COMPAQ
STORAGEWORKS

Fibre Channel Host Bus Adapter
Installation Guide

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About This Guide

This guide is designed to be used as step-by-step instructions for installation and as a reference for operation, troubleshooting, and future upgrades.

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
FILENAMES	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase.
Type	When you are instructed to *type* information, type the information **without** pressing the **Enter** key.
Enter	When you are instructed to *enter* information, type the information and then press the **Enter** key.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

> ⚠ **WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

> △ **CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

> **IMPORTANT:** Text set off in this manner presents clarifying information or specific instructions.

> **NOTE:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.

> ⚠ ⚡ Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.
>
> **WARNING:** To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

> ⚠ ⊗ Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.
>
> **WARNING:** To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.
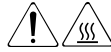
Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

Rack Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

■ The leveling jacks are extended to the floor.

■ The full weight of the rack rests on the leveling jacks.

■ The stabilizing feet are attached to the rack ,if it is a single rack installation.

■ The racks are coupled in multiple rack installations.

■ A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

You are entitled to free hardware technical telephone support for your product for as long you own the product. A technical support specialist will help you diagnose the problem or guide you to the next step in the warranty process.

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ[1]. This service is available 24 hours a day, 7 days a week.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for world wide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to the Internet at http://www.compaq.com.

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)

- Product serial number (s)

- Product model name(s) and numbers(s)

- Applicable error messages

- Add-on boards or hardware

- Third-party hardware or software

- Operating system type and revision level

- Detailed, specific questions

Compaq Website

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. You can access the Compaq website by logging on to the Internet at http://www.compaq.com.

Compaq Authorized Reseller

For the name of your nearest Compaq Authorized Reseller:

- In the United States, call 1-800-345-1518.

- In Canada, call 1-800-263-5868.

- Elsewhere, see the Compaq website for locations and telephone numbers.

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[1] For continuous quality improvement, calls may be recorded or monitored.

Installation

Compaq StorageWorks Fibre Channel Host Bus Adapter/P

The Fibre Channel Host Adapter/P is installed in a server with a PCI local bus. The Compaq StorageWorks Fibre Channel Host Bus Adapter/P provides an interface between the PCI bus in the server and Fibre Channel connected external storage systems.

The Compaq StorageWorks Fibre Channel Host Bus Adapter/P interface to the server is the Peripheral Component Interconnect (PCI) bus. The PCI bus is a high-performance, 32-bit bus with multiplexed address and data lines, and parity information. It provides a high-speed (up to 132 MB/s) path between the system board and the Compaq StorageWorks Fibre Channel Host Bus Adapter/P. The Compaq StorageWorks Fibre Channel Host Bus Adapter/P is a PCI Bus Master device that conforms to the current PCI Local Bus Specification.

The Compaq StorageWorks Fibre Channel Host Bus Adapter/P requires the installation of a GigaBit Interface Converter (GBIC) module before the Fibre Channel cable is connected. The GBIC converts electrical signals from parallel to serial for transmission across the fibre channel media and vice versa. The Fibre Channel cable connector is plugged into the installed GBIC module.
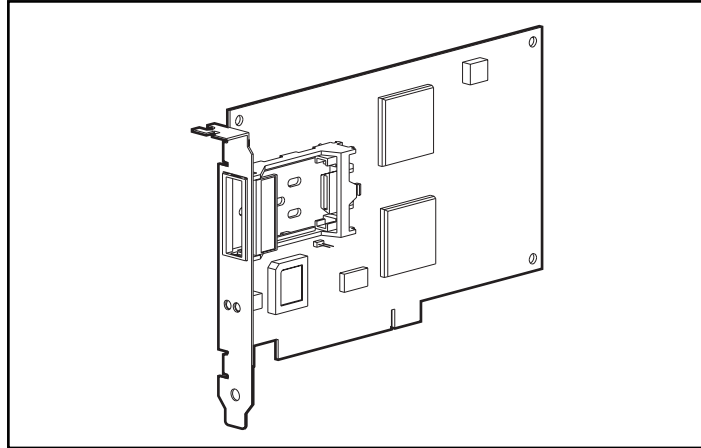
Figure 1-1. Compaq StorageWorks Fibre Channel Host Bus Adapter/P

Compaq StorageWorks Fibre Channel Host Bus Adapter/E

The Fibre Channel Host Adapter/E was designed for use in a server equipped with the EISA expansion bus. The Compaq StorageWorks Fibre Channel Host Bus Adapter/E, under the control of the operating system and dedicated device drivers, provides an interface between the EISA bus in the server and a Fibre Channel Arbitrated Loop (FC-AL).

The EISA expansion bus delivers the capabilities required by high-performance, 32-bit expansion boards, while maintaining compatibility with existing 8- and 16-bit ISA expansion boards. The Compaq StorageWorks Fibre Channel Host Bus Adapter/E takes advantage of the EISA architecture by performing 32-bit bus master burst transfers.

The Compaq StorageWorks Fibre Channel Host Bus Adapter/E requires the installation of a GigaBit Interface Converter (GBIC) module in the receptacle provided, before the fibre channel cable is connected. The GBIC module converts electrical signals from parallel to serial for transmission across the fibre channel media, and vice versa.
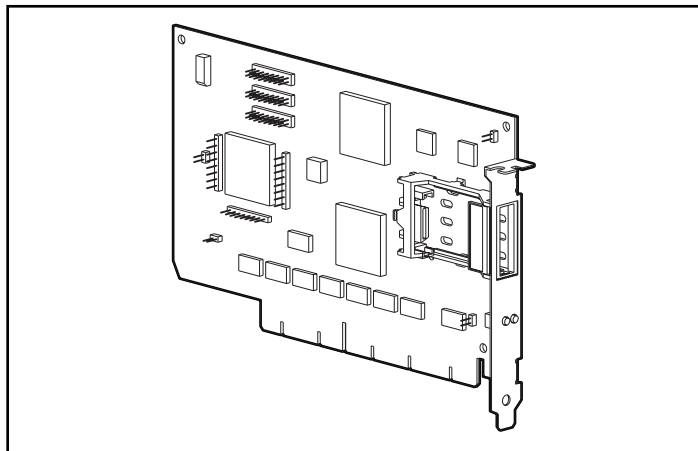
Figure 1-2. Fibre Host Adapter/E

Chapter **2**

Installation of the Fibre Channel Host Adapter

vvThe installation of the Fibre Channel Host Adapter/P or Fibre Channel Host Adapter/E and its connection to StorageWorks RAID Array storage systems must be completed in a logical, step-by-step process. See Table 2-1 for the procedure.

Table 2-1
Fibre Channel Host Adapter Installation Steps

Step	Objective	Go to Chapter/Guide
1.	Run Systems ROMPAQ	See "Running Systems ROMPaq" section in Chapter 2.
2.	Install the Fibre Channel Host Adapter/P or Fibre Channel Host Adapter/E in the server	Refer to your server documentation for specific installation instructions.
3.	Install the GigaBit Interface Converter (GBIC) Module	See "Hardware Installation" section in Chapter 2.

continued

Table 2-1
Fibre Channel Host Adapter Installation Steps *continued*

Step	Objective	Go to Chapter/Guide
4.	Connect Fibre Channel cable to the Fibre Channel Host Adapter	See "Hardware Installation" section in Chapter 2.
5.	Run SmartStart to Load the Operating System and support drivers	See Chapters 3 through 8.

Updating System ROM

The ROM on all Compaq servers can be updated easily by *flashing* the ROM. Flashing is done using a special Compaq utility called ROMPaq, which replaces the existing contents of the ROM with another version stored in a disk file. This is a convenient way to distribute new firmware to keep Compaq products updated with the latest capabilities.

Systems ROMPaq updates the system ROM in all Compaq servers supporting Flash ROM. Use Systems ROMPaq when installing a new Fibre Channel Host Adapter in a Compaq server.

> **IMPORTANT:** Before you install the new Fibre Channel Host Adapter in the server, you should run Systems ROMPAQ to update the system ROM. Use the instructions below to create diskettes with the latest version of Systems ROMPaq from the Compaq SmartStart and Support Software CD V4.3x or later.

ROMPaq Diskettes

The ROMPaq utilities must be run from diskette. The latest version of the ROMPaq diskettes can be created from the Compaq SmartStart and Support Software CD V4.3x or later. Compaq recommends that you initially use this version of ROMPaq because it is the latest one that supports the Fibre Channel Host Adapter.

Materials Needed

You will need the following items to create ROMPaq utility disk or diskettes:

■ Compaq SmartStart and Support Software CD V4.3x or later

■ Blank diskettes

■ Access to a server or workstation with a bootable CD-ROM drive. This may be the system in which you are installing the Fibre Channel Host Adapter.

Creating Diskettes

To create ROMPaq diskettes:

1. Boot the server from the Compaq SmartStart and Support Software CD V4.3x or later.

2. From the Compaq System Utilities screen, select *Create Support Software*.

3. From the Diskette Builder screen, scroll down the list and select one of the following three ROMPaq selections: *Systems ROMPaq Firmware Upgrade Diskette for Compaq ProLiant Servers, Systems ROMPaq Firmware Upgrade Diskette for Compaq Systempro/XL* or *Compaq ProSignia Servers.*

4. Follow the instructions on the screen to create the ROMPaq disk or diskettes.

Running Systems ROMPaq

Systems ROMPaq is used to update the firmware in Compaq servers. The new storage system has enhanced drive array capabilities and many existing servers may not be able to take advantage of these capabilities without updated firmware. Since it is difficult to determine when the firmware needs to be updated, Compaq recommends that you run the latest Systems ROMPaq on your server when installing a new Fibre Host Adapter.

To run Systems ROMPaq:

1. Place the Systems ROMPaq diskette in the server diskette drive.

2. Boot the server by turning on the power.

3. Press **Enter** at the Welcome screen.

4. At the Select A Device screen, select the server from the list of programmable devices. This may be the only item in the list. Press **Enter**.

5. At the Select An Image screen you will see the following:

   ❑ Device to reprogram: your server

   ❑ Current ROM revision: date of existing ROM version

   ❑ Select Firmware Images:

6. Press **Enter**.

7. Review the information on the Caution screen:

   ❑ Device to reprogram: your server

   ❑ Current ROM revision: date of existing ROM version

   ❑ Select Firmware Images:

8. Press **Enter** to reprogram the system ROM or **Esc** to discontinue reprogramming and return to the Select An Image screen.

9. "Reprogramming Firmware" indicates that the system ROM is being reprogrammed. DO NOT INTERRUPT.

IMPORTANT: Do not interrupt the reprogramming cycle. Interrupting the ROM reprogramming will leave the firmware in an unknown state. You may not be able to boot the server if this happens. You will be notified when reprogramming is completed.

---

10. When ROMPaq is finished reprogramming the system ROM, press **Esc** to exit the Systems ROMPaq Utility.

11. Remove the Systems ROMPaq diskette and reboot the server by cycling the power (cold boot).

This completes the firmware update using Systems ROMPaq.

Hardware Installation

Install the Fibre Channel Host Adapter/P or Fibre Channel Host Adapter/E in an available slot in the server. Refer to the server documentation for installation instructions for option boards.

Installing the GBIC and Fibre Channel Cable

The installation of the GBIC and Fibre Channel cable is as follows:

1. Install one GBIC into the receptacle on the Fibre Channel Host Adapter. The GBIC can only be installed one way because the GBIC and the guide rails inside the Fibre Channel Host Adapter receptacle are keyed.

2. Install one of the Fibre Channel cable connectors into the GBIC that was installed in Step 1. The GBIC and the Fibre Channel cable connector are keyed to prevent improper installation. Provide support for the installed Fibre Channel cable so that a bend radius of less than 3 inches does not occur. Support and route the Fibre Channel cable to prevent damage from sharp edges, or from being crushed by nearby equipment. This completes the installation of the GBIC and Fibre Channel cable at the Fibre Host Adapter.

   NOTE: The Fibre Host Adapter option kit contains two shortwave GBIC and a 5-meter cable.

Fibre Channel Cable Option Kits

Five multi-mode Fibre Channel cable option kits are available. Each cable option kit contains one Fibre Channel cable with connectors. The option kits are as follows:

■ 2-meter multi-mode Fibre Channel Cable option kit #234457-B21

■ 5-meter multi-mode Fibre Channel Cable option kit #234457-B22

■ 15-meter multi-mode Fibre Channel Cable option kit #234457-B23

■ 30-meter multi-mode Fibre Channel Cable option kit #234457-B24

■ 50-meter multi-mode Fibre Channel Cable option kit #234457-B25
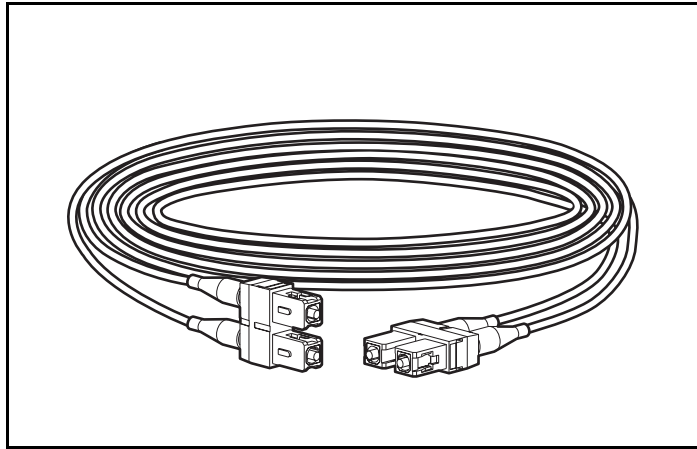
Figure 2-1. Fibre Channel Cable with connectors

GBIC Option Kits

Two types of GBIC option kits are available. The option kits:

■ Shortwave option kit #234459-B21 for distances of 2-500 meters

■ Longwave option kit #340412-B21 for distances of 500-10,000 meters

> **NOTE:** The longwave kit includes a 5 meter, single mode cable for pre-deployment system verification.
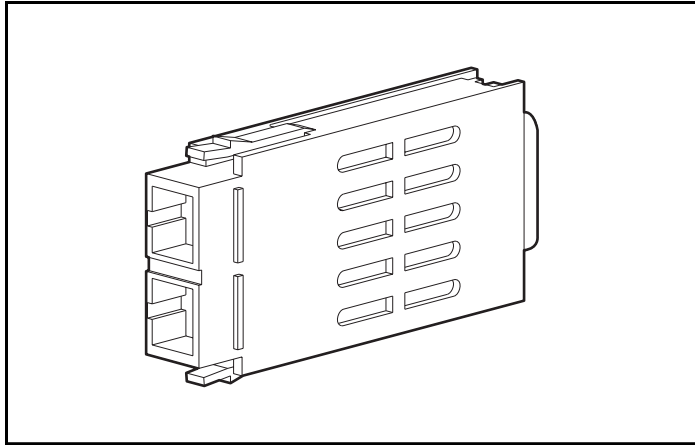
Figure 2-2. GigaBit Interface Converter Module (GBIC)

Chapter **3**

Installing Drivers for NetWare

Installation Instructions for RA4000

This section outlines the installation instructions for the RA4000 driver for NetWare 3.12 or IntranetWare operating systems. If you are setting up a new system with NetWare, use SmartStart, supplied with the server, to install both the NetWare operating system and drivers.

> **NOTE:** If you install the operating system software from the SmartStart and Support Software CD V4.3x or later, all of the software, including device drivers, will be automatically installed and configured.

Before installing the drivers, you should already have:

■ Updated your system firmware by running System ROMPaq

■ Configured the hardware by running the System Configuration Utility

Installing the Drivers Using Diskettes

Use the instructions in this chapter to install the drivers for a new installation manually, or to upgrade the drivers in an existing NetWare server.

The latest drivers and support files for Netware are located on the Compaq SmartStart and Support Software CD V4.3x or later. To access these files, you will need to create a set of Novell Support Software Diskettes (NSSD) from the SmartStart and Support Software CD.

Materials Needed

You will need the following items to install the Compaq Fibre Host Adapter NetWare driver manually on your server:

■ Compaq SmartStart and Support Software CD V4.3x or later

■ Blank diskettes

■ Any server or workstation with a bootable CD-ROM drive

Creating NSSDs

The NetWare driver for the Fibre Host Adapter is located on the Compaq SmartStart and Support Software CD V4.3x or later. To gain access to the driver, you first need to create the diskettes. The diskettes contain the latest drivers and documentation. To create the NSSDs:

1. Boot the server from the Compaq SmartStart and Support Software CD V4.3x or later.

2. From the Compaq System Utilities screen, select *Create Support Software*.

3. From the Diskette Builder screen, select *Create Support Software Diskettes from CD only*.

4. Scroll through the list and select *NetWare Programs.*

5. Follow the instructions on the screen to create the NSSDs.

Additional Information

Included on each NSSD are "readme" files that contain the latest information about using Compaq options in a NetWare environment, including the driver installation procedure. Locate and read this procedure.

To read these text files:

1. Copy the *RDM_DOCS.EXE* file to your hard drive.

   copy a:\rdm_docs.exe c:\

2. Execute *RDM_DOCS.EXE* to extract the readme files.

   c:\rdm_docs

3. Execute *README.COM* to view and print the readme files.

   c:\readme

Installation Instructions for Upgrading the RA4000 to a Redundant Configuration

This section outlines the installation steps for upgrading to a redundant configuration for NetWare 3.12/3.20, 4.11, and 5.0.

To upgrade the RA4000:

1. Shut down the server.

2. Install the following redundant hardware components:

   a. Fibre Host Adapter

   b. Storage Hub 7 or 12

   c. RA4000 Redundant Controller

   d. GBICs and Fibre Channel cables

3. Boot Options ROMPaq to upgrade firmware on all RA4000 Controllers.

4. Boot to DOS on the server.

5. Copy the latest *CPQFC.HAM* driver (V2.0 or greater) to C:\NWSERVER from NSSD 5.10 or later.

6. Make sure the *CPQFC.HAM* driver will be loaded for new Fibre Host Adapter(s) by editing the server's *STARTUP.NCF* file and performing one of the following steps:

   ❑ Add new "load" command(s) for *CPQFC.HAM* using the "slot=n" command line parameters where "n" is the slot number of the new Fibre Host Adapter(s).

OR

   ❑ Use a single instance of "load *CPQFC.HAM*" without a "slot=" command line parameter so that the driver will load for all supported Fibre Host Adapter(s) installed in the server.

7. Restart the server. *CPQFC.HAM* will automatically detect and use new redundant paths.

Chapter **4**

Installing Drivers for Windows NT

Installation Instructions for RA4000

This section outlines the driver installation steps for the Windows NT 4.0 or later operating system. If you are setting up a new system with Windows NT, use the Compaq SmartStart and Support Software CD V4.3x or later to install the drivers necessary to support the Compaq Fibre Host Adapter.

Before installing the drivers you should already have:

■ Updated your system firmware by running System ROMPaq
   (see Chapter 2)

■ Configured the hardware by running the System Configuration Utility

Installing the Driver Using Diskettes

The instructions in this section can be used to install the initial driver for a new Fibre Host Adapter installation manually or to upgrade the driver in an existing Windows NT server with a Fibre Host Adapter.

The latest drivers and support files for Windows NT 4.0 are located on the Compaq SmartStart and Support Software CD V4.3x or later. To access these files, you will need to create a set of Compaq NT SSD diskettes from the SmartStart and Support Software CD.

Materials Needed

You will need the following items to install the Windows NT driver manually:

■ Compaq SmartStart and Support Software CD V4.3x or later

■ Blank diskettes

■ Access to a server or workstation with a bootable CD-ROM drive. This may be the system in which you are installing the Fibre Host Adapter.

Creating the NT SSDs

The Windows NT driver is located on the Compaq SmartStart and Support Software CD. To gain access to the driver, you will first need to create the Compaq NT SSDs. These diskettes contain the latest operating system software, drivers, and supporting documentation for all Compaq equipment supported by Windows NT.

To create the diskettes:

1. Boot the server from the Compaq SmartStart and Support Software CD V4.3x or later.

2. From the Compaq System Utilities screen, select *Create Support Software*.

3. From the Diskette Builder screen, select Create Support Software Diskettes from CD only.

4. Scroll through the list and select Compaq Support Software for Windows NT.

5. Follow the instructions on the screen to create the NT SSDs.

Additional Information

Included on the NT SSDs is an *NTREADME.HLP* file that contains the latest information about Windows NT, including the driver installation procedure. We encourage you to access this information and, where different from the instructions shown here, use those provided in *NTREADME.HLP* on the Compaq SmartStart and Support Software CD (via the NT SSDs).

To read the *NTREADME.HLP* help file, you will need a server running Windows NT.

1. Place the NT SSDs, one at a time, in the floppy drive.

2. Open a Command Prompt, make A: the current drive and type:

   readme.bat

3. Select the help topic to read or print. Some important topics:

   ❑ Compaq NT SSD Installation Methods

   ❑ Using the Compaq NT SSD Setup Program

   ❑ Windows NT Device Driver Specifics

   ❑ Compaq Fibre Host Adapter Support

   ❑ Installing the Compaq Fibre Host Adapter Driver during Windows NT Installation

   ❑ Updating the Compaq Fibre Host Adapter Driver

   ❑ Removing the Compaq Fibre Host Adapter Driver

Installation Procedures

Device drivers may be installed in a Windows NT server using two methods:

■ Compaq NT SSD Setup program installation method

■ Standard Windows NT device driver installation method

Although both are outlined here, use the Compaq NT SSD Setup program installation method.

Compaq NT SSD Setup Program Installation Method

The Compaq NT SSD Setup program installation method refers to device drivers that can be installed via the Setup program located on the Compaq NT SSDs. The Setup program identifies hardware components installed in the machine and suggests device drivers needing installation. The Setup program provides a unified approach to device driver installation under Windows NT.

To run the Compaq NT SSD Setup program:

1. Start Windows NT 4.0 and log in to an account with administrative privileges.

2. Insert the Compaq SSD for Windows NT (Diskette #1) into the diskette drive.

3. From the Program Manager, select *File* and then *Run*.

4. Enter the following:

   a:\setup

5. Select Custom Setup.

6. Select the Mass Storage tabbed panel on the Custom Installation screen.

7. Select Compaq Fibre Host Adapter, then click the Install button.

   The Setup program copies and configures the driver from the Compaq SSD for Windows NT onto your system.

8. Select *Close* and exit the Setup program or select other tabbed sections to install, update, or remove other software components.

9. Remove the Compaq SSD for Windows NT diskette from the drive, shut down Windows NT, and reboot the system to load the driver.

Installing the Fibre Host Adapter Driver during Windows NT Installation

This section describes how to install the driver from the Compaq NT SSD during the initial installation of Windows NT 4.0.

To install the driver:

1. Begin the Windows NT 4.0 installation process.

2. When prompted to perform either an Express or Custom installation, select *Custom*.

3. When prompted to let Setup detect mass storage devices or to select them manually, press **S** to skip detection.

4. At the next screen, press **S** to specify additional SCSI controllers.

5. From the displayed list, highlight *Other (Requires disk provided by a hardware manufacturer)* by clicking that line. Press **Enter**.

6. As prompted, insert the Compaq NT SSDs into the drive, one at a time, and press **Enter** each time.

7. Highlight *Compaq Fibre Host Adapter* in the list of displayed controllers and press **Enter**.

8. After the driver has been loaded into memory, the Setup program will return to the screen displayed in step 4. *Compaq Fibre Host Adapter* should now appear in the list of recognized mass storage devices. If it is necessary to install additional device support, repeat steps 4-8. Otherwise, continue with step 9.

9. Press **Enter** and continue installation of Windows NT.

10. Later during Windows NT installation, reinsert the Compaq NT SSD into the diskette drive. The Setup program will copy the drivers to the system.

11. Complete installation of Windows NT.

Updating the Fibre Host Adapter Driver

Updating the Fibre Host Adapter driver is a two-step process. First, you must remove the driver, then reinstall the driver. With the new Compaq SSD for Windows NT Setup program, you no longer have to perform the remove/add steps.

To update the driver:

1. Start Windows NT and log in to an account with administrative privileges.

2. Insert the Compaq SSD for Windows NT (Diskette #1) into the diskette drive.

3. Start Setup by entering

   a:\setup

4. Select *Custom* setup.

5. Select the *Mass Storage* tabbed panel on the Custom Installation screen.

6. Select *Compaq Fibre Host Adapter*, then click the *Update* button. The Setup program updates the driver on your system from the Compaq SSD for Windows NT diskette.

7. Select either *Close* and exit the Setup program or select other tabbed sections to either install, update, or remove other software components.

8. Remove the Compaq SSD for Windows NT diskette from the diskette drive, shut down Windows NT, and reboot the system to load the driver.

Removing the Fibre Host Adapter Driver

To remove the Compaq Fibre Host Adapter driver:

1. Start Windows NT and log into an account with administrative privileges.

2. Insert the Compaq SSD for Windows NT (Diskette #1) into the diskette drive.

3. Start Setup by entering

   a:\setup

4. Select *Custom* setup.

5. Select the *Mass Storage* tabbed panel on the Custom installation screen.

6. Select *Compaq Fibre Host Adapter,* then click the *Remove* button.

7. After the driver has been removed from your system, Setup returns to the Custom installation window.

8. Select *Close* and exit the Setup program or select other tabbed selections to install/update/remove other software components.

9. Remove the Compaq SSD for Windows NT diskette from the diskette drive, shut down Windows NT, and reboot your system.

Installation Instructions for Upgrading the RA4000 to a Redundant Configuration

This section outlines the installation steps for upgrading to a redundant configuration.

To upgrade the RA4000:

1. Shut down the server(s).

2. Install the following redundant hardware components:

   a. Fibre Host Adapter

   b. Storage Hub 7 or 12

   c. RA4000 Redundant Controller

   d. GBICs and Fibre Channel cables

3. Boot Options ROMPaq to upgrade the firmware on all RA4000 Controllers.

4. Install the latest Windows NT operating system drivers from the SmartStart and Software Support CD V2.13 or later.

5. Boot the server(s) and run the Redundancy Manager Install CD.

6. Install the operating system Redundancy Manager software from the CD, then reboot the server.

7. Configure the storage system using the Redundancy Manager.

Chapter **5**

Installing Drivers for SCO OpenServer 5.0

This chapter outlines the driver installation steps for the SCO OpenServer 5.0 operating system for the Compaq Fibre Host Adapter. If you are setting up a new system, use the Compaq SmartStart and Support Software CD V4.3x or later to install the necessary drivers.

Before installing the drivers, you should already have:

■ Updated your system firmware by running System ROMPaq
(see Chapter 2)

■ Configured the hardware by running the System Configuration Utility

NOTE: If using the Compaq SmartStart and Support Software CD V4.3x or later to install the operating system, all of the software, including device drivers, will be automatically installed and configured for the Fibre Host Adapter.

Installing the Drivers Using Diskettes

The instructions in this section can be used to install the initial driver manually for a new Fibre Host Adapter installation or to upgrade the drivers in an existing SCO OpenServer 5.0 server with a new Fibre Host Adapter.

The latest drivers and support files for SCO OpenServer 5.0 are located on the Compaq SmartStart and Support Software CD V4.3x or later. To access these files, you will need to create a set of Compaq EFS Diskettes from the Compaq SmartStart and Support Software CD V4.3x or later.

Materials Needed

You will need the following items to create a set of Compaq EFS diskettes:

- Compaq SmartStart and Support Software CD V4.3x or later

- Blank diskettes

- Access to a server or workstation with a bootable CD-ROM drive. This can be the server in which you are installing the Fibre Host Adapter.

Creating the EFS Diskettes

To create the EFS diskettes:

1. Boot the server from the Compaq SmartStart and Support Software CD.

2. From the Compaq System Utilities screen, select *Create Support Software*.

3. From the Diskette Builder screen, select *Create Support Software Diskettes.*

4. Scroll through the list and select *SCO Open Server 5.0 EFS*.

5. Follow the instructions on the screen to create and label the diskettes.

Accessing Installation Information

Driver installation information for SCO OpenServer 5.0 from Compaq and SCO OpenServer 5.0 (non-Compaq) are different. Choose the correct procedure below.

Servers Running Compaq SCO OpenServer 5.0

To access the driver installation information for systems running SCO OpenServer 5.0 from Compaq:

1. Place the diskette labeled *Compaq EFS for SCO Openserver 5.0* in the diskette drive of a server capable of reading a text file.

2. Use a text editor or other utility to read or print the file *README.EFS* from the diskette.

3. Follow the instructions in this file to install the Fibre Host Adapter driver in a server running SCO OpenServer 5.0 from Compaq.

Servers Running Non-Compaq SCO OpenServer 5.0

To access the driver installation information for systems running non-Compaq SCO OpenServer 5.0:

1. Place the diskette labeled *Compaq EFS for SCO OpenServer 5.0* in the diskette drive of a server.

2. Reboot the system.

3. Select the file named *README.EFS* to view (**Enter**) or print (**F7**).

4. Follow the instructions in this file to install the Fibre Host Adapter driver in a server running a non-Compaq version of SCO OpenServer 5.0.

Chapter **6**

Installing Drivers for UnixWare

Installation Instructions for RA4000

This section outlines the driver installation steps for the UnixWare operating system that supports the Compaq Fibre Host Adapter. If you are setting up a new system, use the Compaq SmartStart and Support Software CD V4.3x or later to install the necessary drivers.

Before installing the drivers, you should already have:

■ Updated your system firmware by running System ROMPaq (see Chapter 2)

■ Configured the hardware by running the System Configuration Utility

   NOTE: If you install the operating system software from the SmartStart and Support Software CD V4.3x or later, all of the software, including device drivers, will be automatically installed and configured for the Fibre Host Adapter.

Installing the Drivers Using Diskettes

The instructions in this section can be used to install the driver initially for a new Compaq Fibre Host Adapter installation or to upgrade the driver in an existing UnixWare server with a Compaq Fibre Host Adapter.

The latest drivers and support files for UnixWare, as well as information about installing the drivers, are located on the Compaq SmartStart and Support Software CD V4.3x or later. To access these files you, will need to create a set of Compaq UnixWare EFS diskettes from the Compaq SmartStart and Support Software CD.

Materials Needed

You will need the following items to create a set of Compaq UnixWare EFS diskettes:

■ Compaq SmartStart and Support Software CD V4.3x or later

■ Blank diskettes

Access to a server or workstation with a bootable CD-ROM drive. This may be the system in which you are installing the Fibre Host Adapter.

Creating the EFS Diskettes

To create the UnixWare EFS diskettes:

1. Boot the server from the Compaq SmartStart and Support Software CD.

2. From the Compaq System Utilities screen, select *Create Support Software*.

3. From the Diskette Builder screen, select *Create Support Software Diskettes*.

4. Scroll through the list and select *Compaq SCO UnixWare EFS*.

5. Follow the instructions on the screen to create and label diskettes.

Accessing the Information

To access the driver installation information:

1. Place the diskette labeled *Documentation Diskette* in the diskette drive of a server or computer. If you wish to print the information file, this system must be connected to a printer.

2. Reboot the system.

3. Select the file named *CASA.TXT* to view or print the installation information.

4. Follow the instructions in this file to install the Fibre Host Adapter driver in an existing UnixWare server.

Installation Instructions for Upgrading the RA4000 to a Redundant Configuration

This section outlines the installation steps for upgrading to redundant for UnixWare 2.1 and 7.

To upgrade the RA4000:

1. Install the latest EFS from SmartStart and Support CD V4.4 or later on the server.

2. Make sure MP10 is installed and enabled (UnixWare 7).

3. Reboot the server (recommended).

4. Shut down the server.

5. Install the following redundant hardware components:

   ❑ Fibre Host Adapter

   ❑ Storage Hub 7 or 12

   ❑ RA4000 Redundant Controller

   ❑ GBICs and Fibre Channel cables.

6. Boot Options ROMPaq to upgrade firmware on all RA4000 Controllers.

7. Reboot the server.

8. If you are running UnixWare 7, run sdiad to discover the redundant paths.

Chapter **7**

Installing Drivers for OS/2

This chapter outlines the driver installation steps for the OS/2 v2.x or later operating system. If you are setting up a new system with OS/2 use the Compaq SmartStart and Support Software CD V4.3x or later, supplied with the server, to install both the OS/2 operating system and the drivers necessary to support the Compaq Fibre Host Adapter automatically.

Before installing the drivers you should already have:

■ Updated your system firmware by running System ROMPaq
(see Chapter 2)

■ Configured the hardware by running the System Configuration Utility

Installing the Drivers Using a Diskette

The instructions in this section can be used to install the initial driver for a new Fibre Host Adapter installation manually, or to upgrade the driver in an existing OS/2 server with a Fibre Host Adapter.

Materials Needed

You will need the following items to manually install the OS/2 driver on your server:

■ Compaq SmartStart and Support Software CD V4.3x or later

■ One blank diskette

■ Access to a server or workstation with a bootable CD-ROM drive. This may be the system in which you are installing the Fibre Host Adapter.

Creating an SSD

The OS/2 driver for the Fibre Host Adapter is located on the Compaq SmartStart and Support Software CD V4.3x or later. To gain access to the driver, you will first need to create the OS/2 SSD. This diskette contains the latest operating system software, drivers, and supporting documentation to support OS/2 on Compaq servers. To create this diskette:

1. Boot the server from the Compaq SmartStart and Support Software CD.

2. From the Compaq System Utilities screen, select *Create Support Software*.

3. From the Diskette Builder screen, select *Create Support Software Diskettes from CD only*.

4. Scroll through the list and select *Compaq OS/2 2.x Support Software*.

5. Follow the instructions on the screen to create the OS/2 SSD.

Additional Information

Included on the OS/2 SSD are Readme files containing the latest information about OS/2 support software, including the driver installation procedure. Locate and read this procedure. If the procedure differs from that shown here, use the one on the SSD.

To read the Readme files, you will need a server with a DOS partition or a computer running DOS or Windows:

 1. Place the OS/2 SSD in the diskette drive.

 2. From the DOS prompt, type:

    a:\readme

OR

 1. From the *File* pull-down menu in Windows Program Manager, select *Run* and enter:

    a:\readme.com

 2. Select the files to read or print. Important files are:

    ❑ README.1ST

    ❑ WHATSNEW.RDM

    ❑ ADDARRAY.RDM

    ❑ HISTORY.RDM

    ❑ SCSI.RDM

    ❑ CPQFCAL.RDM

Installation Procedures

To copy the driver file to the OS/2 directory on your boot drive:

 1. Place the OS/2 SSD in the diskette drive.

 2. From the OS/2 command prompt, type:

    a:\cpqfcal c:

    The *CPQFCAL.ADD* driver file will be copied to the *x*:\os2 directory (where *x* is the boot drive) and any existing driver will be renamed *CPQFCAL.OLD*. The *CONFIG.SYS* file will be updated to load this driver at start up.

3. *CPQFCAL.ADD* does not provide boot support. Therefore, before you reboot the server, be sure that the first *BASEDEV=*.ADD* corresponds to the driver controlling the boot drive. Edit the *CONFIG.SYS* file to reorder the *BASEDEV=CPQFCAL.ADD* statement so that it appears after the Boot Controller Driver *BASEDEV* statement.

4. Save the updated *CONFIG.SYS* file and exit the editor.

5. Perform a normal system shutdown and reboot the server to load the new driver.

Chapter **8**

Installing Drivers for Banyan VINES

This chapter outlines the driver installation steps for the Banyan VINES 6.x or 7.x operating system to support the Compaq Fibre Host Adapter.

Before installing the drivers, you should already have:

■ Updated your system firmware by running System ROMPaq
  (see Chapter 2)

■ Configured the hardware by running the System Configuration Utility

Installing the Driver

The instructions in this section can be used to install the initial driver for a new Fibre Host Adapter installation or to upgrade the driver in an existing Banyan VINES 6.x or 7.x server with a Fibre Host Adapter.

Materials Needed

You will need the following items to manually install the Banyan VINES driver for the Fibre Host Adapter on your server:

■ Compaq SmartStart and Support Software CD V4.3x or later

■ Blank diskettes

■ Access to a server or workstation with a bootable CD-ROM drive. This may be the system in which you are installing the Fibre Host Adapter.

Creating the Peripheral Adapter Support Software Diskettes

The Banyan VINES 6.x and 7.x drivers with installation procedures and other information for the Compaq Fibre Host Adapter are located on the Compaq SmartStart and Support Software CD V4.3x or later. To gain access to the drivers, you will first need to create the Peripheral Adapter Support Software for VINES 6.x and 7.x diskettes. These diskettes contain the latest drivers and supporting documentation for all Compaq equipment (except NICs) supported by Banyan VINES 6.x or 7.x.

To create the diskettes:

1. Boot the server from the Compaq SmartStart and Support Software CD.

2. From the Compaq System Utilities screen, select *Create Support Software*.

3. From the Diskette Builder screen, select *Create Support Software Diskettes from CD only*.

4. Scroll through the list and select *Peripheral Adapter Support Software for VINES 6.x and 7.x.*

5. Follow the instructions on the screen to create the diskettes.

Additional Information

The last Peripheral Adapter Support Software diskette is a bootable DOS documentation diskette. The *README.SSD* file on this diskette contains a short description of the drivers and includes a procedure for installing the Fibre Host Adapter driver. To access this file, follow the instructions on the diskette label.

Installation Procedures

To install the Fibre Host Adapter driver, follow the installation procedures specified in the *README.SSD* file.

Appendix A

Electrostatic Discharge

A discharge of static electricity from a finger or other conductor may damage printed circuit boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Preventing Electrostatic Damage

To prevent electrostatic damage, observe the following precautions:

■ Avoid hand contact by transporting and storing parts in static-safe containers.

■ Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.

■ Place parts on a grounded surface before removing them from their container.

■ Avoid touching pins, leads, or circuitry.

■ Always make sure you are properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following measures when handling or installing electrostatic-sensitive parts:

■ Use a wrist strap connected by a ground cord to a grounded workstation or the computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm +/- 10 percent resistance in the ground cords.

■ Use heel straps, toe straps, or bootstraps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.

■ Use conductive field service tools.

■ Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, arrange to have an Authorized Compaq Service Provider install the part.

NOTE: For additional information on static electricity, or assistance with the installation of this product, contact your Authorized Compaq Service provider.

Appendix **B**

Regulatory Compliance Notices

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (that is, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCC Logo or FCC ID on the label. Class A devices do not have an FCC Logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A Equipment

This equipment has been tested and found to comply with the limits for a
Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are
designed to provide reasonable protection against harmful interference when
the equipment is operated in a commercial environment. This equipment
generates, uses, and can radiate radio frequency energy and, if not installed
and used in accordance with the instructions, may cause harmful interference
to radio communications. Operation of this equipment in a residential area is
likely to cause harmful interference, in which case the user will be required to
correct the interference at personal expense.

Class B Equipment

This equipment has been tested and found to comply with the limits for a
Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are
designed to provide reasonable protection against harmful interference in a
residential installation. This equipment generates, uses, and can radiate radio
frequency energy and, if not installed and used in accordance with the
instructions, may cause harmful interference to radio communications.
However, there is no guarantee that interference will not occur in a particular
installation. If this equipment does cause harmful interference to radio or
television reception, which can be determined by turning the equipment off
and on, the user is encouraged to try to correct the interference by one or more
of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to
  which the receiver is connected.

- Consult the dealer or an experienced radio or television technician for
  help.

Modifications

The FCC requires the user to be notified that any changes or modifications
made to this device that are not expressly approved by Compaq Computer
Corporation may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Declaration of Conformity, United States Only

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

For questions regarding this declaration, contact:

Compaq Computer Corporation
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

Or call (281) 514-3333

To identify this product, refer to the Series number found on the product.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards):

■ EN55022 (CISPR 22) - Electromagnetic Interference

■ EN50082-1 (IEC801-2, IEC801-3, IEC801-4) - Electromagnetic Immunity

■ EN60950 (IEC950) - Product Safety

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文を
お読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
に基づくクラスB情報技術装置です。この装置は、家庭環境で使用すること
を目的としていますが、この装置がラジオやテレビジョン受信機に近接して
使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に
基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

Laser Devices

The GigaBit Interface Converter (GBIC) module contains a laser device. All Compaq systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

Laser Safety Warnings

> ⚠ **WARNING:** To reduce the risk of exposure, to hazardous radiation, do not try to open the enclosure. Allow only an authorized Compaq Service Provider to repair the laser equipment.

> ⚠ **WARNING:** To reduce the risk of exposure to hazardous radiation, do not operate controls, make adjustments, or perform procedures to a laser device other than those specified herein or in the GBIC installation guide.

Compliance with CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States. This device is classified as a Class 1 laser product as defined by IEC 825.

Laser Product Label

The following label or equivalent is located on the surface of your GBIC module.

CLASS 1 LASER PRODUCT

This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.

Figure B-1. Laser Product Label

Laser Information

Table B-1
Laser Information

Laser Type	Semiconductor GaAlAs
Wave Length	780 nm +\- 35 nm
Divergence Angle	53.5 degrees +\- 0.5 degrees
Output Power	Less than 0.2 mW/10, 869 Wm −2 sr −1
Polarization	Circular 0.25
Numerical Aperture	0.45 inches +\- 0.04 inches

Appendix *C*

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Website

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. You can access the Compaq website:

http://www.compaq.com.

Telephone Numbers

Contact your nearest Compaq Authorized Reseller or Service Provider for more information.

■ For the name of your nearest Compaq Authorized Reseller:

❑ In the United States, call 1-800-345-1518

❑ In Canada, call 1-800-263-5868

■ For Compaq technical support:

❑ In the United States and Canada, call 1-800-386-2172

❑ Elsewhere, call one of the numbers listed in Table C-1

Table C-1
Compaq Worldwide Technical Support
Telephone Numbers

Location	Voice	FAX
APD	65-7503030	65-7504909
Argentina	54-13133100	54-13133100 Ext. 21
Australia	61-2-9911-1955	61-2-9911-1900
Austria	0222-87816-16	0222-87816-82
Bahrain	973-210-214	
Belgium	(02) 716-96-96	(02) 725-22-13
Brazil	55 11 5505-3600	55 11 5505-3922 Ext. 4336
Canada	1-800-386-2172	
Caribbean	1-800-345-1518	
Central America	281-378-2206	
Chili	562-274-3007	
China	86-10-834-6721	86-10-834-6713
Colombia	571-345-0266	571-312-0157
Czech Republic	42-2-232-8772	42-2-232-8773
Denmark	45-90-4545	45-90-45-95
Equador	593-2504540	
Europe/Middle East/Africa	(49) 089-9933-2891	
Finland	9800-206-720 (+358-800-1-206720)	90-6155-9899 (+358-0-61559899)
France	(33 1) 41-33 4455	(33 1) 41-33-4263
Germany	0180-5-212111	089-9933-3399
Hong Kong	852-90116633	852-28671734
Hungary	36-1-201-8776	36-1-201-9696
India	(91-80) 5596023	

Telephone Numbers *continued*

Location	Voice	FAX
Italy	392-57-90300	392-575-00686
Japan	0120-101589	+81 3-5402-5959
Korea	82-2-523-3575	82-2-3471-0321
Malaysia	(603) 718-1636	
Mexico	(525) 229-7910	(525)229-7988
Netherlands	06-91681616	06-8991116
New Zealand	649-307-3969	
Norway	22-072-020	22-072-021
Poland	48-2-630-3535	48-2-630-3553
Portugal	351-1-4120132	351-1-4120654
Singapore	65-7503030	65-7504909
South Africa	+27-11-728-6999	+27-11-728-3335
Spain	341-640-1302	341-640-0124
Sweden	(46) 8 703 5240	(46) 8 703 5222
Switzerland	411 838 410/2222	01-837-0969
Taiwan	(886) 2 3761170	(886) 2 7322660
Thailand	62-2-679-6222	62-2-679-6222
United Kingdom	44-81-332-3888	44-81-332-3409
United States	1-800-386-2172	1-800345-1518
Venezuela	(582) 953.69.44	(582) 952.86.70

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