

Chapter 5

SYMBIOS SCSI DEVICE DRIVERS

Overview

This chapter provides information about Windows 98/NT installation procedure.

5.1 DOS.TXT

INSTALLATION GUIDE FOR THE SDMS 4.0 DOS DRIVERS

This file describes the features and use of the Symbios SDMS device drivers for the DOS/Windows operating system environment. It is divided into the following sections:

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Introduction

In SDMS 4.0, the SCSI BIOS for the Symbios family of PCI SCSI chips is capable of mapping SCSI hard disk drives behind any non-SCSI hard disk drives (IDE, ESDI, etc.) within the same system. A driver-less solution will allow connection of up to 24 hard drives (SCSI and non-SCSI) under DOS 5.0 and above.

Full Virtual DMA Services (VDS), including features such as scatter-gather, are also supported by the SCSI BIOS. Therefore, to gain maximum performance, you should disable any double buffer option provided by disk caching software (such as Microsoft's SMARTDRV.EXE) for all drives handled through SDMS.

When You Need to Load Drivers

Connecting peripherals other than hard disk drives requires loading the appropriate driver. Some of the drivers work together, and some are capable of direct communication with a Symbios PCI/SCSI controller.

ASPI8XX.SYS

This driver is an ASPI (Advanced SCSI Programming Interface) manager which provides standard ASPI compatibility between your SCSI host adapter hardware and ASPI compatible applications.

YMDISK.SYS

This is a device driver for non-INT13h SCSI disk drives and removable media devices, and it works through the ASPI manager.

SYMCD.SYS

This is a device driver for CD-ROM drives, and it works through the ASPI manager.

The following sections list these drivers, their features, and their loading requirements.

Installation of SDMS Drivers for DOS

Using the DOS Installation Utility

The Symbios SDMS DOS Installation Utility provides a quick and easy method for performing either an automatic or custom installation of the SCSI device drivers in a DOS/Windows environment. It works with any system using an SDMS supported Symbios SCSI chip. The DOS Installation Utility identifies the system, scans the SCSI bus, and properly installs the needed SCSI device drivers.

The SDMS Software Device Drivers diskette that contains the DOS device drivers also holds the DOS Installation Utility. To use the utility, insert the

disk into your floppy drive while in the DOS environment, and type:

INSTALL

Press Enter, and then follow the directions presented on the screen.

When performing a custom installation, an understanding of the information presented in the following sections for manual installation may prove useful.

About Your ASPI8XX.SYS Driver

Features

- Supports Advanced SCSI Programming Interface (ASPI) applications
- Supports up to eight host adapters
- Releases initialization code for smaller runtime size
- Works with or without a SDMS 3.0 or SDMS 4.0 Bootrom
- Performs synchronous negotiation
- Supports target initiated negotiation
- Performs Wide SCSI
- Supports Ultra2 SCSI (80 MBytes/Sec when using Wide SCSI)
- Has full Virtual DMA Services (VDS) support, including scatter-gather
- Allows Disconnect/Reselect
- Supports adapter exclusion
- Allows shared interrupts
- Supports single-threaded I/O
- Supports DMI Non-Volatile Storage (NVS) (can read device configuration information from NVS when NVRAM is not present for the device)
- Support for Symbios usage of PCI Subsystem ID to control various features and configuration settings (See PCI Subsystem ID Definitions for SCSI Class, rev. 1.03, dated 5/28/97)
- Supports booting from a CD-ROM

Description

ASPI8XX.SYS

This driver is an ASPI manager that provides an interface to popular ASPI applications. It is required when you want to use SYMDISK.SYS or SYMCD.SYS, or whenever you want to run an ASPI application.

This interface replaces an SDMS BIOS (if present), and fully supports all devices supported by the BIOS. If an SDMS BIOS is not present, only an ASPI interface is provided.

Installing Your ASPI8XX.SYS Driver

To install the ASPI8XX.SYS driver, follow these steps:

1. Use the COPY command to copy the ASPI8XX.SYS driver from the SDMS SCSI Drivers diskette to your boot disk.
2. Add this line to the system's CONFIG.SYS file:

DEVICE=C:[path]ASPI8XX.SYS

This line must appear before any line loading other SDMS drivers (such as, SYMCD.SYS, SYMDISK.SYS), or any other ASPI compliant driver/application.

Command Line Options

The ASPI8XX.SYS driver has several configurable features that are set via switches on the command line in your CONFIG.SYS file.

The command line options are as follows and the usage is detailed below:
/NORST, /ASK, /WIDTH (or /W), /DISCONNECT (or /DC), /SYNCH_RATE (or /SR), /PARITY (or /P), /EXCLUDE (or /X), /HOST_ID (or /ID), /SCAM, /TIMEOUT (or /T), /VERBOSE (or /V)

In the following descriptions, “path” refers to the adapter number (boot order designation), and “id” refers to the SCSI ID. The following conventions are also used:

[] items in brackets are optional

* means repeat item 0 or more times

IMPORTANT: No spaces are allowed within a single command line option, but spaces are required between different command line options. Using these command line options will override the settings in the SCSI BIOS Configuration Utility.

Using the /NORST Option

This option prevents a SCSI bus reset during loading of ASPI8XX.SYS.

For example, if a SCSI bus reset is not desired during load, the line in the CONFIG.SYS file that loads ASPI8XX.SYS would look like this:

DEVICE=C:[PATH]ASPI8XX.SYS /NORST

Using the /ASK Option

This option prompts at system boot-up time about loading the ASPI8XX.SYS driver.

Option Syntax: /ASK

For example, to activate this option, the line in your CONFIG.SYS file that loads ASPI8XX.SYS should look like this:

DEVICE=C:[PATH]ASPI8XX.SYS /ASK

Using the /WIDTH (or /W) Option

The width parameter defines the maximum data width negotiated with a device. This option is used with host adapters capable of 16-bit data transfers. Valid settings are 8 or 16.

Option Syntax: /WIDTH=n<path[:id]>[,n<path[:id]>]*

For example, if your first host adapter (boot order designation = 0) is a 16-bit adapter, and you wish to force 8-bit transfers to a device at SCSI ID 2, the line in the CONFIG.SYS file that loads ASPI8XX.SYS should look like this:

```
DEVICE=C:[PATH]ASPI8XX.SYS /WIDTH=8<0:2>
```

Using the /DISCONNECT (or /DC) Option

This option allows a device to disconnect since SCSI devices have the ability to disconnect from the bus during an I/O transfer. If a particular host adapter has parity checking disabled, all devices attached to it must have disconnects disabled, since parity is required during the reselection phase.

Valid options are ON (allow disconnects) or OFF (do not allow disconnects). The default for all devices is ON.

Option Syntax: /DISCONNECT=n<path[:id]>[,n<path[:id]>]*

For example, to disable disconnects on the device attached to the first host adapter (boot order designation = 0) at SCSI ID 2, the line in the CONFIG.SYS file that loads ASPI8XX.SYS should look like this:

```
DEVICE=C:[PATH]ASPI8XX.SYS /DISCONNECT=OFF<0:2>
```

Using the /SYNCH_RATE (or /SR) Option

This option sets the maximum synchronous transfer rate (in mega transfers per second) to negotiate with a particular device. The allowable values are 0, 5, 10, 20, and 40 providing the host adapter is capable of the specified speed. Specify 0 (zero) to turn off synchronous transfers for a particular device. The default value is the fastest rate supported by your host adapter.

Option Syntax: /SYNCH_RATE=n<path[:id]>[,n<path[:id]>]*

For example, to turn off synchronous transfers to the device attached to the first host adapter (boot order designation = 0) at SCSI ID 3, the line in the CONFIG.SYS file that loads ASPI8XX.SYS should look like this:

```
DEVICE=C:[PATH]ASPI8XX.SYS /SYNCH_RATE=0<0:3>
```

Note: When executing synchronous transfers using an 8-bit SCSI bus, mega bytes per second = mega transfers per second. Also, when you are doing synchronous transfers using a 16-bit SCSI bus, mega bytes per second = 2 * mega transfers per second.

Using the /PARITY (or /P) Option

This option tells the host adapter to disable the SCSI bus data integrity checking feature known as parity. Some SCSI devices do not generate parity. Valid options are ON (check parity) or OFF (do not check parity). The default for all devices is ON.

Warning: When disabling parity checking, also disable disconnects for that adapter since you cannot disable parity checking for reselection. If a device does not generate parity, and it disconnects, the I/O will never complete.

Option Syntax: /PARITY=n<path[,path]*>[,n<path[,path]*>]*

For example, to turn off parity checking on the first host adapter (boot order designation = 0), the line in your CONFIG.SYS file that loads ASPI8XX.SYS should look like this:

```
DEVICE=C:[PATH]ASPI8XX.SYS /PARITY=OFF<0>
```

Using the /EXCLUDE (or /X) Option

This option allows you to exclude support for an adapter that does not currently have BIOS support. You may not exclude an adapter that is supported (included) by the BIOS when you boot your system. This option has three required parameters:

1. PCI Device ID
 2. PCI Bus Number
 3. PCI Device/Function Number
-

These parameters identify the specific adapter you want to exclude. To obtain these parameters, boot your system using the `/VERBOSE` command line option (explained later in this section). Your monitor displays the parameters for the adapter or path you wish to exclude.

Option Syntax: `/EXCLUDE<a:b:c>[,<a;b;c>]*`

For example, if you found the adapter you wish to exclude to have PCI Device ID 3, PCI Bus Number 0, and PCI Device/Function Number 68, then the line in the `CONFIG.SYS` file that loads `ASPI8XX.SYS` should look like this:

```
DEVICE=C:[PATH]ASPI8XX.SYS/EXCLUDE<3:0:68>
```

Using the `/HOST_ID` (or `/ID`) Option

This option lets you alter the SCSI ID for a host adapter. On an 8-bit adapter, the SCSI IDs are 0-7. On a 16-bit adapter, the SCSI IDs are 0-15 (it is suggested that IDs 8-15 not be used for your adapter). This option will not allow you to select a SCSI ID already in use.

If the host adapter allows connection of both 8-bit and 16-bit devices to the same bus, and the adapter number is changed to greater than 7, then the 8-bit SCSI devices will not be able to reselect the initiator.

Note: You are not allowed to change the SCSI ID of any adapter currently supported by the BIOS.

Option Syntax: `/HOST_ID=n<path>[,n<path>]*`

For example, to change the SCSI ID of your second host adapter (`path=1`) to `ID=6` (providing that adapter is not controlled by the BIOS), the line in the `CONFIG.SYS` file that loads `ASPI8XX.SYS` should look like this:

```
DEVICE=C:[PATH]ASPI8XX.SYS/HOST_ID=6<1>
```

Using the /SCAM Option

This option allows you to enable support for the SCSI Plug and Play protocol called SCAM (SCSI Configured AutoMatically). SCAM support is OFF by default in versions 4.09 and above for the ASPI Manager. You may change the SCAM setting only if the path (adapter) specified is not controlled by the BIOS.

Option Syntax: /SCAM=n<path>[,n<path>]*

For example, to turn on SCAM support on the second host adapter (boot order designation = 1), the line in the CONFIG.SYS file that loads ASPI8XX.SYS should look like this:

DEVICE=C:[PATH]ASPI8XX.SYS /SCAM=ON<1>

Using the /TIMEOUT (or /T) Option

The ASPI8XX.SYS driver uses a time-out mechanism to detect certain errors. When the driver issues a command to a SCSI device, a timer is started. If the timer expires before the command completes, the driver assumes something has gone wrong, and takes steps to recover. The default for this option is 10 seconds, if the device is BIOS controlled. If the device is not BIOS controlled, the default is 0. Also, non-volatile memory settings can alter these defaults. The maximum setting is 0, which is no time-out. The range of allowable values is 0-65535 seconds.

Option Syntax: /TIMEOUT=n<path[:id]>[,n<path[:id]>]*

For example, you might have a particularly slow device (with SCSI ID 3) on the first host adapter (boot order designation = 0). If you wish to extend the time-out for this device to 60 seconds, the line in the CONFIG.SYS file that loads ASPI8XX.SYS should look like this:

DEVICE=C:[PATH]ASPI8XX.SYS /TIMEOUT=60<0:3>

Using the /VERBOSE (or /V) Option

This option causes more detailed information to appear on your monitor, after the ASPI8XX.SYS driver is initialized, during a system boot. For example, the following may be displayed after using the /VERBOSE or /V option:

```
53C875 Rev 3 at PCI ID 15, Bus 0, Dev/Func 70h, CMD=0117h,  
SCRIPTS=FFFBE000h
```

This option is useful if you have multiple adapters in the system and need to know the PCI Device ID, the PCI Bus number, and the PCI Device/Function number for each adapter. This information is required to use the /EXCLUDE option already described in this section.

Option Syntax: /VERBOSE

For example, to see more detailed adapter information displayed when you boot, the line in the CONFIG.SYS file that loads ASPI8XX.SYS should look like this:

```
DEVICE=C:[PATH]ASPI8XX.SYS /VERBOSE
```

Troubleshooting

The following are some potential problems and their suggested solutions.

Problem: System Locks up at boot time.

Solution:

- a. Check for conflicts with other ASPI managers.
- b. Check for correct loading sequence in the CONFIG.SYS file.
- c. Boot the system.

Problem:

The device driver does not recognize one of the non-boot SCSI peripherals (system may lock up).

Solution:

- a. Make sure the drivers were installed in the correct sequence.
- b. Make sure the drivers' CONFIG.SYS line has the correct path to the drivers.
- c. Power down all units in the system.
- d. Make sure all SCSI devices have unique ID numbers.
- e. Make sure both ends of the SCSI bus are terminated.
- f. Check all cable and power connections.
- g. Boot the system.

About Your SYMDISK.SYS Driver

Features

- Supports up to 8 host adapters
- Supports removable media devices
- Supports magneto optical devices
- Supports non-512-byte sectors (1024, 2048, 4096)
- Supports multiple logical unit number (LUN) support
- Supports OS/2 floppy format for MO and hard disks
- Supports multiple host adapters when adapter has not been controlled by the SCSI BIOS (no INT13h devices)
- Can reserve drive letters for installed devices without media present in the device (see /UNITS under Command Line Options)
- Can add drive letters
- Supports power management (to spin down drives)

Description

The SYMDISK.SYS driver is needed when connecting drives with non-512-byte sectors, and when connecting removable drives if the user wants to change the media. It is also required to obtain drive letters for devices (adapters) that are not supported by a BIOS. SYMDISK.SYS communicates through ASPI8XX.SYS. To use the SYMDISK.SYS driver you must load ASPI8XX.SYS also.

Installing Your SYMDISK.SYS Driver

To install the SYMDISK.SYS driver, follow these steps:

1. Use the COPY command to copy the appropriate drivers from the SDMS SCSI Drivers disk to your boot disk.
2. Add the lines shown below to the system's CONFIG.SYS file. The ASPI8XX.SYS driver is also required. List the drivers in this sequence:

```
DEVICE=C:[PATH]ASPI8XX.SYS  
DEVICE=C:[PATH]SYMDISK.SYS
```

Command Line Options

The SYMDISK.SYS device driver has several embedded functions that are accessed via switches on the command line. These options are described below, and use the following conventions:

```
[ ] items in brackets are optional  
* items in brackets followed by an * means repeat 0 or  
more times  
| choose one of the given items
```

IMPORTANT: No spaces are allowed in a single command line option, but spaces are required between different command line options.

Using the /ASK Option

This option prompts the user at system boot-up whether to load SYMDISK.SYS or not. To use this option, the line in the CONFIG.SYS file that loads SYMDISK.SYS should look like this:

```
DEVICE=C:[PATH]SYMDISK.SYS /ASK
```

Using the /UNITS= Option

Note: Symbios recommends that this option be used when using removable media with more than one partition.

The SYMDISK.SYS device driver allows the use of removable media, such as cartridge hard drives, each of which might have a different number of partitions. If media with more than one partition are used, set this option to the maximum number of partitions on any one media. To use this option, the line in the CONFIG.SYS file that loads SYMDISK.SYS should look like this (all on one line):

```
DEVICE=C:[PATH]SYMDISK.SYS /UNITS=path:id:lun:num_units  
[.path:id:lun:num_units]*
```

For example, if there is a removable media drive at SCSI ID 2 on the first host adapter, and you need to reserve three partitions, the command line should look like this:

```
DEVICE=C:[PATH]SYMDISK.SYS /UNITS=0:2:0:3
```

When SYMDISK.SYS initializes, it defaults to either:

- a. One drive letter for a removable media device with no media present.

-OR-

- b. The number of partitions found on the media in the removable media device.

Note: The full path, id, lun, and num_units values are required for this option. Also, there is a limit of 24 devices.

Using the /EXCLUDE= Option

This option allows a user to exclude a “path:id:lun” combination from being scanned or controlled by SYMDISK.SYS. The path parameter is mandatory with all ids and luns for that path excluded by default if just the path is specified. To use this option, the line in the CONFIG.SYS file that loads SYMDISK.SYS should look like this:

```
DEVICE=C:[PATH]SYMDISK.SYS /EXCLUDE=path[:id[:lun]]  
[,path[:id[:lun]]]*
```

For example, if the path is 0, id 2, and lun 0, the command line should look like this:

```
DEVICE=C:[PATH]SYMDISK.SYS /EXCLUDE=0:2:0
```

Note: There is a limit of 24 “path:id:lun” combinations allowed.

Using the /SSIZE= Option

The SYMDISK.SYS device driver defaults to the largest sector size found during boot, handling all different sector sizes found. In the case of removable media, SYMDISK.SYS assumes a 2048 byte sector size when no media is present. This option overcomes this limitation. To use this option, the line in the CONFIG.SYS file that loads SYMDISK.SYS should look like this:

```
DEVICE=C:[PATH]SYMDISK.SYS /SSIZE=512|1024|2048|4096
```

For example, if a removable media drive is used that has a sector size of 2048 bytes, the command line should look like this:

```
DEVICE=C:[PATH]SYMDISK.SYS /SSIZE=2048
```

Note: If SYMDISK.SYS comes across a sector size larger than the one specified in this option, or if it finds a sector larger than the default, it will refuse to read/write to that media. It will report an invalid media error to DOS.

Using the /SPINDOWN= Option

This is a power management feature that automatically spins down a disk when the disk is not accessed for a specified amount of time. The default spindown time is 15 minutes. You can specify a new spindown time in hours and minutes (hh:mm) with a minimum time of 1 minute. To use this option,

the line in the CONFIG.SYS file that loads SYMDISK.SYS should look like this (all on one line):

```
DEVICE=C:[PATH]SYMDISK.SYS /  
SPINDOWN=hh:mm<path[:id[:lun]]>  
[,hh:mm<path[:id[:lun]]>]
```

For example, to spindown a device on path 0, id 2, and lun 0, after one hour and five minutes of inactivity, the command line should look like this:

```
DEVICE=C:[PATH]SYMDISK.SYS /SPINDOWN=1:5<0:2:0>
```

-Or-

To spindown all devices after the default time-out of 15 minutes, the command line should look like this:

```
DEVICE=C:[PATH]SYMDISK.SYS /SPINDOWN=<>
```

Remember, the <> are required when you specify a path:id:lun in this option.

Troubleshooting

The following are some potential problems and their suggested solutions:

Problem:

The computer locks up and will not complete booting from a non-SCSI hard disk drive.

Solution:

a. Refer to the drive manufacturer's user manual.

Problem:

The computer locks up and will not complete booting from a SCSI hard disk drive.

Solution:

Note: If the SCSI BIOS is seen during boot, a banner similar to the following appears:

Symbios SDMS (TM) v4.0 PCI SCSI BIOS, PCI Rev. 2.0, 2.1
Copyright 1995 Symbios PCI-4.09.00

a. Is the SCSI BIOS seen during boot?

YES Go to b.

NO Power down all units in the system.

Remove all SCSI cables.

Boot system.

Is the SCSI BIOS seen during boot?

YES Power down all units in the system.

Reconnect and check all cable and power connections.

Boot system.

Go to a.

NO Power down all units in the system.

Reseat the host bus adapter.

Check CMOS setup.

Boot system.

Go to a.

b. Does the SCSI BIOS see the bootable SCSI drive?

Note: When the computer boots, SDMS scans the SCSI bus. Devices found on the SCSI bus are identified as in the following lines:

HA	ID	LUN	VENDOR	PRODUCT	REV
0	2	0	SEAGATE	ST31230N	0060
0	7	0	Symbios	SYM53C815	0003

YES Go to c.

NO Power down all units in the system.
 Make sure the hard drives have different ID numbers (boot drive should have lowest ID).
 Make sure both ends of the SCSI bus are terminated.
 Check all cable and power connections.
 Check CMOS setup.
 Boot system.
 Go to a.

c. If boot is still unsuccessful, follow the solution to the next problem.

Problem:

The device driver does not recognize one of the non-boot SCSI peripherals (system may lock up).

Solution:

- a. Make sure the drivers were installed in the correct sequence.
- b. Make sure the drivers' CONFIG.SYS line has the correct path to the drivers.
- c. Power down all units in the system.
- d. Make sure the hard drives have different ID numbers (boot drive should have lowest ID).
- e. Make sure both ends of the SCSI bus are terminated.
- f. Check all cable and power connections.
- g. Boot the system.

About Your SYMCD.SYS Driver

Features

- Compatible with Microsoft's CD-ROM Extension 2.21 and above
- Multi-session Photo CD support
- Supports up to eight host adapters

Description

The SYMCD.SYS device driver is needed whenever a CD-ROM device is connected on the SCSI bus. You must load it in conjunction with Microsoft's CD-ROM Extension 2.21 or above (MSCDEX.EXE). SYMCD.SYS communicates through ASPI8XX.SYS, so you must load ASPI8XX.SYS to use SYMCD.SYS.

Installing Your SYMCD.SYS Driver

To install the SYMCD.SYS driver, follow these steps:

1. Use the COPY command to copy the appropriate driver(s) from the SDMS SCSI Drivers diskette to your boot disk.
2. Add SYMCD.SYS to the CONFIG.SYS file. It goes in after ASPI8XX.SYS and SYMDISK.SYS (if this driver is also being used), in this order:

```
DEVICE=C:[PATH]ASPI8XX.SYS
DEVICE=C:[PATH]SYMDISK.SYS
DEVICE=C:[PATH]SYMCD.SYS /D:NAME
```

Note: The /D: is not a drive letter designation; it indicates the name you wish assigned to your CD-ROM. You must include the NAME, which can use any combination of up to 8 characters.

3. To ensure that sufficient drive letters are available to identify all devices connected to the SCSI bus, add the MS-DOS LASTDRIVE command to the CONFIG.SYS file:

```
LASTDRIVE=x
```

where x specifies a drive letter in the range C through Z. The letter assigned to LASTDRIVE represents the last valid drive MS-DOS is able to recognize and also represents the maximum number of drives available. For example, LASTDRIVE=K allows access to eleven (11) logical drives. For further details about LASTDRIVE, consult your MS-DOS manual.

4. Unless your CD-ROM access software specifies otherwise, Microsoft's CD-ROM Extension (MSCDEX.EXE) should execute from the AUTOEXEC.BAT file in order to access your drive. Add the following line to the AUTOEXEC.BAT file:

```
[PATH]MSCDEX /D:NAME
```

For example, if:

```
DEVICE=C:[PATH]SYMCD.SYS /D:MY_CD
```

is in the CONFIG.SYS file, then:

```
[PATH]MSCDEX /D:MY_CD
```

should exist in the AUTOEXEC.BAT file. The /D: switches must match.

5. Check installation instructions for the CD-ROM drive itself for other parameters necessary to include with MSCDEX.
6. When MSCDEX is loaded during the AUTOEXEC.BAT file execution, a message is returned assigning a drive letter to the CD-ROM drive. For example:

```
DRIVE E=DRIVER MY_CD UNIT 0
```

This informs the user that the CD-ROM drive is recognized and ready for use.

Command Line Options

The SYMCD.SYS device driver has several embedded functions available that are accessed via switches on the command line. An explanation of these options follows:

IMPORTANT: No spaces are allowed in a single command line option, but spaces are required between different command line options.

Using the /ASK Option

This option prompts the user at initialization time whether to load SYMCD.SYS or not. For example, the line in the CONFIG.SYS file that loads SYMCD.SYS would look like this:

```
DEVICE=C:[PATH]SYMCD.SYS /D:MY_CD /ASK
```

Using the /UPTOLUN= Option

This option changes the default for multiple LUNs per Target ID on the SCSI bus. The current default is to scan all LUNs. CD-ROM changers that use multiple LUNs work by default. To turn off scanning all LUNs on a SCSI bus, choose /UPTOLUN=0. This saves some time during boot.

Using the /NOBCD Option

This option supports the Trantor Music Box CD audio application. Using this option prevents the track numbers from being converted to BCD (Binary Coded Decimal). If this option is used with CD audio applications such as Adaptec's cdplayer, Corel's cd-audio, or Future Domain's cdaudio, track numbers >16 are not reported correctly because these applications require binary track numbers.

For this option, the line in the CONFIG.SYS file that loads SYMCD.SYS would look like this:

```
DEVICE=C:[PATH]SYMCD.SYS /NOBCD
```

Troubleshooting

The following are some potential problems and their suggested solutions:

Problem:

The CD-ROM drive is not seen at boot time, or the system locks up.

Solution:

- a. Make sure the required drivers are installed and in the correct sequence.
- b. Make sure the drivers' CONFIG.SYS line has the correct path to the driver.
- c. Make sure MSCDEX, in the AUTOEXEC.BAT, has the same drive name as the CD-ROM driver in the CONFIG.SYS file.
- d. Make sure there is no ID or drive letter designation conflict.
- e. Power down all units in the system.
- f. Check the cable and power connections.
- g. Make sure the SCSI bus is properly terminated.
- h. Make sure sufficient drive letters are specified (through the MS-DOS lastdrive= command) to include your CD-ROM. A CD-ROM that uses multipledisks requires a letter for each disk.

Important Additional Information For DOS Users**Assignment of Drive Letters**

The MS-DOS operating system assigns drive letters to primary partitions first. After the primary partitions have been assigned drive letters the logical partitions are assigned drive letters. Do not assume that the drive letter designations will follow consecutively from device-to-device within a PC system.

An Example:

A system is configured with an IDE hard disk as the boot drive, a SCSI hard disk, and a CD-ROM drive. The IDE drive has three partitions: one primary and two logical. The SCSI hard disk has two partitions: one primary and one logical. The SCSI hard disk is assigned ID one, and the CD-ROM is ID four. The distribution of the drive letters is:

A: 3 1/2" floppy drive
B: 5 1/4" floppy drive
C: IDE primary partition
D: SCSI primary partition
E: IDE first logical partition
F: IDE second logical partition
G: SCSI logical partition
H: CD-ROM

5.2 WIN9598.TXT

INSTALLATION GUIDE FOR THE SDMS DRIVERS:

SYMC8XX.MPD V4.09.00

SYM_HI.MPD V4.10.00

This file describes the features and use of the Symbios SDMS device drivers for the Windows 95/98 operating system environment. It is divided into the following sections:

Introduction for Windows 95/98

Features

Symbios Devices Supported

Description

Installing Your SYMC8XX.MPD/SYM_HI.MPD Driver(s)

Preparing a Symbios Driver Diskette

New System Installation

Existing System Installation

Existing System Using ASPI8XX.SYS DOS ASPI Driver

Verifying Correct Driver Installation

Command Line Options

Troubleshooting

Important Additional Information

Enabling/Disabling Ultra SCSI Support

Disabling Auto Request Sense Support

Enabling SCAM Support

Multiple Symbios Host Adapter Considerations

Introduction for Windows 95/98

Windows 95/98 is an operating system designed to run on Intel processors using current technology. It provides a graphical user interface environment incorporating many high-level features (refer to the Microsoft Windows 95/98 documentation for details). An I/O manager handles I/O requests in Windows 95/98.

To address a SCSI peripheral, the I/O manager goes through the appropriate drivers. Class drivers for hard disk, floptical, CD-ROM, printer, and scanner peripherals are provided in Windows 95/98. Other class drivers, provided by peripheral manufacturers, are added to support new devices.

Symbios/Microsoft provide miniport drivers, called SYMC8XX.MPD and SYM_HI.MPD, to complete the path to a Symbios controller or processor with an optional SDMS SCSI BIOS. The following sections describe these drivers and their installation.

Features

- Synchronous negotiation (including Fast/Ultra SCSI/Ultra2 SCSI)
- Wide negotiation
- Auto Request Sense
- Supports multiple host adapters
- Supports multiple Logical Unit Numbers (LUNs)
- Disconnect/Reselect
- Scatter-Gather
- Differential Support
- Supports SCSI pass-through functionality
- SCAM Support (SCSI Configured AutoMatically)
- Target initiated negotiation support
- NVRAM support (wide/sync parameters, SCSI Host ID, SCAM on/off)

Symbios Devices Supported

The SYMC8XX.MPD driver supports the following devices and Symbios host adapters based on those devices:

- SYM53C810, SYM53C810A, SYM53C810AE (SYM8100S, SYM8100ASP)
- SYM53C815 (SYM815XS, SYM8150SP)
- SYM53C825, SYM53C825A (SYM8250S, SYM8251S, SYM8251D, SYM8250ASP, SYM8251ASP, SYM8251AD)
- SYM53C860, SYM53C860AE (SYM8600SP)
- SYM53C875, SYM53C875E (SYM8750SP, SYM8751SP, SYM8751D)
- SYM53C876 (SYM22801, SYM22802)
- SYM53C885
- SYM53C895, (SYM8951U)

The SYM_HI.MPD driver supports the following device and associated Symbios host adapter:

- SYM53C896 (SYM22910)

Description

SYMC8XX.MPD and SYM_HI.MPD are designed to Microsoft's specification for miniport drivers. These drivers allow connection of SCSI devices including disk drives, CD-ROMs, and tape drives for PCI-based machines. To support a new SCSI device, the Windows 95/98 architecture requires that a class driver for that type device is present (usually supplied by Microsoft, or possibly by the peripheral manufacturer). No changes to SYMC8XX.MPD or SYM_HI.MPD are required. This driver is only supported under Windows 95/98.

SCSI commands are passed directly from a Windows application to the SCSI devices by using the SCSI pass-through facility (refer to Microsoft Windows 95/98 documentation for details). This facility allows applications to directly control and access SCSI devices by filling in a data structure and calling in to the port driver.

The SYMC8XX.MPD and SYM_HI.MPD drivers support Ultra SCSI protocol, providing twice the raw data transfer rate of Fast SCSI for disk drives and Symbios host adapters that support Ultra SCSI. These drivers also support Ultra2 SCSI protocol, providing quadruple the raw data transfer rate of Fast SCSI.

Caution: Ultra SCSI requires more stringent SCSI bus cabling setups than Fast SCSI. Ultra2 SCSI requires low-voltage differential (LVD) termination.

Installing Your SYMC8XX.MPD/SYM_HI.MPD Driver

Preparing a Symbios Driver Diskette

Copy the files listed below for the appropriate driver (supplied to you on diskette) to the root directory of a clean floppy diskette, and use this Symbios Driver diskette during installation.

For the SYMC8XX.MPD driver: SYMC8XX.MPD
SYM_C8XX.INF

For the SYM_HI.MPD driver: SYM_HI.MPD
SYM_HI.INF

New System Installation

This procedure installs the SYMC8XX.MPD or SYM_HI.MPD driver onto a Windows 95/98 system for all new system installations. Use this procedure when initially upgrading to Windows 95/98. Windows 95/98 automatically adds the driver to the registry and copies the driver to the appropriate directories.

NOTE: Some Symbios PCI SCSI host adapters are supported by a driver bundled in Windows 95/98. For these adapters, the bundled driver is automatically installed during Windows 95/98 Setup. To change to the SYMC8XX.MPD driver, follow the instructions under “Existing System Installation” after the Windows 95/98 installation is completed.

1. Start the Windows 95/98 Setup according to the Microsoft instructions.
2. Setup enters the hardware detection phase after a system reboot. The “Setting up Hardware” message box appears. If the message “Symbios PCI SCSI Host Adapter” appears, then the host adapter supports the bundled driver, and it installs automatically. After the Windows 95/98 installation completes, you can install the SYMC8XX.MPD and/or SYM_HI.MPD drivers according to the “Existing System Installation” instructions.
3. If the bundled driver does not support the host adapter, Setup displays a New Hardware Found - PCI SCSI Bus Controller dialog box. Select “Driver from disk provided by hardware manufacturer” and click OK.

Note: If ASPI8XX.SYS (the Symbios SDMS 4.0 DOS ASPI driver) is loaded when beginning the Windows 95/98 installation, no messages about PCI SCSI Bus Controllers are displayed. The installation completes, but real-mode disk drivers are used. See the section below on “Verifying Correct Driver Installation.” To install the SYMC8XX.MPD or SYM_HI.MPD drivers, (which disable loading of the ASPI8XX.SYS driver under Windows 95/98) see the section on “Existing System Using ASPI8XX.SYS DOS ASPI Driver” below.

4. Insert the Symbios Driver diskette into drive A: (or B:) (the one prepared in *Preparing a Symbios Driver Diskette*) and click OK. If using drive B:, you must select it from the pick list.
5. Windows 95/98 automatically copies the appropriate driver files and rebuilds its driver database.
6. A “System Settings Change” dialog box is displayed. Remove the diskette from the drive and click Yes to restart the computer.

At this point, Windows 95/98 Setup completes and the new driver is operational. To verify this, see the section “Verifying Correct Driver Installation.”

Existing System Installation

This procedure installs the SYMC8XX.MPD or SYM_HI.MPD driver onto an existing Windows 95/98 system. These instructions indicate where specific information applies to Windows 95 or Windows 98. Otherwise unless noted, the instructions apply to both operating systems. Please review the steps below before beginning the installation.

1. Boot Windows 95/98.
2. Click Start. Move to Settings, Control Panel, and click.
3. Double-click on the System icon.
4. Click on the Device Manager tab.

Note: If the SCSI controllers entry, or the PCI Symbios C8XX SCSI Host Adapter entry do not exist, the system is probably using the ASPI8XX.SYS DOS ASPI driver. See the “Existing System Using ASPI8XX.SYS DOS ASPI Driver” section below.

5. Either double-click on the SCSI controllers entry, or click once on the plus sign to the left of it.
6. Select the PCI Symbios C8XX SCSI Host Adapter entry. Click the Properties button.
7. Click the Driver button. In Windows 95, the version of the currently active driver should display in the File details section. In Windows 98, press the DRIVER FILE DETAILS button to get this information displayed.

Note: In certain versions of Windows 95, the version of the active driver appears as NOT available. This is an operating system issue and is fixed in later versions of Windows 95. To verify the version of the driver, click on the Properties field of the SYMC8XX.MPD file under the Version tab. The MPD driver is generally found in the \WINDOWS\SYSTEM\IOSUBSYS\ directory.

8. Click the Change Driver... button.
-

For Windows 95

9. Even though you may have previously installed the SYMC8XX.MPD or SYM_HI.MPD drivers, click the Have Disk... button to install a newer version.
10. Insert the Symbios Driver diskette in drive A: (or B:) (the one prepared in * Preparing a Symbios Driver Diskette *) and click OK. If using drive B:, you must select it from the pick list.
11. The Select Device dialog box should display “Symbios 8xxxx PCI SCSI Host Adapter,” where 8xxxx matches the installed adapter. Click OK.
12. The Driver tab is updated to display the new driver files. To install these driver files, click OK. (Do NOT click the Change Driver... button.) The driver files are copied and a new driver database is built.

For Windows 98

“Update Device Driver Wizard” starts and provides several windows with choices. Follow the steps below to correctly install the device driver for Windows 98.

9. After the Intro window appears, click on the NEXT button.
 10. The Wizard provides a choice between having the Wizard search for a better driver than the one in use or displaying a list of drivers from a specific location. Choose “search...” and click on the NEXT button.
 11. The next window allows the user to specify which device(s) will be searched, such as a Floppy, CD-ROM, or specify a specific path. Mark “Floppy disk drive” only and click on the NEXT button.
 12. The next window advises that the you continue using the currently installed driver. Mark “Install one of the other drivers” and click on the “View List” button.
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13. The next window displays a list of drivers from the specified search devices and the currently installed driver. Highlight the driver of choice and click OK.
 14. The previous window appears with the selected driver displayed as the driver to install. Click on the NEXT button.
 15. The summary window displays the driver of choice and the path to be installed from is brought up. Click on the NEXT button.
 16. The Wizard summary window appears. Click on the Finish button.
-

A “System Settings Change” dialog box appears. Remove the flex disk from the drive and click on the Yes choice to restart the computer.

At this point, the new driver is operational. To ensure the correct driver has been installed, see the section “Verifying Correct Driver Installation.”

Existing System Using ASPI8XX.SYS DOS ASPI Driver

This procedure installs the SYMC8XX.MPD or SYM_HI.MPD drivers onto an existing Windows 95/98 system which is using the ASPI8XX.SYS DOS ASPI driver. You can check this by using the Verifying Correct Driver Installation instructions below.

1. Boot Windows 95/98.
 2. Click Start. Move to Settings, Control Panel, and click.
 3. Double-click on the System icon.
 4. Click on the Device Manager tab.
 5. Either double-click on the Other entry, or click once on the plus sign to the left of it.
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6. Select the PCI SCSI Bus Controller entry. Click the Properties button.
7. Click the Driver button. A message should state that no drivers are installed for this device.
8. Click the Change Driver... button.
9. In the Select Hardware Type dialog box, select SCSI Controllers.
10. In the Select Device dialog box, click the Have Disk button.
11. Insert the Symbios Driver diskette in drive A: (or B:) (the one prepared in * Preparing a Symbios Driver Diskette *) and click OK. If using drive B:, you must select it from the pick list.
12. The Select Device dialog box should display “Symbios 8xxxx PCI SCSI Host Adapter”, where 8xxxx matches the installed adapter. Click OK.
13. The Driver tab is updated to display the new driver files. To install these driver files, click OK. (Do NOT click the Change Driver... button.) The driver files are copied and a new driver database is built.
14. A “System Settings Change” dialog box is displayed. Ignore the message saying to turn off your computer and change hardware settings. Remove the diskette from the drive and click Yes to shut down the computer. Press Ctrl-Alt-Delete or the system reset button to restart the system.

At this point, the new driver is operational. To verify this, see the section “Verifying Correct Driver Installation”

Verifying Correct Driver Installation

After installing/updating with the SYMC8XX.MPD or SYM_HI.MPD drivers, you should verify proper operation of the driver.

1. Check that all devices on the SCSI bus are available via My Computer. Double click on the My Computer icon. Check that all logical SCSI hard drives and CD-ROM drives are shown.
2. Click on the Start button. Move to Settings, Control Panel, and click. Double click on the System icon. Click the Device Manager tab. Check that no host adapter is displayed with a yellow or red symbol under the SCSI controllers entry. If there is, continue with the steps below to help determine the problem.
3. Either double-click on the SCSI controllers entry, or click once on the plus sign to the left of it. One entry for each host adapter installed in the system is displayed. Select an entry, then click the Properties button. The Device Status message should read "This device is working properly." If any other messages appear, continue with the steps below to get more information on the problem.
4. Click the Driver tab. For Windows 98, next hit Driver File Details. Two entries should appear, one for the INF and one for the MPD file. The INF file does not contain embedded version information, so the File Details are all Not Available. Select the MPD file. The file version of the driver is displayed.
5. Click Cancel to leave the Host Adapter Properties dialog box. Click on the Performance tab. A list of performance attributes is displayed. Below the list, you should see the message "Your system is configured for optimal performance." If any other messages appear, select each message and click the Details button. This provides more information on why the system is not performing optimally and methods to correct the problem.

If no problems are encountered in the above steps, the new driver is operating properly. Otherwise, consult the section on Troubleshooting for additional information.

Troubleshooting

The following are some problems their suggested solutions:

Problem:

During Installation, No SCSI Devices Are Found.

Solution:

- a. Ensure that all devices are powered on and terminated correctly.
- b. Check that no devices have duplicate SCSI IDs.
- c. Make sure INT A is assigned for the PCI slot(s) where your SCSI host adapter(s) are installed.
- d. Be sure that all devices appear properly in the display banner of the SDMS SCSI BIOS at boot time.

Problem:

System Crashes During Installation With A Message Indicating Inaccessible Boot Device.

Solution:

- a. This error is usually associated with an IRQ, DMA channel, I/O (chip) address, or BIOS address conflict. Set the SCSI host bus adapter board to use a different interrupt.

Problem:

Problems With Ultra SCSI Devices Using Ultra SCSI Protocol.

Solution;

- a. If the system is configured with a Symbios host adapter that supports Ultra SCSI, an Ultra SCSI device is on the SCSI bus, and Ultra SCSI support by the SYMC8XX.MPD or SYM_HI.MPD driver is enabled, intermittent problems and possible system crashes can occur if the SCSI bus cable and terminators do not conform to the Ultra SCSI specification.
- b. If the system is bootable, disable Ultra SCSI support using the procedure described below.
- c. If the system is not bootable to Windows 95/98, hold down F8 when Starting Windows 95/98... is displayed. At the menu, select Safe Mode. Once the system is booted, disable Ultra SCSI support using the procedure described below.

- d. If the system operates properly without Ultra SCSI enabled, it is highly likely that the SCSI bus cable and terminators are not configured correctly for Ultra SCSI. See the Symbios host adapter hardware manual for information on Ultra SCSI cabling requirements.
- e. Verify that the devices appear with the proper value for speed in the SDMS SCSI BIOS banner at boot time. Please see Chapter 2, “SCSI BIOS,” for additional details.

Problem:

Problems With Scanners

Solution:

- a. If a scanner is not operating properly (either the scanner is not found or a SCSI interface error occurs during scanning), it is possible that the third-party scanner drivers do not support the auto request sense feature of Symbios host adapters. Disable the auto request sense feature as described below and try the scanner operation again.

Command Line Options

Enabling/Disabling Ultra SCSI Support

Ultra SCSI support is controlled by settings in the adapter NVRAM. These settings can be viewed or changed via the Configuration Utility. During system boot, after the Symbios PCI BIOS banner, the message “Press Control-C to start Configuration Utility” appears for a few seconds. Press Control-C to start this utility.

Select one of the adapters displayed, then “Device Selections”. This shows the Sync Rate for each device and the selected adapter. To set a device to Ultra, the speed should be set to 20 MegaBytes/second (for width of 8) or 40 MegaBytes/second (for width of 16). To disable Ultra, the speed should be no higher than 10 MegaBytes/second (for width of 8) or 20 MegaBytes/second (for width of 16). If the speed of the adapter itself is changed, the speed for all devices will be set no higher than the adapter speed.

Disabling Auto Request Sense Support

When the SYMC8XX.MPD and/or SYM_HI.MPD drivers are installed, support for auto request sense is enabled. Auto request sense is a feature of the adapter where certain device information is obtained automatically without system control, thereby increasing overall performance. However, some third-party peripheral drivers do not support the use of auto request sense, resulting in perceived device failures. Therefore, to allow these devices to operate properly, the auto request sense feature can be disabled using the Device Manager on a per adapter basis.

Use this procedure for disabling auto request sense support:

1. Click on the Start button. Move to Settings, Control Panel, and click. Double click on the System icon. Click the Device Manager tab.
2. Either double-click on the SCSI controllers entry, or click once on the plus sign to the left of it. One entry for each host adapter installed in the system is displayed. Select the adapter desired, then click the Properties button. Click the Settings tab.
3. In the Adapter settings entry, type "DisableAutoReqSense=1;", without the quotes. If there is already an entry displayed, type the above at the end of the existing entry. Be sure to include the semi-colon.
4. Click OK to exit the Settings tab.
5. Click OK again. If the entry was changed, the "System Settings Change" dialog box is displayed. Click Yes to restart the computer.

After the system reboots, auto request sense is disabled for the selected adapter. To re-enable auto request sense, delete the entry that was made above. If other entries exist, be sure to leave them intact.

Enabling SCAM Support

SCAM (SCSI Configured AutoMatically) is a protocol that allows SCAM-compliant peripherals to assign their SCSI IDs dynamically at boot time, eliminating the need for the user to check and set unique SCSI IDs. This feature is disabled by default in the Symbios PCI BIOS and the SYMC8XX.MPD and SYM_HI.MPD drivers. Some legacy (non-SCAM) peripherals have problems with the SCAM protocol, resulting in the device either not being seen by the operating system, or not working correctly. However, if usage of the SCAM protocol is desired, there are two methods for enabling SCAM: Method 1 and Method 2.

Method 1

Use this method when the adapter has NVRAM. During system boot, after the Symbios PCI BIOS banner, the message “Press Control-C to start Configuration Utility” is displayed for a few seconds. Press Control-C to start this utility.

Select the desired adapter, then “Adapter Setup”. On the Adapter Setup menu, highlight “S-SCAM Support” and press Enter. Use the up/down arrows to select the ON setting, and press Enter. Exit from the menus and save the settings. This will turn on SCAM for both the PCI BIOS and the SYMC8XX.MPD or SYM_HI.MPD driver (whichever is controlling the selected adapter). To disable SCAM, repeat the above procedure to change the setting to OFF.

Method 2

For adapters that do not have NVRAM, SCAM can be enabled within Windows 95/98:

1. Click on the Start button. Move to Settings, Control Panel, and click. Double click on the System icon. Click the Device Manager tab.

2. Either double-click on the SCSI controllers entry, or click once on the plus sign to the left of it. One entry for each host adapter installed in the system appears. Select the adapter desired, then click on the Properties button. Click on the Settings tab.
3. In the Adapter settings entry, type in “do_SCAM=1;”, without the quotes. If there is already an entry displayed, type the above at the end of the existing entry. Be sure to include the semi-colon.
4. Click OK to exit the Settings tab.
5. Click OK again. If the entry was changed, the “System Settings Change” dialog box appears. Click Yes to restart the computer.

After the system reboots, SCAM is enabled for the selected adapter. To disable SCAM, delete the entry that was made above. If other entries exist, be sure to leave them intact.

Multiple Symbios Host Adapter Considerations

If multiple Symbios PCI SCSI host adapters are installed in the system, special actions are sometimes required to install or change drivers. This is due to the fact that some Symbios host adapters are supported by the bundled driver, and also that one Symbios driver can support multiple Symbios host adapters installed in the system.

With multiple Symbios adapters, it is possible to have a situation where one adapter is assigned to one driver, and another is assigned to a different version of the same driver. This can cause conflicts that may cause the system to switch to real mode drivers, affecting performance and access to CD-ROM or tape drives.

There are two methods for ensuring that all Symbios host adapters are controlled by only one version of the appropriate driver (when installing additional boards or updating drivers).

Method 1

Using the Device Manager, change the driver for a particular host adapter to the desired driver. When asked to reboot the system for the new settings to take effect, click No. Change drivers for all Symbios host adapters in the system supported by that same driver to the new driver, and reply No to rebooting until the final adapter is changed. If booting from a SCSI device, ensure that the adapter controlling this device is the last one changed.

Method 2

Determine which driver file is active for all adapters through the Properties tab in Device Manager. Go to the \WINDOWS\SYSTEM\IOSUBSYS directory and rename the driver file to an extension other than MPD. Reboot the system.

While booting, the system may ask to load the bundled driver file from the Windows 95/98 installation disk. Click OK. When the system says it cannot find the file, click Skip File. Do this for all adapter messages while booting. After the system is booted, use the Device Manager to change the driver for each adapter to the desired driver. Do NOT reply Yes to reboot the system until the final adapter has been changed.

5.3 WINDOWS NT

Installation Guide For The SDMS Drivers: SYMC8XX.SYS V4.08.00
SYM_HL.SYS V4.10.00

This file describes the features and use of the Symbios SDMS device drivers for the Windows NT 3.5x/4.x operating system environment. It is divided into the following sections:

Introduction for Windows NT 3.5x/4.x

Features

Symbios Devices Supported

Description

Installing the SYMC8XX.SYS/SYM_HL.SYS Driver(s)

New System Installation

Obtaining Drivers from Symbios Web Site

Existing System Installation

Windows NT 4.x

Windows NT 3.5x

Performance Tuning for NT 4.0

Large Block Size Support

Maximum Number of Concurrent I/Os

Disk Mirroring

Command Line Options

Troubleshooting

Introduction for Windows NT 3.5x/4.x

Windows NT is an operating system designed to run on processors using current technology. It provides a graphical user interface environment incorporating many high-level features (refer to the Microsoft Windows NT documentation for details). I/O requests in Windows NT are handled by an I/O manager. To address a SCSI peripheral, the I/O manager goes through the appropriate drivers. Class drivers for hard disk, floptical, CD-ROM, printer, and scanner peripherals are provided in Windows NT

.

Other class drivers, provided by peripheral manufacturers, may be added to support new devices. Tape device support is built into the operating system itself and does not require a class driver. Symbios/Microsoft provide miniport drivers, called SYMC8XX.SYS and SYM_HI.SYS, to complete the path to a Symbios controller or processor with an optional SDMS SCSI BIOS. The following sections describe this driver and its installation.

Features

- Synchronous negotiation (including Fast/Ultra SCSI/Ultra2)
- Wide negotiation
- Tagged command queuing
- Supports multiple host adapters
- Supports multiple Logical Unit Numbers (LUNs)
- Disconnect/Reselect
- Scatter-Gather
- Differential support
- Supports SCSI pass-through functionality
- Supports disk array configurations with no LUN 0
- Supports disk array configurations with non-contiguous LUNs
- Target initiated negotiation support
- Auto request sense
- Maximum block size support: NT 4.0 - 1MB, NT 3.5x - 256K
- NVRAM support (wide/sync parameters, SCSI Host ID)

Symbios Devices Supported

The SYMC8XX.SYS driver is named “Symbios Logic PCI (53c8XX)” for driver installation. It supports the following devices and Symbios host adapters based on those devices:

- SYM53C810, SYM53C810A, SYM53C810AE (SYM8100S, SYM8100ASP)
- SYM53C815 (SYM815XS, SYM8150SP)
- SYM53C825, SYM53C825A (SYM8250S, SYM8251S, SYM8251D, SYM8250ASP, SYM8251ASP, SYM8251AD)
- SYM53C860, SYM53C860AE (SYM8600SP)
- SYM53C875, SYM53C875E (SYM8750SP, SYM8751SP, SYM8751D)
- SYM53C876 (SYM22801, SYM22802)
- SYM53C885
- SYM53C895, SYM53C895A (SYM8951U)

The SYM_HI.SYS driver is named “Symbios Logic PCI High Performance Driver” for driver installation. It supports the following device and Symbios host adapter based on this device:

- SYM53C896 (SYM22910)

Description

SYMC8XX.SYS and SYM_HI.SYS are designed to Microsoft's specification for miniport drivers. These drivers allow connection of SCSI devices including disk drives, CD-ROMs, and tape drives for PCI-based machines. To support a new SCSI device, the Windows NT architecture requires that a class driver for that type device be present (usually supplied by Microsoft, or possibly by the peripheral manufacturer). No changes to SYMC8XX.SYS or SYM_HI.SYS are required. These drivers are only supported under Windows NT 3.51 and later versions (including NT 4.0). They do not run under earlier versions of NT.

SCSI commands are passed directly from a Windows application to the SCSI devices by using the SCSI pass-through facility (refer to the Microsoft Windows NT documentation for details). This facility allows applications to directly control and access SCSI devices by filling in a data structure and calling in to the port driver.

The SYMC8XX.SYS and SYM_HI.SYS drivers support Ultra SCSI protocol, providing twice the raw data transfer rate of Fast SCSI for disk drives and Symbios host adapters that support Ultra SCSI. These drivers also support Ultra2 protocol, providing quadruple the raw data transfer rate of Fast SCSI.

CAUTION: Ultra SCSI requires more stringent SCSI bus cabling setups than Fast SCSI. Ultra2 requires low-voltage differential (LVD) termination.

The Symbios driver bundled in Windows NT 3.51 is named NCRC810.SYS. When Windows NT selects the bundled Symbios driver during setup, the driver information (i.e., "NCR C810 PCI SCSI Host Adapter") is displayed. Although this implies that the driver only supports the SYM53C810, it actually supports the SYM53C810, SYM53C810A, SYM53C815, SYM53C825, and SYM53C825A. In fact, the Symbios bundled driver controls all of the controllers listed that are in the system. Please keep in mind that Windows NT 3.51 setup only displays the driver information, not every controller found by that driver.

The Symbios driver bundled in Windows NT 4.0 is named SYMC810.SYS. When Windows NT selects the bundled Symbios driver during setup, the driver information (that is, “Symbios C810 PCI SCSI Host Adapter”) is displayed. Although this implies that the driver only supports the SYM53C810, it actually supports the SYM53C810, SYM53C810A, SYM53C815, SYM53C825, SYM53C825A, SYM53C860, SYM53C875, and SYM53C876. In fact, the Symbios bundled driver controls all of the controllers listed that are in the system. Please keep in mind that Windows NT 4.0 setup only displays the driver information, not every controller found by that driver.

Installing the SYMC8XX.SYS/SYM_HL.SYS Driver

New System Installation

This procedure installs the SYMC8XX.SYS or SYM_HL.SYS driver onto a Windows NT system. Use this procedure when installing NT onto an unused SCSI drive. NT automatically adds the driver to the registry and copies the driver to the appropriate directory.

1. Start the NT installation by booting from the Microsoft Setup floppy disk.
2. Press Enter when the Welcome to Setup screen appears.

Note: Steps 3 & 4 occur with Win 3.51; for Win 4.0, go to Step 5.

3. With floppy disk 2, there is an initial setup screen that prompts you to continue by pressing Enter. Press Enter to see additional setup screens. Here you can choose Custom Setup or Express Setup. Symbios recommends that you choose Custom Setup by pressing C to skip the automatic scan of SCSI adapters and drivers, which is done by the Express Setup option.

If Express Setup is chosen, the installation program scans for SCSI adapters and finds the Symbios PCI (53C810) driver (NCR810.SYS for NT 3.5x, SYMC810.SYS for NT 4.0), which is an older version of the

SYMC8XX.SYS driver. Let the installation continue. When installation completes, change the driver. See the “Existing System Installation” section of these procedures to change the driver.

4. Press S to skip mass storage device detection. (If Enter is pressed, the installation program scans for SCSI adapters and finds the Symbios PCI (53C810) driver (NCRC810.SYS for NT 3.5x, SYMC810.SYS for NT 4.0), which is an older version of the SYMC8XX.SYS driver. Let installation continue. When the installation completes, change the driver. To change the driver, see the “Existing System Installation” section.)
5. When a screen displays the SCSI adapters found, choose S to configure additional SCSI adapters.
6. Move the highlight bar to Other and press Enter.
7. When prompted for the manufacturer-supplied hardware support disk, insert the appropriate Symbios Driver diskette containing the Windows NT driver required to support your Symbios adapter(s) and press Enter. The diskettes are distributed with the adapters. To obtain the Windows NT driver from the Symbios Web Site to use as the installation disk, see “Obtaining Drivers from Symbios Web Site” for more information.

Note: If both Symbios drivers need to be installed, they can be installed one after the other using steps 6 through 8. Installation order is not important.

8. Depending on the driver being installed, either “Symbios Logic PCI (53C8XX)” or “Symbios Logic PCI High Performance Driver” is shown highlighted. Press Enter to proceed.
9. NT should now recognize the Miniport driver and the SCSI hardware. Press Enter to continue.

At this point, simply follow the Microsoft Windows NT installation procedure.

Existing System Installation

This procedure installs the SYMC8XX.SYS or SYM_HL.SYS driver onto an existing Windows NT system.

NOTE: Windows NT 4.x uses the Windows 95 user interface, resulting in minor changes to the procedure for updating SCSI drivers. Procedures for both NT 4.x and NT 3.5x are listed.

Windows NT 4.x

1. Boot NT and log on as Administrator.
2. Click the Start button, move to Settings, then to Control Panel, and click.
3. Double-click on SCSI Adapters.
4. Click the Drivers tab. If NCRCSDMS.SYS, NCRC810.SYS, NCRC8XX.SYS, or SYMC810.SYS drivers are listed, select the driver(s) and choose Remove before adding the new driver. Also, if the driver name of the driver you are installing (SYMC8XX.SYS or SYM_HL.SYS) is listed, remove it before adding the new driver. Select OK when the Remove Driver message prompts, "Are you sure you want to remove this driver?". Another message may display saying "The SCSI Adapter has been marked as a boot device ...". Click OK.
5. Click Add. A list of installed adapters is displayed.
6. Click the Have Disk button.
7. When prompted, insert the appropriate Symbios Driver diskette containing the Windows NT driver required to support your Symbios adapter(s). For the path to copy manufacturer's files from, enter

A:\WINNT\MINIPORT and select OK.

8. Depending on the driver being installed, either “Symbios Logic PCI (53c8XX)” or “Symbios Logic PCI High Performance Driver” is shown highlighted on the Install Driver menu. If it is not highlighted, select it. Choose OK.

At this point, the following message may occur:

“The driver(s) for this SCSI Adapter are already on the system. Do you want to use the currently installed driver(s) or install new one(s)?”

Selecting Current uses the driver already on the system, and selecting New uses the driver on the floppy disk. Unless you want to use the older version already on the system, choose New. If you chose Current, go to step 10.

9. For the path to the OEM SCSI Adapter files, A:\WINNT\MINIPORT should be displayed. Select Continue. Then remove the floppy disk from your A: drive.
10. A System Settings Change message displays “You must restart your computer before the new settings take effect. Do you want to restart your computer now?” Click on the Yes button to restart and reboot NT. If you choose Cancel, remember that you must restart before the new driver is loaded.
11. If both Symbios drivers need to be installed, they can be installed one after the other without rebooting for each one. Installation order is not important.
12. Rebooting loads your new Miniport driver(s).

Windows NT 3.5x

1. Boot NT and log on as Administrator.
2. Open the Main window in the Program Manager.

3. Double-click on Windows NT Setup.
4. Choose Options, then choose Add/Remove SCSI Adapters.... If NCRSDMS.SYS, NCRC810.SYS, NCRC8XX.SYS, or SYMC810.SYS drivers are listed, select the driver(s) and choose Remove before adding the new driver. Also, if the driver name of the driver you are installing (SYMC8XX.SYS or SYM_HL.SYS) is listed, remove it before adding the new driver. Select OK when the Setup Message prompts, "Are you sure you want to remove the selected SCSI Adapter?"
5. Then choose Add, and select OK when the Setup Message prompts, "Are you sure you want to add a SCSI Adapter?"
6. On the SCSI Adapter list, go to the bottom and choose Other.
7. When prompted, insert your Symbios Driver diskette containing the appropriate Windows NT driver required to support your Symbios adapter(s). For the path to copy manufacturer's files from, enter

A:\WINNT\MINIPORT and select OK.
8. Depending on the driver being installed, either "Symbios Logic PCI (53c8XX)" or "Symbios Logic PCI High Performance Driver" is shown highlighted on the Select OEM Option menu. If it is not highlighted, select it. Choose OK.
9. On the Select SCSI Adapter Option menu, choose Install with the appropriate driver highlighted.

At this point, the following message may be displayed:

"The driver(s) for this SCSI Adapter are already on the system. Do you want to use the currently installed driver(s) or install new one(s)?"

Selecting Current uses the driver already on the system, and selecting New uses the driver on the floppy disk. Unless you want to use the older version already on the system, choose New. If you chose Current, go to step 11.

10. For the path to the OEM SCSI Adapter files, A:\WINNT\MINIPORT should be displayed. Select Continue.
11. On the SCSI Adapter Setup menu, choose Close.
12. If both Symbios drivers need to be installed, they can be installed one after the other without rebooting for each one. Installation order is not important.
13. Rebooting loads your new Miniport driver.

Performance Tuning for NT 4.0

NT 4.0 has registry entries that can be used to increase the performance of SCSI I/O for certain configurations. The tunable parameters are large transfer block size support and a guaranteed number of concurrent I/Os for a particular SCSI bus.

Large Block Size Support

The SYMC8XX.SYS and SYM_HL.SYS drivers can support up to a 1MB transfer size in NT 4.0 and a 256K transfer size in NT 3.5x. In NT 3.5x this larger transfer size is enabled by default and cannot be changed. However, in NT 4.0 the default transfer size is 64K. To enable a larger transfer size, an entry must be added to the registry, using the file sym_256K.reg. This file will set a 256K maximum, but it can be edited to set other desired maximum transfer sizes.

1. Locate the sym_256K.reg data file (supplied with the driver files) using Windows Explorer and double-click on the file.

-OR-

2. Type at the command prompt:

```
regedit sym_256K.reg
```

This will insert an entry in the registry to enable 256K block size support. Any maximum block size between 64K and 1MB (-8KB) can be set by editing the sym_256K.reg file. The formula to calculate the proper value for MaximumSGList is:

$$\text{MaximumSGList} = (\text{Maximum Block Size}) / 4K + 1$$

For 256K: $256K / 4K = 64$, add 1 for 65 (decimal) or 0x41. The maximum value allowed for MaximumSGList is 255 or 0xFF. This denotes an absolute maximum transfer size of 1040384, which is 8K less than 1MB ($1040384 / 4K = 0xFE$, add 1 for 0xFF or 255). Be sure to read the information in the sym_256K.reg data file before editing it.

The system must be rebooted for the new registry setting to be effective.

To reset the maximum block size to the default of 64K, follow the instructions above, except use symdfblk.reg as the data file.

Maximum Number of Concurrent I/Os (Guaranteed)

NT (both 3.51 and 4.0) only guarantee a maximum of 32 concurrent I/Os active on a particular SCSI bus. However, due to the method of memory allocation, the actual limit of concurrent I/Os can vary greatly between various drivers or versions of drivers. This can have a huge impact on performance benchmarking between different driver versions or adapter vendors. In effect, one adapter may actually be able to have 70 or 80 I/Os outstanding, while another adapter could only have 32. This can also affect systems with high performance storage subsystems, such as disk arrays.

Note: NT 3.51 cannot be tuned for this parameter. Only NT 4.0 uses this setting.

In order to have a guaranteed number of concurrent I/Os, an entry must be added to the registry, using the file sym100io.reg.

```
regedit sym100io.reg
```

This will insert an entry in the registry to guarantee a maximum of 100 concurrent I/Os per adapter.

If a maximum other than 100 is desired, the sym100io.reg file can be edited. However, setting this value to a high number uses increasing amounts of non-paged pool memory, a critical NT resource. High values for this setting can degrade system performance. Be sure to read the information in the sym100io.reg data file before editing it.

The system must be rebooted for the new registry setting to be effective.

To reset the guaranteed number of concurrent I/Os to the default of 32, follow the instructions above, except use symdefio.reg as the data file.

Auto Request Sense

Enabling and Disabling Auto Request Sense is found in the section titled “Troubleshooting.”

Disk Mirroring

This section applies only to Intel x86-platforms where the Symbios 4.xx PCI SCSI BIOS is used.

Symbios 4.xx PCI SCSI BIOS loads only one image in the memory when the system boots regardless of how many host bus adapters (HBAs) are used in the system. All of the disk drives on all HBAs will be recognized through the INT13h function call. Because of this implementation, disk mirroring under NT needs to be done via the following instructions which might be different from Microsoft’s documentation.

Here's how to create an NT Fault Tolerant (FT) floppy so that you can boot from the mirrored partition in case the primary partition fails.

1. Format a floppy disk in drive A: using NT (File Manager or Windows Explorer) for use as a Fault Tolerant boot floppy.
2. From the root directory of the primary partition, copy NTLDR, NTDETECT.COM, and BOOT.INI to this floppy disk.
3. Temporarily remove the read-only attribute of the BOOT.INI file so that it can be modified and saved.
4. Edit BOOT.INI on the FT floppy and modify the following line where you want to boot the mirrored partition.

```
multi(0)disk(0)rdisk(x)partition(y)\<winnt_directory>
```

where

multi(0) and disk(0) should always remain same.

x = (the drive number of the mirrored partition in the INT13 chain - 80h).

The drive number of the mirrored partition can be found during system bootup of the Symbios 4.xx PCI SCSI BIOS when the primary partition does not exist. It should say either BOOT (=80h), 81h, 82h, and higher. Therefore the value of x would be 0 when BOOT, 1 when 81h, 2 when 82h, etc.

y = the partition number on the drive (starts at 1 which equals single partition on the drive)

For example, let's say there are two Symbios 8xx HBAs in the system. The first HBA, HBA #0 which is the boot path, has two SCSI hard drives on ID 0 and ID 5. The second HBA, HBA #1, has two SCSI hard drives on ID 2 and ID 4. Assuming that the SCSI bus scan starts from ID 0 and goes up, the drive number of INT13h will look like this:

HBA #0, ID 0= BOOT (which is 80h)
HBA #0, ID 5= 81h
HBA #1, ID 2= 82h
HBA #1, ID 4= 83h

Now NT is installed on the boot drive, HBA #0 ID 0, and a mirrored partition is established on HBA #1 ID 2. If the primary partition fails, for example due to power failure, then the drive number of INT13h will change:

HBA #0, ID 5= BOOT (which is 80h)
HBA #1, ID 2= 81h
HBA #1, ID 4= 82h

Therefore, the following line should be used in the BOOT.INI on the NT Fault Tolerant boot floppy to boot from the mirrored partition, HBA #1 ID 2. Note that rdisk(1) was calculated from $x=81h-80h$.

multi(0)disk(0)rdisk(1)partition(1)\<winnt_directory>

5. Save the BOOT.INI and restore the "read-only" attribute.

Troubleshooting

The following are some potential problems and their suggested solutions:

Problem :

During installation, no SCSI devices are found.

Solution:

- a. Ensure that the custom setup is chosen on the Setup Method screen.
- b. Ensure that all devices are powered on and terminated correctly.
- c. Check that no devices have duplicate SCSI IDs.
- d. Make sure INT A is assigned for the PCI slot(s) where your SCSI host adapter(s) are installed.
- e. For systems with some Award BIOSes, ensure that the PCI IRQ is set to edge triggered.

Problem:

System crashes during installation with a message indicating inaccessible boot device.

Solution:

- a. This error is usually associated with an IRQ, DMA channel, I/O (chip) address, or BIOS address conflict. Set the SCSI host adapter to use a different interrupt.
- b. This error is sometimes caused by a virus infecting the Master Boot Record of the boot device. Use a write-protected DOS bootable flex containing virus scanning and cleaning software to check for any viruses on the boot device, and remove if any are found.

Problem:

A disk drive is recognized as seven different devices when only one is physically connected to the SCSI bus.

Solution:

- a. This error is usually caused by older SCSI devices incorrectly indicating to NT that they support multiple LUNs. Contact the device manufacturer for a firmware upgrade.
- b. Ensure that there are no devices with the same SCSI ID as the HAB.

Problem:

Problems with SCSI devices installation or operation

Solution:

- a. If a SCSI device is not operating properly (either the device is not found or a SCSI interface error occurs during scanning), it is possible that the third-party device drivers do not support the auto request sense feature of Symbios host adapters. Disable the auto request sense feature as described below and try the device operation again.
- b. Using the file “symno_ar.reg” (supplied with the Symbios NT driver files), either double click the file in Windows Explorer or File Manager or type “regedit symno_ar.reg” at the command prompt. This inserts a registry entry that disables the auto request sense feature. The system must be rebooted for this change to take effect.
- c. To re-enable the auto request sense feature, use the file “sym_auto.reg” and perform one of the update methods in step b. above.

Problem:

Problems with certain SCSI devices when using an Ultra SCSI adapter.

Solution:

- a. Some SCSI devices do not function properly when the adapter attempts to negotiate Ultra SCSI transfer rates. If a device is not operating properly, check the transfer speed setting using the 4.xx PCI BIOS Configuration Utility (press Control-C when the Symbios PCI BIOS banner is displayed during the system boot process). Devices that do not support Ultra SCSI should be set to a maximum of 10 MB/sec for narrow (8 bits), 20 MB/sec for wide (16 bits).

Problem:

Problems with Ultra SCSI devices using Ultra SCSI protocol.

Solution:

- a. If the system is configured with a Symbios host adapter that supports Ultra SCSI and an Ultra SCSI device is on the SCSI bus, intermittent problems and possible system crashes can occur if the SCSI bus cable and terminators do not conform to the Ultra SCSI specification.

- b. Disable Ultra SCSI support for all devices via the SDMS 4.xx PCI BIOS Configuration Utility (press Control-C when the Symbios PCI BIOS banner is displayed during the system boot process).
- c. If the system operates properly without Ultra SCSI enabled, it is highly likely that the SCSI bus cable and terminators are not configured correctly for Ultra SCSI. See the Symbios host adapter User's Guide for information on Ultra SCSI cabling requirements.

5.3 OS/2

Installation Guide for the Symbios SDMS OS/2 SYM8XX.ADD V4.09.00
and SYM_HI.ADD V4.10.00 drivers:

Introduction

Features

Description

Symbios Devices Supported

Installing Your SDMS OS/2 Driver

Driver Order in the CONFIG.SYS File

Command Line Options

Troubleshooting

Introduction

The OS/2 operating system version 4.0 provides an integrated platform featuring a graphical windowing interface, called Presentation Manager, that allows multiple applications to be viewed at the same time. Multitasking is also supported, enabling several different programs to run at the same time in different windows. Presentation Manager allows the user to switch between programs, start other programs, and maintain files and directories. This version of OS/2 requires an 80386 or higher microprocessor. Other hardware requirements include a minimum of 8 megabytes of RAM and a minimum hard disk drive size of 90 megabytes. Symbios SDMS 4.0 provides the necessary SCSI device drivers for OS/2: SYM8XX.ADD and SYM_HI.ADD. Symbios recommends reviewing the OS/2 manual prior to proceeding.

Features

- Supports synchronous negotiation (including Fast/Ultra SCSI/Ultra2 SCSI)
- Supports Wide SCSI (single-ended and differential)
- Supports multiple host adapters
- Supports disconnect/reselect
- Supports scatter/gather
- Allows tagged command queuing
- Supports single-ended, differential, and low-voltage differential termination
- Allows target-initiated negotiation
- Supports NVRAM/NVS configuration storage
- Supports alternate CHS (Cylinder Head Sector) mapping algorithm

New Features:

- Allows up to 8 host adapters
- Provides a command line /EXCLUDE option to block use of a specified adapter
- Provides higher performance by requiring only one interrupt per I/O
- Supports flexible GPIO pin definition using a table in the Manufacturing data area of Non-Volatile Memory

Description

Although the Symbios SCSI controller's firmware can access the SCSI hard disk drives attached to the computer independently, the SCSI device drivers SYM8XX.ADD and SYM_HI.ADD act as an enhanced interface between the computer system and the SCSI BIOS firmware. Use of the device drivers increases the abilities of the SCSI controller firmware and fully utilizes the advancements and improvements of Pentium-based and higher microprocessors.

The device drivers are also necessary to support the use of SCSI tape drives and CD-ROM drives with an OS/2 system. The Symbios SYM8XX.ADD and SYM_HI.ADD device drivers are written in compliance with the IBM OS/2 ADD (Adapter Device Driver) specification, and the device drivers work with third party applications that comply with the same specification.

Both the SYM8XX.ADD V4.09.00 and SYM_HI.ADD V4.10.00 drivers allow up to 8 host adapters to be present in your system. The first 4 host adapters will be accessed in the order you specify using the SCSI BIOS Configuration Utility provided with some members of the 8XX family of host adapters. Refer to your host adapter's user guide for information on the availability and use of the SCSI BIOS Configuration Utility. Remaining host adapters will be accessed based on their physical position in your system. Refer to your system documentation for further information.

Symbios Devices Supported

The SYM8XX.ADD driver supports the following devices and associated Symbios host adapters:

- SYM53C810, SYM53C810A, SYM53C810AE (SYM8100S, SYM8100ASP)
- SYM53C815 (SYM815XS, SYM8150SP)
- SYM53C825, 53C825A (SYM8250S, SYM8251S, SYM8251D, SYM8250ASP, SYM8251ASP, SYM8251AD)
- SYM53C860, SYM53C860AE (SYM8600SP)
- SYM53C875, SYM53C875E (SYM8750SP, SYM8751SP, SYM8751D)
- SYM53C876 (SYM22801, SYM22802)
- SYM53C885
- SYM53C895 (SYM8951U)

The SYM_HI.ADD driver supports the following device and associated Symbios host adapter:

- SYM53C896 (SYM22910)

Installing Your SDMS OS/2 Driver

- Installing SYM8XX.ADD/SYM_HI.ADD with OS/2 Already Installed
- Installing SYM8XX.ADD/SYM_HI.ADD and OS/2 from a Floppy to a SCSI Hard Drive
- Installing SYM8XX.ADD/SYM_HI.ADD and OS/2 from a SCSI CD-ROM to a SCSI Hard Drive

These installation instructions are specific and accurate for the SDMS OS/2 V4.09.00 driver: SYM8XX.ADD and V4.10.00 driver: SYM_HI.ADD. Refer to the text file OS2.TXT located on the SDMS diskette for a version of these instructions guaranteed to match your driver.

The Symbios device driver floppy diskette contains six files for OS/2:

1. Device drivers SYM8XX.ADD and SYM_HI.ADD,
2. Text files SYM8XX.DDP and SYM_HI.DDP, and
3. Executable files SYM8XXPC.EXE and SYM_HIPC.EXE.

When the device driver installation utility under OS/2 is activated, it looks for all files with the DDP extension. The DDP file contains the necessary information to install the SCSI device driver. The EXE file contains a utility that verifies that an appropriate adapter is present. If you do not wish to install both device drivers, create a floppy diskette containing the appropriate driver, DDP file and EXE file to use instead of the Symbios device driver floppy diskette.

Note: If you previously installed OS2CAM.ADD (a previous version of the SYM8XX.ADD driver), delete OS2CAM.ADD and the corresponding BASEDEV= statement in the CONFIG.SYS file after you complete the installation procedures. If you previously installed SYM8XX.ADD and/or SYM_HI.ADD in a directory other than \OS2\BOOT, move SYM8XX.ADD and/or SYM_HI.ADD to \OS2\BOOT, where the new versions of these drivers can replace the old versions. The system will continue to boot using the previous drivers until these steps are taken.

Installing SYM8XX.ADD/SYM_HI.ADD with OS/2 Already Installed

At the OS/2 Desktop, open the System Setup folder located within the OS/2 System folder and follow these steps:

1. Open the Install/Remove folder and then double-click on the Device Driver Install icon.
2. Insert the floppy diskette containing the Symbios device driver(s) in the source drive. The system will find all DDP files on the floppy diskette and automatically install the corresponding drivers.
3. To make sure that the installation was successful, open the Utilities folder located within the Programs folder on the OS/2 Desktop. Then double-click on the OS/2 System Editor to start the editor. Open the CONFIG.SYS file in the root directory and find the line(s):

```
BASEDEV=SYM8XX.ADD/V  
and/or  
BASEDEV=SYM_HI.ADD/V
```

Then check that the appropriate drivers are in the \OS2\BOOT directory on the boot drive.

Installing SYM8XX.ADD/SYM_HI.ADD and OS/2 from a Floppy to a SCSI Hard Drive

In this case, since OS/2 will be installed from a floppy diskette, it is not required that the driver be present to install the operating system (as is the case when installing from a CD-ROM). The following steps allow installation of OS/2 from a floppy diskette:

1. After the installation of OS/2 completes and the WorkPlace Shell desktop builds, open the System Setup folder located in the OS/2 System folder. Open the Install/Remove folder and then double-click on the Device Driver Install icon.
2. Insert the floppy diskette containing the Symbios device driver(s) in the source drive. The system will find all DDP files on the floppy diskette and automatically install the corresponding drivers.
3. To make sure that the installation was successful, open the Utilities folder located within the Programs folder on the OS/2 Desktop. Then double-click on the OS/2 System Editor to start the editor. Open the CONFIG.SYS file in the root directory and find the line(s):

```
BASEDEV=SYM8XX.ADD/V  
and/or  
BASEDEV=SYM_HI.ADD/V
```

Then check that the appropriate drivers are in the \OS2\BOOT directory on the boot drive.

4. Continue with the OS/2 installation process as documented in the OS/2 Installation Guide.

Installing SYM8XX.ADD/SYM_HI.ADD and OS/2 from a SCSI CD-ROM to a SCSI Hard Drive

To install OS/2 from a SCSI CD-ROM attached to a Symbios host adapter, the SCSI driver must be present in order to access the CD-ROM. The following steps allow installation of OS/2 from a SCSI CD-ROM:

1. Make copies of the floppy diskettes used for installation that are included with the CD-ROM version of OS/2.
2. Determine the appropriate driver for installation by locating the host adapter to which the CD-ROM is attached in the section of this guide titled "Symbios Devices Supported". Then copy the indicated driver to the copy of Diskette 1. In order to do so, you must delete files on Diskette 1 to provide space. Consult the README.1ST file on the Device Driver Pak Volume 1.0 CD. It contains a list of files that may not be deleted. Follow the instructions provided in the README.1ST file. Once space is made available on Diskette 1, copy the appropriate Symbios device driver onto this diskette.

When .ADD drivers are deleted from Diskette 1, make certain to delete or remark out the corresponding BASEDEV= statement in the CONFIG.SYS file. Otherwise, error messages will show up during installation.

3. Edit the CONFIG.SYS file on the copy of Diskette 1 by adding one of the following lines at the end of the file:

```
BASEDEV=SYM8XX.ADD/V
      or
BASEDEV=SYM_HI.ADD/V
```

Follow the directions in the README.1ST file for adding the following line to the CONFIG.SYS file:

```
SET COPYFROMFLOPPY=1
```


This allows the Symbios driver to be copied from the installation diskette to the system's boot drive.

4. Place the copy of Installation Diskette in the A: drive and reboot the computer.
5. Proceed with the OS/2 installation process as documented in the OS/2 Installation Guide.

Driver Order in the CONFIG.SYS File

Because of the way OS/2 assigns drive letters, the order in which drivers appear in the CONFIG.SYS file is important. The drivers must appear in the order in which the drive letters are to be assigned. In particular:

1. OS/2 Warp will install the BASEDEV= line at the beginning of the target system's CONFIG.SYS file regardless of where the line is located in that file on Diskette 1. You may need to rearrange the order in which drivers appear in the CONFIG.SYS file for the target system.
2. The driver for the host adapter to which the boot device is attached must appear before all other BASEDEV=drivers in the CONFIG.SYS file.
3. If you are installing both Symbios drivers, the driver corresponding to the host adapter with the boot drive attached must appear first in the CONFIG.SYS file.

Refer to the OS/2 documentation to fully understand this requirement.

Command Line Options

Using the /VERBOSE Option

Using the /!DM Option

Using the /!SM Option

Using the /EXCLUDE Option

Using the /SYNCH_RATE Option

Using the /SYNCH_OFFSET Option

Using the /TIMEOUT Option

Using the /DISCONNECT Option

Using the /PARITY Option

Using the /QTAG Option

Using the /WIDTH Option

The host adapter has a default configuration that consists of optimal values for operation. You may decide to alter these default values if there is a conflict between device settings or if you need to optimize system performance. Some values may be changed using the SCSI BIOS Configuration Utility provided with some members of the 8XX family of host adapters. Refer to the host adapter's user guide for information on the availability and use of the SCSI BIOS Configuration Utility. In addition, the Symbios OS/2 device drivers have several embedded functions that can be accessed via switches on the command line in the CONFIG.SYS file.

Values are applied in the following order:

- Manufacturer's settings
- SCSI BIOS Configuration Utility changes
- Command line options

At any point during this process, subsequent changes in synchronous and wide negotiations may only decrease speed or reduce width. Any changes that attempt to increase speed or width will be ignored.

The options available using command line switches are described below. The SYM8XX.ADD driver is used in all examples; SYM_HL.ADD may be substituted for SYM8XX.ADD with identical results.

Using the /VERBOSE (or /V) Option

This option appears on the command line by default. It enables display of a banner, version number, and SCSI bus information during start up of the system.

Usage: /VERBOSE

For example, if you wish to see more detailed information displayed when booting, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD/VERBOSE
      or
BASEDEV=SYM8XX.ADD/V
```

To disable this feature, remove this switch from the command line.

Using the /!DM Option

This option disables use of the IBM-supplied DASD manager (OS2DASD.DMD) for the devices listed. The DASD manager supports direct access devices such as hard drives.

Usage:
/!DM<hba[:id]>[,<hba[:id]>]*

Where:

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed “HBA”. This is not the SCSI ID of the host adapter. Use an hba value with no :id following it to indicate all devices on an adapter.

id represents a SCSI target ID on the indicated adapter. To indicate all devices on a host adapter, do not use the SCSI ID of the host adapter for the id value. Instead, use the hba value as indicated in the preceding paragraph.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

For example, to disable OS2DASD.DMD for devices on host adapter 0 at target IDs 3 and 5, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD /!DM<0:3>,<0:5>
```

Using the /!SM Option

This option disables use of the IBM-supplied SCSI manager (OS2SCSI.DMD) for the devices listed. The SCSI manager supports SCSI tape drives.

Usage:

```
/!SM<hba[:id]>[,<hba[:id]>]*
```

Where:

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed “HBA”. This is not the SCSI ID of the host adapter. Use an hba value with no :id following it to indicate all devices on an adapter.

id represents a SCSI target ID on the indicated adapter. To indicate all devices on a host adapter, do not use the SCSI ID of the host adapter for the id value. Instead, use the hba value as indicated in the preceding paragraph.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

For example, if you want to disable OS2SCSI.DMD for devices on host adapter 0 at target IDs 3 and 5, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD /!SM<0:3>,<0:5>
```

Using the /EXCLUDE (or /X) Option

This option disables a host adapter so that it is not seen by the Symbios OS/2 device drivers. This allows a host adapter to be ignored without physically removing the board from the system. This may be necessary if the adapter in question is causing a resource conflict.

Usage:

/EXCLUDE<chip:bus:dev/func>[,<chip:bus:dev/func>]*

Where:

chip is a unique identifier that indicates the Symbios board type. The Verbose option displays a table with this value appearing in the “CHIP” column.

bus represents the PCI bus number into which the adapter is plugged. The Verbose option displays a table with this value appearing in the “BUS” column.

dev/func is the number derived by combining the PCI device and function numbers and functions as a unique board identifier in conjunction with the PCI bus. The Verbose option displays a table with this hexadecimal value appearing in the “DEV/FUNC” column. It may contain an A, B, C, D, E, or F as part of its value.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

For example, to exclude a host adapter with chip type F, PCI bus number 0 and dev/func number A0, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD/EXCLUDE<F:0:A0>
```

Note: If you exclude the adapter to which the boot device is attached, then you will not be able to boot.

Using the /SYNCH_RATE (or /SR) Option

This option sets the maximum synchronous transfer rate (in megabyte transfers per second) to negotiate with a particular device. The allowable values for this setting are 0, 5, 10, 20, and 40 megabyte transfers per second, if the adapter is capable of the specified speed. All host adapters in the 8XX family support at least 10 megabyte transfers per second; some support 20 or 40 megabyte transfers per second. To turn off synchronous transfers for a particular device, specify 0 (zero). The value set by this option only defines the maximum transfer rate negotiated. The actual rate also depends on what the device can do. The default value is the fastest transfer rate that is supported by a particular host adapter.

Usage:

/SYNCH_RATE=n<hba[:id]>[,n<hba[:id]>]*

Where:

n = 0, 5, 10, 20 or 40.

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed "HBA". This is not the SCSI ID of the host adapter. Use an hba value with no :id following it to indicate all devices on an adapter.

id represents a SCSI target ID on the indicated adapter. To indicate all devices on a host adapter, do not use the SCSI ID of the host adapter for the id value. Instead, use the hba value as indicated in the preceding paragraph.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

For example, to turn off synchronous transfers to ID 3 on host adapter 0, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

BASEDEV=SYM8XX.ADD /SYNCH_RATE=0<0:3>

As another example, to set synchronous transfers to 10 megabyte transfers per second on all devices on adapter 1, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD/SR=10<1>
```

Note: The maximum synchronous transfer rates effectively double when the adapter and device permit wide transfers (See the /WIDTH option). For example, a synchronous transfer rate setting of 40 megabyte transfers per second will actually produce a transfer rate of 80 megabyte transfers per second if the adapter and device both allow and are set to perform wide transfers.

Using the /SYNCH_OFFSET (or /SO) Option

This option sets the maximum synchronous offset to negotiate with a particular device. The allowable values for this setting are 0 to the maximum synchronous offset supported by the specified adapter. The SYM53C8XX controller chips support offsets up to 31. Refer to your host adapter's user guide for information on the maximum offset supported by your host adapter. If 0 (zero) is specified for the synchronous offset value, synchronous transfers are turned off for any specified device. The value set by this option only defines the maximum offset that is negotiated. The resulting rate also depends on the device capability. The default value is the maximum offset that is supported by a particular host adapter.

Usage:

```
/SYNCH_OFFSET=n<hba[:id]>[,n<hba[:id]>]*
```

Where:

n = 0..maximum synchronous offset for the adapter.

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed "HBA". This is not the SCSI ID of the host adapter. Use an hba value with no :id following it to indicate all devices on an adapter.

id represents a SCSI target ID on the indicated adapter. To indicate all devices on a host adapter, do not use the SCSI ID of the host adapter for the id value. Instead, use the hba value as indicated in the preceding paragraph.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

For example, to change the synchronous offset to 6 for ID 3 on host adapter 0, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD /SYNCH_OFFSET=6<0:3>
```

Using the /TIMEOUT (or /T) Option

The Symbios device drivers use a time-out mechanism to detect certain errors. When the driver issues a command to a SCSI device, a timer is started. If the timer expires before the command completes, the driver assumes that something has gone wrong with the device, and takes steps to recover. The default value for this is 10 seconds. If you set the value to be less than the system has allocated for a particular device, your value will be ignored. To turn off the time-out mechanism for a particular device, set the value to 0 (zero).

Usage:

```
/TIMEOUT=n<hba[:id]>[,n<hba[:id]>]*
```

Where:

n = time-out value in seconds for device, n=(0..65535)

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed "HBA". This is not the SCSI ID of the host adapter. Use an hba value with no :id following it to indicate all devices on an adapter.

id represents a SCSI target ID on the indicated adapter. To indicate all devices on a host adapter, do not use the SCSI ID of the host adapter for the id value. Instead, use the hba value as indicated in the preceding paragraph.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

For example, if you have a particularly slow device on ID 3 on host adapter 0 and you wish to extend the time out on this device to 60 seconds, then the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD/TIMEOUT=60<0:3>
```

Using the /DISCONNECT (or /DC) Option

SCSI devices have the ability to disconnect from the bus during an I/O transfer. This option allows (or does not allow) a device to disconnect during an I/O transfer. If a particular adapter has parity checking disabled, then you must use this option to disable disconnects for all devices on that adapter that do not generate parity. Refer to the /PARITY option for more information.

Usage:

```
/DISCONNECT=n<hba[:id]>[,n<hba[:id]>]*
```

Where:

n = ON or OFF.

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed "HBA". This is not the SCSI ID of the host adapter. Use an hba value with no :id following it to indicate all devices on an adapter.

id represents a SCSI target ID on the indicated adapter. To indicate all devices on a host adapter, do not use the SCSI ID of the host adapter for the ID value. Instead, use the hba value as indicated in the preceding paragraph.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

Valid options are “ON” (allow disconnects) and “OFF” (do not allow disconnects). The default for all devices is “ON”.

For example, if you want to disable disconnects on the device at ID 2 on host adapter 0, then the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD/DISCONNECT=OFF<0:2>
```

Using the /PARITY (or /P) Option

The SYM53C8XX chips are capable of enabling or disabling the SCSI bus data integrity checking feature known as “parity”. Some non-SCSI compliant devices sold as SCSI devices do not generate parity. You can use this option to disable parity checking. The SYM53C8XX chips always generate parity (for outputs), but may optionally check the parity (for inputs).

Usage:

```
/PARITY=n<hba[,hba]*>[,n<hba[,hba]*>]*
```

Where:

n = ON or OFF.

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed “HBA”. This is not the SCSI ID of the host adapter.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

Valid options are “ON” (check parity) and “OFF” (do not check parity). The default for all devices is “ON”, which enables parity checking for all devices.

For example, to turn off parity checking on host adapter number 0, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD /PARITY=OFF<0>
```

Note: When disabling parity checking, it is necessary to disable disconnects for any device that does not generate parity, as the SYM53C8XX chips cannot disable parity checking for that device during the reselection phase. If a device does not generate parity and it disconnects, the I/O never completes as the reselection never completes. Refer to using the /DISCONNECT option for more information about disabling disconnects for a device.

Using the /QTAG (or /QT) Option

Queue tagging allows more than one outstanding command per SCSI device. Some non-SCSI compliant devices sold as SCSI devices do not allow queue tags, in which case queue tagging needs to be disabled. The value given in the command line will be the depth of the queue for queue tags for the device(s) indicated. To disable queue tag support, a value of 0 or 1 should be given.

Usage:

```
/QTAG=n<hba[:id]>[,n<hba[:id]>]*
```

Where:

n = the number of queue tags allowed for a device (0..256).

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed "HBA". This is not the SCSI ID of the host adapter. Use an hba value with no :id following it to indicate all devices on an adapter.

id represents a SCSI target ID on the indicated adapter. To indicate all devices on a host adapter, do not use the SCSI ID of the host adapter for the id value. Instead, use the hba value as indicated in the preceding paragraph.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

For example, to turn off queue tagging for ID 3 on host adapter number 0, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD /QTAG=0<0:3>
```

As another example, to set the queue depth to 5 for all devices on host adapter number 2, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD /QT=5<2>
```

Using the /WIDTH (or /W) Option

Devices attached to a SCSI bus are narrow or wide devices. Narrow devices transfer data one byte (or 8 bits) at a time. Wide devices transfer two bytes (or 16 bits) at a time. The value given in the command line option will determine the size of data transfers.

Usage:

```
/WIDTH=n<hba[:id]>[,n<hba[:id]>]*
```

Where:

n = 8 or 16.

hba represents the logical number of a host adapter as displayed by the Verbose option in the column headed "HBA". This is not the SCSI ID of the host adapter. Use an hba value with no :id following it to indicate all devices on an adapter.

id represents a SCSI target ID on the indicated adapter. To indicate all devices on a host adapter, do not use the SCSI ID of the host adapter for the id value. Instead, use the hba value as indicated in the preceding paragraph.

[] indicate optional information.

* indicates the pattern enclosed in the [] may be repeated.

For example, to have the device at ID 3 on host adapter number 0 treated as a narrow device, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD/WIDTH=8<0:3>
```

As another example, to have all devices on host adapter number 2 treated as 8-bit devices, the line in the CONFIG.SYS file that loads SYM8XX.ADD should look like this:

```
BASEDEV=SYM8XX.ADD/W=8<2>
```

Troubleshooting

The following are some potential problems and their suggested solutions:

Problem:

You cannot access the SCSI device(s).

Solution:

- a. Make sure the SCSI device driver is installed properly.
- b. Make sure each device has power.
- c. Verify that the appropriate BASEDEV= line (BASEDEV=SYM8XX.ADD /V or BASEDEV=SYM_HI.ADD /V) exists in the CONFIG.SYS file.
- d. Check the ordering of BASEDEV= entries in the CONFIG.SYS file to be sure that the boot device is loaded first.
- e. Verify that the correct driver is in the appropriate directory (\OS2\BOOT).
- f. Check the cable connections and the host adapter installation.
- g. Verify that the adapter is not turned off in the SCSI BIOS Configuration Utility and that the adapter is not excluded using the /EXCLUDE command line option.

Problem: The computer hangs or locks up when booting and the SCSI devices attached are not seen by the computer system.

Solution:

- a. Make sure that all the SCSI devices are configured at different ID numbers. If booting the system from a device on the SCSI bus, the boot drive must have the lowest ID or the highest ID. This depends on the scan order option selected in the SCSI BIOS Configuration Utility. For more information, consult the BOOTROM.TXT file or the documentation provided with the host adapter board.
- b. Make sure both, but only, the ends of the SCSI bus are terminated.
- c. Make sure the device driver is listed in the CONFIG.SYS file (and loaded when booting).

Problem:

The device driver does not see one of the SCSI devices.

Solution:

- a. Reboot the computer.
- b. Make sure the SCSI devices have different ID numbers.
- c. Make sure both, but only, the ends of the SCSI bus are terminated.
- d. Check the cable and power connections.
- e. Check the ordering of BASEDEV= entries in the CONFIG.SYS file to be sure that the boot device is loaded first.
- f. Verify that the adapter is not turned off in the SCSI BIOS Configuration Utility and that the adapter is not excluded using the /EXCLUDE command line option.

Problem:

OS/2 attempts to install to or boot from an IDE drive instead of the SCSI drive.

Solution:

The system BIOS finds the IDE drive before it finds the SCSI drive, and therefore uses the IDE drive as the boot device.

- a. Check that the appropriate BASEDEV= line (BASEDEV=SYM8XX.ADD / V or BASEDEV=SYM_HI.ADD / V) appears first in the CONFIG.SYS file.
- b. Disable the IDE drive in the CMOS setup.
- c. On some hardware platforms, the IDE drive must be physically disconnected before installing to a SCSI drive.

Problem: The following message appears at bootup:

“OS/2 is unable to operate your hard disk or diskette drive. The system is stopped. Correct the preceding error and restart the system.”

Solution:

a. This problem occurs when the system is booting from a hard drive attached to an IDE bus, a SCSI disk is attached to the Symbios host adapter, and the Symbios BASEDEV= line (BASEDEV=SYM8XX.ADD /V or BASEDEV=SYM_HI.ADD /V) appears in the CONFIG.SYS file before the IDE device driver statement.

-OR-

This problem occurs when the system is booting from a hard drive attached to the Symbios adapter, an IDE drive is in the system, and the IDE BASEDEV= line appears in the CONFIG.SYS file before the Symbios BASEDEV= line (BASEDEV=SYM8XX.ADD /V or BASEDEV=SYM_HI.ADD /V).

b. Boot the system using the floppy drive and installation diskettes to the F3=Command Prompt screen. Use the TEDIT.EXE editor to edit the CONFIG.SYS file. Move the BASEDEV= statements to be in the appropriate order for the system's configuration.

c. Restart your system.

5.5 Solaris

Installation Guide for the Symbios SDMS Solaris Driver, Version 4.02.00 This file describes the features and use of the Symbios SDMS Device Driver for the Solaris Operating system 2.6. It is divided into the following sections:

Introduction

Features

How to Install Your SDMS Solaris Driver

Installing the Driver During Solaris Installation

Updating Solaris with the driver

Troubleshooting

Introduction

The Solaris 2.6 x86 is an operating system designed to run on single or multiple processors. It provides a command line interface environment and a graphical environment that incorporates many high level features. Refer to the Web site, www.sun.com/solaris/revguide for 2.6 X86 documentation for further details.

The Symbios driver, SYMHISL, allows the Solaris operation to interface with SCSI devices connected to a Symbios SYM53C896 controller. The following sections describe the procedures to install the driver during a new installation of Solaris, and to update the driver with an existing installation of Solaris.

Features

- Provides synchronous negotiation (including Fast SCSI/Ultra SCSI/Ultra2 SCSI)
- Supports multiple host adapters
- Supports disconnect/reselect
- Allows multiple and non-contiguous LUN support
- Supports scatter/gather
- Supports wide devices
- Supports tagged command queuing
- Supports multiprocessors

Description

The Symbios SYMHISL driver is designed to Sun Microsystems SCSA specifications for device drivers. This driver allows connection of SCSI devices including disk drives, CD-ROMS, and tape drives for PCI-based machines. To support a new SCSI device, the Solaris 2.6 x86 architecture requires that the device complies to the SCSI standard. SYMHISL is a Solaris 2.6 32-bit version driver for the Symbios SYM53C896 controller.

Installing the SDMS Solaris Driver**New System Installation**

These instructions provide details to create a Symbios SYMHISL Driver Update diskette to be used during installation of the operating system when using the SYM53C896 controller.

1. Uncompress and un-tar the install.tar.z file before installing Solaris by typing these commands:

```
#mv install.tar.z install.tar.Z
```

```
#uncompress install.tar
```

```
#tar -xvf install.tar
```

```
#cd install
```

2. For Solaris 2.6, copy the bootconf.exe file to the Solaris Driver Configuration Assistant diskette that is used to boot the machine during installation. This replaces the existing bootconf.exe file on that diskette. Ensure that volume management is running and the diskette is in drive A: and type these commands:

```
#volcheck -v
```

```
#cp bootconf.exe /floppy/floppy0/solaris/bootconf.exe
```

```
#eject floppy
```

3. Create the SYMHISL Driver Update diskette using the diskette image provided in the install package. Insert a new, blank floppy and use the following commands.

```
#volcheck -v
```

```
#dd if=symitu.dd of=/vol/dev/rdiskette0/unnamed_floppy
```

```
#eject floppy.
```

Label this diskette SYMHISL Driver Update.

4. Boot the system to use the Driver Configuration Assistant diskette provided by Sun Microsystems. When the first screen appears, choose the Driver Update option.
 5. The system prompts to insert the diskette labeled SYMHISL Driver Update that you created in step 3. Choose the Continue option.
 6. Continue to follow the operating system prompts to proceed with the installation.
-

7. Then choose the Begin Installation option. The system prompts with the options “Auto Reboot” or “Manual Reboot.”

For Solaris 2.6, you “must” choose the Manual Reboot option.

9. When the next screen appears, remove the floppy diskette from the disk drive. Click on the OK button. The “Solaris Install Console” window appears upon completion of the installation. The system prompts you to insert the Driver Update Diskette labelled SYMHISL.
10. Insert the SYMHISL Driver Update diskette, and press Enter.

Follow the instructions to patch the operating system bootconf.exe file. This patch must be done for the operating system to boot, otherwise the operating system will have to be reinstalled.

Make sure the SYMHISL Driver Update diskette is in the floppy drive. Type these commands:

```
#mount -F pcfs /dev/diskette0 /mnt
```

```
#cp /mnt/bootconf.exe /a/platform/i86pc/boot/solaris/bootconf.exe
```

```
#umount /mnt
```

```
#reboot
```

11. Installation for the Solaris operating system and SYMHISL driver has completed.

Existing System Installation

These instructions provide details to install the Symbios SYMHISL driver to an existing Solaris operating system installation.

1. Uncompress and un-tar the install.tar.z file by typing these commands in order to create a directory named install. Type these commands:

```
#mv install.tar.z install.tar.Z
```

```
#uncompress install.tar
```

```
#tar -xvf install.tar
```

2. Change to the install directory and become the super user. To do this, type these commands:

```
#cd install
```

```
#su
```

Password: (enter password)

3. You must patch one of the boot files of the operating system, otherwise the system will fail to boot. To patch the boot file, make a backup of the existing bootconf.exe file. Then, copy the bootconf.exe from the install directory to replace the older file. Type these commands to perform the designated tasks:

```
#cp /platform/i86pc/boot/solaris/bootconf.exe \  
/platform/i86pc/boot/solaris/bootconf.backup
```

```
#cp ./bootconf.exe /platform/i86pc/boot/solaris/bootconf.exe
```

For Solaris 2.7, go to step 5 directly.

4. Execute the `install.sh` shell script to add the SYMHISL driver to the operating system. The shell script will copy the SYMHISL and SYMHISL.CNF files to the `/kernel/drv` directory as SYMHISL and SYMHISL.CONF respectively. To execute this script, type the following command:

```
#./install.sh
```

5. The SYMHISL device driver is now installed. Now you may safely add the SYM53C896 controller. Then, reboot the machine to reconfigure the system and to recognize the new devices.

Troubleshooting

The following are some potential error messages that may be preceded by a warning message displayed by the operating system. In the message descriptions below; the SYMHISL<n> signifies that <n> can be replaced by some number assigned to it by the operating system. That value helps to identify the SCSI bus that is reporting the error.

SYMHISL<n>: This hardware not supported by this driver

SYMHISL has been told to control a 53C896 hardware which is made by a manufacturer other than Symbios, Inc. This adapter requires a special driver provided by that manufacturer. Please contact the manufacturer for assistance.

SYMHISL<n>: Failed to map device registers

SYMHISL was unable to access the hardware registers necessary for operation. The operating system did not properly configure the PCI device.

SYMHISL<n>: NVS error, failed to restore value of 'reg' property

SYMHISL was able to access the resources needed to determine NVS configuration but was not able to return the system to its prior state. Further configuration errors may occur.

SYMHISL<n>: NVS error, failed to map system memory.

NVS data can't be used.

SYMHISL<n>: NVS error, failed to update 'reg' property.

NVS data can't be used.

SYMHISL<n>: NVS error, failed to allocate memory.

NVS data can't be used.

SYMHISL<n>: NVS error, unable to find 'reg' property

NVS data can't be used.

For each of the above errors, SYMHISL was not able to access NVS configuration data to see if it exists. On some systems, this will not be a problem. On other systems however, NVS data contains the configuration information for this adapter and SYMHISL is not able to use that configuration. This may cause the user to manually configure the driver using the symhisl.conf configuration file. Please refer to the man page driver.conf(4), which is the standard reference on how to edit the symhisl.conf file. The instructions for editing symhisl.conf can also be found in the path /kernel/drv/symhisl.conf.

SYMHISL<n>: Hardware not properly enabled by system, cmd=xxxxh

The system has not properly enabled the configuration resources that SYMHISL needs in order to use this hardware. The cmd=xxxxh value needs to be reported to technical support.

SYMHISL<n>: Unsupported 64-bit register address. Please load 64-bit version of kernel and driver

This version of the SYMHISL driver does not support physical addresses using 64-bit values. Contact Symbios Technical Support at 533-7230 if to determine if a new driver is available to support 64-bit version.

SYMHISL<n>: The host adapter id in the .conf file is being ignored because the SCSI BIOS Configuration Utility will override it.

The symhisl.conf file has a line (scsi-initiator-id=x) which is used to change the host adapter SCSI ID. That line is being ignored because the SCSI BIOS Configuration Utility has set the SCSI ID. Please use the SCSI BIOS Configuration Utility to change the SCSI ID.

SYMHISL<n>: Ignored invalid scsi-initiator-id value = x

The symhisl.conf file has an invalid scsi-initiator-id value as displayed in the error message. The allowable values are in the range 0..15.

SYMHISL<n>: Could not allocate memory to read configuration data.

The driver was unable to allocate memory required to process the configuration data. This means that the configuration was not properly determined. To fix this you may need to manually configure the driver using the symhisl.conf file.

SYMHISL<n>: Failure reading NVM configuration data

The driver was unable to read the configuration data supplied by the SCSI BIOS Configuration Utility. This means that the configuration was not properly determined. To fix this you may need to manually configure the driver using the symhisl.conf file.

SYMHISL<n>: Failure reading NVM manufacturing data

The driver was unable to read the configuration data supplied by the manufacturer. This means that the adapter configuration may be incorrect and unknown errors may occur. Please contact your manufacturer for a replacement adapter.

SYMHISL<n>: The SCSI BIOS Configuration Utility has SCAM enabled but this driver is not capable of SCAM. Please disable SCAM in the boot ROM.

The SDMS boot ROM is capable of using the SCAM protocol to assign SCSI IDs. The SYMHISL driver is not capable of using SCAM. In order to properly configure your system, please disable SCAM using the SCSI BIOS Configuration Utility.

SYMHISL<n>: Configuration data is corrupt and will be ignored

The configuration data provided by the SDMS SCSI BIOS Configuration Utility has been determined to be corrupted. Please run the SCSI BIOS Configuration Utility to correct this error.

SYMHISL<n>: Manufacturing data is corrupt and will be ignored

The manufacturer configuration data has been found to be corrupt. Please contact your manufacturer for a new adapter.

SYMHISL<n>: Unknown synchronous value in NVM data = x

The SYMHISL driver needs to be updated to understand this new synchronous configuration data value. Until the driver is updated, synchronous mode will be disabled.

SYMHISL<n>: Unknown width value in NVM data = x

The SYMHISL driver needs to be updated to understand this new wide configuration data value. Until the driver is updated, wide mode will be disabled.

SYMHISL<n>: Unable to make reset notification callbacks

The SYMHISL was unable to notify the target device driver of a SCSI bus reset. The target driver may start to malfunction because of this.

SYMHISL<n>: Disabling queue tags for target ID x

The SYMHISL driver has determined that the specified target is no longer responding to queue tagged I/O in a proper manner and has disabled queue tags for that device. This usually means that the specified device does not support queue tags. To disable this message, disable queue tags for the given device using the SCSI BIOS Configuration Utility.

SYMHISL<n>: Device (ID=x, LUN=x) not supported

The SYMHISL driver was told to ignore the specified device by the SCSI BIOS Configuration Utility. The operating system has requested to use that device so this message was displayed to warn the user of the conflict.

SYMHISL<n>: ddi_dma_numwin() failed

SYMHISL<n>: ddi_dma_getwin() failed

SYMHISL<n>: ddi_dma_alloc_handle: xxh unknown/impossible

SYMHISL<n>: ddi_dma_buf_bind_handle: DDI_DMA_INUSE impossible

SYMHISL<n>: ddi_dma_buf_bind_handle: xxh unknown/impossible

SYMHISL<n>: ddi_dma_unbind_handle: failed

The operating system failed to respond to the named routine in a known manner. This is a fatal error that is not recoverable. Please report this error to technical support.

SYMHISL<n>: Device in a slave-only slot and is unusable

SYMHISL<n>: Hi-level interrupts not supported

The adapter is in a slot that can not be used with this driver. Please try moving the adapter to a different PCI slot.

SYMHISL<n>: Failed to attach. This adapter will not be installed.

Because of the previous error, this adapter could not be “attached” to the I/O subsystem and will not be accessible. See the previous error message and solve that problem.

SYMHISL<n>: Unable to obtain soft state structure

The driver was unable to initialize a required data structure and therefore did not load. Please call technical support.

SYMHISL<n>: Failed to attach interrupt handler

The driver was unable to initialize the interrupt handler as required. Please call technical support.

SYMHISL<n>: The adapter is malfunctioning

SYMHISL<n>: The adapter is malfunctioning or is of an unknown type

The driver is not able to communicate with the hardware. You may need to update your driver or your hardware.

SYMHISL<n>: Failed to create minor node required for DMI interface

The driver was unable to create an entry point for the DMI device driver. If you are not using the DMI device driver then you may safely ignore this message.

SYMHISL<n>: Could not attach to the SCSI subsystem

The driver was unable to communicate with the SCSI device driver that is part of the operating system. You may need to update your driver.

SYMHISL<n>: Failed to allocate memory

The driver was unable to allocate the memory needed during initialization. You may have run out of available memory.

SYMHISL<n>: Unbind failed!

The driver had a problem when attempting to unload itself. This is a fatal error.

5.5 SCOUNIX

INSTALLATION GUIDE FOR THE SDMS SCO UNIX DRIVER V4.06.00

This file describes the features and use of the Symbios SDMS device driver for the SCO OpenServer 5 operating system environments. These instructions assume that you are using a Symbios host adapter and appropriate SCSI devices. You only need to “link” the new Symbios device driver if you have a Symbios host adapter in the system. Go to the Troubleshooting section for further information about installation to an IDE Hard Drive.

This file is divided into the following sections:

- Introduction

 - Features

 - Description

- Installing Your SCO Unix Driver

 - Procedure 1, New System Installation

 - Installing the SCO UNIX Driver

 - Installing SCSI Device Support

 - Procedure 2, Existing System Installation

 - Installing the SCO UNIX Driver

 - Adding a SCSI Disk Drive

 - Adding a SCSI Tape Drive

 - Adding a SCSI CD-ROM

 - Troubleshooting

Please read the note below before proceeding with the installation instructions.

Note: 1) The 4.06 driver supports all of the OpenServer 5 releases of SCO UNIX (Releases 5.0.0, 5.0.2, 5.0.4 and 5.0.5).
2) The 4.06 driver diskette contains package `slha`, which is for all SCO OpenServer 5 releases.
3) Within the text instructions for adding SCSI Disk Drives, Tape Drives, and CD-ROM drives, the system prompts the user to check whether the driver is the default value or enter the exact driver name. The package name and the driver name are `slha`.

Introduction

SCO UNIX is the first Unix operating system licensed for IBM-compatible microcomputers. The integrated communications, file system, international application support, and documentation create an ideal platform for those requiring a full-featured, UNIX-based operating system. SCO UNIX takes full advantage of the capabilities of the 80386 and above microprocessors.

To connect SCSI devices to one or more host adapters, you must place the proper host adapter driver in the SCO UNIX kernel. The Symbios Boot Time Loadable Driver (BTLD) diskette contains one package:

`slha` contains the driver for all SCO OpenServer releases

You must link-edit the driver into the SCO UNIX kernel. The kernel must reside on the boot drive: either an internal, non-SCSI hard drive (for example, an IDE drive), or a SCSI hard drive attached to host adapter 0 with SCSI ID 0 and LUN 0. The BTLD permits an easy installation of UNIX with the software provided by SCO.

SCO OpenServer provides only one installation diskette, labeled Boot Disk. This diskette, along with the Symbios BTLD driver diskette, and other software media, are used during an SCO OpenServer installation.

The following sections provide instruction on configuring the SCO UNIX kernel with the Symbios driver, installing SCO UNIX onto a hard drive, and adding SCSI peripheral devices. These instructions assume you are familiar with UNIX system administration.

Features

- Provides easy UNIX installation on a hard disk with the Symbios Boot
- Time Loadable Driver (BTLD) diskette
- Multiple processor support (with SCO Symmetrical Multiprocessing Support package installed)
- Supports synchronous negotiation (including Fast, Ultra, and Ultra2 SCSI)
- Supports Wide SCSI (single-ended and differential)
- Supports disconnect/reselect
- Supports scatter/gather
- Allows multiple and non-contiguous LUN support
- Allows tagged command queuing
- Provides dynamic interrupt mapping
- Supports target initiated negotiation
- Allows shared interrupts
- Supports Multiple LUNs
- Allows automatic drive spin up
- Supports RAID up to 1024 byte block sizes
- Supports NVRAM and NVS configuration data areas

New Feature:

- Supports termination control via NVRAM and NVS settings

Description

UNIX installation on a SCSI system requires creation of a SCO UNIX kernel that contains the SCSI driver to support SCSI devices. There are two possible installation procedures:

1. Installing UNIX and the proper Symbios driver for the first time on a boot drive.
2. Loading or updating the proper Symbios driver on a boot drive.

Procedure 1: New System Installation

If you plan to perform a new SCO UNIX installation that includes the proper Symbios driver, then follow this procedure. The Boot Time Loadable Driver (BTLD) provides a user-friendly method for installing SCO UNIX onto a hard disk drive.

Procedure 2: Existing System Installation

If you plan to attach SCSI devices to a Symbios host adapter while using a non-SCSI hard drive (for example, an IDE drive) as the boot hard drive already containing a SCO UNIX system, follow Procedure 2 to install the Symbios driver on the non-SCSI boot drive. Some of the SCSI devices supported include tape drives, CD-ROM drives, and SCSI hard disk drives used as secondary storage. This procedure is also followed to replace a previously installed Symbios driver on a SCSI or non-SCSI boot drive.

Each of these procedures is described in detail below. Symbios recommends that you complete the entire installation in one session. You should have sufficient time (possibly over an hour) available to complete this without interruption.

Installing the SCO UNIX Driver

Procedure 1: New System Installation

This procedure installs SCO UNIX onto a hard disk drive. This installation is necessary to build a new UNIX kernel that includes your Symbios driver. During installation, you are given the option of retaining current partitions on the root hard disk. For instance, you could have a DOS partition or a user UNIX partition already established on the drive. For more details on UNIX installation, refer to the SCO OpenServer Handbook.

1. Link the Symbios BTLT into the UNIX kernel during installation.
 - a. Insert the SCO UNIX installation diskette and reboot the system. This diskette is labeled Boot Disk.
 - b. At the “boot:” prompt (prompt appears without the double quotes), type:

link

Press Enter.
 - c. At the next prompt type:

slha

for all SCO OpenServer Releases.

Do not remove the diskette. Press Enter.
 - d. When prompted during the installation, insert either the installation diskette or the Symbios BTLT diskette, and press Enter.

If the system prompts you to enter a routine:

“Please enter which routine (0-40) to replace ‘?’ to list),
‘a’ to add “slhainit” at the end [default],
‘n’ to do nothing, or ‘q’ to quit”

Enter the indicated routine number that appears above this message.

The system may prompt with another inquiry:

“Please enter
which routine (0-2) to replace ‘?’ to list),
‘a’ to add “slhapoll” at the end [default],
‘n’ to do nothing, or ‘q’ to quit”

Enter the indicated routine number that appears above this message.

- e. Continue the installation according to the SCO UNIX documentation.
- f. The SCO OpenServer system automatically creates a UNIX kernel file called `unix.safe` during installation. To access this UNIX kernel, type after the “boot:” prompt:

`unix.safe`

2. Install SCSI device support.

- a. Continue from Procedure 2, step 3.

Installing the SCO UNIX Driver

Procedure 2: Existing System Installation

This procedure assumes SCO UNIX is already installed on a hard disk drive. This installation is necessary to build a new UNIX kernel which includes the proper Symbios host adapter driver. The basic steps for accomplishing this are outlined below. For more details on UNIX installation, refer to the SCO UNIX System Administrator's Reference manual.

1. The SCO OpenServer system automatically creates a UNIX kernel file called `unix.safe` during installation. To access this UNIX kernel, type after the "boot:" prompt:

```
unix.safe
```

2. Install your Symbios driver.

- a. Insert the Symbios BTL D diskette in the drive and type:

```
installpkg
```

Press Enter to continue.

- b. A prompt appears to insert the requested diskette. Since the Symbios diskette is already inserted, press the Enter key to continue.

- c. A prompt now asks for the name of the package. Type:

```
slha
```

for all SCO OpenServer releases.

Press Enter to continue.

d. If a driver is already present from a previous installation, a prompt inquires about replacing it. Reply y for yes.

e. Once the install package (installpkg) has completed, relink the kernel by typing `/etc/conf/cf.d/link_unix` at the command prompt.

f. The system executes the command and then prompts for a response to:

1. Do you want this kernel to boot by default (y/n)?

Type: y

Press Enter

Then the system backs up the old kernel.

2. Do you want the kernel environment rebuilt (y/n)?

Type: y

Press Enter.

g. To activate the new kernel, you must reboot the system. At the command prompt, type:

reboot

Press Enter.

3. Adding a SCSI Disk Drive

Note: If you are not adding a SCSI disk drive to this system, go to step 4.

- a. At the command prompt, type:

```
mkdev hd
```

Press Enter.

- b. The system prompts for the identifier of the host adapter that supports this device. If the default is correct, press Enter. If the default is not correct, type:

```
slha
```

for all SCO OpenServer releases.

Press Enter.

- c. The system prompts for the host adapter that supports the disk drive. Type the correct host adapter number and press Enter.

If an additional Symbios host adapter is being added to the SCO UNIX kernel, the system may prompt if you want to update the link-kit (add another host adapter). Type y and press Enter. If you entered the host adapter number incorrectly, type n, and press Enter; the system then prompts for the host adapter identifier of the preceding step.

- d. With SCO OpenServer, the system prompts for the SCSI bus number of the disk drive. The default bus number is 0 (zero). To reply, press Enter or type zero and press Enter.

- e. The system prompts for the Target ID of the disk drive. Type the SCSI ID number of the disk drive and press Enter. If the ID entered is in the range 8-15, a prompt requests verification that the device you are adding is a wide (16-bit) device, as only wide devices may have IDs greater than 7. Type y and press Enter if the device is wide. Type n and press Enter if an ID greater than 7 is incorrectly entered for a narrow (8-bit) device. The Target ID prompt is then re-issued so you can enter the correct Target ID.
-

- f. The system prompts for the Logical Unit Number (LUN) of the disk drive. Type the desired LUN and press Enter, or press Enter for the default value of zero.
- g. The system prompts you to update the SCSI Configuration file. Type y and press Enter if the displayed values are correct. Type n if the values are incorrect, and return to step 3d.
- h. A prompt appears to create a new kernel. Type y if only one device or this is the last device to be added, or type n if additional devices are to be added. See step 6, “Rebuilding the Kernel,” if you replied y; return to step 3 if you replied n.

4. Adding a SCSI Tape Drive.

Note: If you are not adding a SCSI tape drive to this system, go to step 5.

- a. At the command prompt, type:

```
mkdev tape
```

Press Enter

- b. The Tape Drive Configuration Program menu appears. Select option 1 to install a tape drive, and press Enter.
- c. The Tape Drive Installation Menu appears. Select option 4 to install a SCSI tape drive, and press Enter. From the next list, select the type of SCSI tape drive to install, and press Enter.
- d. The system prompts to configure the tape drive. Type y and press Enter.

e. The system prompts for the identifier of the host adapter that supports this device. If the default is correct, press Enter. If the default is not correct, type:

slha

for all SCO OpenServer releases.

Press Enter.

f. The system prompts for the host adapter that supports the tape drive. Type the correct host adapter number, and press Enter.

If an additional Symbios host adapter is being added to the SCO UNIX kernel, the system may prompt if you want to update the link-kit (add another host adapter). Type y and press Enter. If you entered the host adapter number incorrectly, type n, and press Enter; the system then prompts for the host adapter identifier of the preceding step.

g. With SCO OpenServer, the system prompts for the SCSI bus number of the tape drive. The default bus number is 0 (zero). To reply, press Enter or type zero and press Enter.

h. The system prompts for the SCSI ID of the tape drive. Type the SCSI ID number of the tape drive and press Enter.

i. The system prompts for the LUN of the tape drive. Type 0 (zero) and press Enter. The system then prompts to update the SCSI Configuration file. Type y and press Enter.

j. A list appears that shows the special devices created. Press Enter, and another list appears that shows the links to the installed tape drive. When prompted for a boot string, type q and press Enter to return to the Tape Drive Configuration Program menu. Type q and press Enter to terminate the Tape Drive Configuration Program menu.

k. A prompt appears to create a new kernel. Type y if only one device or this is the last device to be added, or type n if additional devices are to be added. See step 6, “Rebuilding the Kernel,” if you replied y; return to step 3 if you replied n.

5. Adding a SCSI CD-ROM Drive.

Note: If you are not adding a SCSI CD-ROM drive to this system, go to Step 6.

a. At the command prompt, type:

```
mkdev cdrom
```

Press Enter

b. The CD-ROM Configuration Program menu appears. Select option 1 to install a CD-ROM drive and press Enter.

c. The system prompts to configure the CD-ROM Drive. Type y and press Enter.

d. The system prompts for the identifier of the host adapter that supports this device. If the default is correct, press Enter. If the default is not correct, type:

```
slha
```

for all SCO OpenServer releases.

Press Enter.

e. The system prompts for the host adapter that supports the CD-ROM drive. Type the correct host adapter number and press Enter.

If an additional Symbios host adapter is being added to the SCO UNIX kernel, the system may prompt if you want to update the link-kit (add another host adapter). Type `y` and press Enter. If you entered the host adapter number incorrectly, type `n`, and press Enter; the system then prompts for the host adapter identifier of the preceding step.

f. With SCO OpenServer, the system prompts for the SCSI bus number of the CD-ROM. The default bus number is 0 (zero). To reply, press Enter or type zero and press Enter.

g. The system prompts for the SCSI ID of the CD-ROM Drive. Type the SCSI ID number and press Enter.

h. The system prompts for the LUN of the CD-ROM drive. Type the desired LUN and press Enter, or press Enter for the default value of zero.

i. The system prompts to update the SCSI Configuration file. Type `y` and press Enter. A prompt appears to configure a CD-ROM/TAPE installation device. Unless this is desired, type `n` and press Enter. A prompt appears to add a High-Sierra file system. Type `y` and press Enter. The system displays the High Sierra/ISO9600 file system Configuration Program menu. Select option 1 to add High-Sierra and press Enter. The system updates the SCSI configuration file and returns to the CD-ROM Configuration Program menu. Type `q` and press Enter to terminate the CD-ROM Configuration Program menu.

j. A prompt appears to create a new kernel. Type `y` if only one device or this is the last device to be added, or type `n` if additional devices are to be added. See step 6, “Rebuilding the Kernel,” if you replied `y`; return to step 3 if you replied `n`.

6. Rebuilding the Kernel.

a. To rebuild the kernel, execute the command:

```
/etc/conf/cf.d/link_unix
```


b. The system displays a message and then prompts for a responses:

1. Do you want this kernel to boot by default (y/n)?

Type: y

Press Enter

Then the system backs up the old kernel.

2. Do you want the kernel environment rebuilt (y/n)?

Type: y

Press Enter.

c. To activate the new kernel, you must reboot the system. Type the command:

reboot

Press Enter.

d. After the system reboots and the “boot:” prompt appears, press Enter and the new kernel loads.

e. Log in as usual.

Troubleshooting

The following conditions should exist after a successful installation:

The directory `etc/conf/sdevice.d` should contain a file named `slha`. This file contains the `sdevice` entries.

The directory `etc/conf/cf.d` contains files `sdevice`, `mdevice`, and `mscsi`. Files `sdev.hdr` and `mdev.hdr` describe the values of the possible field entries in the files `sdevice` and `mdevice`, respectively.

- The `sdevice` file should contain a `slha` entry for each Symbios host adapter configured in the system.
- The second field in the `sdevice` file should read 'Y'.
- A `slha` entry should appear in the `mdevice` file.
- A `slha` entry for each configured SCSI device should appear in the `mscsi` file.

Directory `/etc/conf/pack.d/slha` should exist and contain the files `Driver.o` and `space.c`.

The following are some potential problems and their suggested solutions:

Problem:

Loading the SCO UNIX kernel to an IDE Hard Drive

Solution:

You only need to "link" if you have a SCSI device attached to a Symbios host adapter. Follow the instructions in the SCO UNIX Installation documentation. Once the installation has completed, then go to Step 2 in Procedure 2 and use the `installpkg` to install your Symbios driver.

Problem:

A SCSI device is not found.

Solution:

- a. Reboot and press `Cntl C` when prompted to view the Configuration Utility displays.

- b. Verify the device is on the correct host adapter and ID.
- c. If the device is not shown, then it is probably turned off or a cabling problem exists.

Problem :

UNIX System behaves unreliably after a configuration change.

Solution :

Whenever the hardware or software configuration is altered, you must rebuild the kernel. Use the directory /etc/conf/cf.d and type:

```
./link_unix
```

to rebuild the kernel.

Problem:

An error message occurs during the rebuild of the kernel.

Solution:

- a. Reinstall the proper Symbios driver using the installpkg utility.
Remember to relink the kernel.
- b. Reboot the system.

Problem:

The root disk is not found or the partitioning of the disk fails.

Solution:

- a. If your boot drive is a SCSI disk, use the SCSI BIOS Configuration Utility to check that the disk is assigned SCSI ID 0 (zero) and is configured to host adapter 0 (zero), LUN 0 (zero).

Problem

A SCSI tape drive is not seen during installation.

Solution:

Use the SCSI BIOS Configuration Utility to check that the tape drive is assigned SCSI ID 2, and that it is configured to host adapter 0 (zero), LUN 0 (zero).

Also, verify that the ID of the tape drive does not conflict with any other SCSI device ID.

Problem:

A SCSI CD-ROM drive is not seen during installation.

Solution :

Use the SCSI BIOS Configuration Utility to check that the CD-ROM drive SCSI ID is set to 5, and that it is configured to host adapter 0 (zero), LUN 0 (zero).

Also, verify that the ID of the CD-ROM drive does not conflict with any other SCSI device ID.

5.7 UNIXWARE

Installation Guide For the Symbios SDMS UnixWare Driver V4.06.00

This file describes the features and use of the Symbios SDMS Device Driver for the SCO UnixWare 2.1 or later (including UnixWare 7) operating system environments. It is divided into the following sections:

Note: The 4.06 driver only supports UnixWare 2.1.X and later. If you need support for UnixWare 2.0.X please use the 3.02.00 driver.

Introduction

Features

Description

How to Install Your SDMS UnixWare Driver

Installing the Driver During UnixWare Installation

Updating UnixWare 2.1 or UnixWare 7 with the c8xx Driver

Troubleshooting

Introduction

UnixWare 2.1 and UnixWare 7 extends the Unix SVR4.2 operating system, allowing tight integration with NetWare in an easy-to-use graphical form. UnixWare features include a graphical user interface, NetWare networking, application compatibility, multi-tasking capability, and multi-user capability. In addition UnixWare 2.1 provides multiprocessor support.

The storage device drivers for UnixWare are based on the Portable Device Interface (PDI) architecture. PDI logically breaks down a driver into a controller specific portion (c8xx host adapter driver) and a device specific portion (the target driver). The third component is SDI (the SCSI Device Interface), a kernel resident driver that interfaces with both the target driver and host adapters.

The Symbios SDMS c8xx driver allows SCO UnixWare (previously Novell UnixWare) operating systems to interface with SCSI devices connected to a Symbios SYM53C8XX chipset and/or Symbios 8XX host adapter cards.

The driver can be statically linked (integrated) or dynamically linked (loadable) with the kernel. If the driver is integrated with the kernel, then the rebuilt kernel must reside on the boot drive. The following sections describe the procedures to install the driver during a first time installation of UnixWare, and to update already installed UnixWare with the Symbios SDMS c8xx driver.

Features

- Allows easy installation using PDI - ID tools.
- Provides synchronous negotiation (including Fast SCSI, Ultra SCSI, and Ultra2 SCSI)
- Supports multiple host adapters
- Supports Disconnect/Reselect
- Allows multiple and non-contiguous LUN support
- Supports dynamic interrupt mapping
- Supports scatter/gather
- Wide device support
- Supports SCSI pass-through functionality
- Supports tagged command queuing
- Multiprocessor support
- Supports target-initiated negotiation
- Supports NVRAM and NVS Configuration data areas

New Feature:

- Supports Termination Control via NVRAM and NVS settings

Description

The Symbios SDMS c8xx driver for SCO UnixWare operating systems is available on a 3.5 inch floppy diskette labeled PCI SCSI SCO UnixWare. Use this diskette to load the driver during the installation of the operating system, or to access the devices on the SCSI bus after a UnixWare installation. The following sections describe these procedures.

For SCO UnixWare 2.1 and later, the Host Adapter diskette contains the c8xx driver for use during initial installation of SCO UnixWare. If you have both the c8xx driver directly from Symbios and also the driver bundled with the UnixWare Operating System, use the latest release of the c8xx driver.

Installing the SDMS UnixWare Driver

Installing the c8xx Driver: New System Installation

When performing UnixWare installation, if the computer is set up to boot from the SCSI bus through a Symbios SYM53C8XX chipset, the driver is automatically linked statically with the kernel to suit the setup. You must follow the instructions in the UnixWare Installation Handbook before installing the driver.

1. Boot the computer using the Install diskette delivered with the UnixWare Operating System distribution package.
2. Follow the instructions on the screen.
3. Insert the SDMS PCI UnixWare driver diskette when prompted to insert the Host Adapter diskette and press Enter. The message “Please wait while HBA hardware modules are being loaded” appears.

If you want to install other host adapter drivers, then insert the HBA diskette provided with the UnixWare distribution package and press Enter.

If there are no other host adapter drivers to install, press F10 to continue the installation and just follow the instructions.

4. The system loads the required drivers, such as c8xx and indicates when they are loaded.
5. Continue to follow instructions on the screen or refer to the UnixWare Installation Handbook to complete installation.

Note: During the installation, if the driver does not find a hard disk on which to install the operating system, it aborts the process.

6. At the end of the installation you might see a prompt to reinsert the c8xx driver diskette. Insert the SDMS PCI UnixWare driver diskette and press Enter.

The kernel is rebuilt, and the system gets ready to boot from the SCSI disk drive.

7. Remove the driver diskette when prompted to do so and reboot the system.

Installing the c8xx Driver: Existing System Installation

Install the c8xx driver on a system currently running UnixWare by using one of three different procedures. The method to use depends on the setup of your system and on whether you want the system to remain running during this process. By reviewing the following questions, you can determine which procedure to follow.

Q: Is your Boot disk a SCSI hard disk on the SCSI bus connected to a Symbios SYM53C8XX chipset?

If the answer is yes, then you **MUST** statically link the kernel and reboot the system. Follow the instructions in sections:

- Loading the Package
- Configure for Statically Linked driver
- Rebuild the UnixWare Kernel

Q: Do you need or desire to install the driver without halting the system?

If the answer is yes, then you want to install the driver as a dynamically loadable driver. Follow instructions in sections:

- Loading the Package
- Configure for Dynamically Loadable driver
- Loading Loadable module

If the answer is no to the above questions, then follow instructions in sections:

- Loading the Package
- Rebuild the UnixWare Kernel

Loading the Package

Before you install the c8xx driver, make a backup copy of the existing kernel:

1. Log on as root.
2. At the shell prompt type:

```
cp /stand/unix /stand/unix.safe
```

Use this copy of the old kernel to reboot the system if the driver installation fails. Refer to the later section titled Troubleshooting for more information.

3. Once the old kernel is saved, insert the SDMS PCI UnixWare driver diskette.

4. Load the driver using the `pkgadd` command by typing:

```
pkgadd -d /dev/dsk/f0t  
-or-  
pkgadd -d diskette1
```

5. Select `c8xx` and press Enter. The `c8xx` driver gets loaded on the system.
6. The system again prompts you to load the driver even if loading was successful. Type `q` (quit) and press Enter.
7. Verify that the driver is now listed and loaded successfully by typing:

```
pkginfo c8xx
```

8. The package information should look like this:

```
system c8xx Symbios IHV HBA
```

Configure for Statically Linked Driver

1. Make a backup copy of the `c8xx` system configuration file as follows:

```
cd /etc/conf/sdevice.d  
cp c8xx /tmp/c8xx.sys
```

2. Check if the System file configured is static. If the file contains the line “\$static”, it is configured for static link. To look at this file, type the following command:

```
more c8xx
```

3. If the System file does not contain the text “\$static” on the line immediately following the “\$version” line, add it using a text editor. Do not include the double quotes.

Configure for Dynamically Loadable Driver

1. Make a backup copy of the c8xx system configuration file as follows:

```
cd /etc/conf/sdevice.d
cp c8xx /tmp/c8xx.sys
```

2. Remove the “\$static” line from the c8xx file using a text editor, or by typing the following commands:

```
grep -v '$static' c8xx > /tmp/c8xx.tmp
mv /tmp/c8xx.tmp c8xx
```

3. Configure the loadable driver into the system as follows:

```
/etc/conf/bin/idbuild -M c8xx
```

Loading the Loadable Module

1. Once the loadable driver is configured into the system, your driver is ready to load into the running system using the modadmin command as follows:

```
modadmin -l c8xx
```

Note: When the driver is loaded, it scans the SCSI bus and displays the devices found on it. An integer module-id used to identify the c8xx driver appears on the screen when loading completes.

2. To access the devices on the SCSI bus, create the entries into the device table using pdi commands as follows:

```
cd /etc/scsi
. /pdimkdev -ifS
. /pdimkdtab -ifS
The system is now ready to use.
```

Rebuilding the UnixWare Kernel

1. Reboot the system. When the c8xx package is loaded, it sets a system flag to automatically rebuild the kernel upon the next system boot. To reboot, type the following commands:

```
cd /  
init 6
```

During the boot process, the driver scans the SCSI bus and lists the devices found on it. If the kernel panics during boot, then reboot the system with the saved copy of the old kernel. Booting from the saved copy of the kernel is described in the following section titled Troubleshooting. If the reboot is successful, the system is ready to use.

Troubleshooting

Problem:

Driver Installation Fails.

Solution:

- a. Replace the system Unix with the backup copy you created before attempting to install the c8xx host adapter driver. To perform this task, reboot the system.
- b. Wait for the Operating System Logo to display, then press the space bar to begin an interactive boot session.
- c. When the “[boot]” prompt is displayed:
 If the system is UnixWare 2.1.x, type:
 KERNEL=unix.safe
 go
 If the system is UnixWare 7, type:
 boot=unix.safe
- d. The Operating System logo and “Booting UnixWare...” reappears. Then the system starts booting from the Unix kernel you specified in the previous step.

