COMPAQ

Compaq Value-Added Support Software for Microsoft Windows NT

White Paper
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NOTICE

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This white paper is intended for Compaq FSEs, Resellers, and customers who install and maintain Microsoft Windows NT on Compaq systems. Compaq provides integrated hardware and software support to customers running Compaq server networks. Compaq SmartStart integrates the Compaq developed device drivers during the Windows NT operating system installation. When you install and configure your server with SmartStart, your system configuration includes the "total" Compaq software driver solution.

SmartStart subscribers receive an updated SmartStart package approximately every quarter that includes the *Compaq Support Software CD* for Compaq Server Products. Compaq developed drivers and utilities that enable you to take advantage of specific capabilities offered on Compaq products in Windows NT environments. The files on the Support Software CD that support Windows NT are referred to as Compaq Support Software for Microsoft Windows NT 3.5x (SSD), Version 1.1x (Compaq SSD for Windows NT). If you install and configure your system with SmartStart, you only need to access the Compaq SSD for Windows NT to apply updates as future enhancements and additions are made to the drivers.

If you use Windows NT from Microsoft to install and configure your system, you must apply the Compaq SSD for Windows NT to add specific support for some Compaq products during the installation. You will also need to access the Compaq SSD for Windows NT to apply updates as future enhancements and additions are made to the drivers.

This white paper provides information to help you understand the differences between Compaq support software and utilities for Windows NT and the support software included with the Windows NT base product installation.

This white paper discusses:

■ Why Compaq provides device drivers to support Windows NT

❑ Value-added features built into Compaq support software

❑ How to obtain the most current Compaq support software and how to identify driver revision levels

■ Compaq hardware and software components supported in the
Windows NT operating system

❏ Microsoft and Compaq device driver feature comparison

❏ Recommends when you should use the Compaq developed drivers for
Windows NT

■ A support matrix listing Windows NT and Compaq developed drivers

■ A support table listing each device driver and the associated component
supported (Windows NT base product installation or Compaq SSD for
Windows NT)

This white paper does not include driver installation instructions. Refer to the
NTREADME.HLP file that supports the Compaq SSD for Windows NT from
Compaq for the required installation information.

NOTE: All versions of the Compaq SSD for Windows NT released up to and including
Version 1.17 require you to create diskettes from the SmartStart CD or the Compaq
Support Software CD to access these drivers. However, beginning with Version 1.18
you can access and install Compaq support software and utilities directly from the
Compaq Support Software CD.

Why Use Support Software Drivers Developed by Compaq?

Compaq and Microsoft work closely together to ensure that our customers
receive the latest support for Compaq hardware drivers in the Windows NT
base product. However, it is not always possible to include all device driver
technology enhancements at the time Microsoft ships their product. For this
reason, Compaq provides operating system-specific support software for
Compaq hardware via other release methods. Compaq is committed to
providing customers with the tools and information that will help them get the
most out of their Compaq hardware configurations.

Compaq Value-Added Features

Device drivers developed by Compaq take advantage of the features built into Compaq hardware products. Compaq device drivers:

■ Provide support for systems management, Compaq Insight Manager, and Compaq Insight Management Agents

■ Provide the latest available feature enhancements along with mechanisms for problem resolution

■ Provide support for Compaq hardware not currently supported in the existing Microsoft Windows NT base product

Compaq Support Software for Windows NT

The following list provides information on where to find the latest Compaq support software for Windows NT from SmartStart and from several other distribution sources, such as:

■ Available through SmartStart subscription service.

NOTE: To become a SmartStart subscriber, fill out the appropriate information on the *Compaq SmartStart Activation Key FAX Order Form* that shipped with your Compaq server.

■ Available for download on the Compaq BBS (713) 518-1418.

■ Available on the Compaq World Wide Web site on the Internet located at www.compaq.com.

■ Available from anonymous ftp on the Internet. FTP to ftp.compaq.com.

■ Available for download on CompuServe. GO CPQFORUM.

■ Available on the Compaq QuickFind CD, under SoftPaqs (subject to QuickFind CD releases). For subscription information:

❏ End-User: Contact a Compaq Authorized Reseller, or to pre-pay direct with Compaq call 1-800-952-7689.

❏ Resellers: Contact Service Order Administration at 1-800-231-9977 or to pre-pay call 1-800-952-7689. You can also complete the QuickFind Authorized Reseller Order Form and FAX it to Compaq to place your order.

Viewing Compaq Driver Revision Levels

If you are not sure which driver revision level is installed on your system, there is a way to view this information for some drivers. Drivers on the Compaq SSD for Windows NT contain embedded revision levels in the files (Version 1.03 and later of the SSD).

To view this information from the Windows NT Program Manager:

1. Open *File Manager* in the Main Program Group.

2. Click on the Compaq device driver file you want to review.

3. Select *File → Properties*.

The driver revision information is displayed in the *Version* field and the Compaq SSD for Windows NT version is displayed in the *Product Version* field.

If the *Company Name* field displays Microsoft, that indicates the driver was installed with the original installation. If Compaq is displayed in the *Company Name* field, the driver has been updated with the Compaq SSD for Windows NT.

The following driver files include revision levels that you can look up:

AMSINT.SYS	Compaq SCSI Controller Support (Compaq SSD for Windows NT, Version 1.17 or earlier)
CPQARRAY.SYS	Compaq Drive Array Support
CPQ32FS2.SYS	Compaq SCSI Controller Support
CPQC710.SYS	Compaq SCSI Controller Support
CPQRSDRV.SYS	Compaq On-Line Recovery Support
CPQBEZEL.SYS	Compaq Volume Control Support
PWRMGMT.SYS	Compaq Power Management Support
PRLNTSS.SYS	Compaq ProLiant Storage System Support
NETFLX.SYS	Compaq Network Controller Support
NETFLX3.SYS	Compaq Network Controller Support

| *PCNTN3.SYS* | Compaq Network Controller Support |
| *SYSMGMT.SYS* | Systems Management Support |

NOTE: You can also look up the revision levels for other associated installation and support files included on the Compaq SSD for Windows NT (*.INF, .DLL, .EXE* and so on). This is not a complete list, it is provided as an example.

Supported Components

The following list identifies the hardware and software components supported by Compaq device drivers in a Windows NT environment.

■   Hardware Abstraction Layer (HAL) Uniprocessor
     and Multiprocessor

■   Intelligent Drive Array

■   SCSI Controller (disk, tape, and CD-ROM)

■   Network Controller

■   ProLiant Storage System

■   Systems Management

■   Standby and On-Line Recovery Server Option

■   Uninterruptible Power Supply (UPS)

■   Volume Control Service

■   Other Compaq components supported include: Power Management,
     CD-ROM Drives, Business Audio

■   Video Graphic Drivers

Each of these components are discussed in more detail later in this white paper. Also included at the end of this white paper is a Windows NT Support Software Matrix. The matrix indicates where to find the appropriate device driver (Compaq SSD for Windows NT or in the Windows NT base product).

Hardware Abstraction Layer

This section provides an overview of the Hardware Abstraction Layer (HAL), a layer of software that interacts directly with your computer hardware. It is one of several modular components that together make up the Windows NT operating system. The HAL operates at a level between the hardware and the Windows NT Executive Services, so that system services and device drivers need not be aware of any hardware-specific information. System services make calls to HAL routines to determine hardware-specific information and do not require direct hardware interaction.

The components include:

■   Hardware Abstraction Layer (HAL)

■   Kernel

■   Executive System Services

■   Environment subsystems (Hardware)

The diagram that follows represents the Windows NT component relationship.

Executive System Services					
I/O Manager	Object Manager	Security Reference Monitor	Process Manager	Local Procedure Call Facility	Virtual Memory Manager
Cache Manager File systems	Kernel				
Network drivers Device drivers	Hardware Abstraction Layer (HAL)				

Hardware
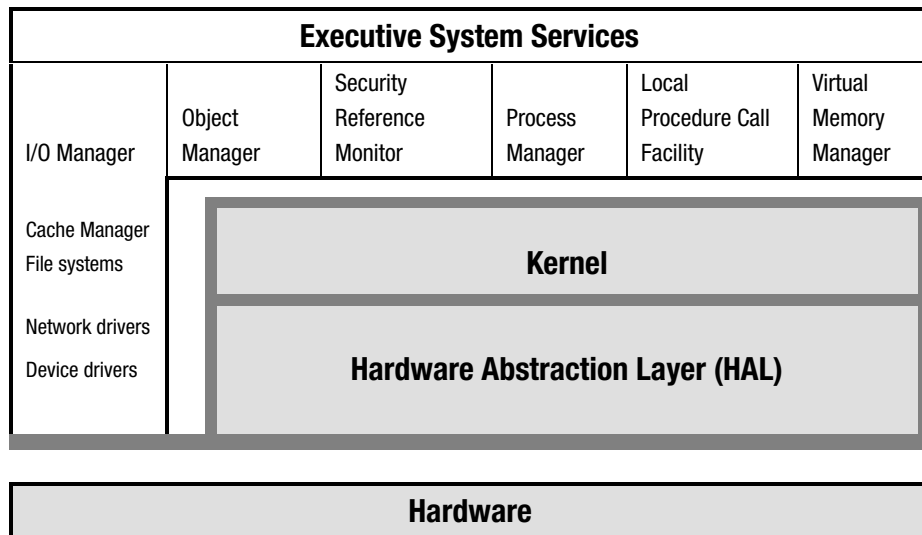
NOTE: The Windows NT component diagram was adapted from a diagram published in Volume 1 of the *Windows NT Resource Guide for Windows NT Workstation and Windows NT Server Version 3.5.* Refer to Volume 1 of the Resource Kit for more information.

The Windows NT operating system design allows it to be portable among different hardware platforms, including CISC (80386 and higher) and RISC processors. Because the HAL operates between the hardware and the Windows NT Executive System Services, you can customize the HAL to take advantage of hardware features. The HAL eliminates the need for Microsoft to redesign the Windows NT operating system for each hardware platform.

Hardware vendors, like Compaq, can customize the HAL to take advantage of the features built into their platform. The HAL provides the interface that is needed to "hide" the hardware from the operating system. During installation, the Windows NT SETUP program determines which hardware platform is being configured and installs the appropriate HAL.

NOTE: A number of customized HALs are shipped standard with Windows NT. To view customized HALs, execute the command: *DIR hal*.dl*/s* from the root directory of the Windows NT Server CD. However, be careful when you make a HAL selection because each HAL is customized and designed to run on a specific manufacturer's equipment.

The Windows NT HAL provides the following:

■   Routines that allow a single version of Windows NT to run on all x86-based platforms.

■   Routines that allow a single device driver to support the same device on all x86-based platforms.

■   Routines that allow hardware vendors to modify the existing HAL to include enhanced hardware feature support.

The following sections compare and contrast the component support included with the Microsoft base product HAL to the Compaq enhanced driver support HALs.

Microsoft Base-Product HAL Features

The Windows NT installation program includes a HAL that provides basic HAL functionality on Compaq hardware. Microsoft base-product HALs provide routines that enable a single device driver to support a specific device on different hardware platforms. The HAL hides hardware platform-dependent details such as I/O interfaces, interrupt controllers, and multiprocessor communication mechanisms. Thus, through the HAL filter, different hardware platform configurations can be accessed in the same manner by the device driver.

Compaq Value-Added HAL Features

The Compaq HALs provide the same basic functionality as the Microsoft HAL but also include functionality that takes advantage of the features built into Compaq hardware. Compaq recommends that you use the Compaq developed HALs because they are updated on a more frequent basis than the HALs provided with the Windows NT base product. The Compaq HALs provide many feature enhancements for Compaq hardware.

For example Compaq HALs provide:

■ Support for new Compaq systems not currently supported in the existing Windows NT base product HAL.

■ Up-to-date software enhancements that support Insight Management Agents for Windows NT, such as features that provide error logging support to the systems management driver (not included in the Microsoft HAL).

■ Problem resolutions for Compaq customers, such as built-in mechanisms for Compaq device drivers to dynamically call the HAL and detect which updates were applied to correct potential error conditions.

Customized Compaq HALs

The following table identifies the customized Compaq HALs that support the different types of Compaq computers.

> **!** **IMPORTANT:** All Compaq HALs support the PCI bus interface.

Table 1
Customized Compaq HALs for Compaq Hardware Platforms

Single-Processor Hardware Platforms	Compaq HAL Used
ISA Laptops and Desktops	*HALISA.DLL*
EISA Desktop	*HALUP.DLL*
Any Compaq Server with a Single Processor	*HALUP.DLL*
Multiprocessor Hardware Platforms	**Compaq HAL Used**
Systempro Systempro/XL ProLiant 2000, 4000, 4500	*HALSP.DLL*
ProLiant 1500	*HALMPS.DLL*

NOTE: During installation the Compaq SSD for Windows NT Setup Program determines which hardware platform is being configured and installs the appropriate HAL. When the appropriate HAL is installed, it is renamed to be *HAL.DLL.*

A brief feature overview of each of the four Compaq HALs follows:

■ Compaq Uniprocessor (UP) HAL Features (*HALUP.DLL*)

 The UP HAL is the standard HAL for Compaq uniprocessor systems. The Compaq UP HAL for uniprocessor systems overrides a PCI problem resolution feature included in the Microsoft UP HAL. The Microsoft UP HAL corrects a PCI problem that is not exhibited in Compaq PCI hardware.

> **!** **IMPORTANT:** The PCI correction feature in the Microsoft UP HAL causes performance degradation on high-speed Compaq PCI-based systems, such as the Compaq Deskpro XL. Compaq recommends that you install the Compaq UP HAL to ensure that you obtain the best performance possible on Compaq systems.

■ Compaq Multiprocessor (MP) HAL Features (*HALSP.DLL*)

One of the feature enhancements of the Compaq MP HAL is that it provides support for multiprocessing servers. This includes supporting distributed interrupts across multiple processors for Compaq ProLiant and Compaq Systempro/XL servers. The MP HAL included with the Windows NT base product services interrupts on the first processor only. Distributing interrupts among multiple processors provides more efficient use of system resources.

The Compaq MP HAL also provides performance improvement for old entry points, a mechanism to control the number of processors started, and problem resolution for kernel performance counter support. These features are discussed in detail in the Compaq SSD for Windows NT *NTREADME.HLP* file.

■ Compaq Industry Standard Architecture (ISA) HAL Features (*HALISA.DLL*)

The Compaq ISA HAL includes power management support for the Compaq LTE Elite. The system enters hibernation mode when the **SUSPEND** button is pressed or when system activity is idle for a configurable period of time. The power management support consists of a device driver, a Windows NT service, and an application to adjust the power management settings. The power management support requires the Compaq ISA HAL.

In Windows NT hibernation mode, the hibernation file must reside on a file allocation table (FAT) system partition and must be created under DOS or Windows. Since the LTE Elite comes preinstalled with MS-DOS/Windows, Compaq recommends that the hibernation file be created before installing Windows NT. Windows NT should be installed as a multiboot operating system option on LTE Elite products.

NOTE: Refer to the *NTREADME.HLP* file on the Compaq SSD for Windows NT; it includes more information about power management support.

■ Compaq Multiprocessing (MPS) HAL Features (*HALMPS.DLL*)

The Compaq MPS HAL provides compatible multiprocessor support for Multiprocessor Specification-based servers such as the Compaq ProLiant 1500. This new method of multiprocessing takes advantage of additional capabilities provided with the Intel MPS capable processors.

The Compaq HAL corrects a problem in the initialization method of the hardware interrupt mechanism within Windows NT. It also provides better backward compatibility with older PCI device drivers. The Microsoft HAL capabilities include assigning interrupt values ranging from 1 to 255. Some third-party hardware device drivers were designed only to operate at interrupt values from 1 to 16. The Compaq MPS HAL provides an option called MOVEINT, so that third-party device drivers can be properly set within the expected range.

The MOVEINT option works as follows:

❏ If you assign MOVEINT a value of 1, it assigns an interrupt value similar to the Microsoft HAL (with a value from 1 to 255).

❏ If MOVEINT is assigned a value of 0, it stops the HAL from moving third-party device driver interrupts. The interrupt will operate at the interrupt value that its driver expects (with a value between 1 and 16).

MOVEINT defaults to 0 in the Compaq HAL, which prevents interrupts from moving.

An example *BOOT.INI* file follows:

```
[boot loader]
timeout=30
default=multi(0)disk(0)rdisk(0)partition(1)\WINNT35
[operating systems]
multi(0)disk(0)rdisk(0)partition(1)\WINNT35="Windows NT  3.5 - Support Old PCI Drivers"
/MOVEINT=0
multi(0)disk(0)rdisk(0)partition(1)\WINNT35="Windows NT  3.5 "
/MOVEINT=1
```

NOTE: The *BOOT.INI* file is a hidden system read-only file. To modify the file, you must first modify the File Manager to show all hidden files and to allow modification of read-only files. You may then modify the *BOOT.INI* file attributes by selecting *File Manager* → *Properties.*

CAUTION: It is extremely important that you choose the correct operating system and version in the System Configuration Operating System selection process. Selecting the wrong version of the operating system might cause your system to initialize incorrectly and cause a "blue screen trap" to display. If a blue screen trap occurs, you have encountered a system stop error. You must power off the computer and restart the system. Use the boot diskettes provided with the Windows NT operating system software. Follow the instructions on the screen to reinitialize Windows NT.

■ Compaq MP/UP HAL Information

In Windows NT 3.1, a user could upgrade from UP to MP by installing the correct MP HAL and copying over the MP version of the kernel. In Windows NT 3.5 and 3.51, however, installing only the MP HAL and kernel to upgrade from UP to MP can cause blue screen traps.

Upgrading from UP to MP in Windows NT 3.5 and 3.51 requires the use of the Compaq SSD for Windows NT from Compaq Setup program to ensure that the correct files are loaded onto your system. Certain DLL files that are modified during Windows NT 3.5 and 3.51 installation tune the system for UP or MP performance. The modified DLL files include *WINSRV.DLL*, *NTDLL.DLL,* and *KERNEL32.DLL*. The Compaq SSD for Windows NT SETUP program ensures that these files are loaded and that your system is tuned for optimum performance based on your UP or MP configuration.

The following table details the valid combinations of UP/MP HALs and the UP/MP kernels.

Table 2
UP/MP Kernel Combinations

UP/MP Kernel/HAL Matching	UP HAL			MP HAL		
Windows NT Version	3.1	3.5	3.51	3.1	3.5	3.51
UP Kernel	OK	OK	OK	OK	OK	OK
MP Kernel	Not Valid		OK	OK	OK	OK

For more information about these features and other enhancements provided in Compaq HALs, refer to the Compaq SSD for Windows NT appropriate for your installation.

The following table provides a description of each Compaq HAL, a brief description of the supported features for each Compaq HAL, and the appropriate Compaq SSD for Windows NT version required to install specific Compaq HALs.

Table 3
Compaq HAL Base and Value-Added Features

Compaq HALs	Description of Compaq HAL Features
Base features in all Compaq HALs:	■ Announcement of Compaq HAL during blue screen initialization ■ Support for Compaq Insight Management Agents for Windows NT ■ Printer support during blue screen crashes ■ Mechanism to tune the time slice of all system threads ■ Mechanism to determine Compaq problem resolution ■ Bus mastering of Direct Memory Access (DMA) above 16-megabyte limit ■ Problem resolution for I/O Check during a Non-Maskable Interrupt (NMI) ■ Problem resolution for a PCI map register limitation ■ Performance and monitoring support

Compaq HAL Base and Value-Added Features   *continued*

Compaq HALs	Description of Compaq HAL Features
Compaq MP HAL for multiprocessing servers *(HALSP.DLL)*	■ Performance improvement for old entry points ■ Distributes interrupts across multiple processors ■ Mechanism to control the number of processors started ■ Problem resolution for kernel performance counter support
Compaq UP HAL for uniprocessor system *(HALUP.DLL)*	■ Override of Microsoft PCI problem resolution (PCI problem is not applicable on Compaq hardware)
Compaq ISA HAL for industry standard systems *(HALISA.DLL)*	■ Support for power management LTE Elite features
Compaq MPS HAL for MPS multiprocessing servers *(HALMPS.DLL)*	■ Problem resolution for correct initialization of hardware

Software Supported:

Windows NT 3.5 - Build 807 is supported by Compaq SSD for Windows NT 1.12 and later
Windows NT 3.51 - Build 1057 and later are supported by Compaq SSD for Windows NT 1.15
 and later.

During installation, the appropriate Compaq HAL file is renamed to *HAL.DLL.*
The Setup Programs in both the Microsoft Windows NT base product and the
Compaq SSD for Windows NT will automatically rename the HAL. You can
then verify the type of Compaq HAL that was installed. View the properties of
the file through *File Manager → Properties* under the fields labeled File
Description and Internal Name.

Intelligent Drive Arrays

The Compaq device driver, *CPQARRAY.SYS,* supports Windows NT with
much of the same functionality as the Microsoft driver. However, the Compaq
developed driver also provides support for the Compaq SMART-2 Array Controller.
The Microsoft *CPQARRAY.SYS* driver does not include support for the SMART-2
Array Controller.

The following sections compare and contrast the component support included
with the Microsoft base product to the Compaq enhanced driver support.

Microsoft Drive Array Support

Windows NT recognizes Compaq array controllers during the installation process. Windows NT detects the Compaq array controllers as SCSI controllers because the driver has a SCSI-miniport design. Subsequently, all Windows NT operating-specific references to logical units on the controller appear as SCSI IDs. However, Insight Manager detects and will correctly recognize the Compaq array controllers as non-SCSI array controllers and devices when the Compaq device driver is installed.

Compaq Drive Array Support

The Compaq version of the SMART Array device driver *CPQARRAY.SYS,* ensures that you are installing the latest device information and enhancements, including support for Insight Management Agents for Windows NT. The Compaq device driver, *CPQARRAY.SYS,* supports the following controllers:

■ Compaq SCSI Managed Array Technology (SMART)
Controller Family

❑ SMART Array Controller

SMART-2 Array Controller
SMART-2/E Array Controller
SMART-2/P Array Controller

NOTE: A description of the support included by the SMART-2 Controller
and the Compaq Array Configuration Utility used to install it are
provided below.

■ Compaq Intelligent Drive Array-2 (IDA-2)

■ Compaq Intelligent Drive Array (IDA)

■ Compaq Intelligent Array Expansion System (IAES)

SMART-2 Controllers

SMART-2 Controllers provide improved performance over other array controllers in many environments and capacity expansion. The SMART-2 Controllers provide you with the online expansion option of adding more disk drives to an existing logical drive configuration, which results in more fault-tolerant storage capacity (without requiring that you back up and restore from tape). However, Compaq recommends that you take advantage of this added functionality, but not as a replacement for backing up your systems. The *CPQARRAY.SYS* device driver in the Compaq SSD for Windows NT, Version 1.17 and later provides support for the SMART-2 Array Controllers.

NOTE: The *CPQARRAY.SYS* driver versions released before revision 1.17 will work with SMART-2 Controllers; however, they do not provide full feature support and functionality.

Compaq Array Configuration Utility for Windows NT

If you install any SMART-2 Controllers in your system, you must use the Compaq Array Configuration Utility for Windows NT to configure these controllers. The Array Configuration Utility is a graphical-based application that helps you configure the SMART-2 Array Controller. You can also add more disk drives to an existing configuration or you can reconfigure your array controller.

The Array Configuration Utility provides the following configuration benefits:

■ Illustrates the controller configuration in an easy-to-understand graphical format

■ Provides descriptions of various configuration errors

■ Contains configuration wizards that walk you through the configuration process

■ Suggests optimal configuration and fault tolerance for controllers that are not configured

For more information about installing the *CPQARRAY.SYS* driver, refer to the *NTREADME.HLP* file that supports Compaq SSD for Windows NT, Version 1.17 or later.

SCSI Controllers

Compaq supports a wide variety of SCSI controllers and devices. The controllers are recognized and installed during the Windows NT installation process.

NOTE: The Compaq SSD for Windows NT is required to install Compaq SCSI support on the ProLiant 4500 server.

The following sections compare and contrast the component support included with the Microsoft base product to the Compaq enhanced driver.

Microsoft SCSI Controller Drivers

The Microsoft base product installation process automatically installs NCR SCSI device drivers by default. The NCR device drivers provide basic functionality for the Compaq controllers identified:

■ *NCR 53c710* provides basic support for the Compaq 32-Bit Fast-SCSI-2 Controller.

■ *NCR PCI (53c810)* provides basic support for the Compaq Integrated 32-Bit Fast-SCSI-2/P Controller and the Compaq 32-Bit Fast-Wide SCSI-2/P Controller.

■ *NCR 53c9x* provides basic support for the Compaq Integrated SCSI-2 Controller on the Systempro/XL. It also provides support for the Integrated SCSI Controller on the Compaq Portable 486C.

■ *AMD PCI SCSI/NET* provides support for the Integrated PCI SCSI-2 Controller on the Deskpro XL in the Windows NT 3.51 base product installation.

NOTE: The NCR drivers do not support Insight Management Agents for Windows NT and the ProLiant Storage System. Table 4, "Windows NT SCSI Controller Support" contains a list of Compaq SCSI Controllers and recommends when you should use the Compaq SSD for Windows NT as the preferred installation method.

Compaq SCSI Controller Drivers

This section highlights the Compaq SCSI device drivers and the support available with these drivers. Compaq recommends that you install these drivers to obtain full feature support with Compaq SCSI Controllers.

■ Compaq 32-Bit SCSI-2 Controller driver, *CPQ32FS2.SYS,* supports:

❏ Compaq 32-Bit Fast-SCSI-2 Controller

❏ Compaq Integrated 32-Bit Fast-SCSI-2/P Controller

❏ Compaq 32-Bit Fast-Wide SCSI-2/P Controller

❏ Compaq 32-Bit Fast-Wide SCSI-2/E Controller

The Compaq 32-Bit SCSI-2 Controller driver replaces the *NCR 53c710* and the *NCR PCI (53c810)* drivers provided by Microsoft. The Compaq 32-Bit SCSI-2 Controller driver provides support for Insight Management Agents for Windows NT, enhances performance of the disk subsystem, and supports the ProLiant Storage System.

If more than one disk controller is installed in the system, you must use the System Configuration Utility to designate one of the controllers as "First" in the Controller Ordering.

■ Compaq Integrated PCI SCSI-2 Controller driver, *AMSINT.SYS*, supports the Integrated PCI SCSI-2 Controller for the Deskpro XL. This driver is only available via the Compaq SSD for Windows NT for Versions 3.1 and 3.5 installations and is not automatically detected.

SCSI Support Included in Windows NT

Table 4 identifies the SCSI controllers supported by Windows NT and the recommended installation media.

Table 4
Windows NT SCSI Controller Support

Compaq SCSI Controller	Recognized During Windows NT Installation	Disk Devices	Tape Devices	CD-ROM Devices
32-Bit SCSI-2 Controllers	Yes *+	Yes	Yes	Yes
Integrated SCSI-2 for Systempro/XL	Yes	No	Yes	Yes
Integrated SCSI for Portable 486C	Yes	No	No	Yes
6260 SCSI-2 Controller	Yes	Yes	Yes	Yes
Integrated PCI SCSI-2 Controller (for Deskpro XL)	Yes**	Yes	Yes	Yes

Legend: *   Recommend installing from the Compaq SSD for Windows NT.
           ** Requires Compaq SSD for Windows NT for Versions 3.1 and 3.5 installations.
          + The 32-Bit Fast-Wide SCSI-2/E Controllers *require* the Compaq SSD for
              Windows NT during the Windows NT installation.

Compaq SCSI Controllers not Supported in Windows NT

The following SCSI devices are not supported in the Windows NT base product and require support from the driver located on the Compaq SSD for Windows NT:

■ Fast-Wide SCSI-2/E Controller

■ SCSI Option Adapter

■ SCSI Compression Adapter

■ Integrated PCI SCSI-2 Controller

Refer to the *NTREADME.HLP* file included on the Compaq SSD for Windows NT for detailed information and procedures for loading the drivers.

Network Controllers

Compaq includes network device drivers to support the NetFlex Family of Network Controllers and the 32-Bit DualSpeed Token Ring Controller. The Compaq drivers conform to Microsoft NDIS 3.0 miniport architecture. NDIS miniport drivers are also compatible with Windows 95.

The following sections compare and contrast the component support included with the Microsoft base product to the Compaq enhanced driver.

Microsoft Network Controller Drivers

The Microsoft base product provides driver support for most Compaq network controllers. However, the base product does not include all the latest enhancements that take advantage of the features built into the Compaq hardware.

NOTE: The Compaq Ethernet 16TP Controller is supported in the Windows NT base product and, therefore, not included on the Compaq SSD for Windows NT. Refer to Table 7, "Windows NT Support Software Matrix" to identify the Windows NT driver that supports this Compaq controller.

Compaq Network Controller Drivers

This section discusses the Compaq network controller device drivers and the support available with these drivers.

■ *NETFLX.SYS* driver is NDIS 3.0 miniport compliant and supports the NetFlex and NetFlex-2 Controllers in both Ethernet and Token Ring modes, as well as the DualSpeed Token Ring Controller. This controller group includes:

   ❏   32-Bit DualSpeed Token-Ring Controller

   ❏   NetFlex-2 DualPort ENET Controller

   ❏   NetFlex-2 DualPort TR Controller

   ❏   NetFlex ENET-TR Controller

   ❏   NetFlex-2 ENET-TR Controller

   ❏   NetFlex-2 TR Controller

NETFLX.SYS can support as many controllers as there are EISA bus master slots in a system. It also supports Compaq Insight Management Agents for Windows NT, as well as full-duplex connections on switched Ethernet hubs.

■ *NETFLX3.SYS* driver supports NetFlex-3 Controllers and is NDIS 3.0 miniport compliant. The NetFlex-3 supports today's industry standard Ethernet topologies and the newer 100 Mb/s, 100Base-TX, and 100VG-AnyLAN technologies.

This driver includes performance tuning algorithms that dynamically adjust settings on the adapter to optimize throughput and utilization. The *NETFLX3.SYS* driver can support as many controllers as there are bus master slots in a server.

■ *PCNTN3.SYS* driver supports the Integrated NetFlex-L ENET Controller (ProSignia VS, ProSignia 300, and ProSignia 500) and the NetFlex-3/E Controller and the NetFlex-3/P Controller (Deskpro XL). Both of these device drivers are NDIS 3.0-compliant. Windows NT Setup Program does not automatically detect the *PCNTN3.SYS* driver during installation; you must manually install it from the Compaq SSD for Windows NT.

NOTE: During the Windows NT base product installation, Windows NT loads *AMDPCN.SYS,* the AMD PCNET Family Ethernet Adapter. This driver should be replaced by *PCNTN3.SYS* to ensure proper functionality.

Benefits of using Compaq developed network device drivers include:

■ Support for full-duplex operation in 10BaseT and 100Base-TX environments. Full duplex allows simultaneous two-way transmission between nodes while eliminating collisions. The performance transmission and efficiency are increased by doubling the bandwidth of 10Base-T cabling to 20 megabits/second (Mb/s).

■ NetFlex Advanced Registry Parameters that support your Windows NT configuration are added to the Windows NT Registry with default values. These parameters should not be changed. However, you may modify optional parameters, if needed. A complete list of the parameters and a description for each is included in the Compaq SSD for Windows NT *NTREADME.HLP* file.

⚠ **CAUTION:**   Compaq cautions you to modify Registry Parameters at your own risk. Using the Registry Editor incorrectly might cause serious, system-wide problems. This includes registry corruption that might cause you to have to reinstall Windows NT.

■ Support for Compaq Insight Management Agents for Windows NT.

■ The NetFlex-3 driver supports additional Performance Monitor counters. Compaq has developed a Performance Monitor utility that installs or removes counters that support the Compaq NetFlex-3 Performance Monitor DLL. This utility allows you to visually measure performance when you select the Windows NT Performance Monitor utility *PERFMON.EXE*. The counters that you select provide detailed information about transmit and receive operations for the Compaq NetFlex-3 Controller. These counters are helpful in understanding the performance characteristics for a particular NetFlex-3 Controller and can help pinpoint potential network performance bottlenecks.

NOTE: The Compaq Performance Monitor utility is one of several utilities that Compaq provides to support Windows NT on Compaq hardware. These utilities are available to the public on *the Compaq Resource Kit for Microsoft Windows NT*. To request more information or a copy of this Resource Kit, send E-mail to COMPAQNT@BANGATE.COMPAQ.COM.

Compaq Component Support Available Only on the Compaq SSD for Windows NT

This section describes the components that are not supported in the Windows NT base product installation. If you want to install support for the features discussed in this section, you must use SmartStart or the support software provided on the Compaq SSD for Windows NT.

The list of component support includes:

■ Compaq NetFlex-3 driver support for the following controllers

❏ NetFlex-3/E Controller

❏ NetFlex-3/P Controller

❏ Integrated NetFlex E/PCI Controller

❏ Integrated NetFlex-L ENET Controller

> **NOTE:** Windows NT 3.1 and 3.5 base product installations do not include
> NetFlex-3 drive support.

■ Compaq ProLiant Storage System Support

■ Compaq Systems Management Support

■ Compaq Standby Recover Server Option Support

■ Compaq On-Line Recovery Server Option Support

■ Compaq Uninterruptible Power Supply (UPS) Support

■ Compaq Power Management Support

■ Compaq Volume Control Service Support

This white paper provides a brief overview of the supported features. Refer to
the Windows NT *NTREADME.HLP* file for more detailed information and
installation instructions.

Compaq NetFlex Driver Support

Compaq provides several device drivers to support the Compaq NetFlex
Family of Controllers. The Windows NT 3.1 and 3.5 base product installations
do not include support for all NetFlex controllers. The *NETFLX3.SYS* device
driver on the Compaq SSD for Windows NT supports the following controller
configurations:

■ NetFlex-3/E Controller and the NetFlex-3/P Controller (configured in a
ProLiant 1500 5/133 or ProLiant 4500)

■ Integrated NetFlex ENET/PCI Controller

> **NOTE:** The AMD PCI SCSI/NET driver that supports the NetFlex ENET/PCI
> Controller is supported in the base installation of Windows NT 3.51.

■ Integrated NetFlex-L ENET Controller (configured in a ProSignia VS,
ProSignia 500, or ProSignia 300)

Refer to the Network Controller Support section of this white paper for more
information about these drivers. These drivers are available on the Compaq
SSD for Windows NT; the Windows NT *NTREADME.HLP* file provides
installation instructions.

ProLiant Storage System Support

Compaq provides a device driver, *PRLNTSS.SYS,* that supports the ProLiant Storage System when it is attached to a Compaq 32-Bit SCSI-2 Controller. The Windows NT base product installation does not include this support.

PRLNTSS.SYS provides the following feature benefits:

■ Supports Compaq Insight Management Agents for Windows NT 3.5x

■ Intelligent management through Compaq Insight Manager of the On-Line status indicator on ProLiant drive trays

■ Writes to the system event log for any ProLiant alarms such as fan failures, critical temperature conditions, side door open, and redundant power supply fault

■ Writes to the Windows NT Event Log to obtain critical conditions and hot-plug events

■ An interface that allows external management of the drive tray indicators

This driver is available on the Compaq SSD for Windows NT; refer to the *NTREADME.HLP* file included on the SSD for installation instructions.

Systems Management Support

Compaq provides systems management support for Windows NT with *SYSMGMT.SYS,* the Systems Management driver. This driver supports Compaq Server Management (CSM) and Automatic Server Recovery (ASR). These systems management features are available on ProLiant servers and some ProSignia servers. Refer to the user documentation that comes with your server for the features supported.

The *SYSMGMT.SYS* driver supports the following features:

■ Logging of critical errors

■ Automatic Server Recovery

■ Fan outage and temperature detect alarms

■ Logging of corrected memory errors

■ Notification of Redundant Power Supply

- Checking of the Real Time Clock

- Bus Utilization Statistics

- Health driver that filters out incorrect fan and temperature events to prevent system shutdowns from occurring

This device driver must be installed to optimally support Compaq Insight Management Agents for Windows NT 3.5x. The System Management driver depends on the Compaq HAL for support. If the System Management driver is installed, the Compaq HAL is automatically installed at the same time. You will need the Compaq SSD for Windows NT to install the driver and the Compaq System Configuration Utility to configure and enable the driver.

Compaq Standby Recovery Server Option Support

The Compaq Standby Recovery Server Option is designed to improve the fault recovery time of a mission-critical server. When the Primary Server fails, a method is in place to provide the automatic switchover of the ProLiant Storage System to a Secondary Server.

Before you can use the Compaq Recovery Server Option support with Microsoft Windows NT Server Version 3.5x you must order the Compaq Recovery Server Option Kit (PN 213187-001) from Compaq.

The Compaq Recovery Server Option Kit provides the necessary cables and the following software to configure this option:

- System Configuration Utility

- Upgraded System ROM

- Upgraded SMART Controller ROM

- Compaq Recovery Server Option software for Windows NT Version 3.5x

You will also need:

- Compaq Insight Manager 2.50 or later

- Compaq Insight Management Agents for Windows NT Version 3.5x

The Compaq SSD for Windows NT contains the support software for the Compaq Recovery Server Agent. However, you must configure the Recovery Server Option hardware components with the System Configuration Utility before the Compaq SSD for Windows NT Setup program can properly install the support software.

The Compaq Recovery Server Agent software support must be installed after the system is running Windows NT 3.5x.

If one system fails, the surviving server detects the failure and causes the switch of the drives from the failed server to itself. This feature is included in the Compaq SSD for Windows NT as option *Compaq Standby Recovery Server* during set up. The Standby Recovery Agent driver, *CPQRSYS.EXE*, supports Compaq Insight Management Agents for Windows NT 3.5x.

NOTE: The Compaq Standby Recovery Server Option is dependent upon Compaq System Management support to function properly. To correctly install the Standby Recovery Server Option you must load both drivers during installation.

Compaq On-Line Recovery Server Option Support

The On-Line Recovery Server provides a mechanism to dynamically switch selected storage devices from a failed system to a surviving system. In effect, the storage devices are automatically "switched" from the failed system and support is switched to the surviving system.

The Compaq SSD for Windows NT contains the support software for the Compaq On-Line Recovery Server Agent. However, similar to the Standby Recovery Server Option you must configure the Recovery Server Option hardware components with the System Configuration Utility. The Recovery Server Option must be configured before the Compaq SSD for Windows NT Setup Program can properly install the support software. The Compaq Recovery Server Agent software support must be installed after the system is running Windows NT 3.5x.

During normal operation of an On-Line Recovery Server pair, both systems are operational. The Compaq On-Line Recovery Agent in each system sends a heartbeat message to its paired server to indicate that the system is operational. The loss of the heartbeat message indicates system failure. The Compaq On-Line Recovery Agent initiates a switchover sequence when it detects the loss of the heartbeat message.

The driver and supporting files required for the Compaq On-Line Recovery Server Option are located on the Compaq SSD for Windows NT in the \CPQRSYS directory. They are:

■ *CPQRSYS.EXE* — On-Line Recovery Agent

■ *CPQRSDRV.SYS* — On-Line Recovery Driver

■ *CRADMIN.CPL* — Control Panel icon for configuring and controlling the On-Line Recovery Agent

■ *CRAMON.EXE* — On-Line Recovery Agent monitoring application

■ *CPQRSGL.EXE* — Launches drive letter configurations from the failing to the new system after a successful failover switch has occurred.

■ *CPQRSSPT.DLL* — A Windows NT DLL containing Compaq On-Line Recovery Server APIs.

■ *CPQRSMAP.EXE* — Stamps each drive with pre-switch over drive letter mapping.

■ *CPQRSMPR.EXE* — Stamps each drive with post-switch over drive letter mapping.

For more information about this option and the necessary installation instructions, refer to the Compaq SSD for Windows NT *NTREADME.HLP* file. You can also to refer to the *Compaq On-Line Server Recovery* white paper (Doc Number 043A/1095) for more information on this option.

Compaq Uninterruptible Power Supply Support

The Compaq Uninterruptible Power Supply (UPS) provides battery-backed power to your system when the local power fails. The Compaq UPS support software notifies you that the system is going to shut down due to a power failure. However, the Compaq UPS does require the Compaq UPS support software to function properly.

When installed, the Compaq UPS support driver, *CPQUPS.DLL*, runs as a Windows NT Service. The support driver adds the following functionality:

■　Provides an extra level of fault tolerance support for environments running critical applications (available in five models).

> **NOTE:**　The Compaq UPS support driver supplements the Microsoft UPS support; it is not a replacement.

■　You may start and stop the UPS through the Windows NT Services Control Panel application of Windows NT.

■　Compaq Insight Manager and Insight Management Agents supports the Compaq UPS.

■　Network Administrators may tune certain parameters using the Registry Editor. This is an advanced function and Compaq does not recommend that the average user edit these parameters.

Compaq Power Management Support

The Compaq Notebook Power Management Support feature allows you to modify the power conservation settings of the computer while running Windows NT 3.5x.

> **NOTE**:　A System ROM level of at least 9/9/94 is required for Compaq Power Management support.

The Compaq Notebook Power Management provides support for the Compaq LTE Elite Family of Notebook computers and the Compaq LTE 5000 Family of Notebook computers. This support includes a device driver, *PWRMGMT.SYS*, a Windows NT Service, *PMSERV.EXE*, and a Windows NT Control Panel Application, *PWRCONNT.CPL*.

The device driver and the service are loaded during system initialization to coordinate access to the hardware. The console is a Control Panel applet. It allows the user to view and modify the current settings of the power management features of the computer.

> **NOTE**:　Not all features are applicable to all computer systems. Not all Windows 3.1 and Windows 95 features are applicable to the Windows NT 3.5x implementation.

In the Windows NT 3.5x implementation of the Power Management Console, any changes made to the power conservation values take effect immediately. Not all of the features are supported in all Windows NT 3.5x versions. The following features are supported:

- AC Energy Saver
- AC Screen Save
- Brightness
- Hibernation
- Modem
- Processor Speed
- Settings
- System Idle

- AC Hard Disk Idle
- Battery Conservation
- Hard Disk Idle
- Hibernation Time-out
- PCMCIA
- Screen Save
- Standby
- Warning Beeps

Refer to the Compaq SSD for Windows NT *NTREADME.HLP* file for feature descriptions and version support.

Compaq Volume Control Service Support

Compaq Volume Control Service support applies only to the Compaq Presario 500 Series Personal Computers. This support must be installed after the system is running Windows NT 3.5x.

The Compaq Volume Control driver, *CPQBEZEL.SYS*, and the Windows NT service for the Compaq Volume Control driver, *BEZSERV.EXE*, are located on the Compaq SSD for Windows NT. Both of these support files are loaded during system initialization.

The Compaq Volume Control support allows the Windows NT 3.5x operating system to recognize user activity on:

- Speaker Volume Up button

- Speaker Volume Down button

- System Mute buttons

Refer to the Compaq SSD for Windows NT *NTREADME.HLP* for installation instructions and more detailed information.

Compaq QVision Graphic Controller Support

This section provides an overview of the multiple graphic controller support for Compaq systems running Windows NT 3.5x. This section includes general information about the multiple controller features, capabilities, and hardware configurations. The information includes an overview of multiple graphic controller configurations and possible uses.

Compaq supports the multiple graphic controller subsystem with the following controllers:

■ QVision 1280/E Graphic Controller

■ QVision 1280/P Graphic Controller

■ QVision 2000 Graphic Controller

■ QVision 2000+ Graphic Controller

■ Matrox Millennium/PCI Graphic Controller

All current QVision graphic support drivers for Windows NT 3.5x from Compaq are available on a single diskette called the Windows NT 3.5/3.51 Graphics Support Disk (NTGSD) Version 2.30 for Compaq Systems. All Matrox Millennium drivers are available on a separate diskette called the Matrox Millenneum for Windows NT 3.5/3.51 Version 1.10.

Multiple Graphic Controller Subsystem

A Multiple Graphics Controller subsystem is a system that is using more than one and up to the maximum number of EISA or PCI graphic controller slots in the system. Only desktops with full-graphics capabilities are supported in a Multiple Graphic Controller subsystem. Basically, the desktop spans all graphics controllers and monitors; a system with three graphic controllers can have a desktop of 3840x1024. The mouse, cursor, and windows can be moved from one screen to another as if they all reside on one monitor.

The multiple graphics controller subsystem operates completely transparent to the applications. This means the applications are unaware of the fact that they are running in a multiple graphics controller environment. They are only aware that they have a larger desktop in which to display the information.

NOTE: Currently, the multiple graphics controller subsystem only provides support for graphic controllers in a horizontal configuration. Therefore, you can only increase your horizontal resolution by adding a new graphics controller and monitor. Currently, this subsystem does not support an NxM monitor matrix.

■ QVision Controllers support 1 Mbyte or 2 Mbytes of
   Video RAM (VRAM)

■ Matrox Millennium Controllers support 2, 4, or 8 Mbytes of Windows
   RAM (WRAM)

The following list identifies general set up and configuration requirements for multiple graphic controller subsystems:

■ Graphic modes can be set depending on the number of controllers and
   VRAM/WRAM available.

■ All graphics controllers in a system must reside on the same bus.

■ All graphic controllers on a bus must be either EISA or PCI;
   combinations of EISA and PCI controllers are not currently supported.

■ All graphics controllers must support the same capabilities and have the
   same amount of VRAM.

NOTE: In a multiple graphic controller subsystem, it is necessary to have all controllers set in the same graphics mode. Each of the graphic controllers in the subsystem needs to support the same resolution and color depth range.

In addition, all monitors that you include in the configuration also must support the same graphic mode capabilities as the graphic controllers. However, you can use different combinations of monitors (for example a 15-inch monitor with a 20-inch monitor) in a dual-controller mode as long as both monitors support the same graphic mode. You must select a resolution that is supported by both monitors (such as 1024x768). However, if the monitors are significantly different, even though they can support the same modes, the image displayed might be slightly different on each monitor and require some adjustment.

Deskpro Computers

On a new Deskpro computer, you can place two graphics controllers in the PCI slots. Deskpro computers have a QVision 1280/P Controller built into the motherboard. You can effectively configure a system to support a desktop spanning three graphics controllers by placing two more QVision 1280/P Controllers in the available PCI slots.

Compaq ProLiant Servers

A ProLiant server has seven EISA slots available; in this system you can configure seven QVision 1280/E Controllers with seven monitors. For example, the desktop resolution in this case would be 8960x1024 (instead of 1280x1024 for a single screen configuration).

The following table identifies graphic controller options and the associated part numbers.

Table 5
Controller Options

Option	Part Number
QVision 1280/E Graphic Controller	139148-001
QVision 1280/P Graphic Controller	137886-001
QVision 2000 Graphic Controller	148098-001
QVision 2000+ Graphic Controller	137887-001
Matrox Millennium/PCI Graphic Controller	223337-001

Supported Video Resolutions

The following table provides video resolution options and minimum memory requirements needed to support each resolution option.

Table 6
Video Resolutions

Resolution	Color	Minimum VRAM/WRAM Required
1600x1200	16M	8 MB
1600x1200	64K	4 MB
1600x1200	256K	2 MB
1280x1024	16M	4 MB
1280x1024	64K	4 MB
1280x1024	256	2 MB
1024x768	16M	4 MB
1024x768	64K	2 MB
1024x768	256	1 MB
800x600	16M	2 MB
800x600	64K	2 MB
800x600	256	1 MB
640x480	16M	2 MB
640x480	64K	1 MB
640x480	256	1 MB

NOTE: To calculate your effective resolution, multiply the horizontal resolution by the number of graphics controllers in the system.

Software Driver Support

The following Compaq and OEM developed multiple-graphic controller drivers are supported only on Microsoft Windows NT 3.5x platforms:

■ QVision 1280/E Graphic Controller

■ QVision 1280/P Graphic Controller

■ QVision 2000 Graphic Controller

■ QVision 2000+ Graphic Controller

■ Matrox Millennium/PCI Graphic Controller

Compaq Graphic Driver Support

These drivers are available to the public in SoftPaq SP1322. Future versions of these drivers will be also released as SoftPaqs. Compaq FSEs, Resellers, and customers can download SoftPaqs via the Compaq BBS, the World Wide Web, CompuServe, America On-Line, and Prodigy.

Matrox Millennium Driver Support

These drivers are available to the public in SoftPaq SP1467. Future versions of these drivers will be also released as SoftPaqs. Compaq FSEs, Resellers, and customers can download SoftPaqs via the Compaq BBS, the World Wide Web, CompuServe, America On-Line, and Prodigy. Refer to the Compaq Support Software for Windows NT section in this document to access these resources.

For more information about Multiple Graphic Controllers from Compaq, refer to the *Compaq QVision* white paper for Windows NT 3.5/3.51. Also consult the user information that comes with the controller.

Compaq Component Support Available Only in the Windows NT Base Product

This section lists the components that are supported only in the Windows NT base product installation. If you want to install support for these components, select the appropriate installation options during the Windows NT installation. You can also go back and add support after you have Windows NT up and running on your computer.

NOTE: SmartStart also includes support for these components in the
base installation.

The following components are supported only in the Windows NT base
product installation:

- Compaq SCSI Tape Devices

    - 10/20-Gigabyte DLT Drive

    - 15/30-Gigabyte DLT Drive

    - 2/8-Gigabyte DAT Drive

    - 4/16-Gigabyte TurboDAT Drive

    - 5.0-Gigabyte DAT Drive

    - 1.3-/2.0-Gigabyte DAT Drive

    - 1.2-Gigabyte ACA Tape Drive

    - 525-Megabyte ACA Tape Drive

    - 320-/525-Megabyte (Wangtek) Tape Drive

    Refer to Table 5, "Controller Options" to determine which Windows NT
    driver name to use when installing Compaq SCSI Tape drives.

- SCSI CD-ROM Devices

    - DualSpeed CD-ROM Drive

    - Tray Load CD-ROM Drive

- Compaq CD-ROM Devices

    - DualSpeed CD-ROM Drive

    - Tray Load CD-ROM Drive

- Compaq Business Audio

Refer to the Compaq SSD for Windows NT *NTREADME.HLP* file provided
with Windows NT 3.5x for more information about installing these options.

Windows NT Device Driver Support Software Matrix

The following matrix lists Compaq controllers and devices supported by either the Compaq SSD for Windows NT 3.5 and 3.51 or by the Windows NT base product or both. Compaq recommends installing the Compaq drivers, when available, to properly configure your computer.

Table 7
Windows NT Support Software Matrix

Component	Compaq SSD for Windows NT	Microsoft Windows NT base product
Hardware Abstraction Layer (HAL)		
Single Processor Systems	X	•
Multiprocessor Systems	X	•
Power Management Systems	X	
Drive Array		
SMART/SMART-2/IDA-2/IDA/IAES Controllers	X	•
SCSI Controllers		
32-Bit Fast-SCSI-2 Controller	X	•
Integrated SCSI-2 for Systempro/XL		◆
Integrated SCSI for Portable 486C		◆
6260 SCSI-2 Controller		◆
Integrated PCI SCSI-2 Controller	X	▲
Integrated 32-Bit Fast-SCSI-2	X	•

continued

Legend: "**X**" in the "Compaq" column (install using Compaq SSD for Windows NT).
"◆" in the "Microsoft" column (install using the Windows NT base product).
"▲" in the "Microsoft" column (but only applicable to version 3.51).
"•" in the "Microsoft" column (ships with Windows NT, however, an updated or Compaq enhanced version is included on the Compaq SSD for Windows NT).

Windows NT Support Software Matrix *continued*

Component	Compaq	Microsoft
SCSI Controllers *(continued)*		
32-Bit Fast-Wide SCSI-2/P Controller	**X**	•
32-Bit Fast-Wide SCSI-2/E Controller	**X**	
SCSI Tape Devices		
10/20-GB DLT Drive		◆
2/8-GB DAT Drive		◆
15/30-GB DLT Drive		◆
4/16-GB TurboDAT Drive		◆
5.0-GB DAT Drive		◆
1.3-/2.0-GB DAT Drive		◆
1.2-GB ACA Tape Drive		◆
525-MB ACA Tape Drive		◆
320-/525-MB (Wangtek) Tape Drive		◆
SCSI CD-ROM Devices		
DualSpeed CD-ROM Drive		◆
Tray Load CD-ROM Drive		◆
Network		
NetFlex ENET-TR Controller	**X**	•
NetFlex-2 ENET-TR Controller	**X**	•

continued

Legend: "**X**" in the "Compaq" column (install using Compaq SSD for Windows NT).
"◆" in the "Microsoft" column (install using the Windows NT base product).
"▲" in the "Microsoft" column (but only applicable to version 3.51).
"•" in the "Microsoft" column (ships with Windows NT, however, an updated or
Compaq enhanced version is included on the Compaq SSD for Windows NT).

Windows NT Support Software Matrix *continued*

Component	Compaq	Microsoft
Network		
NetFlex-2 TR Controller	**X**	•
NetFlex-2 DualPort ENET Controller	**X**	•
NetFlex-2 DualPort TR Controller	**X**	•
NetFlex-3/E Controller	**X**	▲
NetFlex-3/P Controller	**X**	▲
Integrated NetFlex-L ENET Controller	**X**	•
Integrated NetFlex ENET/PCI Controller	**X**	▲
32-Bit DualSpeed Token Ring Controller	**X**	•
Ethernet 16TP Controller		◆
Other		
ProLiant Storage System	**X**	
System Health Logs/Automatic Server Recovery	**X**	
Compaq Standby Recovery Server Option	**X**	
Compaq On-Line Recovery Server Option	**X**	
Compaq Uninterruptible Power Supply	**X**	
Compaq Power Management	**X**	
Compaq Volume Control	**X**	
Compaq CD-ROM DualSpeed Tray Load Drives		◆
Compaq Business Audio		◆

Legend: "**X**" in the "Compaq" column (install using Compaq SSD for Windows NT).
"◆" in the "Microsoft" column (install using the Windows NT base product).
"▲" Compaq and Microsoft (version 3.51 only) provide same functionality.
"•" in the "Microsoft" column (ships with Windows NT, however, an updated or Compaq enhanced version is included on the Compaq SSD for Windows NT).

Windows NT Driver Names for Compaq Products

In the Windows NT base product, some drivers do not reference Compaq options by the Compaq product name. Use the drivers indicated in the following table to support Compaq options.

Table 8
Windows NT Driver Names for Compaq Products

Compaq Product	Windows NT Driver Name To Use	How To Install
32-Bit Fast-SCSI-2 Controller	NCR 53C710	Windows NT Setup Icon
Integrated 32-Bit Fast-SCSI-2/P Controller	NCR PCI (53C810)	Windows NT Setup Icon
32-Bit Fast-Wide SCSI-2/P Controller	NCR PCI (53C810)	Windows NT Setup Icon
SCSI-2 Options Port	NCR 53C9x	Windows NT Setup Icon
Integrated NetFlex ENET/PCI	*PCNTN3.SYS	Windows NT Setup Icon
Integrated PCI SCSI-2 Controller	*AMD PCI SCSI/NET	Windows NT Setup Icon
6260 SCSI-2 Controller	Adaptec 1x/152x/AIC 6260/6360	Windows NT Setup Icon
10/20-GB DLT Drive	Digital TZ86, TZ87 and DLT2000	Windows NT Setup Icon, Control Panel - Tape
15/30-GB DLT Drive	Digital TZ86, TZ87 and DLT2000	Windows NT Setup Icon, Control Panel - Tape
2/8-GB TurboDAT Drive	4 millimeter DAT Drive	Windows NT Setup Icon, Control Panel - Tape

continued

Windows NT Driver Names for Compaq Products   *continued*

Compaq Product	Windows NT Driver Name To Use	How To Install
4/16-GB TurboDAT Drive	4 millimeter DAT Drive	Windows NT Setup Icon, Control Panel - Tape
5.0-GB DAT Drive	4 millimeter DAT Drive	Windows NT Setup Icon, Control Panel - Tape
1.3-/2.0-GB DAT Drive	4 millimeter DAT Drive	Windows NT Setup Icon, Control Panel - Tape
1.2-GB ACA Tape Drive	Wangtek 525, 250 Drives	Windows NT Setup Icon, Control Panel - Tape
525-MB ACA Tape Drive	Wangtek 525, 250 Drives	Windows NT Setup Icon, Control Panel - Tape
320-/525-MB (Wangtek) Tape Drive	Wangtek 525, 250 Drives	Windows NT Setup Icon, Control Panel - Tape
Ethernet 16TP Controller	Intel EtherExpress 16 LAN Adapter	Control Panel-Network

* These drivers support the Deskpro XL in a Windows NT 3.51 base product
   installation. If your installation is for Windows NT 3.1 or 3.5, you must use the
   Compaq device driver.