Rebuild**: There are two choices for this option, **Enabled** or **Disabled**. When set to **Enabled** the adapter will automatically initiate a rebuild operation when a new hard drive has been inserted after a failure of an array (when the array level supports redundant information).
- **Class Emulation Mode**: Select the mode of the controller, I2O mode or mass storage mode.

Scan Devices

This is not a screen. It initiates a rescan of all devices connected to the controller. Any changes to the status of the physical or logical drives will be reflected in the WebBIOS interface. If a physical drive has failed the words "**Not Responding**" displays to the right of the drive name under the **Physical Drives** heading.

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SCSI Channel Properties



The properties under the **Properties** heading are **Channel Width**, **Termination**, and **SCSI Capabilities**. The Channel Width row displays the speed that the system transmits data, in terms of bits. You can change the options for the other two properties, **Termination** and **SCSI Capabilities**. The values for **Termination** are:

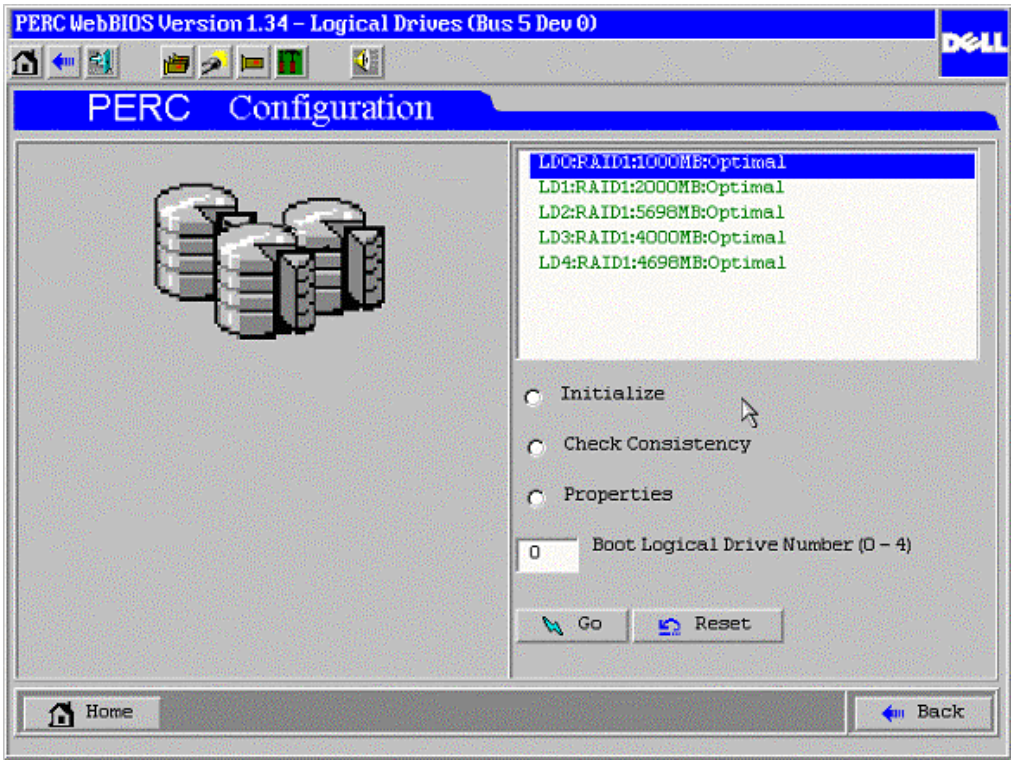
- Enabled (default)
- Disabled

The values for **SCSI Capabilities** are:

- 160M (default)
- Ultra-II
- Wide
- Fast

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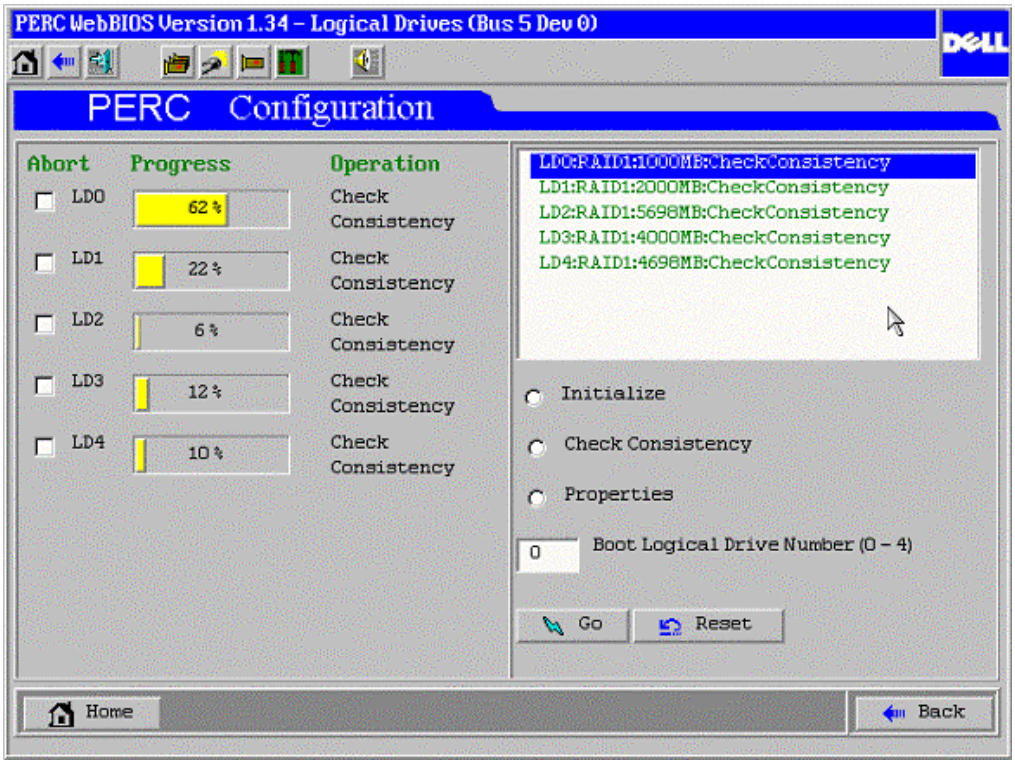
Logical Drives



The Logical Drives screen provides an interface for selecting a logical drive and performing actions on the logical drives. To perform an action, select the logical drive on which to perform the action, select the action, then click the **Go** button. The actions that can be performed are:

- **Initialize**: initialize the logical drive by writing zeros over it.
- **Check Consistency**: check the correctness of redundancy data.

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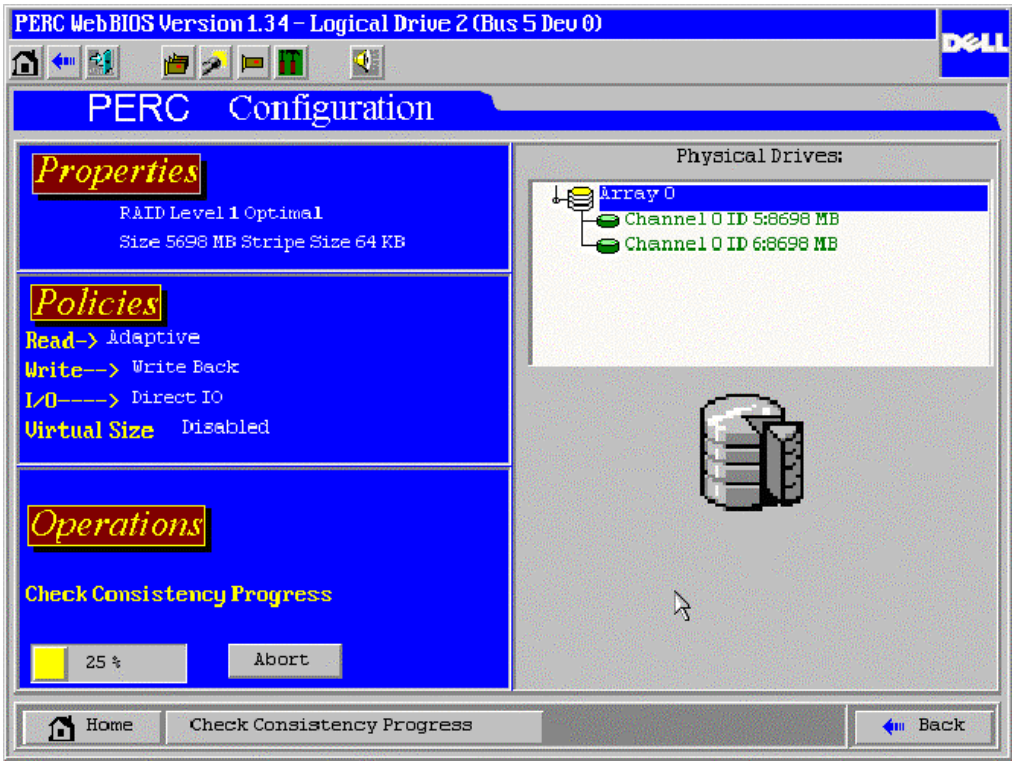


Choose this option to verify the correctness of the redundancy data. This option is available only if RAID level 1, 5, 10, or 50 is selected. WebBIOS automatically converts any differences found in the data.

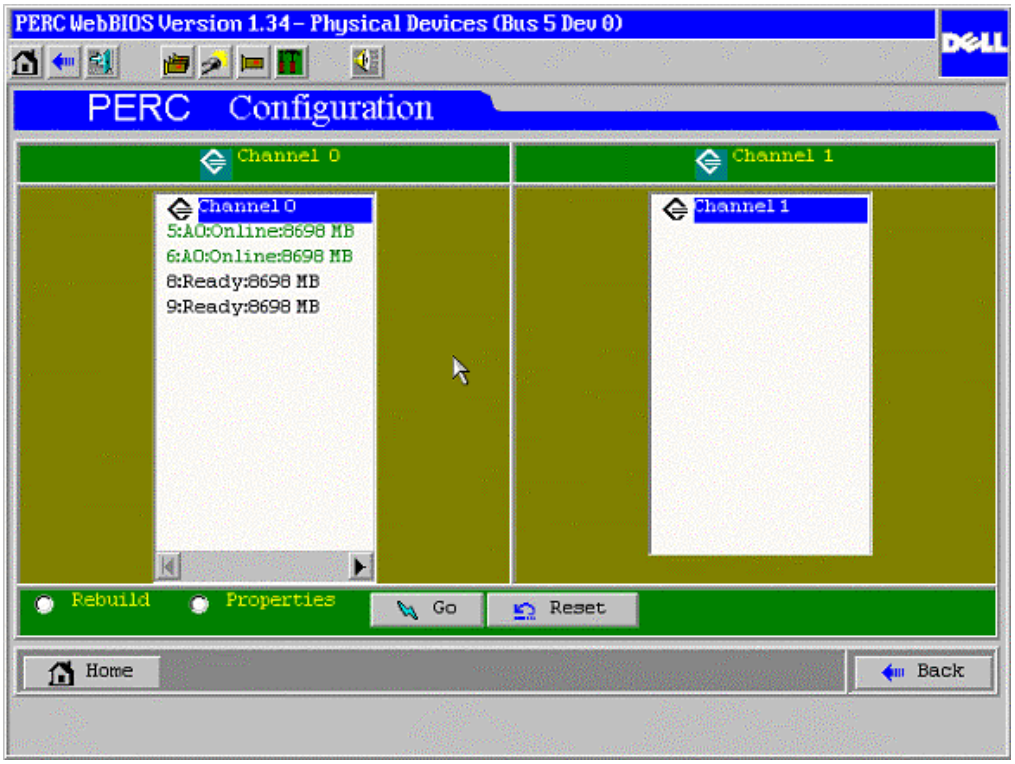
After you click on **Check Consistency** and the **Go** button, a progress chart displays on the left side of the screen to show how much of the consistency check has been completed. There is also an option to abort the check for any or all logical drives. The above screen shows a consistency check in progress.

- **Properties:** change to the SCSI Channel Properties screen.

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Physical Drives

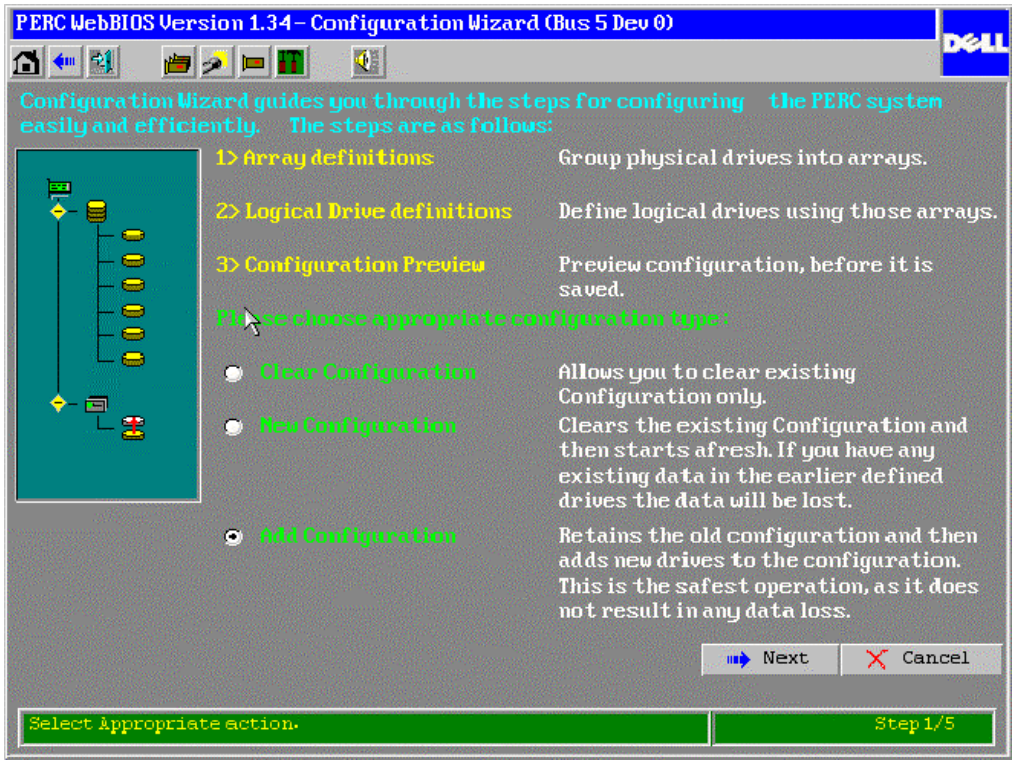


The Physical Drives screen is divided into columns, one for each channel on the controller. The drives physically connected to each channel appears in the appropriate column. There are two radio buttons under the

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columns, **Rebuild** and **Properties**. Clicking on the radio button (**Initialize**, **Check Consistency**, or **Properties**) and then the **Go** button initiates an action. To return to the configuration that existed and not save any changes performed here click the **Reset** button.

Configuration Wizard

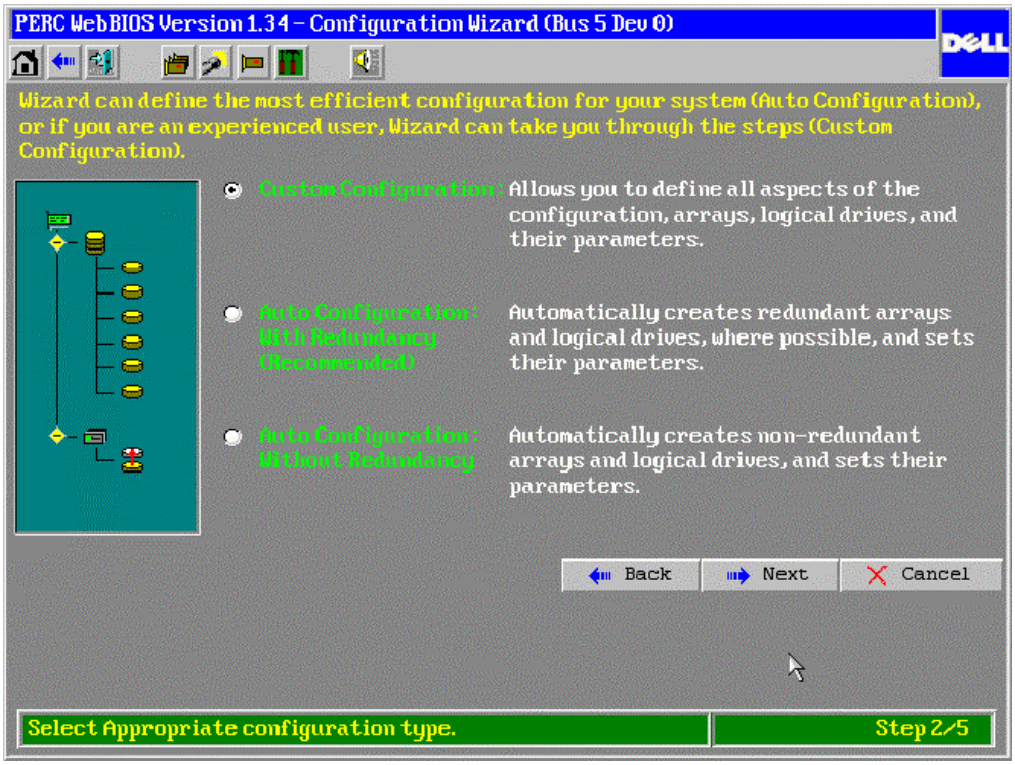


The Configuration Wizard provides a user-friendly interface for the creation of array configurations. The first screen to the wizard provides the opportunity to select:

- **Clear Configuration**: clear the existing configuration only.
- **New Configuration**: clear the existing configuration and start a new array configuration. When this choice is made any existing data on the drives are lost.
- **Add Configuration**: retain the old configuration and add new drives to it. No existing data is lost during this operation.

  To perform one of the operations, select the operation to be performed and then click the **Next** button.

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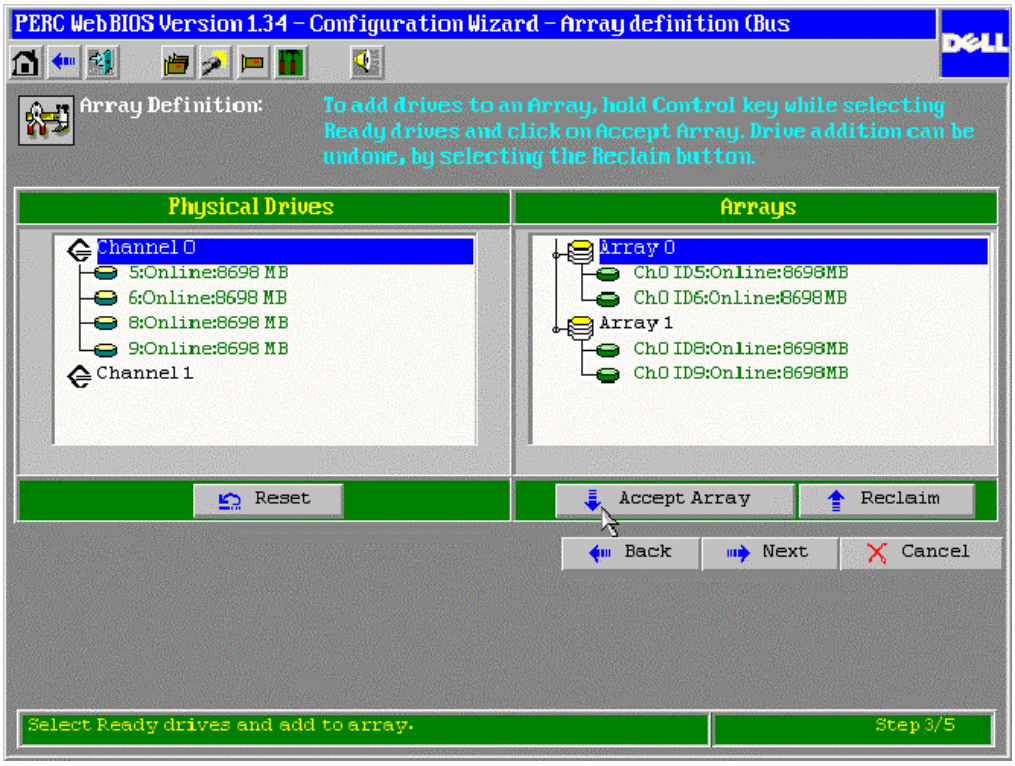


The second page offers three options:

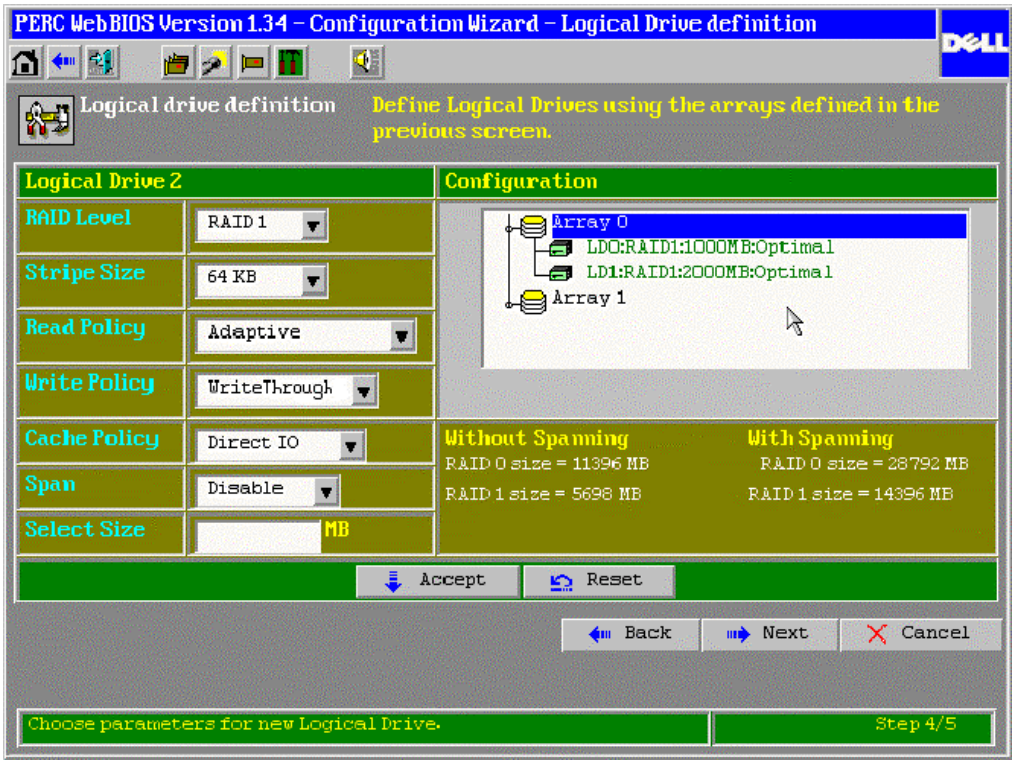
- **Custom Configuration**: allow the user to manually configure the array.
- **Auto Configuration With Redundancy (Recommended)**: automatically create a redundant array.
- **Auto Configuration Without Redundancy**: automatically create a non-redundant array.

To continue, select the operation to perform and then click the **Next** button.

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The third page is the array definition page. To add drives to an array press and hold the <**CTRL**> key and click on the drive(s). Click the **Accept** button to complete adding the drives. To undo the changes click he **Reclaim** button. After completing actions here click the **Next** button.



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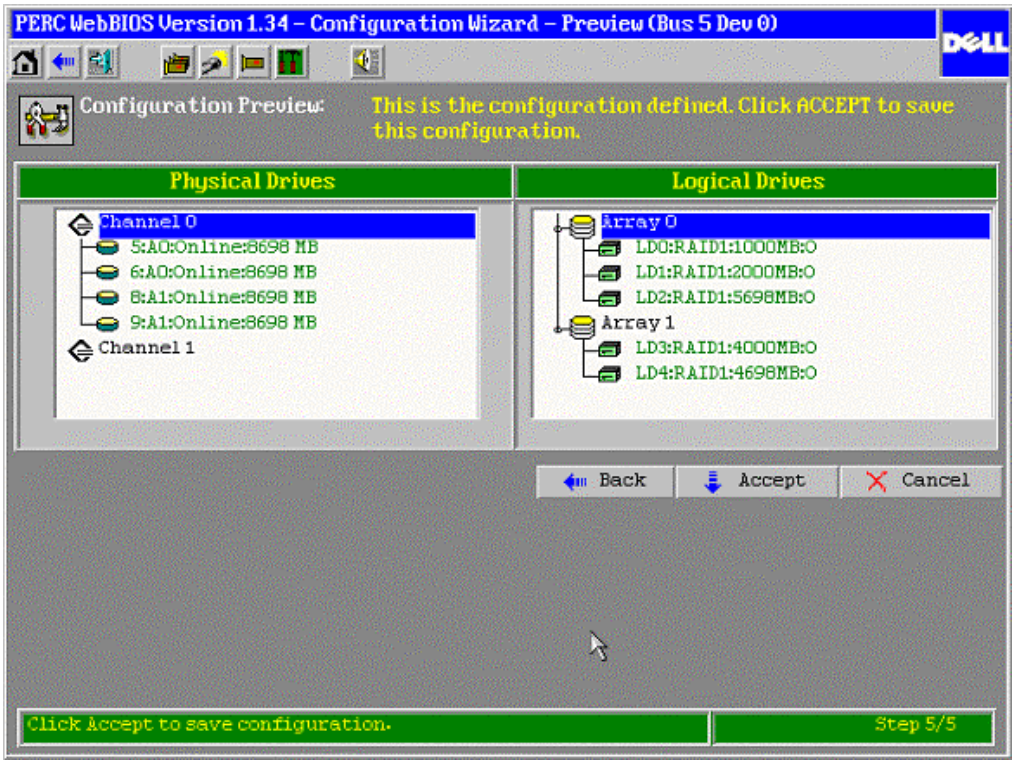
The fourth page is the Logical Drive Definition page. It provides the facility for setting:

- **Raid Level**: options are 0, 1, or 5.
- **Stripe Size**: this defines the size of the data block written to each disk in a logical drive. Larger stripe sizes provide better performance during sequential read transactions. For random reads select a smaller stripe size. The default is 64 KB.
- **Read Policy**: options are normal, read-ahead, or adaptive. Normal specifies that the controller does not use read-ahead for the current logical drive. Read-ahead specifies that the controller uses read-ahead for the current logical drive. Adaptive specifies that the controller begins using read-ahead if the two most recent disk access occurred un sequential sectors. If all requests are random the algorithm reverts to normal, however, all requests are still evaluated for possible sequential operation. This is the default setting.
- **Write Policy**: sets the write policy to write-back or write-through. When set to write-back the controller sends a transfer completion signal after the controller cache has received all of the data in a transaction. When set to write-through the controller sends the transfer completion signal after all of the data in a transaction has been written to the logical drive.
- **Cache Policy**: specify if reads are to be buffered in cache memory (Cached I/O) or not (Direct I/O). Cached I/O is the default setting.
- **Span**: options depend on if the configuration will support spanning. Spanning is the ability for an array to cross channels. If there are drives on more than one channel then the options are Enable or Disable. Otherwise, the only option is Disable.
- **Select Size**: This is where the size of the array is specified. There are options to the right of this item advising what the size should be based on different sections made such as **Raid Level**. Click in the text box supplied and type the appropriate size, the size entered must agree with the **Raid Level** selected otherwise when the size is entered and **Next** is clicked the page will redisplay with the **Select Size** textbox cleared.

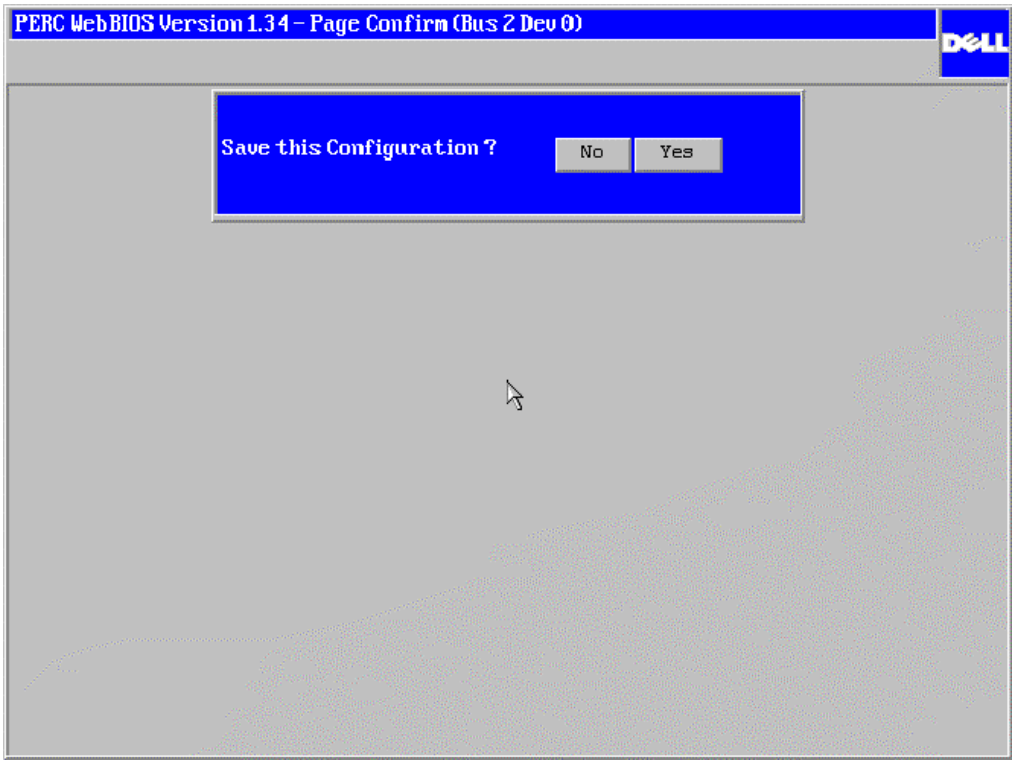
  Make the selection required for the array being defined then click **Accept** to accept the changes. Clicking **Reset** will undo the settings selected.

  Click **Next** to continue onto the next and final page to the wizard.

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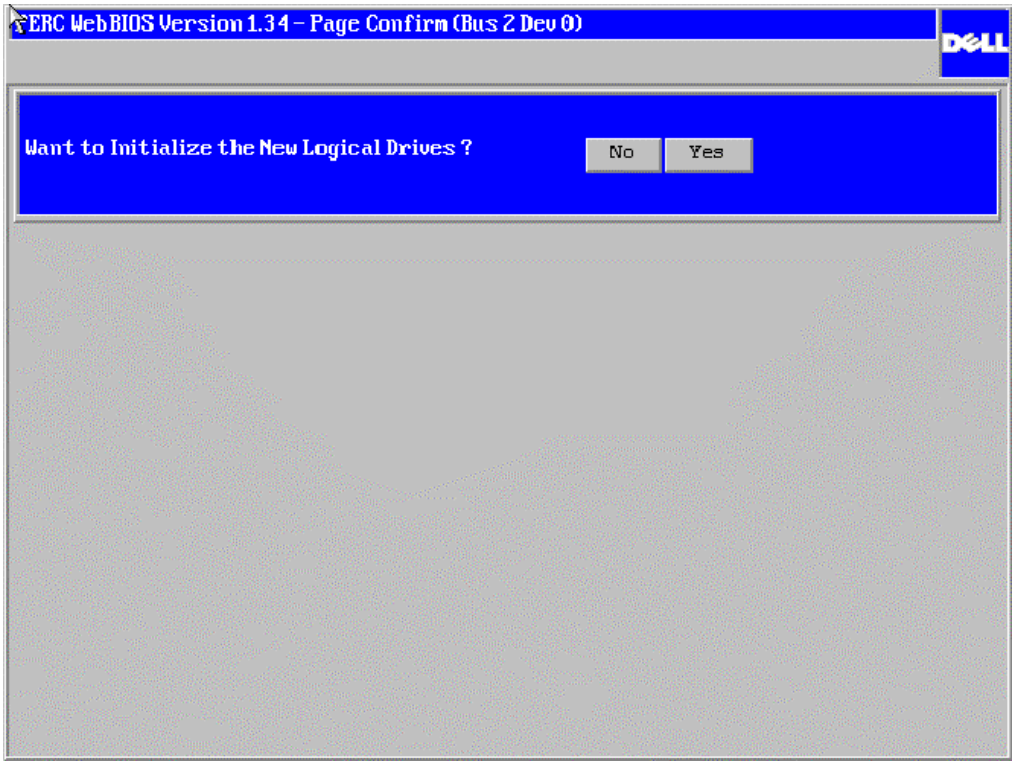


The fifth screen displays a preview of the array just configured. Click **Accept** to save the configuration. Click **Back** to make changes.



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After clicking **Accept** in the **Configuration Preview** screen the **WebBIOS** will prompt you to **Save this Configuration**. To save the configuration, click the **Yes** button.



After the configuration is saved, a window displays the option to initialize the new logical drives. After the logical drives are initialized, the **Logical Drives** screen displays. To initialize the new drive click the **Yes** button.

PERC BIOS Error Messages

Message	Problem	Suggested Solution
Adapter BIOS Disabled. No Logical Drives Handled by BIOS	The PERC 3/DC BIOS is disabled.	Enable the BIOS by pressing <**Ctrl**>+<**H**> at the boot prompt to run the PERC 3/DC WebBIOS Configuration utility.
Host Adapter at Baseport xxxx Not Responding	The BIOS cannot communicate with the adapter firmware.	Make sure PERC 3/DC is properly installed. Check SCSI termination and cables.
No PERC 3/DC Adapter	The BIOS cannot communicate with the adapter firmware.	Make sure PERC 3/DC is properly installed.

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Message	Problem	Suggested Solution
Configuration of NVRAM and drives mismatch. Run View/Add Configuration option of PERC 3/DC WebBIOS Configuration Utility. Press any key to run the Configuration Utility.	The configuration stored in the PERC 3/DC adapter does not match the configuration stored in the drives.	Press <**Ctrl**>+<**H**> to enter the PERC WebBIOS Configuration Utility. Choose View/Add Configuration from the Configure menu. Choose View/Add Configuration to examine either the configuration in NVRAM or the configuration stored on the disk drives. Resolve the problem by selecting one of the configurations.
Unresolved configuration mismatch between disks and NVRAM on the adapter after creating a new configuration	Some legacy configurations in the drives cannot be cleared.	Clear the configuration. Low level format the related drives and re-create the configuration.
1 Logical Drive Failed	A logical drive failed to sign on.	Make sure all physical drives are properly connected and are powered on. Press **Ctrl**>+<**H**> to enter the PERC WebBIOS Configuration Utility to find out if any physical drives are not responding. Reconnect, replace, or rebuild any drive that is not responding.
X Logical Drives Degraded	x number of logical drives signed on in a degraded state.	Make sure all physical drives are properly connected and are powered on. Press **Ctrl**>+<**H**> to enter the PERC WebBIOS Configuration Utility to find if any physical drives are not responding. Reconnect, replace, or rebuild a drive that is not responding.
1 Logical Drive Degraded	A logical drive signed on in a degraded state.	Make sure all physical drives are properly connected and are powered on. Press <Ctrl> <H> to enter the PERC WebBIOS Configuration Utility to find out if any physical drives are not responding. Reconnect, replace, or rebuild any drive that is not responding.
Insufficient memory to run BIOS. Press any key to continue…	Not enough PERC 3/DC memory to run PERC 3/DC BIOS.	Make sure PERC 3/DC cache memory has been properly installed.
Insufficient Memory	Not enough memory on the PERC 3/DC adapter to support the current configuration.	Make sure PERC 3/DC cache memory has been properly installed.

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Message	Problem	Suggested Solution
The following SCSI IDs are not responding: Channel x:a.b.c	The physical drives with SCSI IDs a, b, and c are not responding on SCSI channel x.	Make sure the physical drives are properly connected and are powered on.

PERC Audible Messages

Tone Pattern	Meaning	Examples
Three seconds on and one second off	A logical drive is offline.	One or more drives in a RAID 0 configuration failed. Two or more drives in a RAID 1, 5, 10, or 50 configuration failed.
One second on and one second off	A logical drive is running in degraded mode.	One drive in a RAID 1, 5, 10, or 50 configuration failed.
One second on and three seconds off	An automatically initiated rebuild has been completed.	While you were away from the system, a disk drive in a RAID 1, 5, 10, or 50 configuration failed and was rebuilt.

Onboard Network Interface

Magic packet is an Ethernet packet that contains a synchronization byte stream and 16 repetitions of the managed target MAC address. It is used to “wake” a system that is connected to a network and in a low power state.

Wake on interesting packet is not part of the Wake-on-LAN specification. It is part of Microsoft’s Network Device Class Power Management Reference Specification. It details network wakeup frames other than a Magic Packet. The purpose of the frame wake-up mode is to wake up the system when another machine on the network needs to communicate with this system. The mechanism described in this specification does not require the application running on the remote machine to send a special wake-up pattern. Instead when the network device is operating in frame wake-up mode, it tries to identify certain "interesting" frames that are sent by existing network protocols. Some examples of frames that might cause wake-up signals are ARP requests; NETBIOS name lookups, an IP frame addressed to the machine, etc. These frames may be addressed as broadcasts, multicasts, or directly addressed frames.

System Chipset

The north Bridge chip integrates the functions of the memory controller, AGP bus interface, the processor interface, and front side bus for the CIOB20 into a single chip.

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The processor speeds supported by the chip are 100 MHz and 133 MHz. The PowerEdge 1550 is only shipped with processors that support 133 MHz.

The memory bus works with SDRAM at 100 MHz or 133 MHz. The speed of the memory needs to be the same as the processor external speed so it will ship with 133 MHz SDRAM. The CNB20HE-SL will support up to eight (8) 256-Mbit devices for a total of 16 GB of RAM however, the system only has four DIMM sockets and is sold with up to 512 MB DIMMS so it is supported with a maximum of 2 GB of memory. The system will support up to 4 GB with 1 GB DIMMS. The system should also work with 2 GB DIMMs but this could not be tested at the time of writing.

The interface from the CNB20HE-Sl to the CIOB20 operates at 133 MHz. It also supports up to a 4X AGP bus. The ATI Rage XL is an AGP 2X device however. The PowerEdge 1550 does not have an AGP slot for an after market video card.

The CIOB20 is the I/O controller for the PCI bus. It supports two 64-bit PCI busses that can operate up to 66 MHz. The implementation in the PowerEdge 1550 supports one 64-bit 66 MHz bus and one 32-bit 33 MHz bus.

The onboard AIC-7899 SCSI controller and the two PCI slots reside on the 64-bit 66 MHz bus while the two Intel 82559 NIC interfaces reside on the 32-bit 33 MHz bus.

The OSB4 resides on 32-bit 33 MHz bus also. The OSB4 has interfaces for the USB, E-IDE, and ISA busses.

The only device on the ISA bus is the Super I/O controller that provides support for legacy I/O such as keyboard, mouse, serial, parallel, and floppy disk controller.

Onboard Video

The video chip is built on the Rage Pro core and has features that can be exploited by 3D software. The features include:

- A 1.2 million-triangle/sec set-up engine.
- Single-pass trilinear filtering.
- Six (6) perspectively correct texturing modes.
- Video texturing.
- Gouraud and specular shading.
- 3D special effects.

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Dell Open Manage Array Manager

Installation Overview

Dell Open Manage Array manager is supported in Windows NT 4.0 (with Service Pack 5 or greater) and Windows 2000 (with Service Pack 1 or greater). The installation procedure for the two operating systems is identical however there are information dialogs that will appear while installing under Windows 2000 so the procedures for both are enumerated here.

NOTE: The Dell Open Manage Array Manager will replace the native disk management (normally the disk management snap-in used with Computer management).

Windows NT 4.0

The installation into Windows NT 4.0 is straightforward. It uses the standard **InstallShield Wizard** interface. The steps below are a walkthrough of the installation procedure.

Service Pack 5 or greater is required for Dell Open Manage Array Manager to work.

Windows 2000

The installation procedure Windows 2000 is almost identical to the one for Windows NT 4.0. The steps are outlined here with emphasis placed on the additional steps.

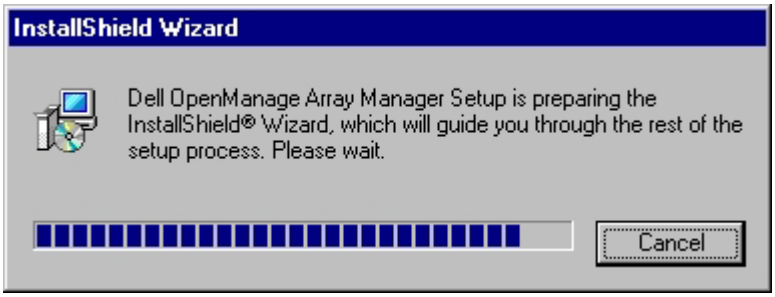
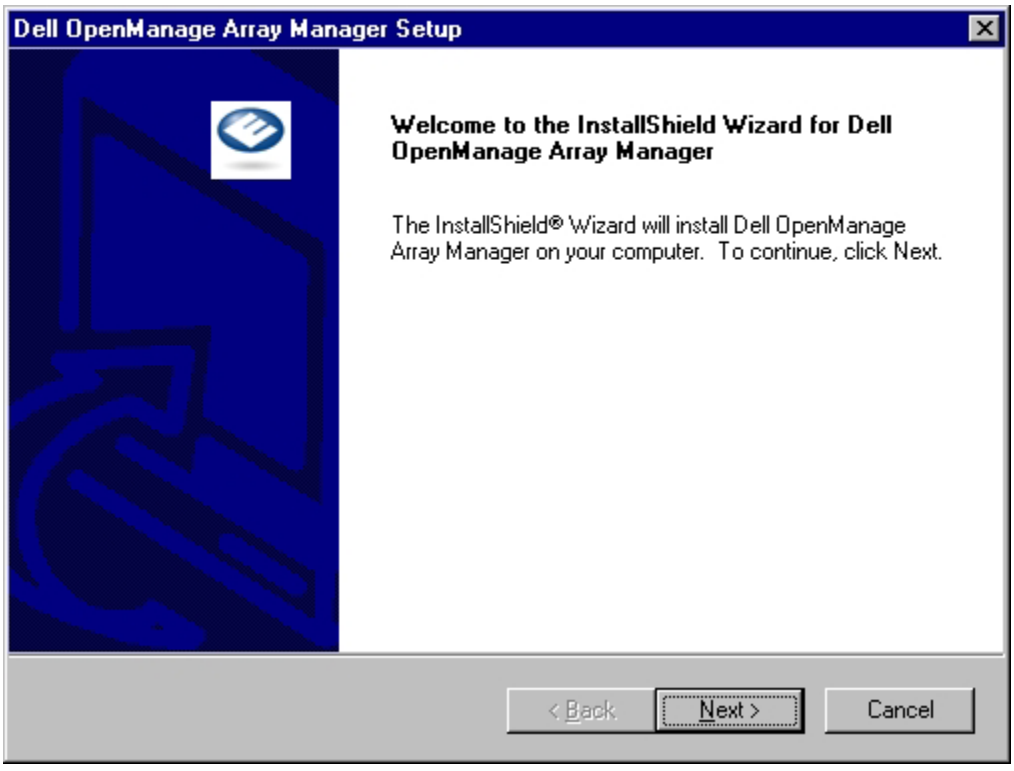
Service Pack 1 or greater is required for functionality of Dell Open Manage Array manager.

An important note is that Dell Open Manage Array manager replaces the functionality of the Disk Management plug-in in Computer Management in Windows 2000. This is noted once during the installation and once after rebooting to complete the installation.

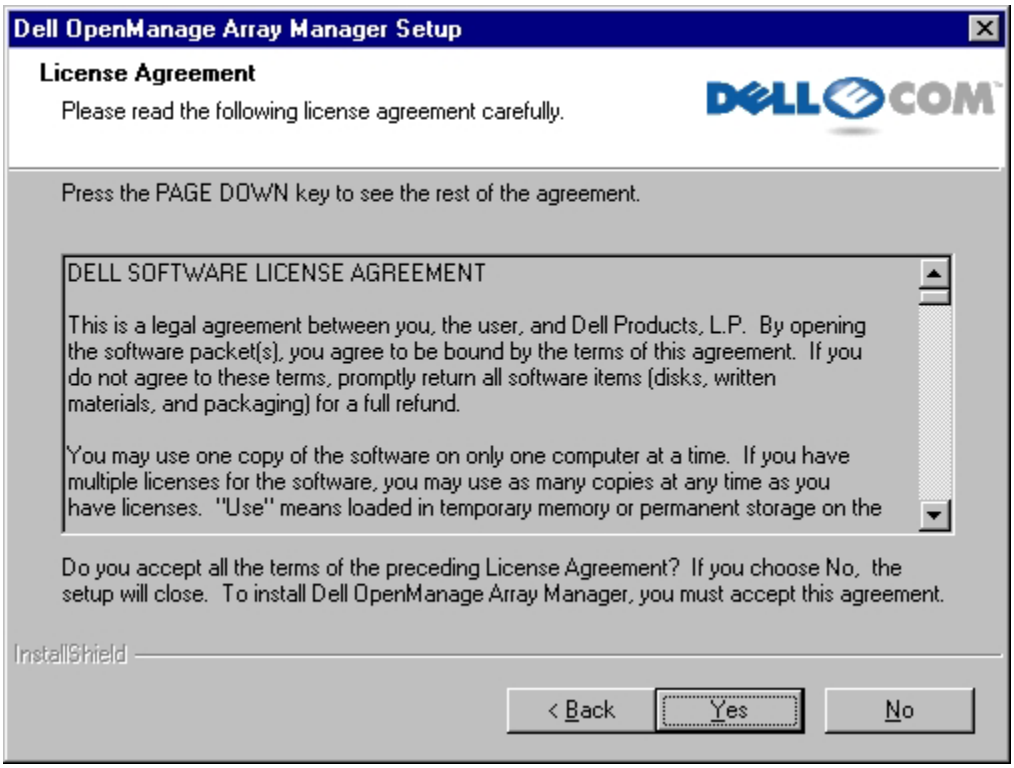
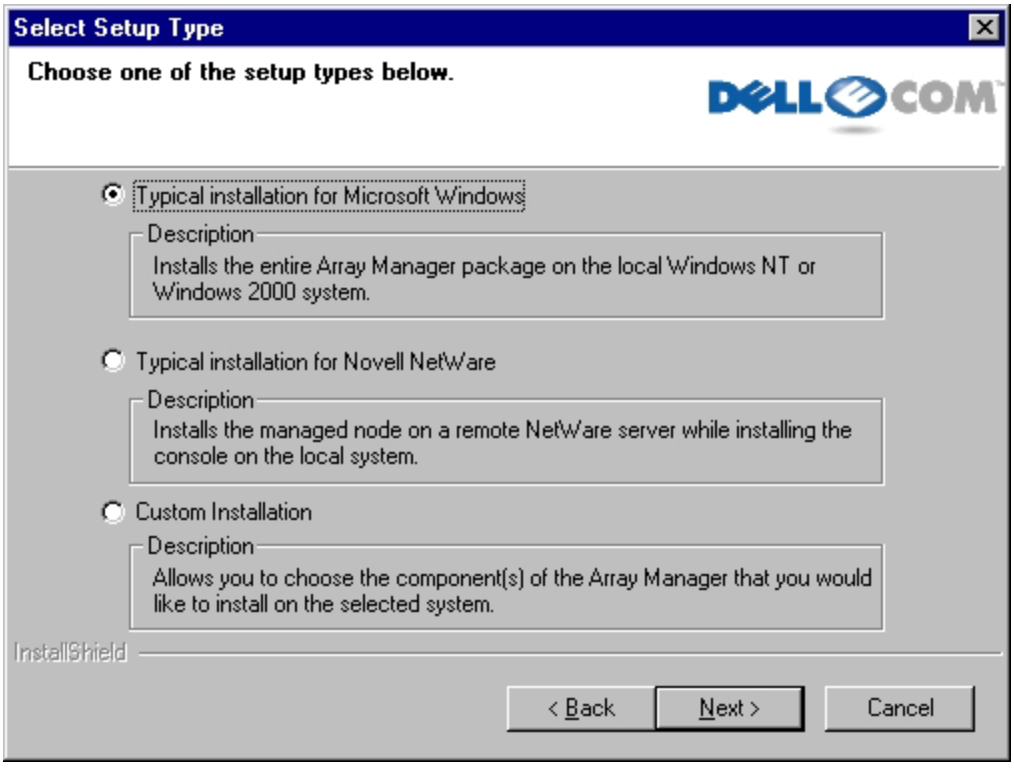
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Installing Dell Open Manage Array Manager on Windows NT 4.0

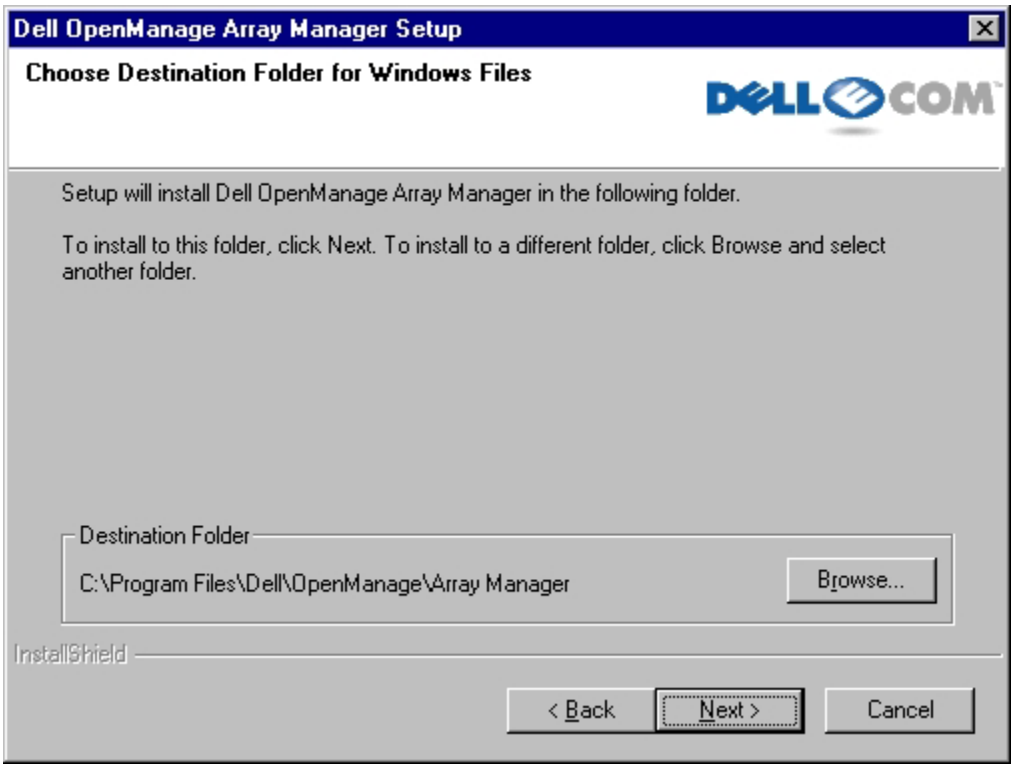
To install Dell Open Manage Array manager on Windows NT 4.0 perform the following steps:

#	Installation of Dell Open Manage Array Manager on Windows NT 4.0
69.	To install Dell Open Manage Array Manager, perform the following steps: • If you insert the CD while the operating system is running and the CD-ROM drive has been configured for autorun then the **autorun.inf** file will be loaded and the setup program will launch. Otherwise, open **My Computer** and double click the CD-ROM icon. The **InstallShield Wizard** will start. 
70.	• At the Welcome Screen click the **Next** button. 

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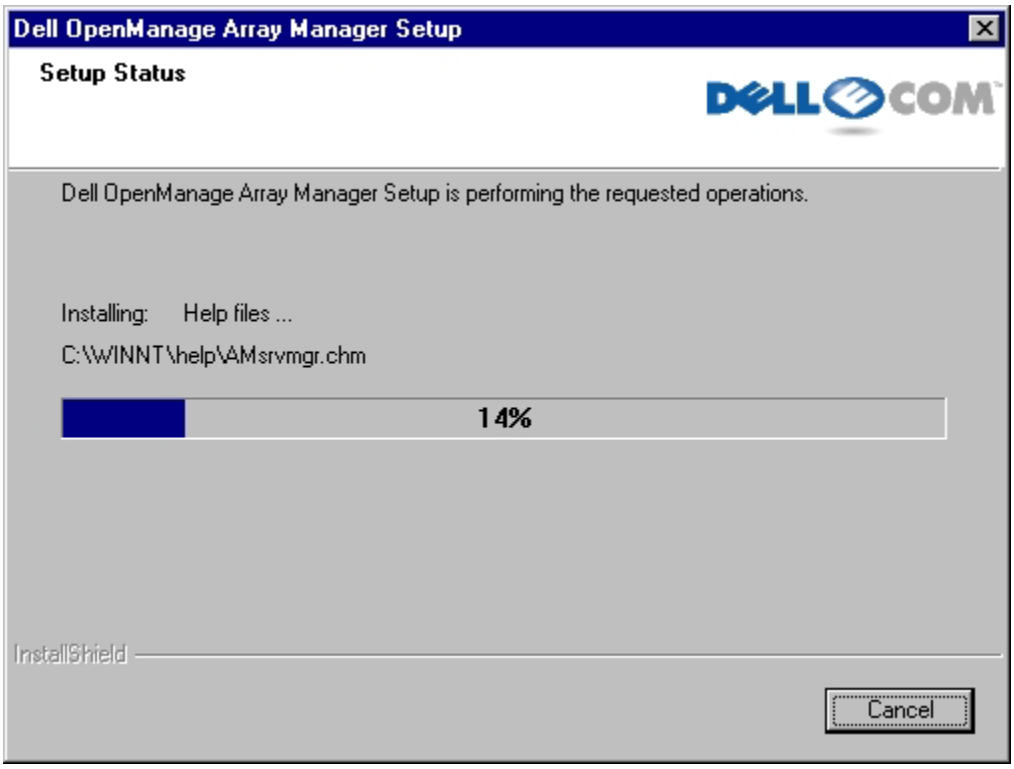
#	Installation of Dell Open Manage Array Manager on Windows NT 4.0
71.	• Read the license agreement and then click the **Yes** button to continue installation. 
72.	• Click the radio button corresponding to the type of installation to perform and click **Next**. 

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#	Installation of Dell Open Manage Array Manager on Windows NT 4.0
73.	• A **System Requirements** screen will appear checking the current configuration against the minimum required configuration. Everything should pass the check. Click the **Next** button to continue.
74.	• At the **Choose Destination Folder for Windows** Files screen click the **Next** button to continue. 

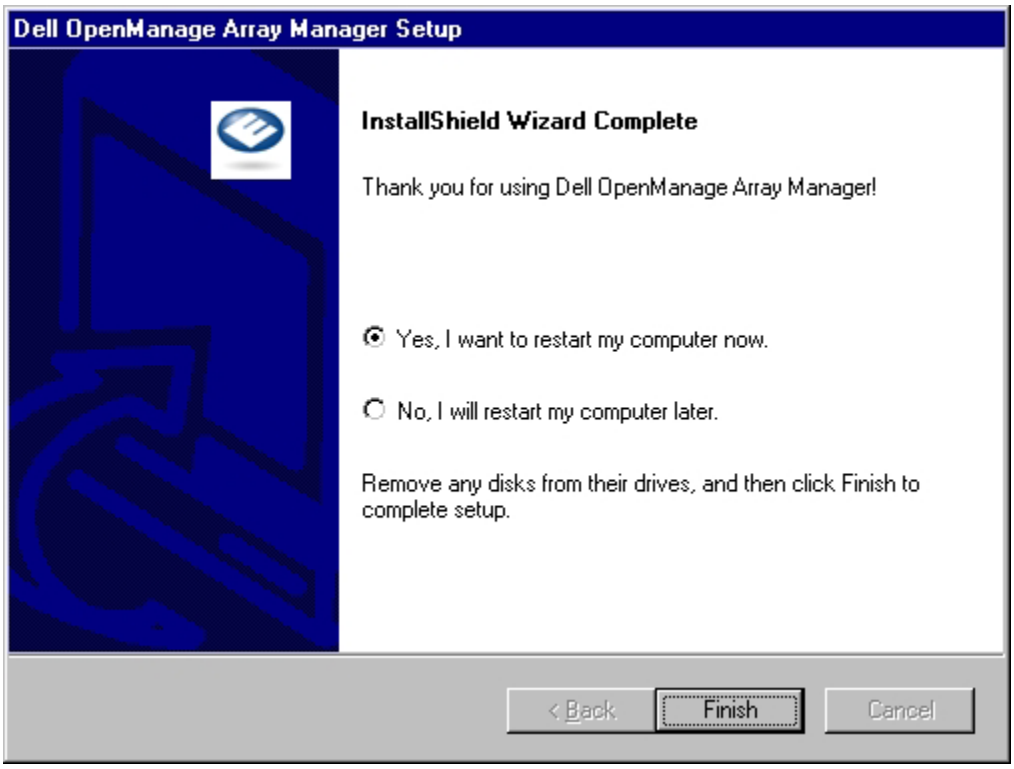
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#	Installation of Dell Open Manage Array Manager on Windows NT 4.0
75.	• The window will change to show the progress of the file copy. This screen requires no user interaction unless you wish to cancel the installation.



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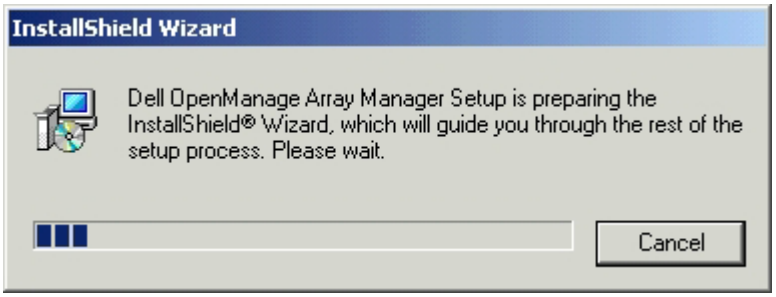
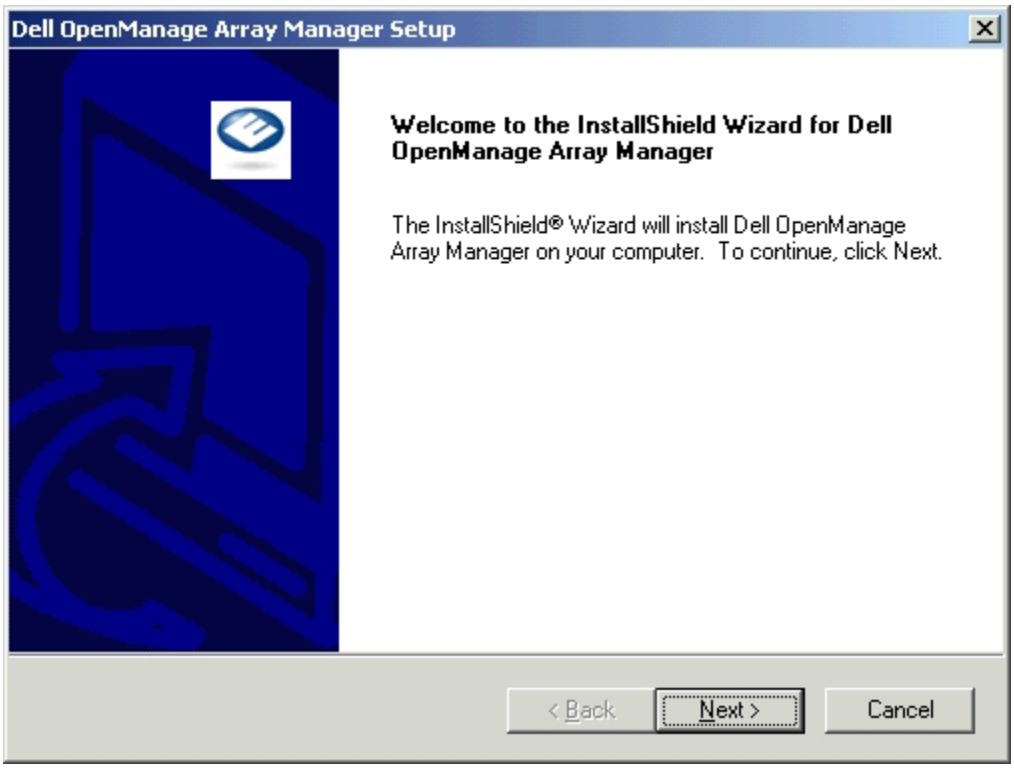
#	Installation of Dell Open Manage Array Manager on Windows NT 4.0
76.	• When prompted, verify that the **Yes, I want to restart my computer now** option button is selected and click the **Finish** button to restart the computer.



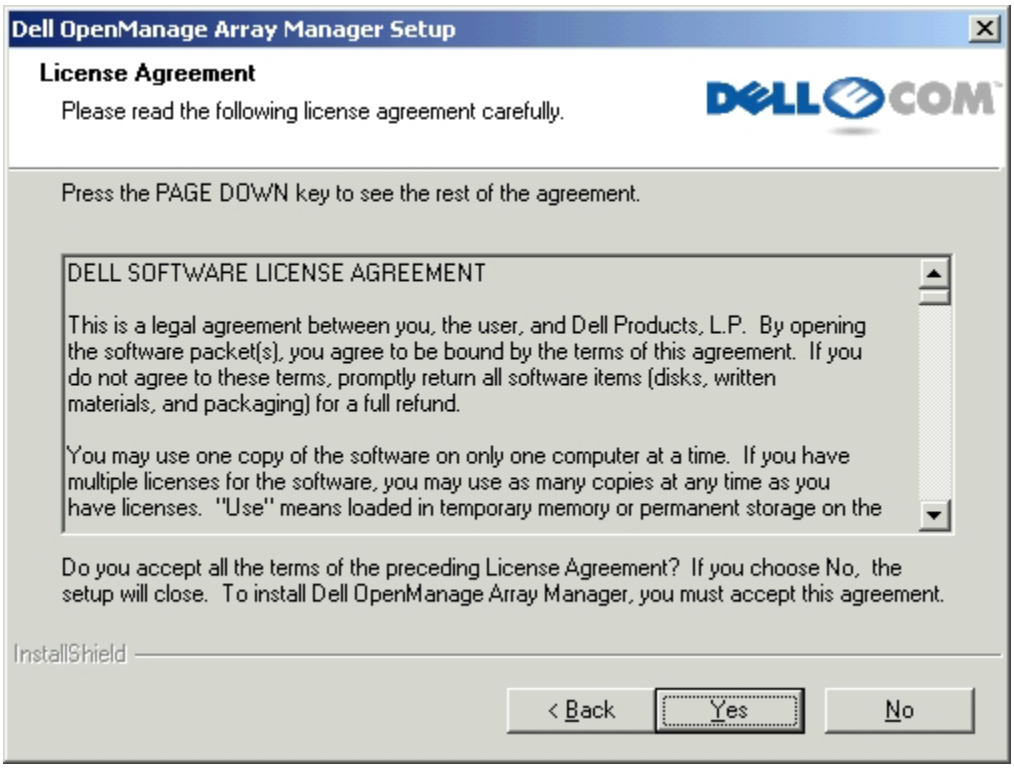
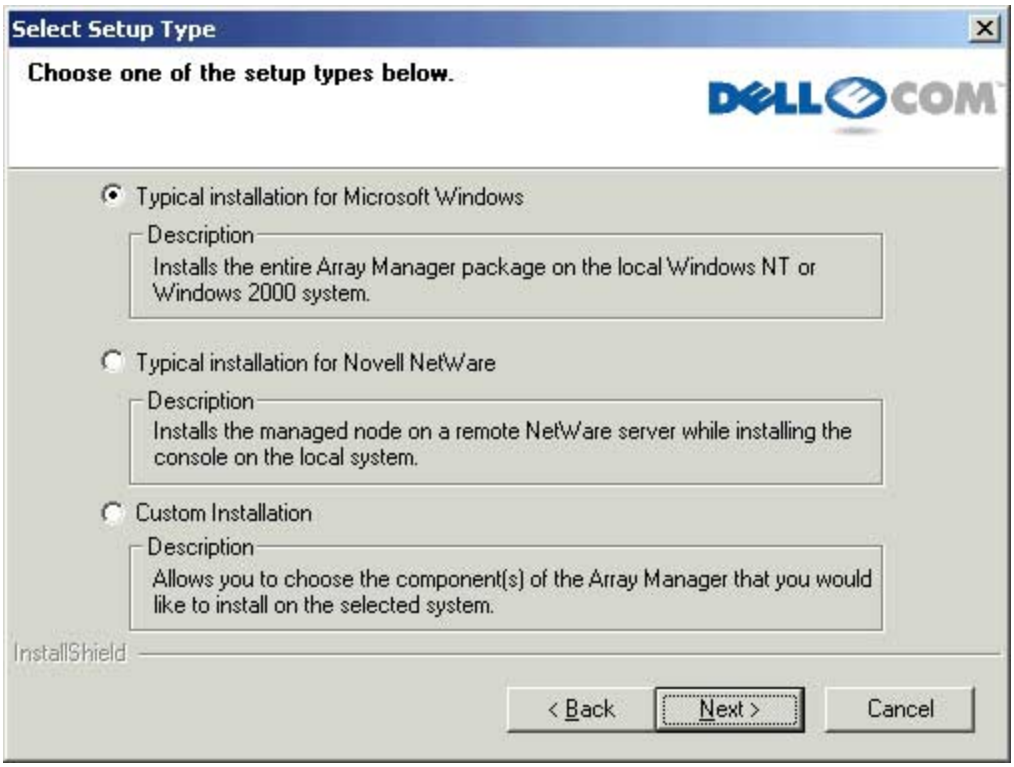
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Installing Dell Open Manage Array Manager on Windows 2000

To install Dell Open Manage Array manager on Windows 2000 perform the following steps:

#	Installation of Dell Open Manage Array Manager on Windows NT 2000
77.	To install Dell Open Manage Array Manager, perform the following steps: • If you insert the CD while the operating system is running and the CD-ROM drive has been configured for autorun then the **autorun.inf** file will be loaded and the setup program will launch. Otherwise, open **My Computer** and double click the CD-ROM icon. The **InstallShield Wizard** will start. 
78.	• At the **Welcome** screen click the **Next button**. 

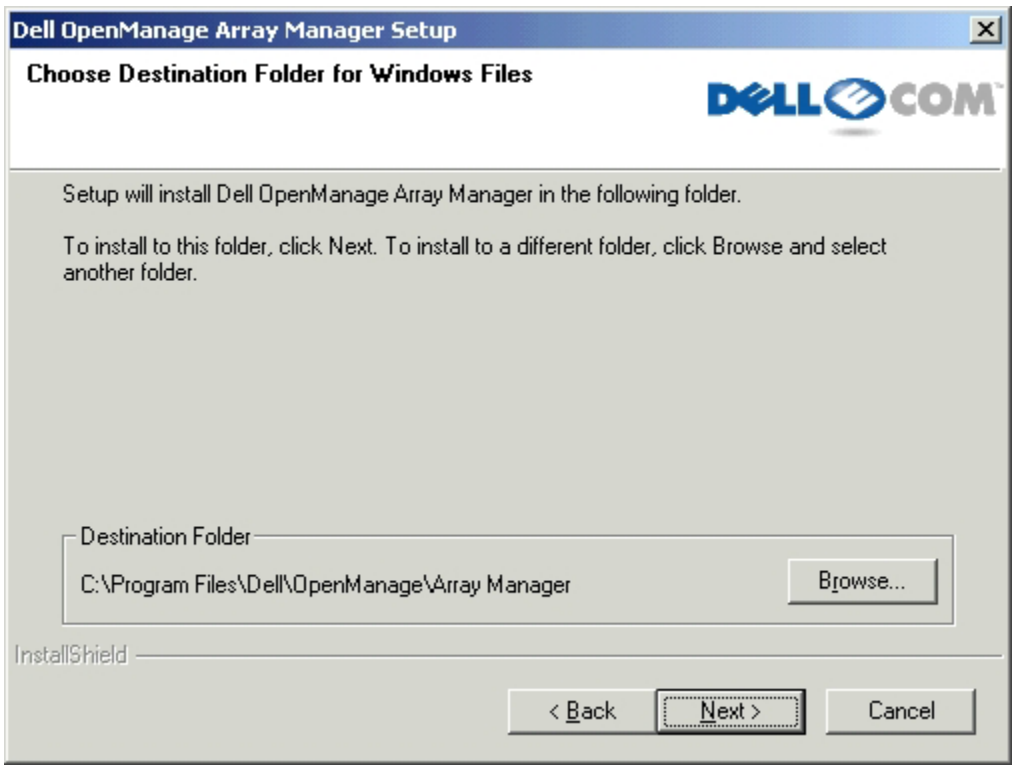
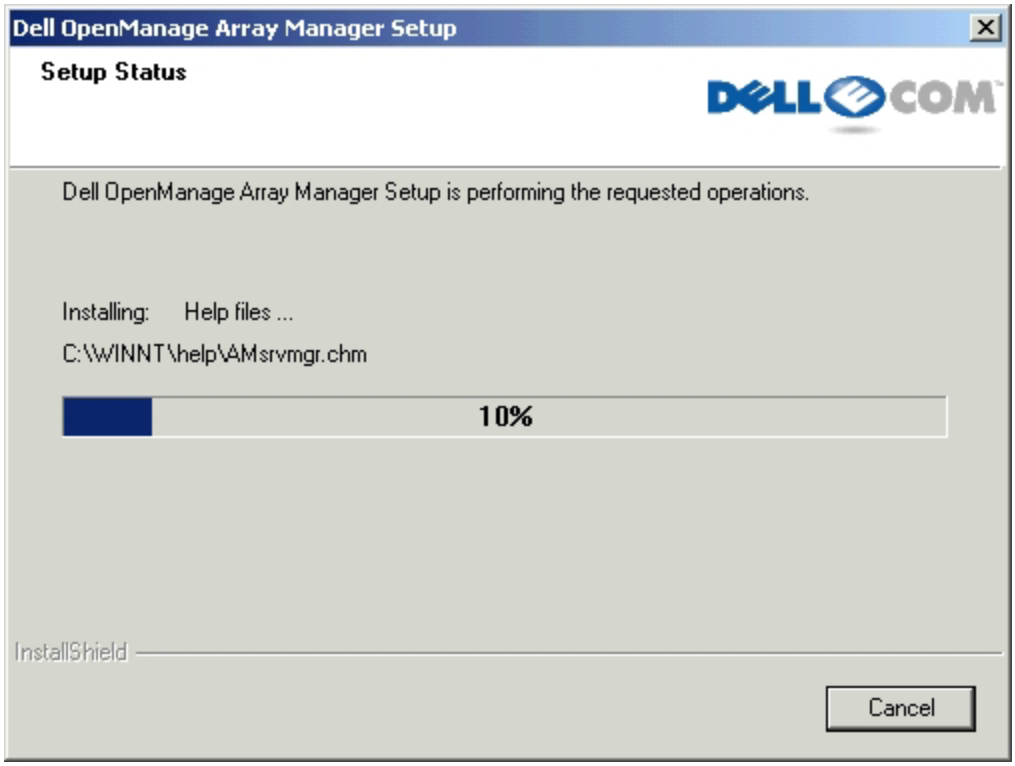
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#	Installation of Dell Open Manage Array Manager on Windows NT 2000
79.	• Read the license agreement and then click the **Yes** button to continue installation. 
80.	• Click the radio button corresponding to the type of installation to perform and click **Next**. 

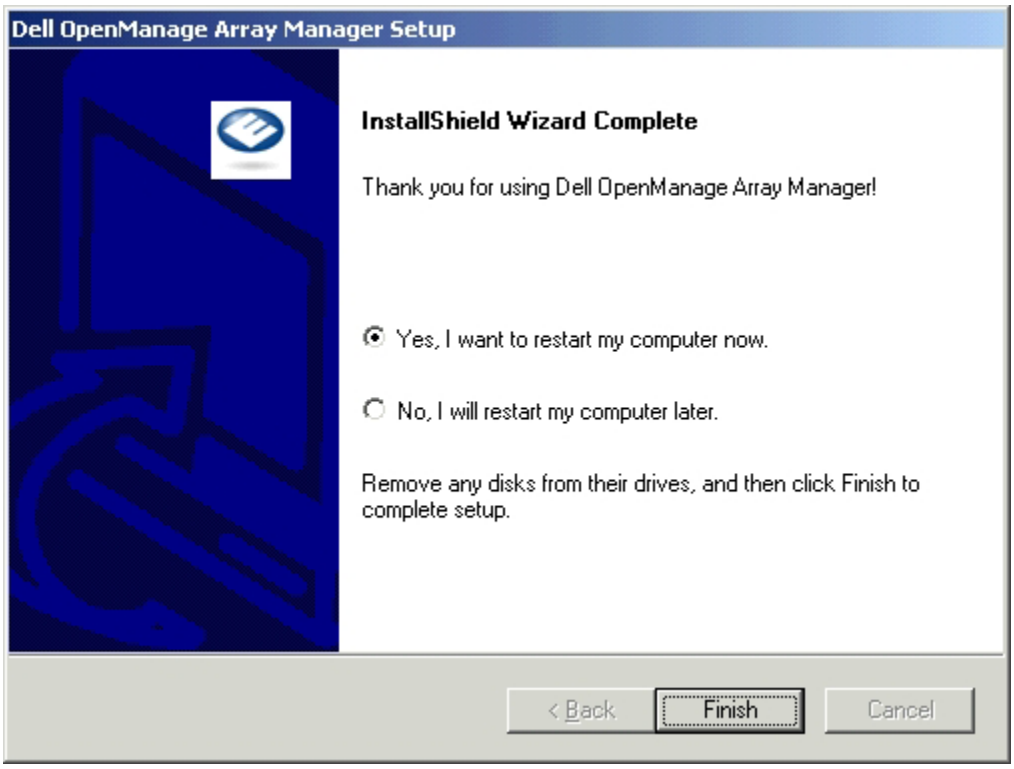
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#	Installation of Dell Open Manage Array Manager on Windows NT 2000
81.	• After choosing the type of installation to perform the installation wizard will recognize that the host operating system is Windows 2000 and will display the following alert. It advises that "**Continuing will replace the native Windows 2000 Disk Management program with Array Manager**...". It will also advise that, "…**If you uninstall Array Manager, the Disk Management program will be restored to its original status**..." Read the full alert and then click on the **OK** button to continue. 
82.	• The next screen that will appear advises, " If this is the first time you have installed Array Manager on this system, the install program will not be able to detect the firmware for any PERC 2, PERC 2/SI, PERC 3/DI, or PERC 3/SI controller in your system. After you have finished the install and rebooted, run the Array Manager Service Manager and click in the Versions tab to ire this information...". Read this and then click the **OK** button to continue. 
83.	• A **System Requirements** screen will appear checking the current configuration against the minimum required configuration. Everything should pass the check. Click the **Next** button to continue.
84.	• At the **Choose Destination Folder for Windows** Files screen click the **Next** button to continue.

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#	Installation of Dell Open Manage Array Manager on Windows NT 2000
	
85.	• The window will change to show the progress of the file copy. This screen requires no user interaction unless you wish to cancel the installation. 
	• When prompted, verify that the **Yes, I want to restart my computer now** option button is

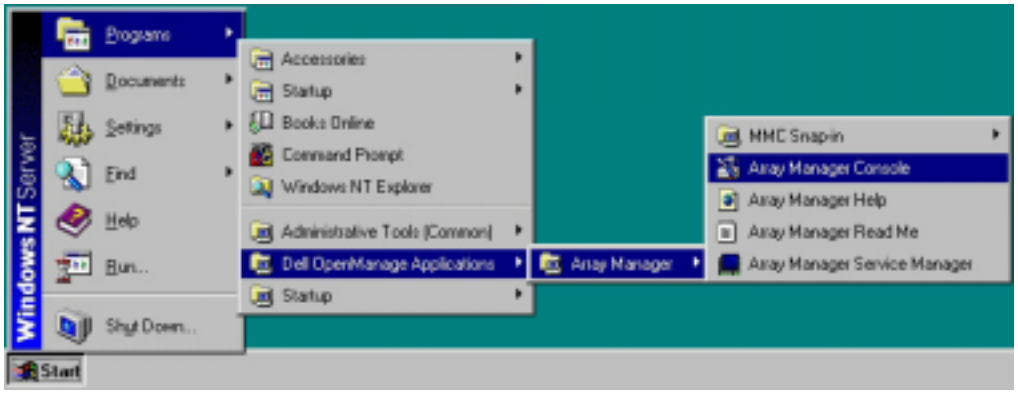
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#	Installation of Dell Open Manage Array Manager on Windows NT 2000
	selected and click the **Finish** button to restart the computer. 
	• Then Windows 2000 will report: Found New Hardware Dell Open Manage 2.5
	• After rebooting the computer an information dialog box will appear on the screen. It has the following text: Array manager has replaced Disk management, the built-in disk and volume manager that comes with Windows 2000. Array Manager extends the functionality of Disk Management with both hardware and software RAID management, while maintaining the disk and volume functions originally found in Disk management. If you uninstall Array Manager on a Windows 2000 machine, the Disk management program will be restored to its original state. For further information, see the section "more on the Array manager and Disk Management relationship" at the end of the overview section of the online help. After reading this, click the **OK** button.

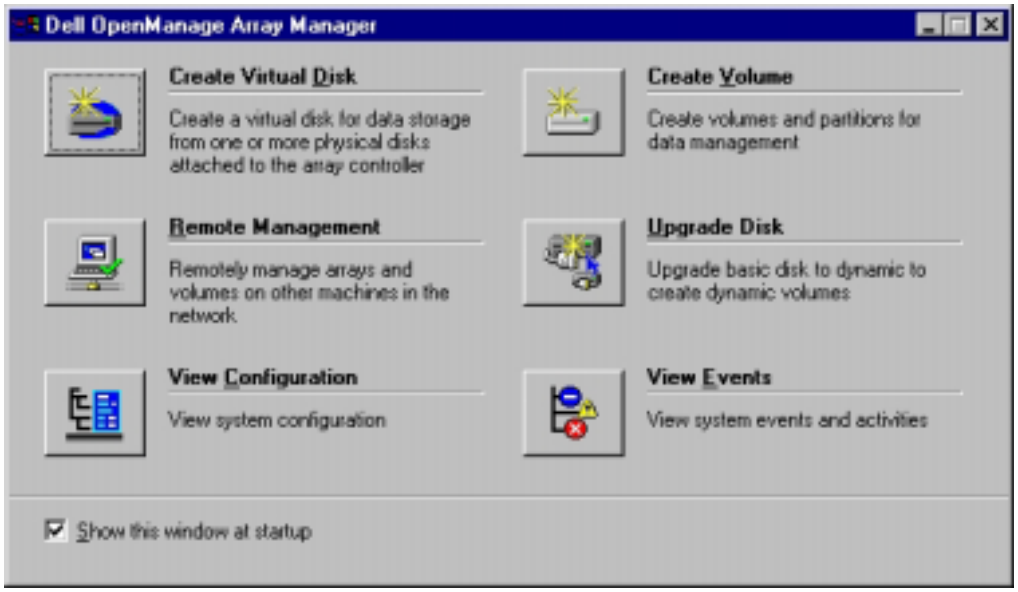
Verifying Functionality of Dell OpenManage Array Manager

To run the Dell Open manage Array Manager click **Start**, then select **Programs**, **Dell OpenManage Applications**, **Array Manager**, **Array Manage Console**. This is shown in the figure below.

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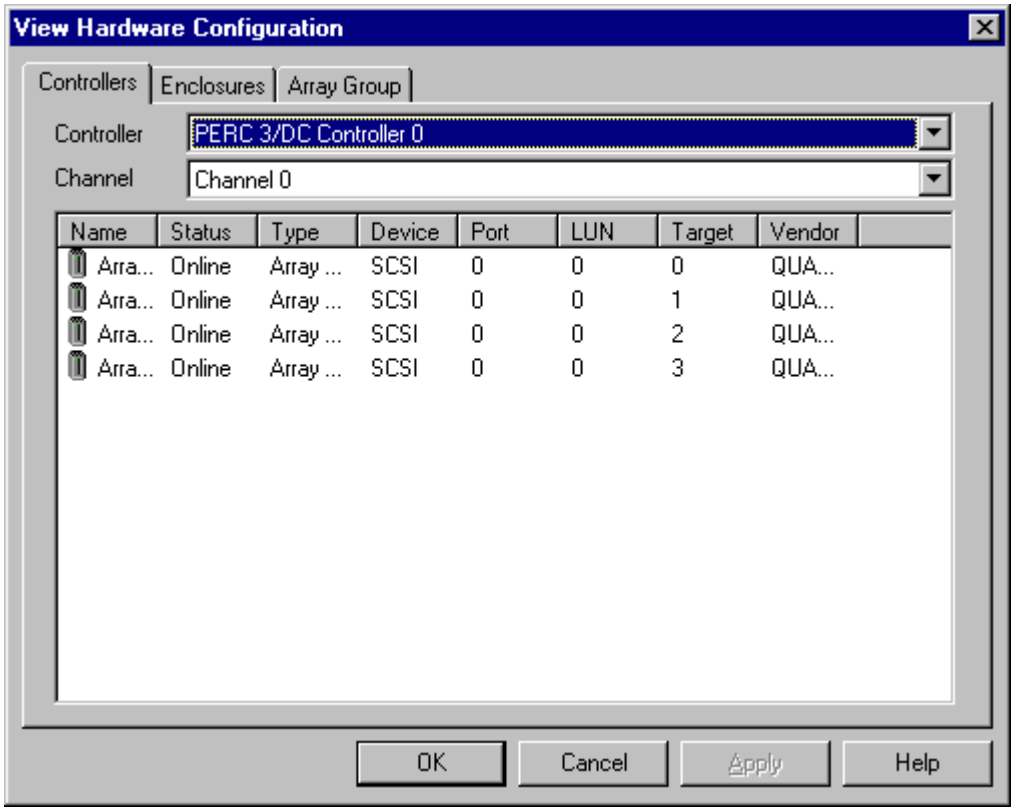


When the Dell Open Manage Array Manager is run the application opens and the window shown below pops up over the application.



Click on the **View Configuration** button and another window should pop-up. The **View Hardware Configuration** window should open. It should look similar to the image that follows. The exact configuration may be different. As long as the status shows online for every disk then the hardware is shown to be able to communicate and the software is shown to be able to interrogate the hardware.

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