MYLEX

User's Guide

MultiMaster™ Software

P / N 3002493 Rev. E

A Software Driver Package for DOS, Windows, Windows 95, Windows NT, OS/2, SCO Unix, UnixWare, and NetWare

Revision History

Revision	Change Activity	Date
A	Release	5/20/94
B	Release	12/09/94
C	Release	03/24/95
D	Release	12/30/95
E	Release	02/28/97

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Table of Contents

Introduction

The software included in the *Software Drivers* package can be used to connect a wide variety of SCSI devices to your computer through your MultiMaster™ SCSI Host Adapter. Each driver supports:

- Multiple Mylex host adapters
- Up to seven SCSI peripheral devices (hard drives, tape drives, etc.) for each narrow (8-bit) adapter, and up to 15 for each wide (16-bit) adapter
- SCSI peripherals such as UltraSCSI or Fast SCSI hard disk drives, SCSI CD-ROM drives, SCSI tape drives, and magneto-optical (MO) drives.

The *Software Drivers* package includes device drivers, driver updates, and/or utility software that works with the following operating systems:

- PC-DOS or MS-DOS
- MS Windows 95
- IBM OS/2
- UnixWare 2.X
- MS Windows 3.X
- MS Windows NT
- SCO Unix
- NetWare

This manual consists of seven chapters, one for each driver family (DOS and Windows 3.X are together in Chapter 1). Each chapter defines software requirements and provides detailed, step-by-step instructions for installing the software in its environment. Appendix A provides supplementary information about the “>1 Gigabyte” option, which is relevant to all installations, and Appendix B provides customer service and warranty information.

Note: *The information in each of this manual’s seven chapters is presented in a parallel fashion whenever possible. However, because of distinct differences in the software for the different environments, this is not always possible.*

Conventions Used Throughout this Publication

The following conventions are used throughout this publication.

Note: *A note like this indicates items of particular interest.*

Caution: *A note like this contains important information that you should read before proceeding.*

Warning: *A note like this contains information that you should read before proceeding in order to prevent damage to the software, loss of data, or other critical problems.*

Screen entries or information displayed on the screen are shown in Courier font. For example: Supply SCSI Support for LUNs.

Where appropriate, in some chapters of the manual, screen text is shown in Helvetica bold. For example: **/etc/conf/pack.d/blc/space.c**

Names of screens are shown in Helvetica plain text. For example: Autoinstall.

Official software names are shown in italics, for example *DOS Software Manager.*

References to file names are shown in all caps, for example BTDOSM.SYS.

References to hardware keys are shown in Helvetica bold and are enclosed in angle brackets. For example: **<Esc>, <Tab>, <Enter>**.

The term ‘screen’ is used to indicate the panels that are part of the software, for example, Autoinstall. The term ‘monitor’ is used to describe the physical computer display.

Supported Hardware

All Mylex device drivers described in this publication support the following host adapters:

Model number	Description
BT-54xC, BT-54xS, BT-54xB	ISA Fast SCSI-2
BT-64x	MicroChannel Fast SCSI-2
BT-74xC, BT-74xS	EISA Fast SCSI-2
BT-75xC	EISA Fast and Wide SCSI-2
BT-757CD	EISA Fast and Wide Differential SCSI-2
BT-445C	VESA Fast SCSI-2
BT-946C	PCI Fast SCSI-2
BT-956C	PCI Fast and Wide SCSI-3
BT-956CD	PCI Fast and Wide Differential SCSI-3
BT-948	PCI Ultra SCSI-3
BT-958	PCI Ultra Wide SCSI-3
BT-958D	PCI Ultra Wide Differential SCSI-3

CD-ROMs Supported

The DOS Software Manager, in conjunction with the CD-ROM Driver and the MS CD-ROM Extension Driver, supports the following CD-ROMs:

- Chinon CDS-431, CDS-435, CDS-525S, CDS-535, CDX-431, CDX-435, and CDX-535
- Hitachi CDR-1750 and CDR-3750
- Matsushita CR-501 and CR-532
- NEC CDR-38, CDR-73, CDR-74, CDR-83, CDR-84, CDR-300, CDR-401, CDR-500, CDR-600, CDR-741 and CDR-841
- MultiSpin 3Xe, MultiSpin 3Xi, and MultiSpin 3Xp
- Panasonic CD-531, CD-532, CDR-533, CDR-501, CDR-503
- Sanyo CRD-400I, CRD-254S
- Sony CDU-55S, CDU-541, CDU-561, CDU-4211, CDU-6211, CDU-6811, CDU-7811 and CDU-7211, CDU-76
- Toshiba XM-3301, XM-3401, XM-3501, XM-3601, and XM-4101
- Pioneer DRM-600, DRM-604, DRM-602X
- Plextor (Texel) DM-3024, DM-3028, DM-5024, DM-5028, PX-43CH, PX-43CS, PX-45CH, PX-45CS, PX-6XCS
- TEAC CD-50,CD-56
- TEXEL DM3024, DM-5024, DM-3028 and DM-5028

The DOS Device Manager, in conjunction with the CD-ROM Driver and the MS CD-ROM Extension Driver, also supports the following multisession photo CD-ROM drives:

- SONY CDU-561, CDU-6211
- Chinon CDS-535, CDX-535
- Toshiba XM-3401B, XM-4104
- Plextor (Texel) DM-5024, DM-5028
- NEC CDR-38, CDR-741, CDR-841, CDR-600
- Panasonic CDR-503, CDR-533
- Sanyo CDR-400

Chapter 1

DOS SOFTWARE MANAGER

Chapter 1: Contents

Preface

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Preface

Chapter 1 describes how to install the *DOS SCSI Software Manager* on platforms running DOS ™ and Windows™ (version 3.1 and later), and how to use the SCSI device tools provided with the software.

Chapter 1 consists of four sections:

- **Section 1•1**, "Overview," introduces the *DOS SCSI Software Manager*, provides information about software and hardware installation requirements, and indicates the CD-ROMs supported by the software.
- **Section 1•2**, "Installing the Software," explains how to install the *DOS SCSI Software Manager*, and how to install and use the SCSI device tools and options.
- **Section 1•3**, "Device Driver Configuration," explains how to update the system configuration file and the AUTOEXEC.BAT file. It also provides samples of each type of file.
- **Section 1•4**, "The Extended Fixed Disk Utility," explains how to use the BTFDISK utility to handle partitions on SCSI drives.

Recommended Reference Material

The following additional reference material is useful when you are installing and using the software.

- the Mylex manual for the SCSI host adapter
- The MS -DOS user's guide
- The Microsoft Windows version 3.X user's guide
- The installation guide and reference manual for your computer
- Installation guides for any third-party device drivers

Software Requirements

To install the *DOS SCSI Software Manager*, you should have the following software:

- The *Software Drivers* diskette for DOS and Windows 3.1
- MS-DOS Version 3.3 or later
- Microsoft Windows 3.1 or later (if applicable)
- Appropriate third-party software (e.g., backup and utility programs)

Hardware Requirements

You need the following basic hardware: an IBM PC or a PC-compatible computer, with a 286, 386, 486, Pentium, or Pentium Pro processor, or with a 286-class, 386-class, 486-class, Pentium-class, or Pentium Pro-class processor

CD-ROMs and Host Adapters Supported

For information about the CD-ROMs and host adapters supported by this software, refer to the “Introduction” section at the front of this manual.

1•1

Overview

The *DOS SCSI Software Manager*, which is part of the *Software Drivers* package, allows software applications running on your computer to communicate with the MultiMaster SCSI host adapter and to access the devices connected to it.

The *DOS SCSI Software Manager* runs on IBM PC (or PC-compatible) computers and works with both the Microsoft DOS and Microsoft Windows 3.X operating systems. It provides software drivers that support devices such as SCSI hard disk drives, SCSI tape drives, magneto optical (MO) disk drives, scanners, and CD-ROM drives.

Software Manager Functions

Typically, the *DOS SCSI Software Manager* is used in the following situations:

- When you are installing SCSI peripherals such as a SCSI CD-ROM drive, SCSI tape drives, or magneto-optical (MO) disk drives
- When the system has more than one SCSI host adapter
- When you want to install more hard drives than your version of DOS supports
- When you want to support applications such as Microsoft Windows 3.1 (and above) that use virtual memory

The following software is included with the *DOS SCSI Software Manager*:

- A driver installation utility (described in Section 1•2) that automatically installs the DOS and Windows device drivers and updates the appropriate configuration files
- SCSI Device Tools, a software utility that is also described in Section 1•2, that can identify, format, and verify SCSI devices

The remainder of this section describes the drivers provided in the *DOS SCSI Software Manager*.

Drivers Present in the Software Manager

The *DOS SCSI Software Manager* is supplied on one of the diskettes in the *Device Drivers* software package. This software package also includes device drivers for other operating systems that are discussed in other parts of this manual. You do not need to use the diskettes that contain software for the other operating systems unless you also use one of these operating systems. If you do, refer to part(s) of this manual that discusses the operating system(s) that you are using.

The *DOS SCSI Software Manager* complies with the requirements of the *Advanced SCSI Programming Interface* (ASPI). It is compatible with Windows version 3.X and has been tested with a wide variety of third-party software such as tape backup and utility programs.

Note: *Chapter 2 of this manual deals with Windows 95™, which requires different drivers. Chapter 3 deals with Windows NT™.*

The *DOS SCSI Software Manager* consists of the following elements:

- **DOS Device Manager**, or BTDOSM (filename: BTDOSM.SYS) provides a common interface between DOS (and DOS applications) and the SCSI host adapter. Once BTDOSM.SYS is loaded, the DOS applications (for example, tape-access programs) can share the SCSI host adapter. BTDOSM.SYS also includes WINASPI (Windows ASPI) layer support.
- **Extended Hard Disk Driver**, or BTMDISK (filename: BTMDISK.SYS) supports multiple Chapter SCSI host adapters within a single system. BTMDISK.SYS also supports hard drives that DOS and/or the BIOS cannot support, or that the BIOS is not configured to support.

- **Extended Hard Disk Utility**, or BTFDISK (filename: BTFDISK.EXE) is the utility that partitions hard drives and is equivalent to the standard DOS FDISK utility.

  The DOS FDISK utility is used to partition the drives that DOS normally supports. You can use Mylex's BTFDISK to partition drives that are not normally supported by DOS. After the disk drive has been partitioned and formatted, DOS will be able to recognize it. the BTFDISK utility allows you to partition SCSI disk drives that have a SCSI ID between 0 and 15.

  BTFDISK can also be used to delete DOS and non-DOS partitions (for example, a UNIX™ partition), to set the active partition, and to display partition information.

- **CD-ROM Driver**, or BTCDROM (filename: BTCDROM.SYS) is the CD-ROM device driver. It must be used in conjunction with the *DOS Device Manager* and the MSCDEX.EXE driver supplied with DOS.
- **MS CD-ROM Extension Driver**, MSCDEX (filename: MSCDEX.EXE) was developed by Microsoft Corporation to allow CD-ROM drives to be accessed through the DOS operating system.

Windows Device Driver Support

Two Windows ASPI™ layer drivers are included with your *DOS SCSI Software Manager* drivers. They are:

- WINASPI.DLL
- VASPID.386 (Virtual Device Driver)

These drivers provide Windows applications with access to your SCSI devices in Multitasking Enhanced ASPI Mode.

Before You Install the Software

Before you start to install the software, make sure that you have the appropriate software, hardware, and reference material, as described in the Preface to Chapter 1. In addition, take a few minutes to review the README file located on the *Software Drivers* diskette. This file contains late-breaking information that was not available when this manual was printed.

1•2

Installing the Software

The *DOS SCSI Software Manager,* which contains the device drivers, is part of the *Software Drivers* package. The SCSI device tools are also included in this package. This section explains how to install the device drivers for DOS and Windows 3.X, and how to use the SCSI device tools.

The information in this section is organized as follows:

- "Installing the DOS SCSI Software Manager" explains how to install the drivers for DOS and Windows 3.X.
  - "Starting Installation — DOS and Windows 3.X," on page 1-7, describes the first group of procedures common to both DOS and Windows 3.X installations.
  - "Finishing Installation — DOS," on page 1-24, describes the final installation procedures for DOS installations.
  - "Finishing Installation — Windows 3.X," on page 1-26, describes the final procedures for Windows installations.
- "Using the SCSI Utility," on page 1-29, explains how to use the options available through the SCSI device tools.

Note: *Read this section in its entirety before starting to install the software.*

Installing the DOS SCSI Software Manager

The *DOS SCSI Software Manager,* which consists of DOS and Windows SCSI device drivers, is on one of the *Software Drivers* diskettes (check the diskette labels to identify the correct diskette). This package also contains the installation utility, Install.exe. This utility installs DOS and Windows drivers, and updates the appropriate configuration files.

Caution: *You must install this software from DOS. If your computer is set up to automatically start Windows 3.X, exit Windows and return to the DOS prompt. Do not attempt to install this software from a DOS prompt in a DOS window in Windows 3.x. Once it is installed, the software works for both DOS and Windows 3.X.*

If you are installing the software from DOS without a mouse, there are various ways to navigate through the screens that appear on your monitor:

- Use the key commands displayed at the bottom of each screen to make your selections.
- Use **<Alt>+** first letter of the option name to select an option.
- Press the **<Tab>** key to move among selections.
- If your screen allows you to scroll, use the **<Up>** and **<Down>** arrows to scroll through selections.
- Within certain scrolling menus, you can use the **<Space Bar>** to highlight and select items.

If you have a DOS mouse driver installed on your system, you can use your mouse to navigate between options and to make menu selections.

Starting Installation — DOS and Windows 3.X

This section describes the installation procedures common to both the DOS and Windows operating systems.

1. Start the computer (if Windows starts, exit to DOS).

2. Insert the diskette from the *Software Drivers* package that contains the DOS drivers (the operating systems are listed on the diskette labels), in your primary floppy drive (usually drive A).

3. Change to drive A by entering `a:` **<Enter>** at the DOS prompt, as shown below:

   ```
   C:\>a: <Enter>
   ```

4. Enter the following command at the `A:\>` prompt:

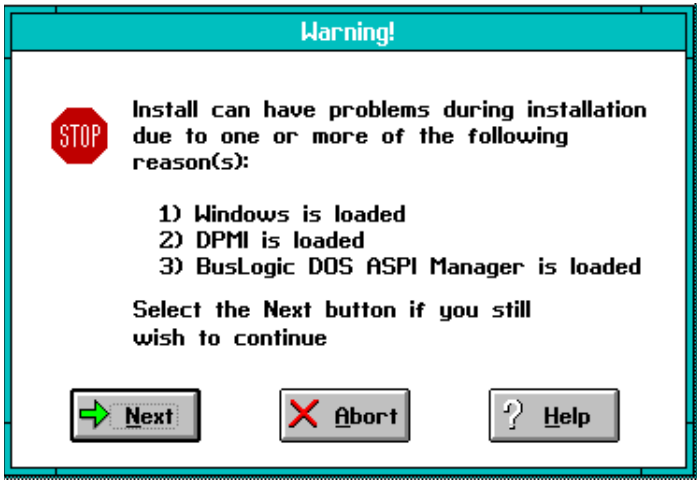
   ```
   A:\>install <Enter>
   ```

5. As the program loads, an hour glass is displayed for approximately 60 seconds. During this time, the program does the following things:

   – Checks for the availability of at least 530 KB of memory and displays the following error message if there is insufficient memory:

   ```
   Autoinstall requires at least 530 KB of DOS memory
   to execute. Please free up the memory by unloading
   unwanted TSRs before executing Autoinstall.
   ```

– Determines whether Windows, DPMI (DOS Protected Mode Interface), and / or the DOS ASPI manager are loaded. If any or all of these are loaded, the following Warning is displayed:



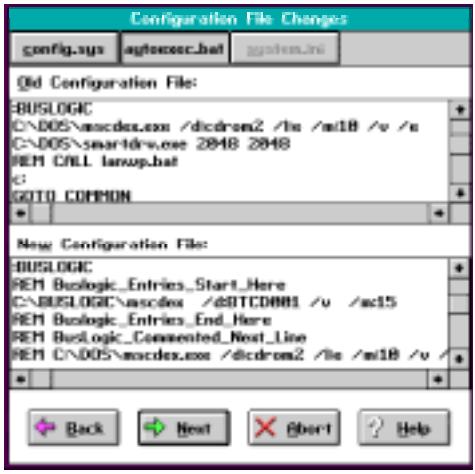
- "Windows is loaded" means that the install program has detected that you might be trying to install the software under Windows and does not approve of this procedure. If you *are* trying to install under Windows, use the Abort button to abort the installation and start again under DOS.
- "DPMI is loaded" means that the INSTALL program detected that you may have started it from the prompt in a DOS window, instead of exiting from Windows. If you did, use the Abort button to terminate the INSTALL program, exit Windows, and start again.
- "DOS ASPI Manager is loaded" means that the BTDOSM.SYS driver is loaded. If this is the case, you should unload the driver. Refer to your DOS user's guide for instructions on how to do this.

Warning: *Always abort the installation when you see this screen. If you select the* Next *button and proceed with the installation, your results will be unpredictable.*

---

6. When the INSTALL program is loaded, the AutoInstall dialog box is displayed. Select Next to continue installing the software.

7. The Options dialog box is displayed.



   – The **Install** button allows you to proceed with the software installation. Select this option now.
   – The **SCSI Device Tools** button allows you to use the SCSI device tools. Refer to "Using the SCSI Utility," on page 1-29 for information about this option. *Do not select this option at this time.*

– The **Exit** button allows you to quit the installation procedure and returns you to the DOS prompt.

8. When you select the Install option, a screen appears momentarily that displays this message:

```
Please Wait, Scanning SCSI [Device]
```

While this message is displayed, Install is scanning the SCSI bus to determine which SCSI devices are attached to the system and which drivers need to be installed.

9. When Install is done scanning for SCSI devices, the system momentarily displays the following message:

```
Please Wait, Creating Device List
```

While this message is displayed, Install is creating a list that includes all of the devices detected during the SCSI-device scan.

10. When Install has finished creating a list of SCSI devices, the Installation Paths dialog box is displayed:

This dialog box includes two text boxes. The Source text box shows the source path for the files you are installing (in this case drive A). The Destination text box shows the default drive and directory where the files will be installed. You can edit or replace the destination path to specify the drive and directory where the files you want the files installed (for example, `D:\NEWDIR`), or you can accept the default drive and directory, `C:\BUSLOGIC.`

The buttons in this dialog box provide the following options:

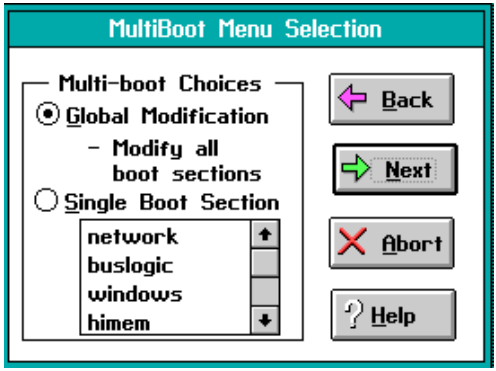
– The **Back** button takes you back to the Options screen.

- The **Next** button continues the installation process.
- The **Abort** button terminates the installation. If you select this button, you are returned to the Options dialog box.
- The **Help** button starts the built-in, context-sensitive help system.

Select the Next button.

11. When you select Next, the Multiboot Menu Selection dialog box is displayed (if you have a Multiboot CONFIG.SYS file):

Note: *Multiboot is an advanced feature of DOS 5.0 and later versions that allows you to set up your computer with different operating environments. This allows you to choose which operating system you want to load. Multiboot accomplishes this by creating multiple configuration files that can be selected from a menu.*



You can select either of the following options from the Multiboot Choices area:

- Select Global Modification if you want the install program to modify the configuration files for all boot options (configurations) on your computer.
- Select Single Boot Section if you want the install program to modify the configuration files for the selected boot option. Once this option is selected, you can scroll through the boot options and select those you want the install program to modify.

Note: *If you do not choose an option, and you select the* Next *button, the system uses the default option,* Global Modification.

Once you have selected an option, exit from this dialog box by selecting one of the following buttons:

- Back returns you to the Installation Paths screen.
- Next continues the installation process.
- Abort terminates the installation. If you select this button, you are returned to the Options dialog box.
- Help starts the built-in, context-sensitive help system.

Select the Next button.

12. Four Environment File Modifications folders are displayed on the screen at the same time. The DOS ASPI Manager folder is selected when this screen first appears.

    You can select any of the other three folders at any time and in any order. If you are using a mouse, you can click on the tab for the folder you want (CDROM Driver, etc.). If you are not using a mouse, use an **<Alt>**+**<***keyname***>** combination to select a button. For example, if you are in the DOS ASPI folder, and you want to go to the CDROM Driver folder, hold down the **<Alt>** key and press **C**. You can also use the **<Up>** and **<Down>** arrows to navigate between folders.

    It is not necessary to view all of the folders. If you select Next in any of the folders, you exit the folder screen, and the Autoinstall screen is displayed.

    The Environmental File Modifications folders allow you to set up specific driver configurations for the following device drivers:

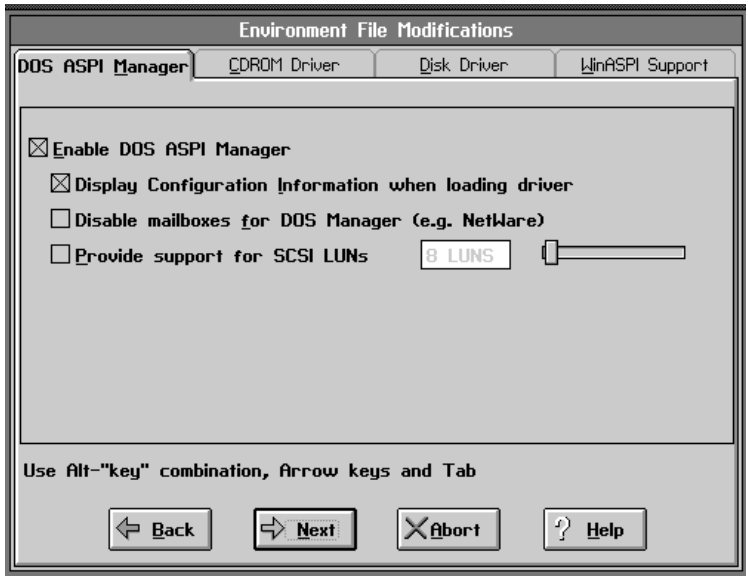
    - DOS ASPI Manager
    - CD-ROM Driver
    - Disk Driver
    - WinASPI Support

    Refer to Chapter 1•3, “Device Driver Configuration,” on page 1-39 for information about specific driver parameters. The help associated with the Environmental File Modifications folders also provides extensive information, and you might want to refer to it at this point.

Note: *If you want to select the default setting in any of the* Environmental File Modifications *folders, just select* Next *to proceed to the* Auto Install *screen.*

Note: *Configuration changes made in any of the folders do not take effect until you complete the* Auto Install *process described in Step 13, on page 1-19.*

A. The DOS ASPI Manager folder shown below lets you enable the DOS ASPI Manager by selecting the Enable DOS ASPI Manager box. This option is enabled by default if a host bus adapter is detected during the scan of SCSI devices (see Step 8).



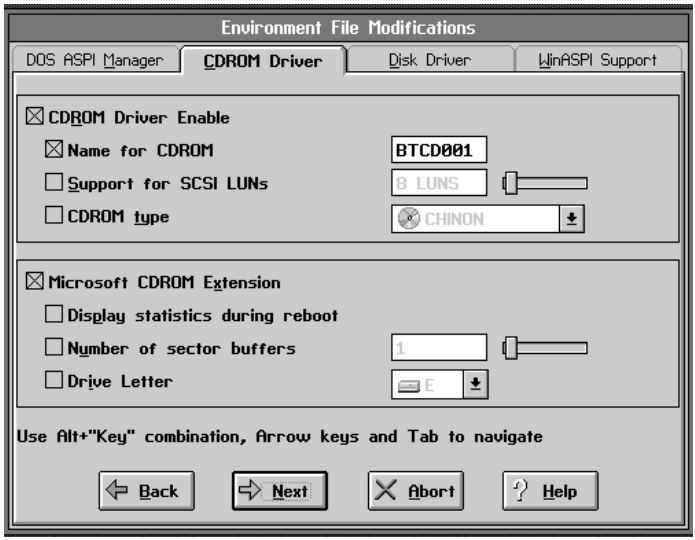
If you select Enable DOS ASPI Manager, you can set the following options:

- If you select Display Configuration Information when loading driver, useful information about your system is displayed while the driver is loading.
- Selecting Disable mailboxes for DOS Manager (e.g. NetWare), allows you to disable mailboxes under certain conditions. The ASPI DOS manager uses a mailbox protocol to interface to the host adapter by default. Since a mailbox cannot be shared by two different device drivers, such as the ASPI DOS Manager and the NetWare ASPI device driver, this option instructs the ASPI DOS manager not to use the mailbox and to instead use special host-adapter commands to pass the command block to the host adapter.
- If you select Supply Support for SCSI LUNs, you can change the number of SCSI LUNs (Logical Unit Numbers) that the DOS Device Manager can recognize. See "BTDOSM.SYS Configuration Options," on page 1-40, for information about the /L parameter that implements this feature.

At any point in the process, or when you have completed adjusting the configuration, you can exit from the DOS ASPI Manager folder by selecting one of the following buttons:

- The **Back** button returns you to the Multiboot Menu Selection screen (if the Multiboot option is enabled). If this option is not enabled, it returns you to the Install Paths screen.
- The **Next** button takes you to the AutoInstall screen described in Step 13.
- The **Abort** button terminates the installation. If you select this button, you are returned to the Options dialog box.
- The **Help** button starts the built-in, context-sensitive help system.

B. The CDROM Driver folder (shown below) lets you perform two major functions: you can enable the CD-ROM driver by selecting CDROM Driver Enable and then setting the various options, and you can set the Microsoft CD-ROM extension by selecting Microsoft CDROM Extension, and then setting the various options.



If the install utility detects a CD-ROM during the SCSI-device scan, CDROM Driver Enable and CDROM Extension are automatically selected.

You can select or deselect the following options in the CDROM Driver Enable area:

- **Name for CDROM** lets you select a name for your CD-ROM drive. You can use any alphanumeric combination of up to eight characters, or you can keep the default name, BTCD001.
- **Supply Support for SCSI LUNs**, lets you define the number of SCSI LUNs (Logical Unit Numbers) that the DOS Device Manager can recognize. Refer to "BTDOSM.SYS Configuration Options," on page 1-40, for information about the /L parameter that implements this feature.
- **CDROM type** lets you designate the drive type your CD-ROM drive is compatible with, if your CD-ROM drive is not specifically supported by the software. You can select any of the CD-ROM drives listed in the "Introduction."

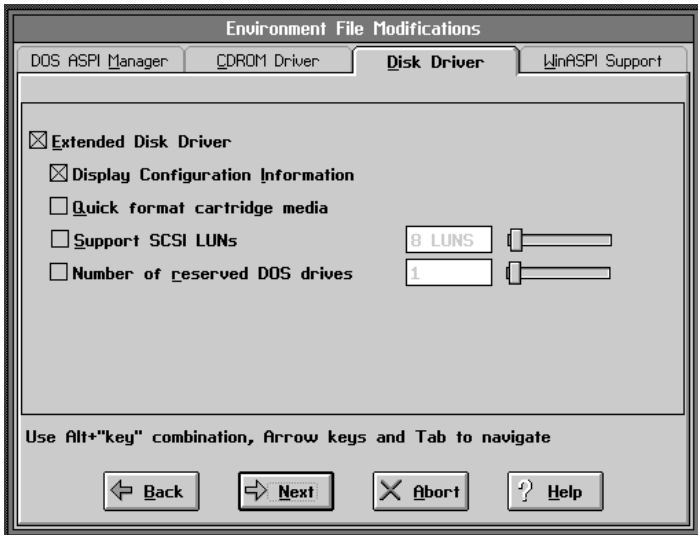
You can set the following options in the Microsoft CDROM Extension area:

- If you check **Display statistics during reboot**, information about the CD-ROM is displayed when the system is rebooting.
- You can set the number of sector buffers by checking **Number of sector buffers** and then moving the slider control towards the right until the number of sector buffers you want to use is displayed. If you need assistance with this setting, click the Help button.
- If you check Drive Letter, you can select any available drive letter for your CD-ROM drive. Which letters are available depends on what other drives are already installed. Typically, the CD-ROM drive is assigned as drive E or above.

At any point in the process, or when you have finished adjusting the configuration, you can exit from the CDROM Driver folder by selecting one of the following buttons:

- The **Back** button returns you to the Multiboot Menu Selection screen (if the Multiboot option is enabled). If this option is not enabled, it returns you to the Install Paths screen.
- The **Next** button takes you to the AutoInstall screen described in Step 13.
- The **Abort** button terminates the installation. If you select this button, you are returned to the Options dialog box.
- The **Help** button starts the built-in, context-sensitive help system.

C. The Disk Driver folder (shown below) lets you configure the extended disk driver. To do this, select the Extended Disk Driver box, and then set the various options. This folder is selected by default if you are using devices such as floptical drives, magneto-optical drives, or other devices that are not recognized by the BIOS.



You can set the following option(s) by selecting their option box(es):

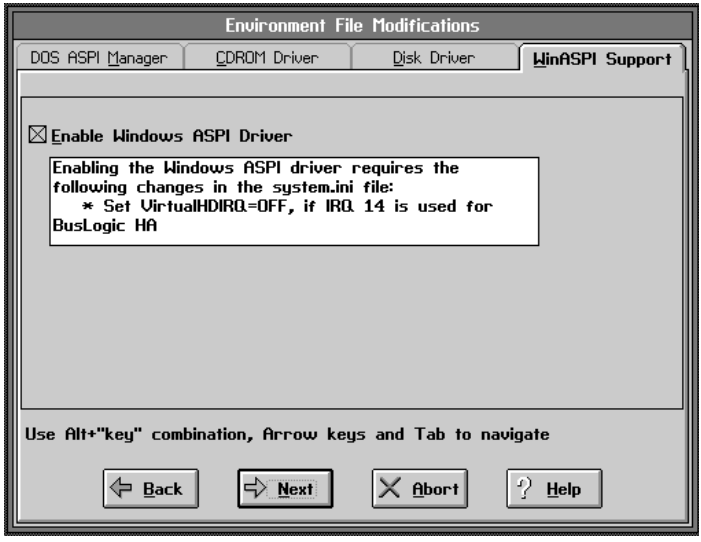
- **Display Configuration Information** displays information about your system configuration.
- **Quick format cartridge media** allows you to quick-format the storage medium (disk) controlled by this driver. This option creates a clean FAT (File Allocation Table) and directory on the cartridge medium without verifying the entire cartridge when the format command is executed.
- **Support for SCSI LUNs** allows you to define the number of SCSI LUNs (Logical Unit Numbers) that the DOS Device Manager can recognize. See "BTDOSM.SYS Configuration Options," on page 1-40, for information about the /L parameter that implements this feature.
- **Number of reserved DOS drives** allows you to set the number of logical DOS drive letters reserved for each device supported by BTMDISK.SYS.

At any point in the process, or when you have finished the configuration, you can exit from the Disk Driver folder by selecting one of the following buttons:

- The **Back** button returns you to the Multiboot Menu Selection screen (if the Multiboot option is enabled). If this option is not enabled, it returns you to the Install Paths screen.
- The **Next** button takes you to the AutoInstall screen described in Step 13.
- The **Abort** button terminates the installation. If you select this button, you are returned to the Options dialog box.
- The **Help** button starts the built-in, context-sensitive help system.

D. The WinASPI Manager folder (shown below) lets you enable the Windows ASPI Manager, by selecting the Enable Windows ASPI Driver box. This folder is selected by default if the Install program detects Windows in the path statement in CONFIG.SYS.

Note: *if you want to select the default setting shown in the following folder, just select the* Next *button, and proceed to the* Auto Install *screen (*see Step 13*).*



If you enable the Windows ASPI driver, you must change the following IRQ setting in the BIOS: if IRQ 14 is used for the Mylex host adapter, turn VirtualHDIRQ OFF. If the Mylex host adapter is configured to use IRQ 14, this software sets VirtualHDIRQ=OFF with no action required from the user.

At any point in the process, or when you have finished the configuration, you can exit from the screen by selecting one of the following buttons:

- The **Back** button returns you to the Multiboot Menu Selection screen (if the Multiboot option is enabled). If this option is not enabled, it returns you to the Install Paths screen.
- The **Next** button takes you to the AutoInstall screen described in Step 13.
- The **Abort** button terminates the installation. If you select this button, you are returned to the Options dialog box.
- The **Help** button starts the built-in, context-sensitive help system.

13. When you have finished entering the information in the Environment File Modifications folder(s), the following AutoInstall screen is displayed.

– If you select Yes, you are confirming the changes you made using the Environment File Modifications folders and instructing the Install program to modify your configuration files to reflect the changes you made.

– If you select No, the configuration files are not changed. However, a copy of the changes you made is placed in the directory where the Mylex software is installed (the Destination directory you selected in the File Paths screen). The files that contain your changes are named CONFIG.BSL, AUTOEXEC.BSL, SYSTEM.BSL. By storing

your changes in the Mylex software directory, the Install program makes it possible for you to modify your configuration files at a later time without having to repeat the entire installation process.

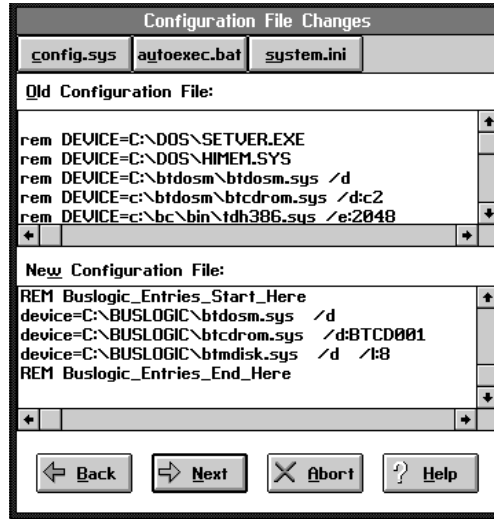
- If you select Abort, the changes you made are discarded, and you are returned to the Options dialog box.

14. The install utility has now updated your system configuration files with information about the new drivers. It has also saved your old configuration files using their old filenames and placed them in the root directory of your hard disk. The contents of both your old and new configuration files (CONFIG.SYS, AUTOEXEC.BAT, and SYSTEM.INI) are then displayed in the Configuration File Changes dialog box. For each file, the top portion of the dialog box displays the contents of the old configuration file, and the bottom portion of the dialog box shows the changes that were made for the new device drivers. You can navigate between the files using the buttons in the tool bar at the top of the dialog box (config.sys, autoexec.bat, and system.ini) or by holding down the **<Alt>** key and typing the first letter in the filename (c, a, or s).

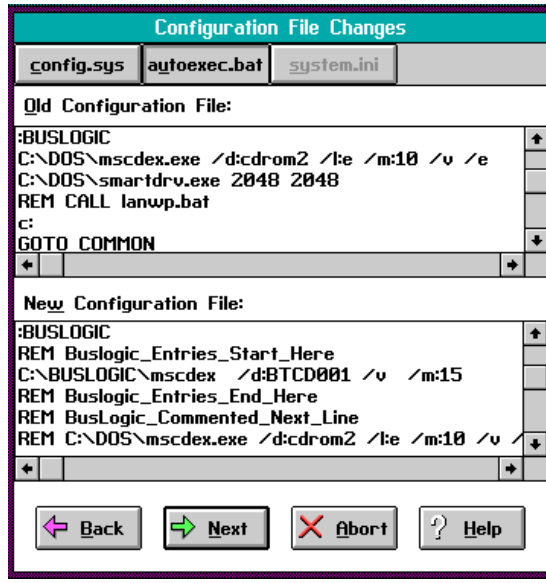
Note: *The* Configuration File Changes *dialog box allows you to scroll through the contents of the files and to highlight items in the list. However, you cannot make any changes to any of the items or delete them.*

Note: *If you do not have Windows installed, the* SYSTEM.INI *button is "grayed out," and this button is inoperative.*

A. The following screen shows the Configuration File Changes dialog box for the CONFIG.SYS file. Select Next to proceed with the installation.

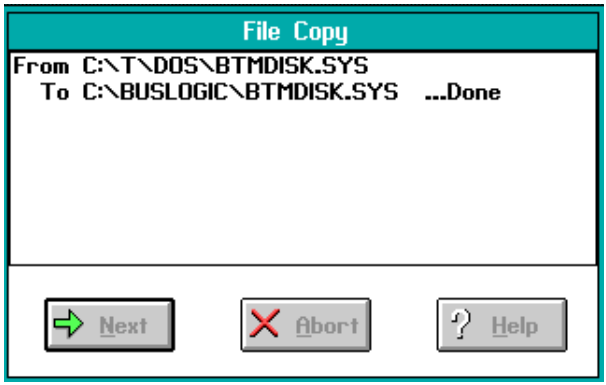


B. The following screen shows the Configuration File Changes dialog box for the AUTOEXEC.BAT file. Select Next to proceed with the installation.

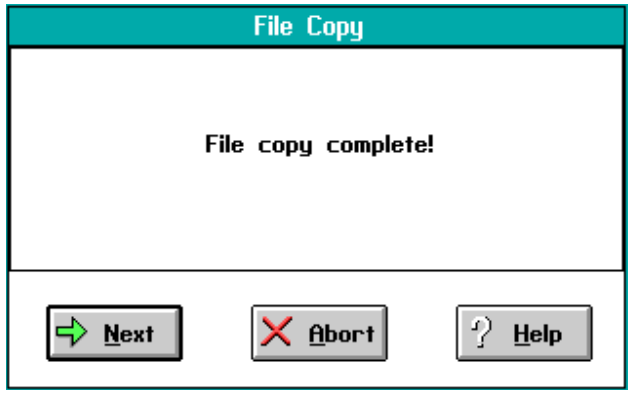


C. The following dialog box shows the Configuration File Changes for the SYSTEM.INI file. Select Next to proceed with the installation.

15. The Install program now copies the necessary files from the diskette to the destination directory you selected in Step 10. During this process, the File Copy dialog box is displayed, and the filenames that are being copied scroll up the screen as they are copied.



16. When the copying process is complete, the following message is displayed.



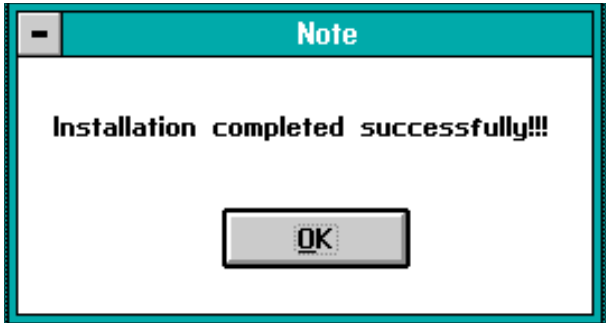
- Select the **Next** button to continue installing the software.
- The **Abort** button returns you to the Options screen.
- The **Help** button starts the built-in, context-sensitive help system.

17. If the system you are installing the Mylex software on has DOS installed, but not Windows, begin the procedure in the section called "Finishing Installation — DOS," which begins on the next page. If you are installing the software on a system that has DOS and Windows 3.X installed, begin the procedure called, "Finishing Installation — Windows 3.X" on page 1-26.

Finishing Installation — DOS

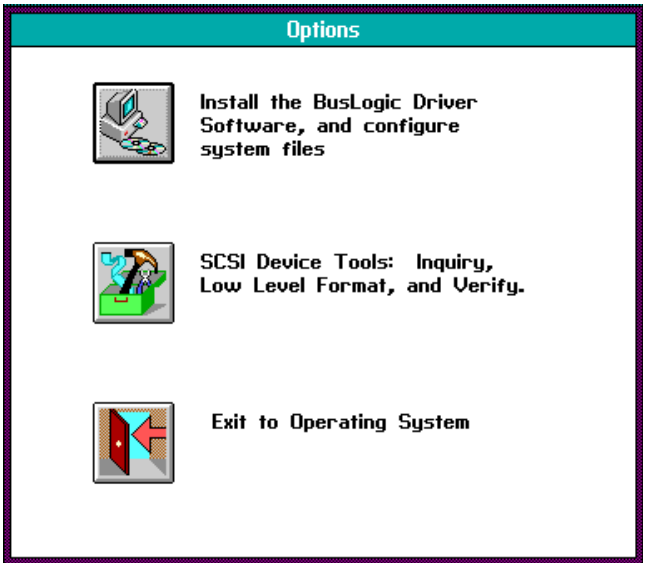
Use the following procedure to complete the Mylex software installation if the system the software is being installed on is running DOS but not Windows:

1. If your system is running DOS only, and you selected Next from the File Copy dialog box, the following dialog box is displayed:



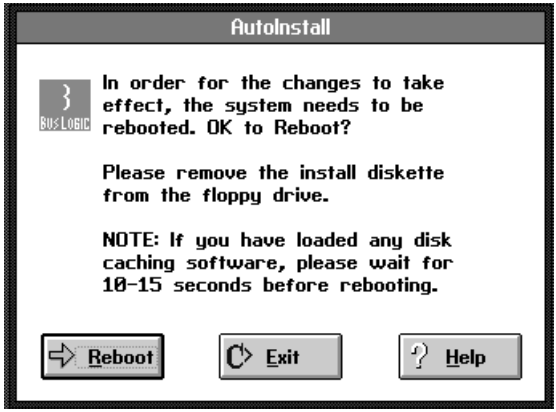
Your device drivers are now installed. Select Next to continue.

2. The Options dialog box is displayed:



Select the Exit button.

3. The following Autoinstall dialog box is displayed:



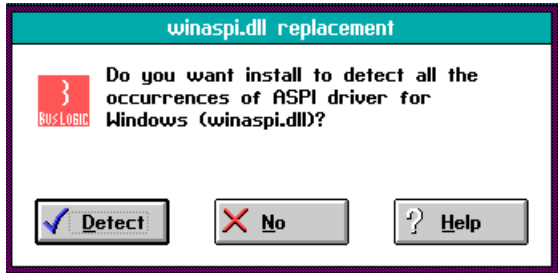
   – The **Reboot** button restarts the system restarts, and the new drivers are activated.
   – The **Exit** button ends the Install program, and restores the DOS prompt. The new drivers are activated the next time you start or reboot the system.
   – The **Help** button starts the built-in, context-sensitive help system.

   Select the Reboot button.

Finishing Installation — Windows 3.X

Use the following procedure to complete the Mylex software installation if the system the software is being installed on is running DOS and Windows 3.X:

1. When the files have been copied from the diskette to the hard disk, the Install program displays the winaspi.dll replacement dialog box:



   This dialog box provides the ability to automatically find all copies of WINASPI.DLL installed on the system.

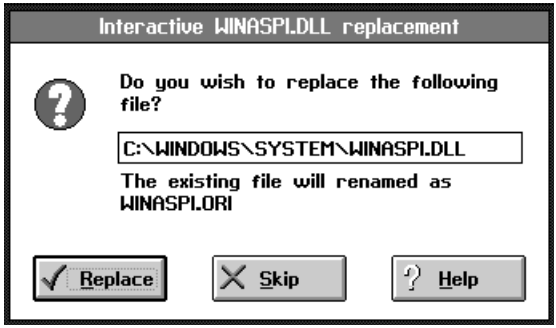
Note: *Your Mylex host adapter requires the ASPI driver included with the DOS Manager to operate properly. If you have previously installed SCSI devices on your system, multiple copies of the ASPI driver may have been installed. The* winaspi.dll replacement *dialog box is intended to help you find and replace older versions of this file.*

   – If you select **Detect**, the program searches for all instances of this driver and then displays the Interactive WINDASPI.DLL replacement dialog box.

   – If you select **No**, the Install program does not search for older versions of WINASPI.DLL. If older versions this file with the same filename exist on your hard disk, the system may operate improperly.

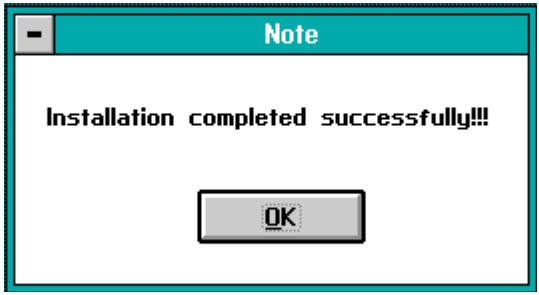
   Select the Detect button.

2. When you select the Detect button, the following dialog box is displayed:

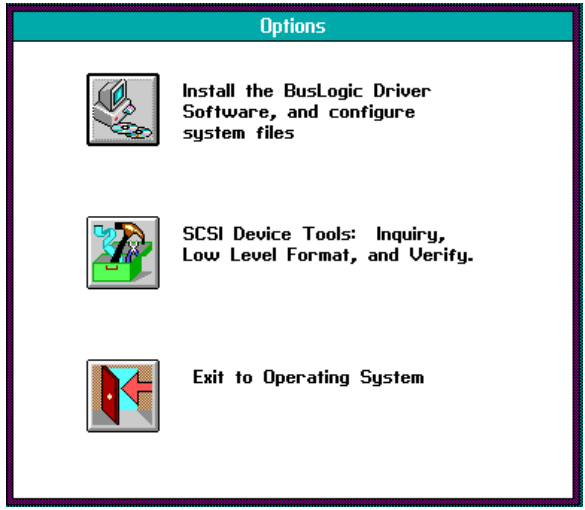


   – If you select the **Replace** button, the program deletes the existing WINASPI.DLL driver file and replaces it with the new ASPI driver.
   – If you select the **Skip** button, older versions of the WINASPI.DLL file that have the same file name may remain on your hard disk, and this may cause the system to operate improperly.

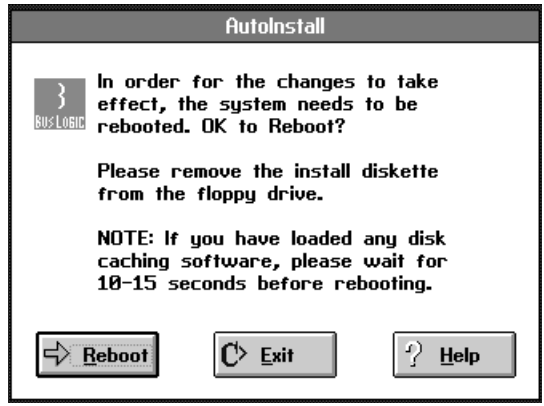
3. The following message, which indicates that the installation is complete, is displayed. Select the OK button.



4. The Options dialog box is displayed:



Select the Exit to Operating System button. The following Autoinstall dialog box is displayed:



- If you select the **Reboot** button, the system restarts, and the new drivers are activated.
- If you select the **Exit** button, the Install program terminates, and the DOS prompt returns. The new drivers are not activated until the next time you start or reboot the system.
- The **Help** button starts the built-in, context-sensitive help system.

Select the Reboot button.

Using the SCSI Utility

The SCSI Utility is part of the *Device Drivers* software package. This section explains how to use the various options to:

- Get information about SCSI devices attached to your system
- Format SCSI devices
- Verify the integrity of devices

The SCSI Utility contains SCSI tools, utility programs that are included on the diskette with the *DOS SCSI Software Manager*. However, the SCSI Utility is not installed on your hard disk when you install the *DOS SCSI Software Manager*. You can run the SCSI tools from the diskette that also contains the *DOS SCSI Software Manager* (insert the diskette in drive A) before or after you have installed the *DOS SCSI Software Manager.*

The following sections explain how start and use the SCSI Utility.

Starting the SCSI Utility

To use the SCSI Utility, use the following procedure:

1. Insert the diskette that contains the DOS software drivers into drive A, and enter the following command at the DOS prompt:

```
a:> install <Enter>
```

Note: *This use of the* Install *program does not install any software. Instead, it starts the program that contains the SCSI device tools. The driver files you installed previously will not be damaged, and the configuration files will not be changed.*

2. The following Autoinstall dialog box is displayed:

Select Next to proceed.

3. The Options dialog box, which allows you to select from the program's options is displayed:

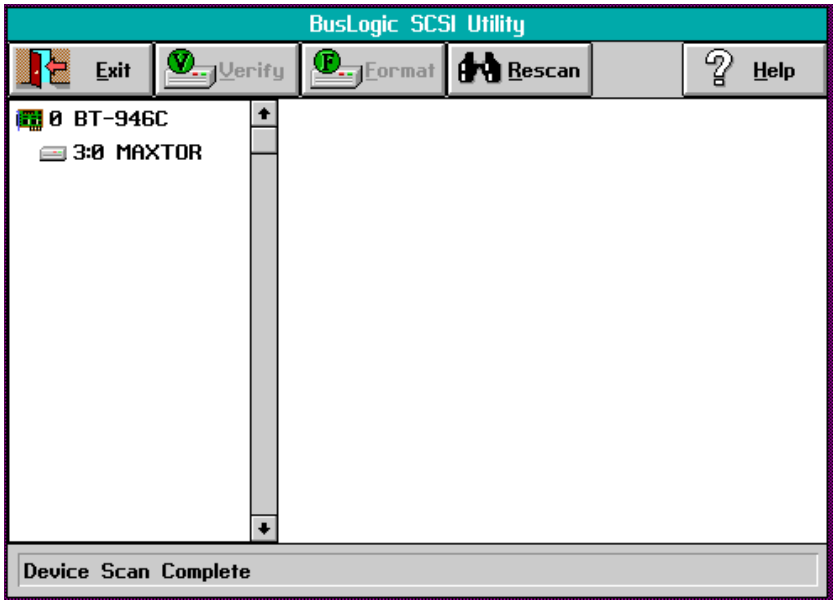
Caution: *Do not select the first option,* Install the Driver*... If you do, you will repeat the installation procedure described earlier in this section.*

Select the SCSI Device Tools option.

4. When you select SCSI Device Tools, the SCSI Utility screen appears. This screen has five buttons, three of which (Verify, Format, and Rescan) allow you to select the three functions of the SCSI Utility. These functions allow you to get information about SCSI devices (Rescan), to format them (Format), or to verify their integrity (Verify).

Getting Information About SCSI Devices

When you select the SCSI Device Tools option from the Options dialog box, the SCSI Utility window appears on your monitor. The software has previously scanned the system to determine which Mylex host adapters and SCSI devices are connected to your system. It presents this information in the following screen:

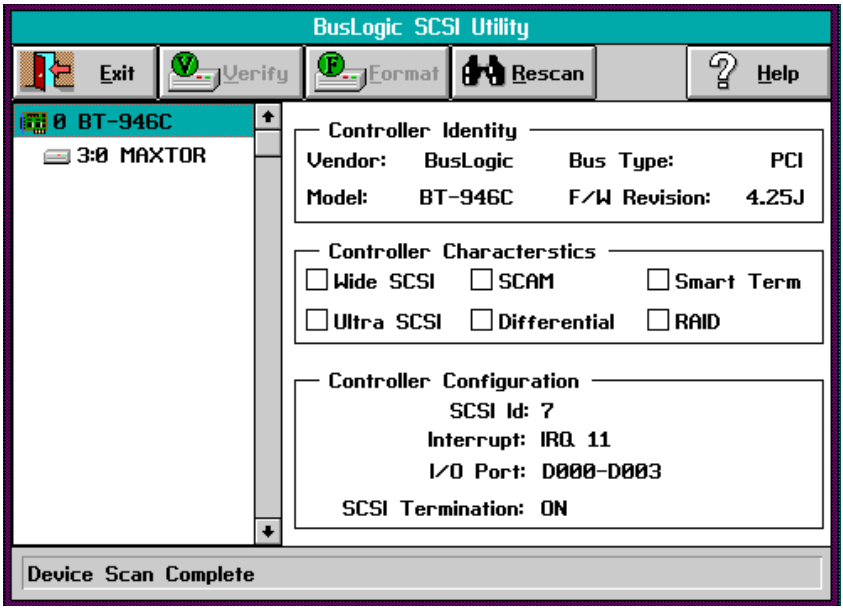


Identifying Host Adapters

Use the following procedure to obtain information about installed host adapters:

1. Select a host adapter from the list on the left side of the screen. In the example shown below, there is only one host adapter, 0 BT-946C.

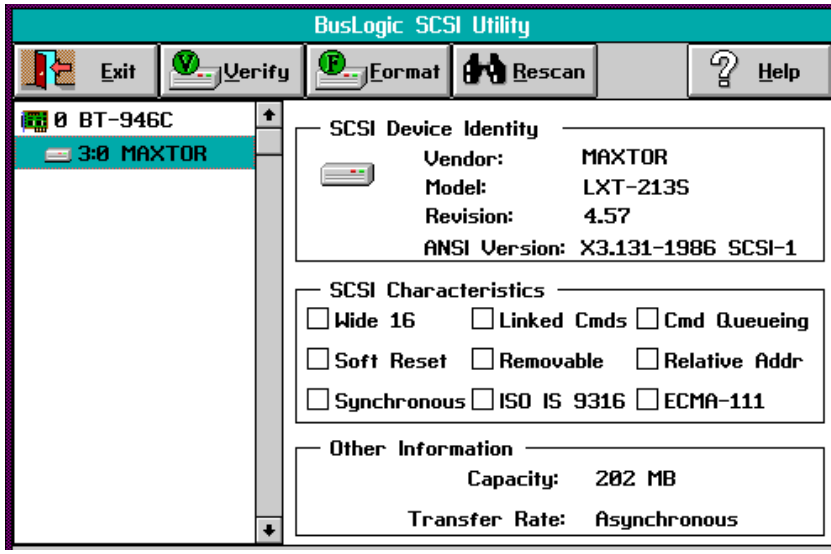
2. Information about the chosen host adapter is displayed in the right panel, as shown below:



Getting Information About SCSI Devices

To identify a SCSI device, use the following procedure:

1. Select a SCSI device from the left side of the window.
2. Information about the selected SCSI device is displayed in the right panel, as shown below:

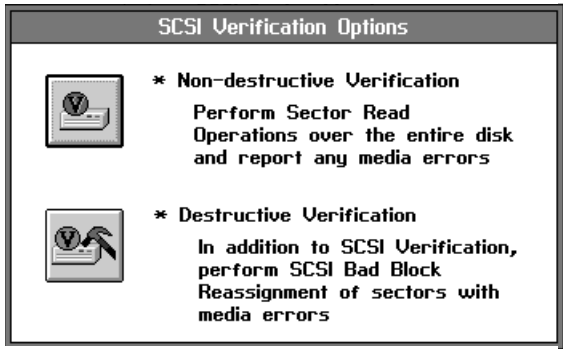


Verifying SCSI Devices

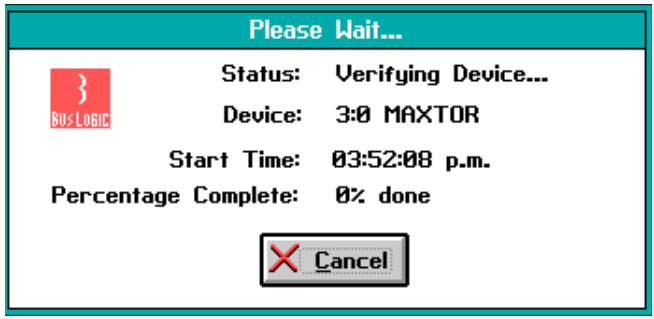
You can use the Verify button to test the selected SCSI device. There are two verification options, Nondestructive and Destructive. Use the following procedure to run the test:

Note: *The length of time required to verify a drive varies with the capacity of the drive.*

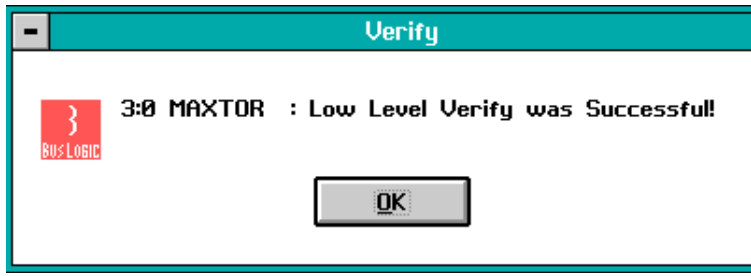
1. Select the Verify button from the toolbar. The following dialog box is displayed:



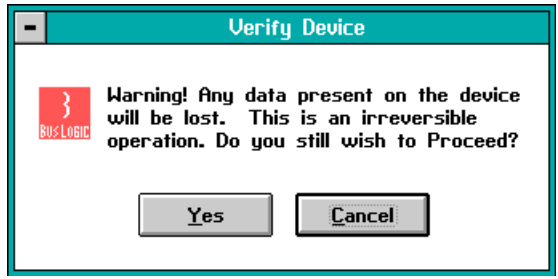
2. If you select Nondestructive Verification, the system performs a sector-read operation over the entire disk and reports any media errors. The following Please Wait... dialog box (shown below) is displayed during this operation. If you select the Cancel, button you are returned to the Mylex SCSI Utility window.



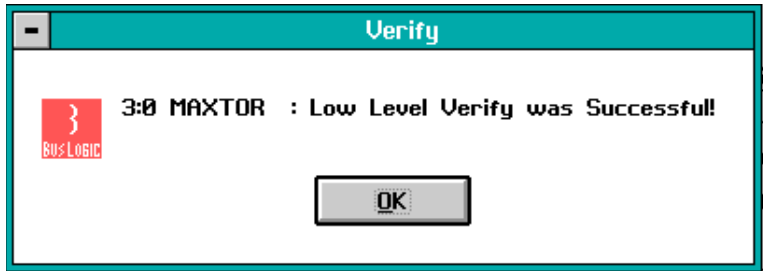
3. When verification is complete, the Verify dialog box replaces the Please Wait... dialog box. Select the OK button to return to the Mylex SCSI Utility screen.



4. If you select Destructive Verification, the system performs the verification process described in Steps 2 and 3, and then reassigns sectors that have media errors. The following Verify Device dialog box, which contains a warning regarding loss of data, is displayed:



   – To cancel the procedure and return to the Mylex SCSI Utility window, select the **Cancel** button.
   – To proceed, select the **Yes** button. The software starts the destructive verification process. When the following dialog box is displayed, select the **OK** button to return to the SCSI Utility window.

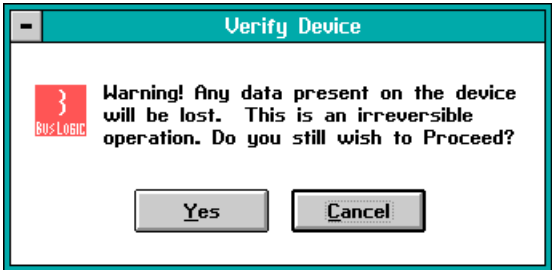


Formatting SCSI Devices

This section explains how to use the SCSI Utility to format SCSI devices.

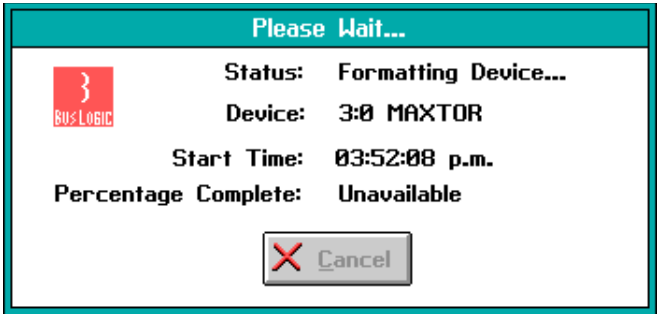
Note: *The length of time it takes to format a drive varies with the capacity of the drive.*

1. Select the Format button in the SCSI Utility window. The dialog box shown below is displayed to warn you about potential loss of data:

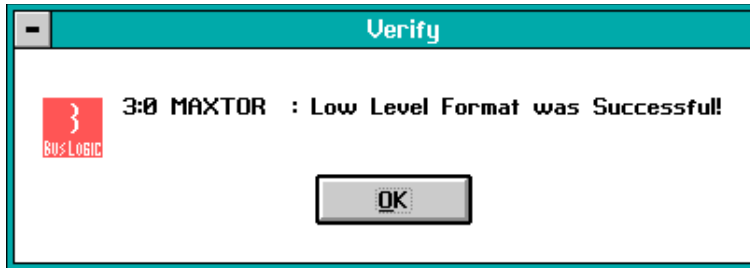


   – To cancel the procedure and return to the SCSI Utility window, select the **Cancel** button.

   – To proceed with the format operation, select the **Yes** button. The software starts the format operation and displays the following dialog box:



– If you select the **Cancel** button in this dialog box, you are returned to the SCSI Utility window. If you do not select the **Cancel** button, the formatting process continues, and when it is complete, the system displays the following dialog box. Select the **OK** button to acknowledge the notice and to return to the SCSI Utility window.



1•3

Device Driver Configuration

If you used the INSTALL utility described in Section 1•2 to install the *DOS SCSI Software Manager* drivers, the appropriate configuration files have already been updated. If you are installing BTCDROM.SYS, the CD-ROM support driver, you must also update the AUTOEXEC.BAT file. This section provides the information you need to update the CONFIG.SYS and AUTOEXEC.BAT files manually or to change the default driver configuration.

Updating the CONFIG.SYS File

If you install new drivers, you must update your system configuration file (CONFIG. SYS) so that the newly installed drivers are loaded and configured automatically.

The CONFIG.SYS file loads the *DOS SCSI Software Manager* files whenever the system boots or reboots, and it must contain a specific device= command for each installed driver.

If you are manually updating the file, use an ASCII text editor to add the necessary device= command to the CONFIG.SYS file. Use the command syntax described in the following pages.

You can include additional configuration parameters in the driver's device= command line in the CONFIG.SYS file. These parameters can be used to customize the driver for your particular system setup. Refer to the driver description for a list of available parameters.

BTDOSM.SYS Configuration Options

The *DOS Device Manager* must be loaded before any extended-memory managers are loaded. To ensure that this happens, the device= command for the *DOS Device Manager* must be at or near the beginning of your CONFIG.SYS file, before any extended memory managers.

The device driver installation utility (see Section 1•2) automatically installs BTDOSM.SYS and adds an entry for it in the CONFIG.SYS file:

```
device=c:\buslogic\btdosm.sys /d
```

Syntax **device =** [drive:*path*] **btdosm.sys** [**/p***port address*] [**/d**] [**/L**] [**/x***speed*]
[**/n***bus on time*] [**/f***bus off time*] [**/i** [**/m**] [**/e**]

[drive:*path*] Specifies the pathname where the DOS Device Manager resides (e.g., C:\BUSLOGIC).

Parameters

[**/p***port address*]

This parameter is *not* required. BTDOSM automatically scans and logs the I/O port address for all installed host adapters. Do not use this parameter unless you want BTDOSM to log only specific adapter addresses. When you use /P, BTDOSM recognizes only the adapters listed in the command line. The possible address values are 330, 334, 230, 234, 130, and 134. Note that this value is in HEX.

For additional information on setting a Mylex host adapter board's I/O port address, refer to the adapter's installation guide.

[**/d**] This parameter determines if the attached target device's configuration information is displayed. If this parameter is used, the configuration information is displayed when the boots.

[**/L**] This parameter provides support for SCSI Logical Unit Numbers (LUNs) that have SCSI IDs other than zero. If this SCSI Logical Unit Number parameter is used, the DOS Device Manager can recognize up to 64 SCSI LUNs for up to 16 target

devices. When the parameter is not used, LUNs are not supported. You can use options **/L8**, **/L16**, **/L32**, or **/L64** to set LUN support for Wide SCSI adapters. Non-wide adapters are limited to 8 LUNs.

[**/x***speed*]

This parameter specifies the AT bus master transfer rate. It allows you to override the AT bus master transfer rate set by the PC/AT host adapter board's parameter setting. By default, the AT bus master transfer speed is set to 04, which equals 5.7 MB/second.

Option	AT Bus Master Transfer Speed	
00	5.0 MB/sec	
01	6.7 MB/sec	
02	8.0 MB/sec	
03	10.0 MB/sec	
04	5.7 MB/sec	(default)

Example:

An AT bus-master transfer rate of 00 (5 MB/sec) has been selected in the following CONFIG.SYS "DEVICE=" command:

```
device=c:\buslogic\btdosm.sys /d /X00
```

[**/n***bus on time*]

This parameter specifies the maximum length of time, in microseconds, that the Mylex host adapter can stay on the system bus (this is a decimal value). The possible options are 02 through 15 microseconds. The default is 11 microseconds.

[**/f***bus off time*]

This parameter specifies the minimum length of time, in microseconds, that the host adapter board must stay off the system bus (this is a decimal value). The possible options are 01 through 64 microseconds. The default is 4 microseconds.

[**/i**] This parameter determines if the embedded INT 13 module is loaded. If this parameter is used, the INT 13 module is not loaded.

If the INT 13 module is not loaded, INT 13 calls are routed through the host adapter's ROM BIOS, rather than through the BTDOSM's INT 13 code.

Note: *This only affects the SCSI disk drives that are installed with the host adapter ROM BIOS.*

[**/m**] This parameter must be set if NetWare 386 is to be installed from a CD-ROM drive.

Example:

```
device=c:\buslogic\btdosm.sys /d /m
```

- Select the following option from the parameter menu when installing the device driver during the NetWare server installation process:

  ```
  SCSI targets to hide from NetWare
  ```

- Enter the CD-ROM device ID, and continue with the standard NetWare installation.

Note: *The* ***(/m)*** *option is to be used* ***only f****or NetWare 386 installation from a CD-ROM drive. For enhanced performance, remove the* ***(/m)*** *option when the installation is complete.*

[**/a**] This parameter enables WINASPI.DLL full Adaptec emulation. This is enabled by default.

[**/b**] This parameter allows you to specify how many active mailboxes and associated CCBs (Command Control Blocks) are allocated. Valid values are 4 (default) through 8. Increasing the count from 4 to 8 requires 1.5 KB of additional memory per host adapter.

[**/e**] This parameter causes the *DOS SCSI Software Manager* to rescan the devices on the SCSI bus. For example, if an external SCSI device (CD-ROM, tape drive, and so on) is not on when you boot the system, the *DOS SCSI Software Manager* rescans the SCSI bus, allowing DOS and other applications to recognize the device without rebooting. When this parameter is enabled, an additional 2 KB of memory is used by the driver.

[**/j**] This parameter limits the *DOS SCSI Software Manager* to 8 SCSI ID scans on a Wide SCSI adapter. When this parameter is not set, BTDOSM scans for 16 target devices when it detects a Wide SCSI adapter. If you have no more than 8 target IDs on a Wide SCSI adapter, using this parameter can save time.

[**-/pci**] This parameter disables PCI I/O address scanning.

[**+/pci**] This parameter disables legacy (ISA) I/O address scanning.

[**/r**] This parameter allows the ASPI manager to do a "hard" reset on the SCSI bus at initialization time. This parameter is useful in multi-initiator configurations.

[**/s**] This parameter enables Seek command operation. By default, it is not turned on.

[**/w**] This parameter works only when the **/d** parameter is also used. It causes the start-up screen to pause when each adapter is scanned, which provides more time to evaluate start-up messages.

WINASPI Layer Drivers

Two Windows-ASPI-layer drivers are included with your *DOS SCSI Manager* drivers: WINASPI.DLL and Virtual Device Driver (VASPID.386). Together, these drivers are used for re-entrant, multi-threaded SCSI bus access for Windows 3.0 or higher. WINASPI provides an easy way for Windows applications to access the SCSI I/O.

If you used the installation utility described in Section 1•2 to install your drivers, the WINASPI drivers are already installed in the C:\WINDOWS directory. The installation utility also adds the following line to the SYSTEM.INI file:

```
device=c:\buslogic\vaspid.386
```

Please note the following:

- If Windows is in running in Standard mode with a memory manager, such as EMM386, WINASPI does not initialize.
- The VASPI VxD is *not* used to select 32-bit disk access (fast disk).
- If the adapter is the primary adapter, and its Interrupt Request (IRQ) is set to 14, add the following statement to the SYSTEM.INI file:

```
VirtualHDIRQ=OFF
```

- Remove the following statement if it appears in your SYSTEM.INI file:

```
TimerCriticalSection=XXXX
```

  where XXXX equals some numerical value.

BTMDISK.SYS Configuration Options

The *Extended Hard Disk Driver* (BTMDISK) must be loaded *after* the *DOS Device Manager*(s) (BTDOSM). You must insert the BTMDISK's DEVICE= command after the BTDOSM's DEVICE= command line.

Note: *BTMDISK requires DOS 4.X or above.*

The driver installation utility automatically installs BTMDISK.SYS when it detects hard drives that are not configured for BIOS support. The installation utility also adds an entry for BTMDISK in the system CONFIG.SYS file, as shown in **bold** in the example below:

```
buffers=20
files=20

device=c:\buslogic\btdosm.sys /d
device=c:\buslogic\btmdisk.sys
```

DOS cannot recognize any additional disk drives until they are partitioned and formatted, even when the *Extended Hard Disk Driver* is installed. Use The *Extended Hard Disk Utility* (BTFDISK), described in Section 1•4, to partition the additional disk drives. Use the DOS FORMAT program to perform a high-level format on the partitioned disks.

For removable devices, such as Bernoulli or magneto-optical (MO) drives, it is not necessary to use BTFDISK to partition the disk. The BTMDISK driver supports the "super-floppy" format type, which prepares the media in the same manner as for a standard floppy disk, as long as no partition table is present on the medium. After inserting a "fresh" cartridge, simply format the device. It is not necessary to reboot the system after formatting the device.

The installation utility adds the following line to the CONFIG.SYS file:

```
device=c\buslogic\btdosm.sys /d
```

Syntax **device =** [drive:*path*] **btmdisk.sys** [**/r**# *of reserved DOS drives*]

[drive:*path*]

Specifies the drive and pathname where the *Extended Hard Disk Driver* resides (e.g., C:\BUSLOGIC).

Parameters

[**/r**# *of reserved DOS drive letters*]

This parameter determines the number of DOS drive letters reserved for removable media. If the hard disk is not removable, this parameter is ignored. The possible values are 1 through 16. When this parameter is not used, one DOS drive letter is reserved for each removable hard disk.

[**/d**] This parameter determines if the attached device's configuration information is displayed. If this parameter is used, the configuration information is displayed when the system boots.

[**/L**] This parameter provides support for SCSI Logical Unit Numbers (LUNs) for devices that have SCSI IDs other than zero. If this SCSI Logical Unit Number parameter is used, BTMDISK can recognize up to 64 SCSI LUNs for up to 16 target devices. When the parameter is not used, LUNs are not supported. Options include **/L8**, **/L16**, **/L32**, or **/L64**, which set LUN support for Wide SCSI adapters. Eight-bit adapters are limited to 8 LUNs.

[**/j**] This parameter limits BTMDISK to scanning 8 SCSI IDs on a Wide SCSI adapter. When this parameter is not set, BTDOSM scans for 16 target devices when it detects a Wide SCSI adapter. If you have 8 or fewer target IDs on a wide adapter, using this parameter can save time.

[**/w**] This parameter works only when the **/d** parameter is used. It causes the start-up screen to pause when each adapter is scanned, providing additional time to evaluate start-up messages.

[**/f**] This parameter allows Insite® Floptical Drives to operate under BTMDISK. Turn off the BIOS Supports Floptical Drives option in AutoSCSI, if you use this parameter.

Note: *If this parameter is active, you* ***must*** *also use the* **/T2** *parameter (described below) to allow floptical diskette changes to be recognized.*

[**/t***n*] This parameter sets the removable "drive to ready" time on cartridge insertion. The value *n* can be 0 through 9, each value incrementing the timeout by five seconds. For example, /T2 sets the time delay before informing the operating system of a Not Ready conflict to 10 seconds.

[**s**] This parameter allows the removable drives to perform a "quick format" on the cartridge media.

BTCDROM.SYS Configuration Options

Use an ASCII text editor to change the LASTDRIVE= command line to LASTDRIVE=Z in the system's CONFIG.SYS file. If the LASTDRIVE= command does not exist in the CONFIG.SYS file, you must add it. The device driver installation program automatically installs BTCDROM when it detects an installed CD-ROM drive, and it updates CONFIG.SYS with the following entry:

```
device= c:\buslogic\btcdrom.sys /d:btcd00
```

Syntax **device=**[*drive*:*path*] **btcdrom.sys** [**/d**:btcdxxx] [/L]

[drive*:path*]**

Specifies the pathname where the Device Driver resides (e.g., C:\BUSLOGIC).

Parameters

[**/d:btcdxxx**] This parameter specifies the name that MSCDEX uses to locate the device driver. After the device driver is installed, the system uses this name to identify the device driver. You can use this name when you configure MSCDEX.EXE in your AUTOEXEC.BAT file.

Every installed CD-ROM drive must have a unique name that is not the name of a file. Mylex recommends using the name BTCDxxx, where xxx is a unique set of three digits. The installation utility automatically assigns a name to the CD-ROM drive and uses that name in its updates to the AUTOEXEC.BAT and CONFIG.SYS files. It names the first CD-ROM drive *BTCD00*.

[**/L**] This parameter provides Logical Unit Number (LUN) support for SCSI CD-ROMs. When this parameter is not used, there is no LUN support. If this parameter is enabled, the **/L** parameter for the *DOS SCSI Software Manager* must also be enabled. See "BTDOSM.SYS Configuration Options" on page 40 for further information.

[**/x**] This parameter turns on the emulation feature that supports single-session Photo CDs for those drives that do not directly support Photo CDs.

[**/t**:*drive type*]

When a CD-ROM drive is not specifically supported by the driver software, you can use this parameter to designate the drive type with which your CD-ROM drive is compatible. Options include sony, toshiba, chinon, hitachi, texel, matsushita, nec, pioneer, plextor, sanyo, and teac.

Sample CONFIG.SYS File

The following is a sample CONFIG.SYS file:

```
device=c:\buslogic\btdosm.sys /d
device=c:\buslogic\btmdisk.sys /d
device=c:\buslogic\btcdrom.sys /d:btcd00
```

The commands in the sample file have the following effects:

- The *DOS Device Manager* is installed, with the Display Configuration Information (**/d**) option enabled. When this option is specified, the system displays the requested configuration information when the system boots.
- The *Extended Hard Disk Driver* is installed. This driver must always be loaded after BTDOSM.SYS.
- The **/d** option enabled for BTMDISK.

The last line of the sample file installs the CD-ROM driver and assigns the name is btcd00 to the CD-ROM drive.

Updating MSCDEX in AUTOEXEC.BAT

The following two conditions must be met when loading MSCDEX:

- Network software must be installed before MSCDEX is loaded.
- MSCDEX must be loaded before any shell program, such as DOSSHELL or Windows, is started.

You can use an ASCII text editor to add the MSCDEX command to the AUTOEXEC.BAT file. The device driver installation program automatically installs MSCDEX.EXE when it detects an installed CD-ROM drive, and it updates the AUTOEXEC.BAT file by adding the following line:

```
\buslogic\mscdex.exe /d:btcd00 /m:12 /L:E
```

This command in the AUTOEXEC.BAT file loads the *BTCD-ROM Support Driver* each time the system boots.

Syntax [*drive:\path*]**\mscdex.exe** [**/d**:btcd*xxx*] [**/m**:*number of sector buffers*] [**/L**:*drive letter*]

[drive*:\path*]

Specifies the drive and pathname where the MS CD-ROM Extension Driver resides (e.g., C:\BUSLOGIC).

Parameters

[**/d:btcdxxx**]

This parameter specifies the name that MSCDEX uses to locate the device driver (this must be the same name that is assigned in the driver's device= command in the CONFIG.SYS file. The installation utility automatically assigns a name to the CD-ROM drive, and it uses that name when it updates to the AUTOEXEC.BAT and CONFIG.SYS files. It names the first CD-ROM *BTCD00*.

[**/m:***number of sector buffers*]

This parameter determines how many sector buffers MSCDEX allocates when it installs. The larger the value, the more sector cache entries are available, and the less MSCDEX has to read directly from the CD-ROM drive. It is important that there be enough entries to cache the path table. The more entries available for directory sectors, the less MSCDEX has to reread the directory files. Typically, each drive should have at least 4 to 5 buffers per drive; larger values result in better performance.

[**/v**] This parameter (**v**erbose) instructs MSCDEX to display additional information about memory usage during initialization.

[**/e**] This parameter directs MSCDEX to use expanded memory if it is available.

[**/L:** *drive letter*]

This parameter assigns a specific drive letter to MSCDEX. For example, **/L:x** assigns the drive letter X to the CD-ROM being installed.

[**/k**] This parameter directs MSCDEX to look for a supplementary volume descriptor that identifies a shift-JIS Kanji volume for Japanese applications.

[**/s**] This parameter tells MSCDEX to patch MS-DOS, allowing CD-ROM drives to be shared on an MS-NET based server.

Sample AUTOEXEC.BAT File

The following sample AUTOEXEC.BAT file shows what an entry for MSCDEX might look like in a typical AUTOEXEC.BAT file:

```
\buslogic\mscdex.exe /d:btcd00 /m:12 /L:e
```

This sample MSCDEX command includes the following parameters:

- **/d:btcd00** is the ID that MSCDEX uses to locate the BTCDROM device driver. Use the same ID that is specified for the for the CD-ROM device driver in the CONFIG.SYS file.
- **/m:12** sets the number of sector buffers to 12.
- **/v** causes additional memory-usage information to be displayed during initialization.
- **/e** instructs the driver to use expanded memory.
- **/L:e** assigns drive letter E to the CD-ROM drive.

1•4

The Extended Fixed Disk Utility

This section describes the Extended Fixed Disk Utility, BTFDISK, which is functionally equivalent to the DOS FDISK utility. BTFDISK can be used to:

- Add a DOS partition to a SCSI disk drive that has a SCSI ID between 0 and 15
- Delete a DOS or non-DOS partition from a SCSI disk drive that has a SCSI ID between 0 and 15
- Specify which partition the system uses as the active partition
- Display information about the system's existing partitions

Warning: *Deleting a partition erases* ***all*** *existing information in that partition. Be sure that you do not unintentionally delete partitions that already exist on disk drives in your system (for example, drive C).*

BTFDISK can be used to partition SCSI disk drives that have SCSI IDs of 0-15. Mylex recommends that you use the DOS FDISK utility to add and delete partitions on SCSI disk drives connected to the first host adapter, and use BTFDISK to add and delete partitions on any of the system's other SCSI disk drives. Doing this can help you to avoid inadvertently deleting a partition on an existing disk drive.

Disk Drive Support

When all of the components of the *DOS SCSI Software Manager* are installed, you can support additional disk drives for each system, including:

- Hard drives that the system BIOS is not configured to support
- Hard drives that the system BIOS is not capable of supporting (Older versions of the BIOS may be limited to supporting two hard drives.)
- Hard drives that the DOS operating system cannot support (DOS versions 5.0 and later have built-in support for up to seven hard drives. The *DOS SCSI Software Manager* supports any additional drives.)

All additional drives must be partitioned and formatted to operate with DOS using BTFDISK.

Using BTFDISK

Before proceeding, copy the BTFDISK program (filename BTFDISK.EXE) to your system's hard drive.

This section provides you with information about

- Adding partitions
- Setting the active partition
- Deleting partitions
- Displaying partition information

Note: *Whenever you add or delete a partition, the program prompts you to reboot the system to activate the change.*

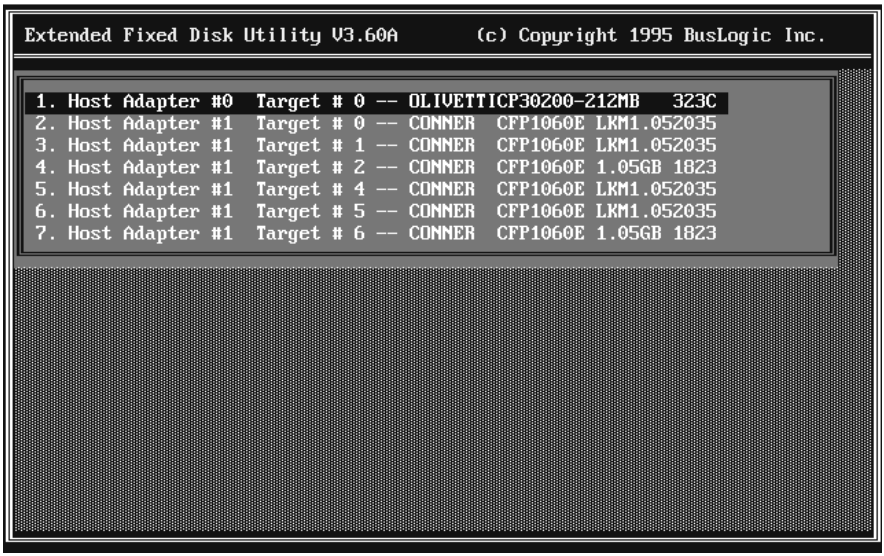
Adding Partitions

To use the BTFDISK utility to add a partition:

1. Type the following command at the DOS prompt to start the BTFDISK program:

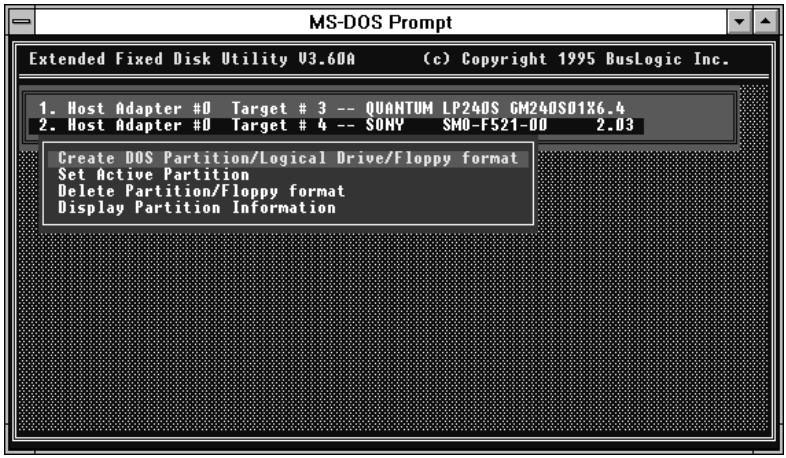
   `btfdisk` **<Enter>**

2. The BTFDISK main screen lists all of the installed disk drives, as shown below:



3. Highlight the drive you want to modify, and press **<Enter>** to display the available menu options.

4. Select the drive you want to modify. If you select a removable drive or a magneto-optical (MO) drive, you see the following screen:

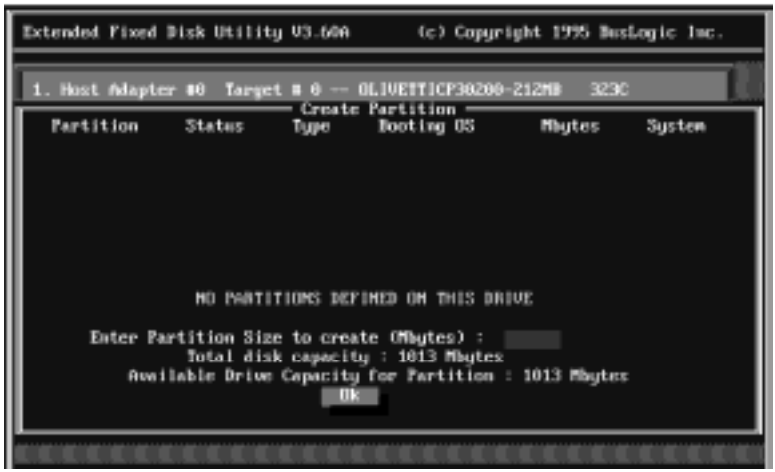


With removable devices and MO devices, you have the following additional options:

- Format the device to work like a floppy drive
- Create a DOS partition or logical drive
- Create a DOS V floppy format
- Create an OS/2 floppy format

5. Select Create DOS Partition.

6. If you the selected drive is a hard drive that has no previously defined partitions, the following screen is displayed:



7. Specify the size for the first partition at the prompt:

```
Enter Partition Size to create (Mbytes):
```

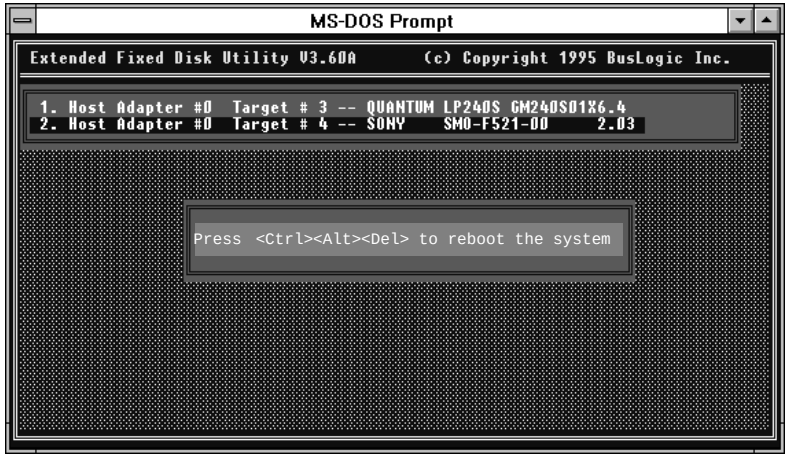
8. You can continue creating partitions until you use up the available space on the drive. The following sample screen shows a drive with two partitions and enough space left to create another 53 MB partition:

9. When you have finished creating partitions, select Ok to exit from this screen.

10. When you have finished using BTFDISK, you must use the DOS FORMAT command to perform a high-level format of the new partitions on the SCSI disk drive(s). For more information on the FORMAT command, refer to the DOS manual.

11. Restart the system to activate the new partitions. The following screen prompts you to reboot the system with the following message:

```
Press <CTRL><ALT><DEL> to reboot the system
```



Setting the Active Partition

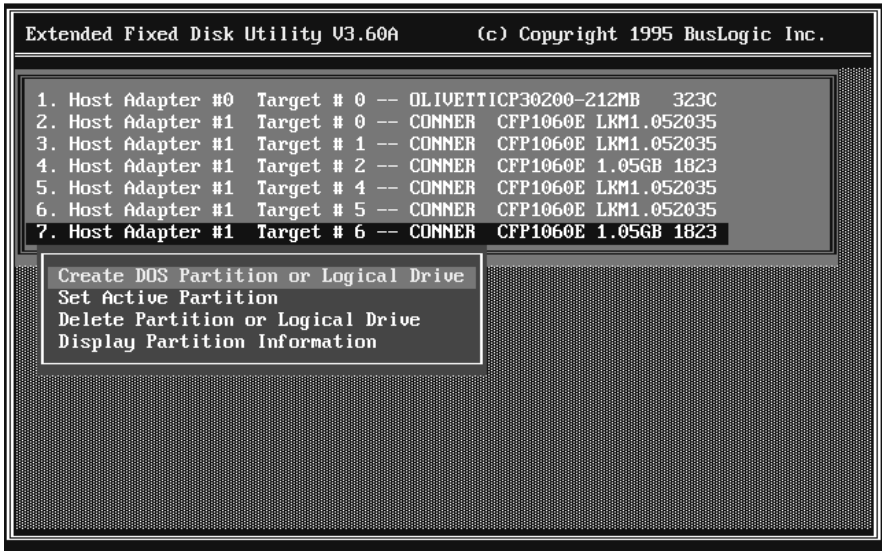
The BTFDISK utility can be used to set the system's active (bootable) partition.

Note: *Only one partition can be active at a time.*

1. At the DOS prompt (`C:\BUSLOGIC>`) type the following to start the BTFDISK program:

   `btfdisk` **<Enter>**

2. The BTFDISK main menu screen is displayed. This screen lists all of the installed SCSI drives. Highlight the drive that contains the partition you want to select and press **<Enter>**.



3. The program displays the existing partition information for that drive:

4. Enter the number of the partition to be used as the active partition.
5. Select Ok to exit.

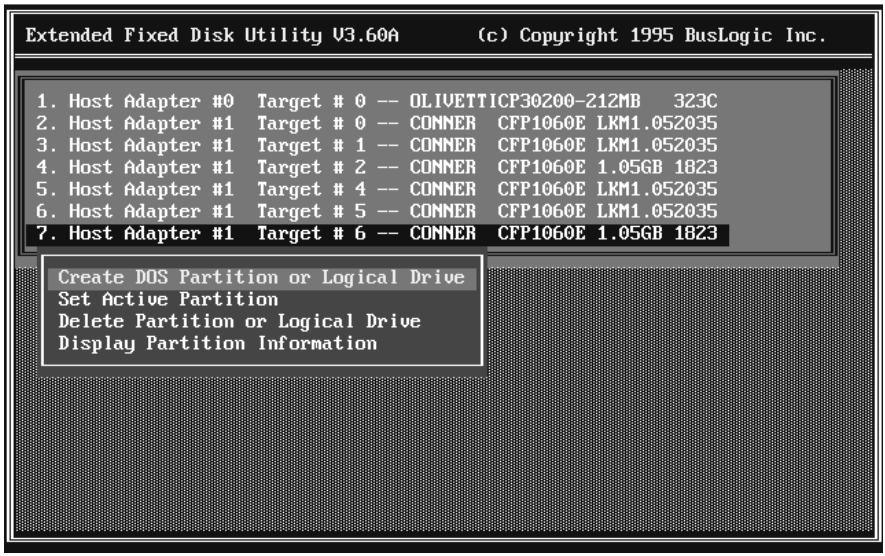
Deleting Partitions

The BTFDISK program can be used to delete a DOS or non-DOS (e.g., UNIX) partition. Logical DOS partitions must be deleted before you can delete a primary DOS partition. Primary partitions are assigned the type PRI, and they can be identified by the partition's label under the Type field in BTFDISK.

1. At the DOS prompt (e.g., `C:\BUSLOGIC>`) type the following to start the BTFDISK program:

   `btfdisk` **<Enter>**

2. The BTFDISK main menu screen, which lists all installed disk drives, is displayed. Highlight the device that contains the partition you want to delete, and press **<Enter>**.



3. Select the Delete Partition or Logical Drive option.

Warning: *Deleting a partition erases* ***all*** *the existing information on that partition. Be sure that you do not unintentionally delete the partitions on the disk drives that already exist on your system (for example, drive C).*

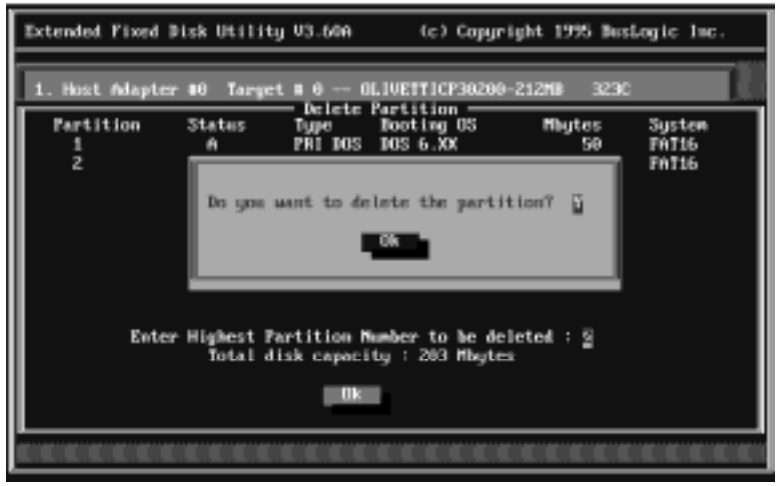
---

4. Enter the number of the partition that you want to delete from the selected SCSI disk drive.

Note: *You can only delete partitions in order from the highest to the lowest number. For example, if there are two partitions,* ***1*** *and* ***2****, you cannot delete* ***1*** *until after you have deleted* ***2****.*

5. The program prompts you to confirm your selection:

```
Do you want to delete the partition? (Enter Y or N)
```



6. Select Ok to exit.

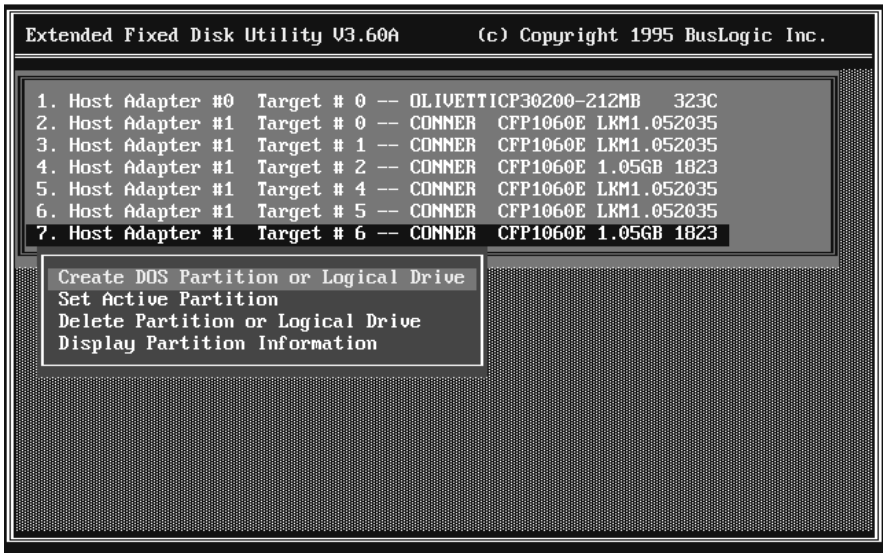
Displaying Partition Information

You can use the BTFDISK program to view information about the existing partitions on the system's SCSI drives.

1. At the DOS prompt (e.g., `C:\BUSLOGIC>`) type the following command to start the BTFDISK program:

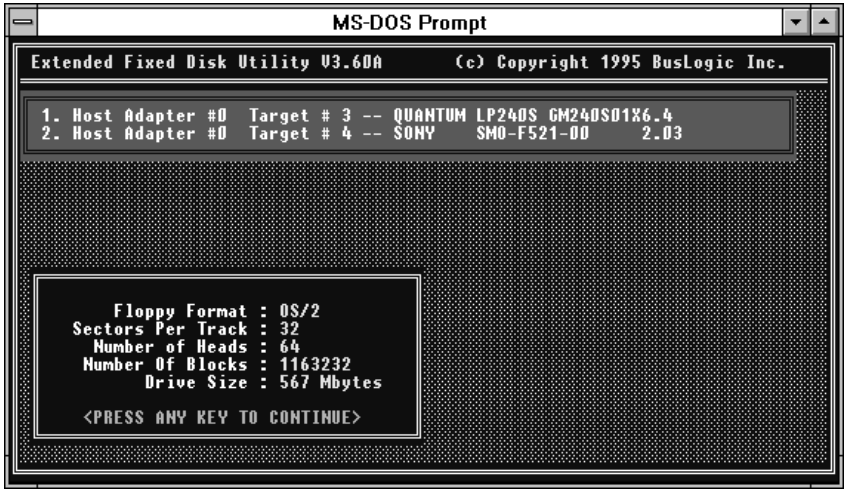
   `btfdisk` **<Enter>**

2. The main menu for the BTFDISK program is displayed. This screen lists all installed disk drives. Highlight the drive you want information on, and press **<Enter>**.



3. Select the Display Partition Information option. You are prompted to enter a partition number.

4. The Display Partition Information screen appears with the requested information displayed. For example, the following screen shows partition information for an MO device formatted as a floppy device.



5. Select Ok to exit.

Chapter 2

WINDOWS 95 DEVICE DRIVER

Chapter 2: Contents

Preface

2•0

Preface

Chapter 2 describes how to install the *Windows 95 Software Driver* (BUSLOGIC.MPD) on PC-compatible systems running Windows 95™. BUSLOGIC.MPD is part of the *Software Drivers* package.

Chapter 2 consists of two sections:

- **Section 2•1**, "Overview," introduces the *Windows 95 Software Driver* package and provides information about software and hardware installation requirements.
- **Section 2•2**, "Installing the Driver Update," explains how to install the software driver on your system.

Recommended Reference Material

The following additional reference material is useful when you are installing and using the software.

- The Mylex manual for your host adapter
- The Windows 95 user's guide
- The system's installation and setup guides
- The system's reference manual
- Manuals for the system's peripherals

Software Requirements

To install BUSLOGIC.MPD, you need the following software:

- Diskette number 1 of the *Software Drivers* package
- The Microsoft Windows 95 operating system

Hardware Requirements

You need the following hardware: an IBM PC or a PC-compatible computer with a 386, 486, Pentium, or Pentium Pro processor or with a 386-class, 486-class, Pentium-class, or Pentium Pro-class processor.

CD-ROMs and Host Adapters Supported

For information about the CD-ROMs and host adapters supported by this software, refer to the “Introduction” section at the front of this manual.

2•1

Overview

The Windows 95 operating system contains built-in support for MultiMaster™ SCSI host adapters. The *Software Drivers* package also includes a driver update (BUSLOGIC.MPD) for Windows 95. You do not need to install this update to run Windows 95, but it is always safe to install the update, and Mylex recommends that you do this if you want to take advantage of the MaxQueueTags configurable parameter provided by the update. This parameter controls the maximum queue tag depth on tagged devices connected to a given host adapter. It allows the tag queue depth to be varied from 1 to 60, with a default of 8.

The Windows 95 device driver allows the Windows 95 operating system to communicate with MultiMaster SCSI host adapters and to access additional SCSI devices connected to the adapter. This driver supports devices such as SCSI hard disk drives, SCSI tape drives, magneto-optical (MO) disk drives, scanners, and CD-ROMs.

Caution: *BUSLOGIC.MPD is supplied on diskette number 1 of the* Software Drivers *package. This diskette and the other diskettes included in this package contain software for the other operating systems that are discussed in other parts of this manual. You do not need to use the other diskettes unless you also use one of these other operating systems. If you do, refer to the part of this manual that discusses the operating system that you are using.*

Refer to Section 2•2 for installation information.

2•2

Installing the Driver Update

Microsoft Windows 95™ includes built-in support for the MultiMaster SCSI Host Adapters. When you are installing Windows 95, the operating system detects Mylex host adapter(s) and automatically installs the Windows 95 software driver (BUSLOGIC.MPD) that is supplied on the Windows 95 diskettes or CD-ROM.

The BUSLOGIC.MPD software driver provided in the *Software Drivers* package provides features that are not supported by Microsoft's version of the driver, including MaxQueue Tags — a configurable parameter that controls the maximum queue tag depth on tagged queuing devices.

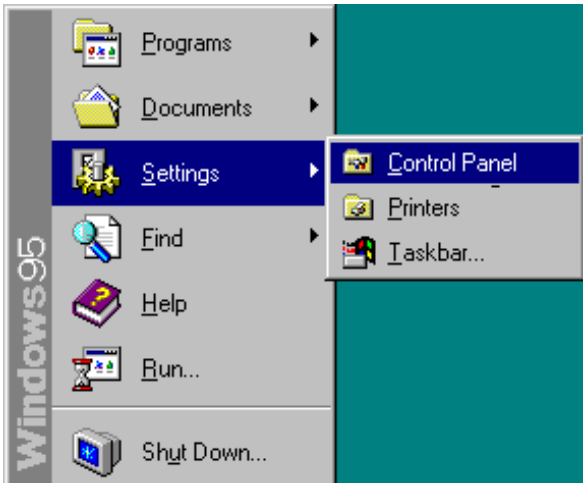
This section provides instructions for installing the device driver update to take advantage of these features.

Note: *Before starting the installation procedure, review the README file included on diskette number 1 of the Software Drivers package for current device driver updates and information.*

Use the following procedure to install the device driver update, BUSLOGIC.MPD:

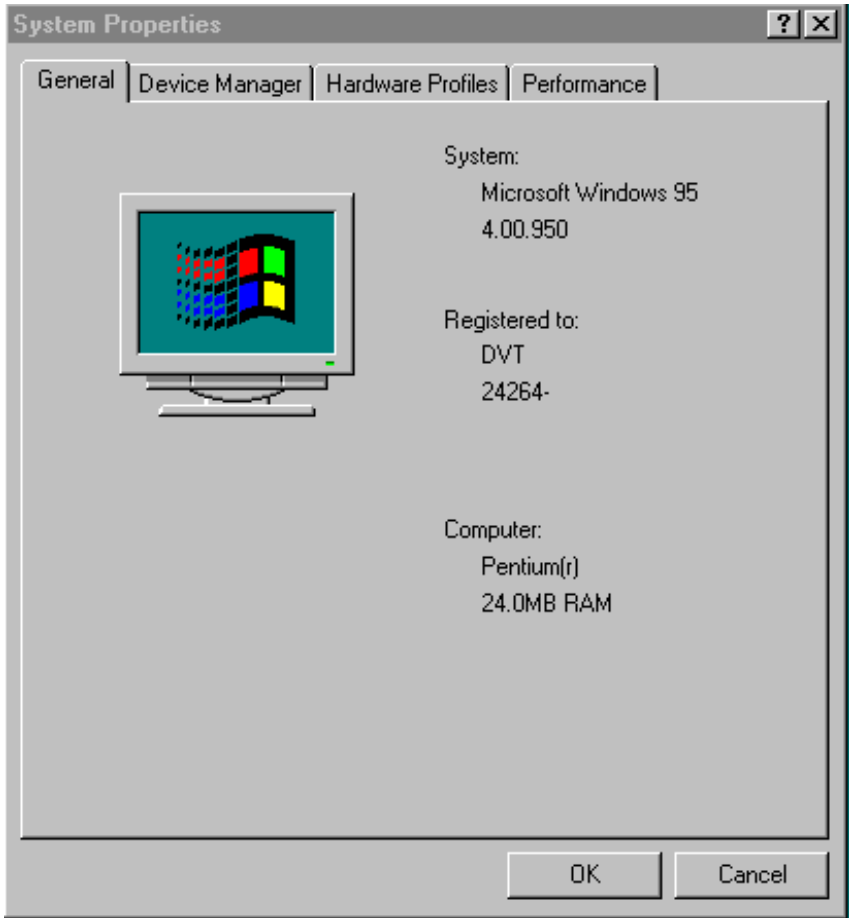
1. Click the Start button to open the Start menu (shown below).

   – Slide the mouse cursor down the start menu until Settings is highlighted.
   – Hold the mouse cursor on Settings until the Settings menu opens.
   – Move the mouse cursor onto the Settings menu and over Control Panel.
   – Click the left mouse button once.

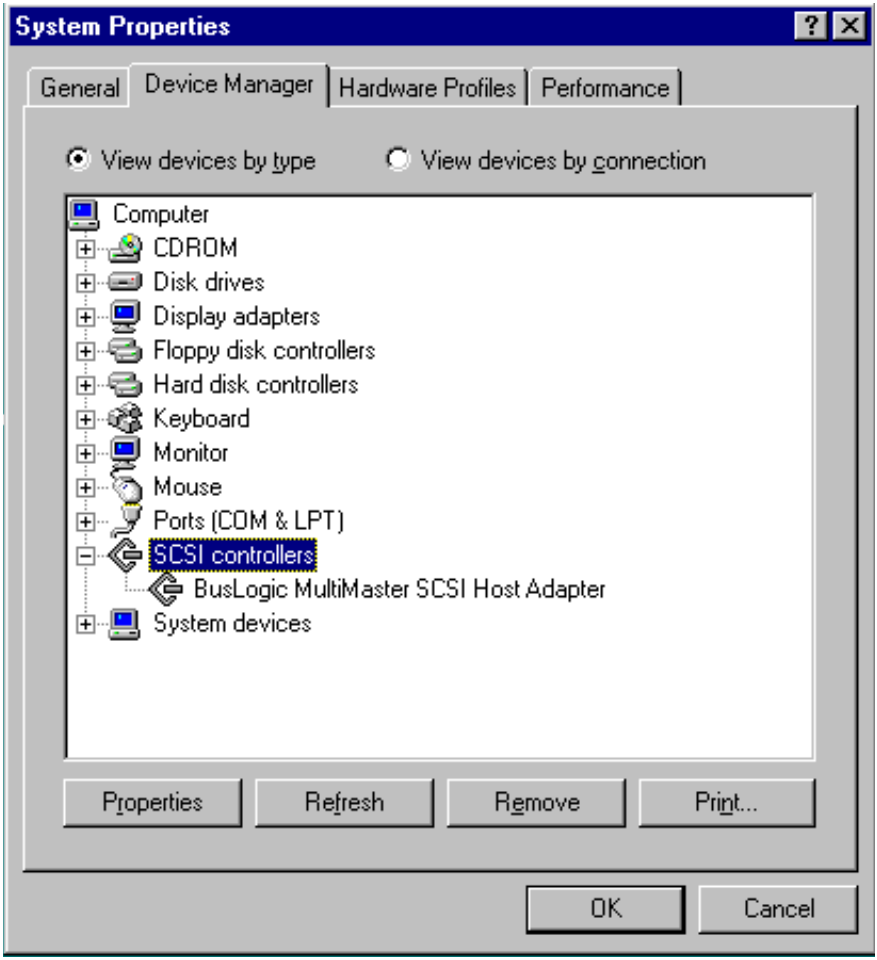


2. When the Control Panel window opens, double-click the System icon.

3. When the System Properties dialog box appears, click once on the Device Manager tab to bring the Device Manager page to the foreground.

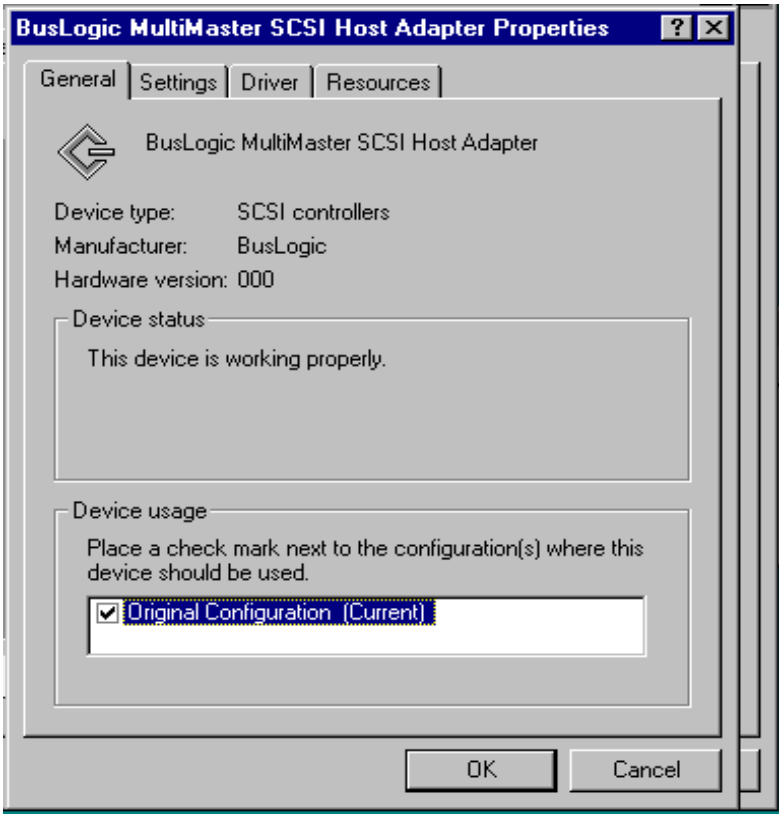


4. With the Device Manager page in the foreground, click the plus sign (+) next to the SCSI Controllers icon. The device tree expands to show all SCSI host adapters that are installed in the system, as shown below:

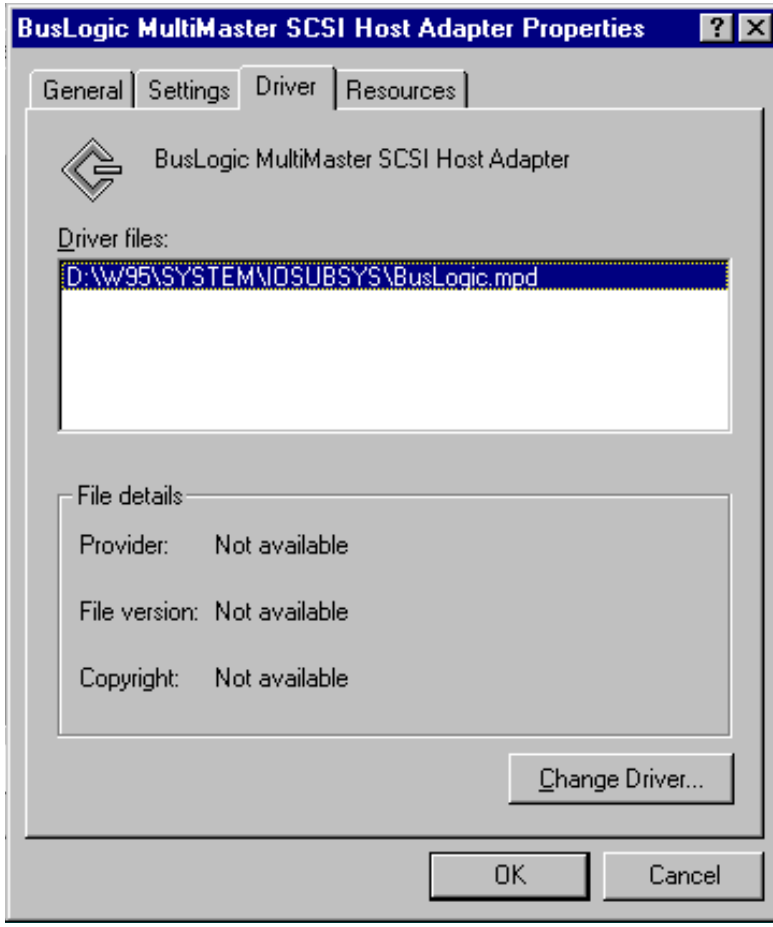


5. Select the MultiMaster SCSI Host Adapter entry by double-clicking it or by highlighting it and selecting the Properties button.

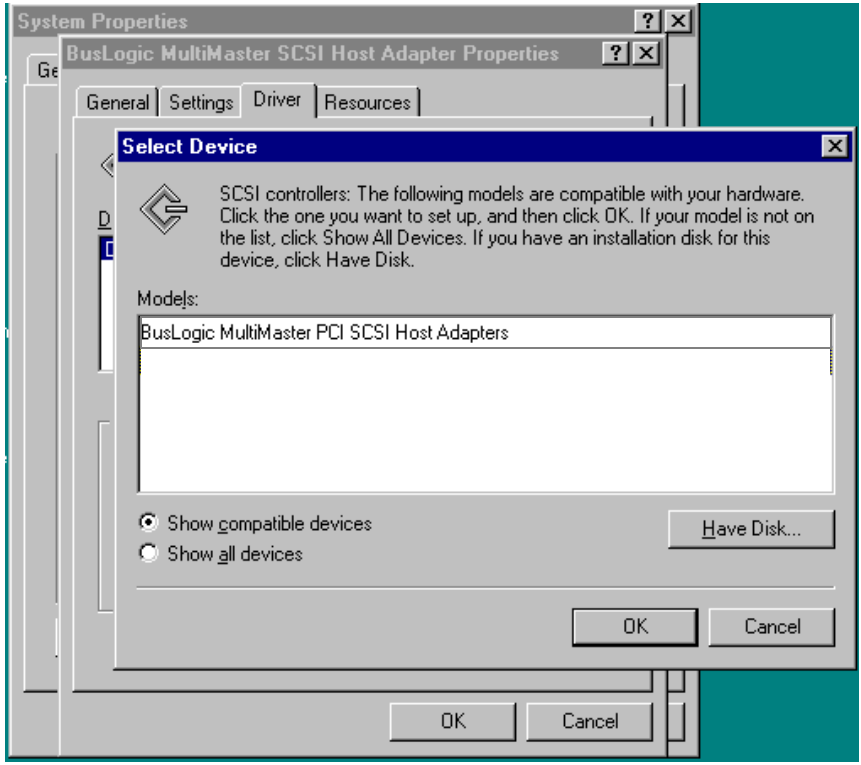
6. When the MultiMaster Host Bus Adapter Properties page is displayed, the General tab is in the foreground, as shown below. This page displays information about the host adapter. Click the Driver tab to bring it to the foreground.



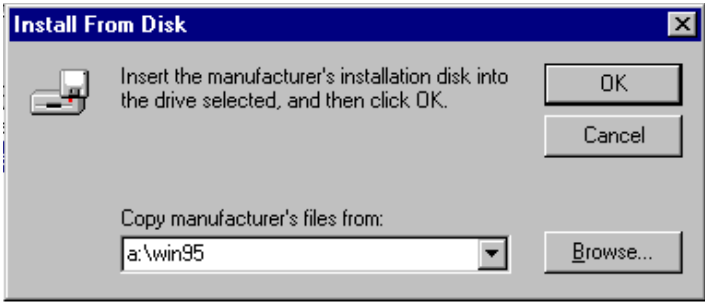
7. When the Driver page is displayed, select the Change Driver button to activate the Select Device dialog box.



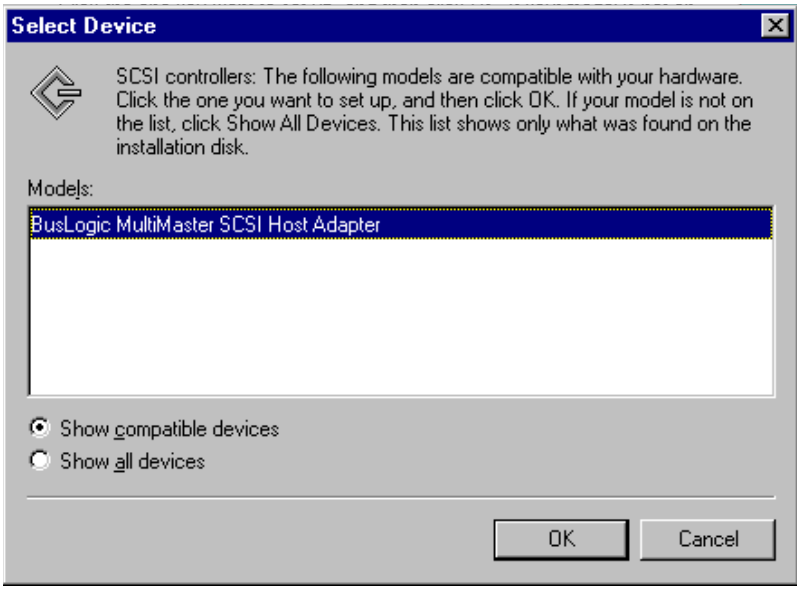
8. The Select Device dialog box contains a list of installed SCSI host adapters. Highlight the SCSI host adapter that you want to update the driver for (for example, if you have a PCI adapter installed, you would see MultiMaster PCI SCSI Host Adapter), and click the Have Disk button.



9. When the Install From Disk dialog box appears,
   - Insert diskette number 1 of the *Software Drivers* package into the floppy drive.
   - Type `a:\win95` in the box labeled Copy manufacturer's files from:
   - Select the OK button.

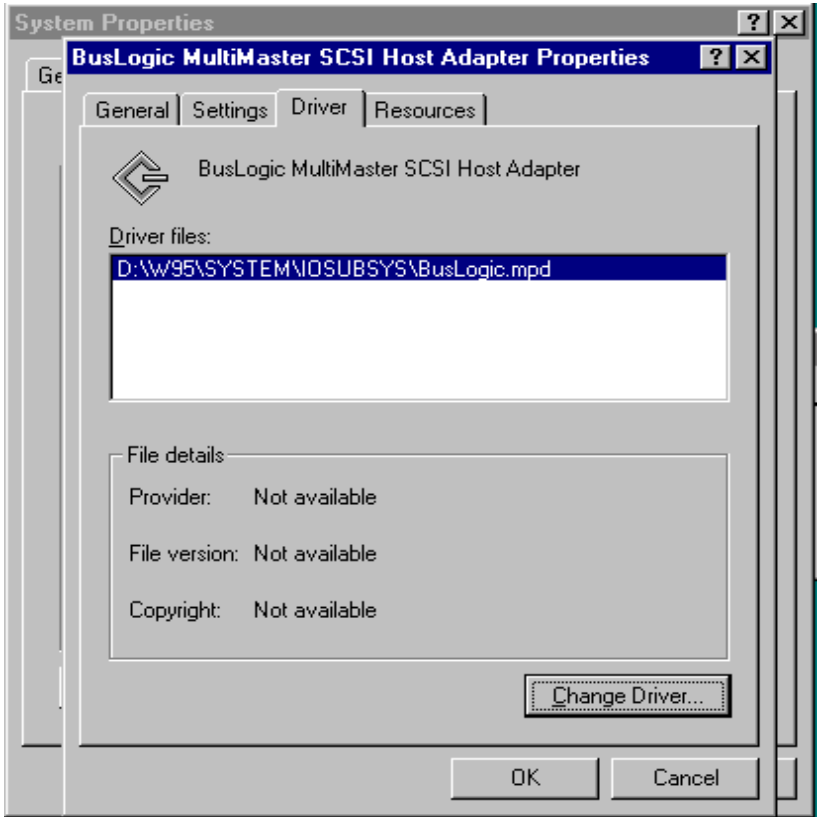


10. When the Select Device dialog box returns, it lists the drivers on the *Software Drivers* diskette that are compatible with the host adapter you selected in Step 8. Click the OK button to confirm that this is the host adapter you want to set up.

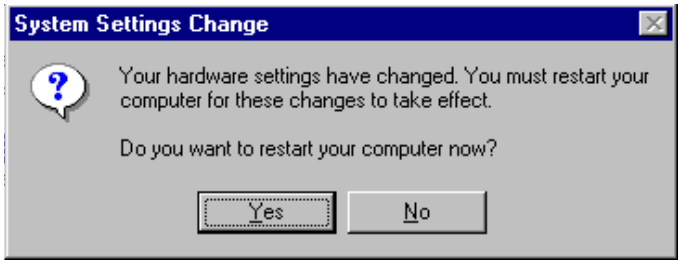


11. When the Driver page reappears, click the **OK** button.

Caution: *Do not click the* Change Driver *button.*



12. A dialog containing a Copying files... message is displayed momentarily. When the System Setting Change dialog appears, the software has been installed. Click the Yes button to restart the computer. The new driver is loaded when the computer restarts and Windows 95 loads.



Chapter 3

WINDOWS NT DEVICE DRIVER

Chapter 3: Contents

Chapter 3: Preface

3•0

Preface

Chapter 3 describes how to install the *Windows NT Device Driver* on Windows NT systems.

Chapter 3 consists of four sections:

- **Section 3•1**, "Overview," introduces the *Windows NT Device Driver*, provides information about software and hardware installation requirements, and lists the CD-ROMs that are supported by the software.
- **Section 3•2**, "Installing the Driver Update on Windows NT 3.5X ," explains how to install the *Windows NT Device Driver* on an existing Windows NT 3.5x installation.
- **Section 3•3**, "Installing the Driver Update on Windows NT 4.0X ," explains how to install the *Windows NT Device Driver* on an existing Windows NT 4.X installation.
- **Section 3•4**, "Configuring the Updated Windows NT Driver," describes the configuration parameters for this version of the driver and explains how to implement them.

Recommended Reference Material

To install the Windows NT driver, you should have the following documentation:

- The Mylex manual for your host adapter
- The Windows NT installation and user's guide
- The system's installation and setup guides
- The system's reference manual
- The manuals for the system's peripherals

Software Requirements

To install the Windows NT device driver, you need the following software:

- Diskette number 1 of the *Software Drivers* package
- The Microsoft Windows NT operating system diskettes, tape, or CD-ROM (version 3.5X or 4.X)

Hardware Requirements

You need the following hardware: an IBM PC or a PC-compatible computer with a 386, 486, Pentium, or Pentium Pro processor, or with a 386-class, 486-class, Pentium-class, or Pentium Pro-class processor.

CD-ROMs and Host Adapters Supported

For information about the CD-ROMs and host adapters supported by this software, refer to the “Introduction” section at the front of this manual.

3•1

Overview

The Windows NT operating system contains built-in support for MultiMaster SCSI host adapters. The *Software Drivers* package includes a driver update, the *Windows NT Device Driver* (BUSLOGIC.SYS) for Windows NT. You do not need to install this update to run Windows NT, but it is safe to install this update, and Mylex recommends that you do this if you want to take advantage of the support for the MaxQueueTags configurable parameter provided in the update. This parameter controls the maximum queue tag depth on tagged devices attached to a host adapter. It allows the tag-queue depth to be varied from 1 to 60, with a default of 8.

The *Windows NT Device Driver* allows the Windows NT operating system to communicate with the SCSI host adapter and to access additional SCSI devices connected to the adapter. This driver supports devices such as SCSI hard drives, SCSI tape drives, magneto-optical (MO) drives, and CD-ROMs.

Caution: BUSLOGIC.SYS *is supplied on diskette number 1 of the* Software Drivers *package. This diskette and the other diskettes included in this package contain software for the other operating systems that are discussed in other parts of this manual. You do not need to use the other diskettes unless you also use one of these other operating systems. If you do, refer to the part of this manual that discusses the operating system that you are using.Refer to Section 3•2 or 3•3 for installation information for Windows NT 3.5X and 4.X, respectively.*

3•2

Installing the Driver Update on Windows NT 3.5X

Microsoft Windows NT includes built-in support for SCSI host adapters. When you install Windows NT, the operating system detects host adapters and automatically installs the *Windows NT Device Driver*, BUSLOGIC.SYS.

The BUSLOGIC.SYS software driver provided in the *Software Drivers* package provides additional features that are not supported by Microsoft's version of the driver, as described in Section 3•1.

Note: *Before beginning the installation procedure, review the README file included on diskette number 1 of the* Software Drivers *package for current device driver updates and related information.*

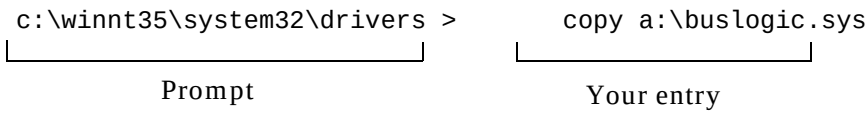
The following procedure describes how install the update. During this process, the device driver for Windows NT (BUSLOGIC.SYS) is copied from diskette number 1 of the Windows NT *Software Drivers* package onto your hard disk.

1. Double-click the DOS Prompt icon in the Main group in Program Manager.

2. At the DOS prompt, change to the root directory of the hard drive where Windows NT is installed (usually this is drive C). Next, change to the directory where the driver is stored. To do this, enter the following command at the prompt:

```
c:> cd\winnt35\system32\drivers <Enter>
```

3. At the next DOS prompt, which shows the current path, type the entry shown below:



4. The driver installation is complete. You must reboot the system for the new driver to take effect.

3•3

Installing the Driver Update on Windows NT 4.0X

Microsoft Windows NT includes built-in support for SCSI host adapters. When you install Windows NT, the Setup program detects host adapters and automatically installs a version of the Windows NT device driver that is included on the Windows NT Setup diskettes or CD-ROM.

The Windows NT driver provided on diskette number 1 of the *Software Drivers* package provides additional features that are not supported by the version of the driver Microsoft provides, as described in Section 3•1.

> ***Note:*** *Before installing the driver, please review the README file included on diskette number 1 of the* Software Drivers *package for current device driver updates and related information.*

The first procedure in this section describes how install the updated driver (instead of the version of the driver provided by Microsoft) when installing Windows NT 4.X. The second procedure describes how to install the driver update on a system that is currently running Windows NT 4.X. During both of these processes, the device driver for Windows NT (BUSLOGIC.SYS) is copied from diskette number 1 of the *Software Drivers* package onto your hard disk.

When you have finished installing Windows NT 4.X with the updated device driver, or have finished updating the device driver on an existing Windows NT 4.X system, read Section 3•4, which provides information on configuring the updated driver.

Installing the Updated Driver with Windows NT Setup

Use the following procedure to install the updated MultiMaster device driver during an installation of Windows NT 4.X:

> ***Note:*** *The Windows NT Setup screens shown in the following procedure are reproduced from an installation of* Windows NT Workstation 4.0. *Although the screens from the* Windows NT Server *Setup program vary slightly from these, the installation procedure provided here works equally well for both the Workstation and Server installations.*

1. Start the Windows NT installation according to the installation instructions provided with the operating system.

2. When Windows NT Setup finishes copying temporary files to your hard disk and inspecting your computer's hardware configuration, it displays the following text-based screen:

```
Windows NT Workstation Setup

Setup has recognized the following mass storage devices in your computer:

(other possible devices)
BusLogic Multimaster
(other possible devices)

  • To specify additional SCSI adapters, CD-ROM drives, or special
    disk controllers for use with Windows NT, including those for which
    you have a device support disk from a mass storage device
    manufacturer, press S.

  • If you do not have any device support disks from a mass storage
    device manufacturer, or do not want to specify additional
    mass storage devices for use with Windows NT, press ENTER.

S=Specify Additional Device  ENTER=Continue  F3=Exit
```

Note: *In the screen above, "(other possible devices)" represents any other entries in the list of detected mass-storage devices. Depending on your computer's configuration, these lines may contain the names of other devices, or they may be blank.*

Your MultiMaster host adapter should be listed in this screen, along with any other mass-storage host adapters / controllers that are installed in your computer. Whether or not your host adapter is listed, press **S** to choose the Specify Additional Device option. If you do not choose this option, the default Windows NT device driver on the Windows NT Setup diskettes or CD-ROM will be installed, and you will have to install the updated device driver manually after completing Windows NT Setup.

3. Windows NT Setup displays the following screen:

```
Windows NT Workstation Setup

You have asked to specify an additional SCSI adapter, CD-ROM drive,
or special disk controller for use with Windows NT.

  • To select a mass storage device from the following list,
    use the UP or DOWN arrow key to move the highlight to
    the mass storage device you want, and then press ENTER.

  • To return to the previous screen without specifying an additional
    mass storage device for use with Windows NT, press ESC.

                                                        (More ↑)
 Other (requires disk provided by a hardware manufacturer)




 ENTER=Select   F3=Exit   ESC=Cancel
```

Press **<Enter>**.

Note: *If you press the UP arrow key, the screen scrolls through a list of host adapter models from a number of manufacturers. Since your intent is to install the updated device driver on diskette 1 of this release of the* Software Drivers *package, you must ensure that the highlight is on* "Other (requires diskette from manufacturer)" *when you press* **<Enter>**.

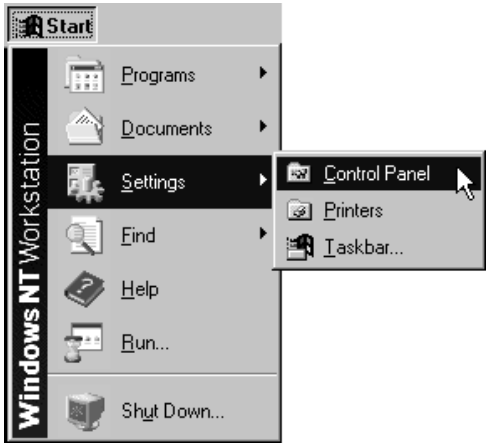
4. When the Setup program prompts you to insert the "Manufacturer-supplied hardware support disk," insert diskette number 1 of the *Software Drivers* package in drive A, and press **<Enter>**.

5. Windows NT Setup copies the driver file (BUSLOGIC.SYS) from the diskette and installs it as it continues the Windows NT installation. Follow the installation instructions that are provided with Windows NT and/or the instructions displayed by the Windows NT Setup program to complete the installation.

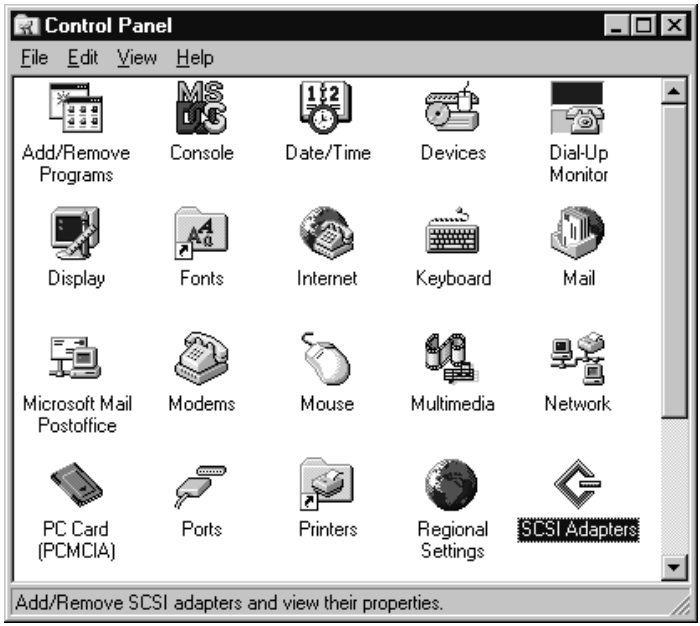
Updating the MultiMaster Windows NT Driver on a System Running Windows NT 4.X

Use the following procedure to update the MultiMaster device driver on a system running Windows NT 4.X:

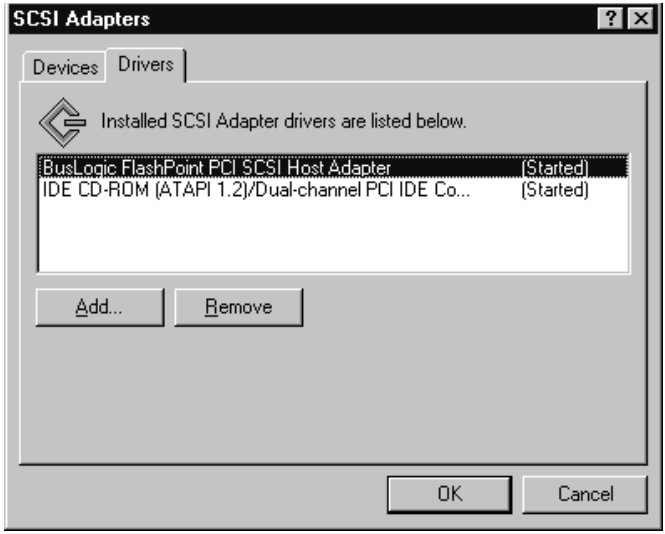
1. Click the Start button to open the Start menu, slide the mouse cursor up or down the start menu until Settings is highlighted (as shown below). When the fly-out menu opens, move the mouse cursor onto Control Panel, and click the left mouse button once.



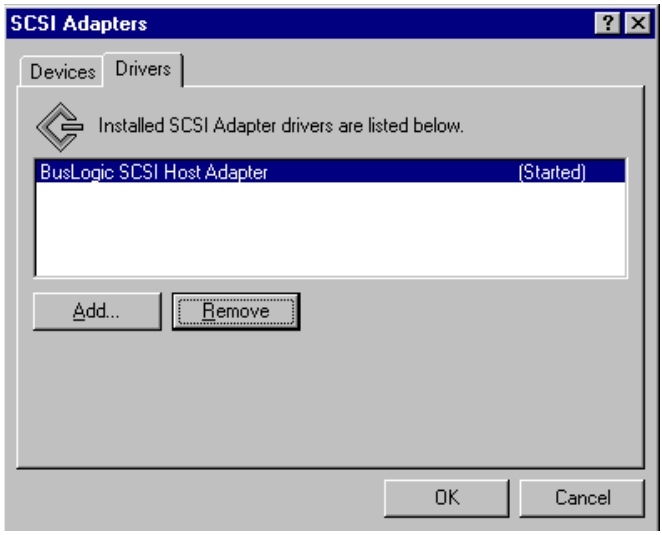
2. When the Control Panel window opens, double-click the SCSI Adapters icon.



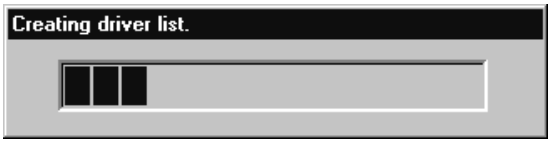
3. When the SCSI Adapters dialog box is displayed, click once on the Drivers tab to bring the Drivers page to the foreground.

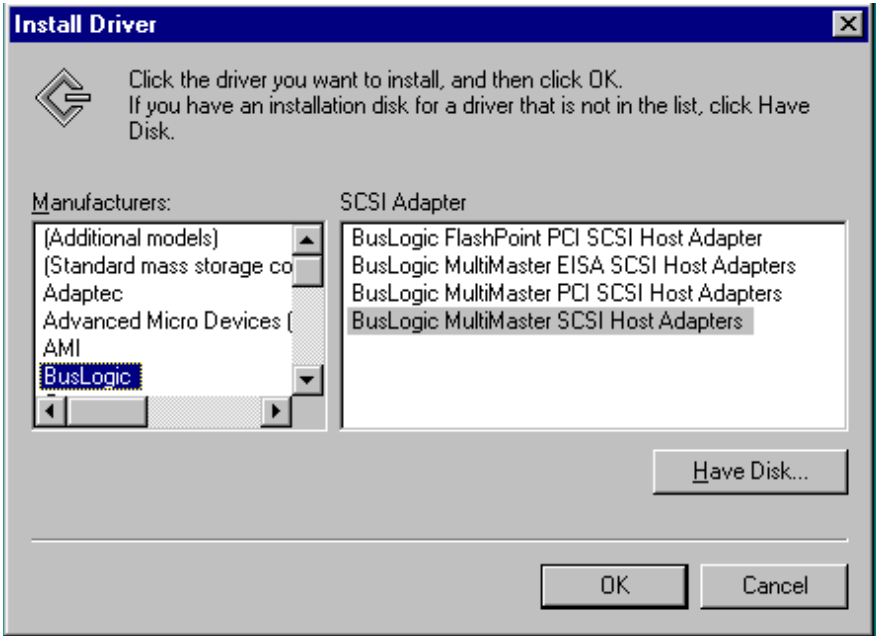


4. With the Drivers page in the foreground of the SCSI Adapters dialog box, click the MultiMaster PCI SCSI Host Adapter list entry to highlight it (if it is not already highlighted), and then click the Add button.



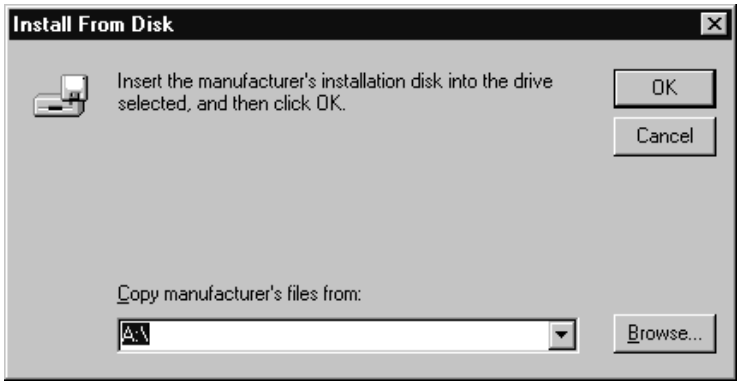
5. The Creating driver list progress bar is displayed briefly, and then the Install Driver dialog box is displayed, as shown below:



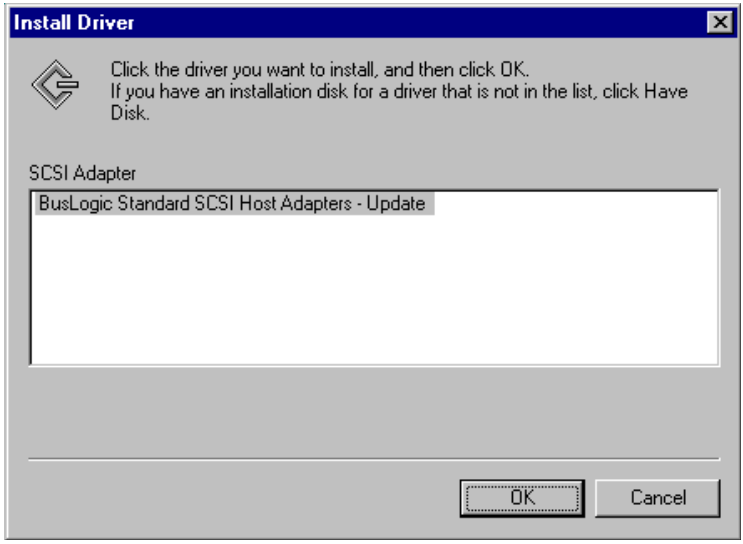


Click the Have Disk button.

6. The Install From Disk dialog box is displayed, as shown below. The message in this dialog box asks you to insert the manufacturer's installation disk into the selected drive. Insert diskette number 1 of the *Software Drivers* package into drive A, and click the OK button.

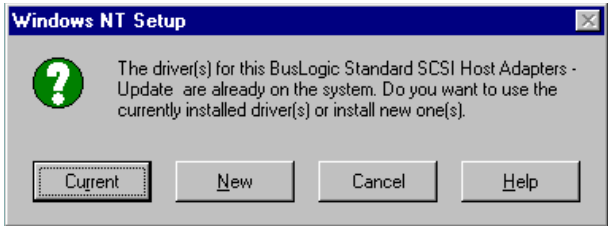


7. Another Install Driver dialog box is displayed. This one lists the drivers Windows NT Setup found on the diskette:

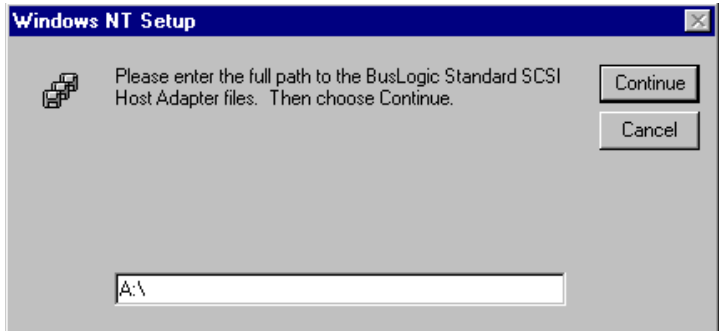


The correct device driver is already highlighted, so just click the OK button.

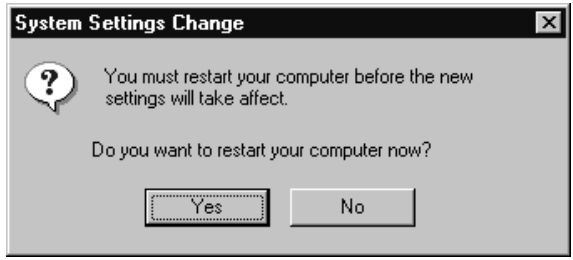
8. The next dialog box asks you to choose between keeping the currently installed version of the "Standard SCSI Host Adapter" driver and installing the new driver found on the diskette. Click the New button.



9. When the next dialog box is displayed, the message it contains asks you to enter the full path to the driver file (see below). Ensure that the text box shows A:\ for the path (or the correct path to the floppy drive you are using), and click the Continue button.



10. A dialog box that contains a progress bar is displayed briefly while the driver file is copied from the diskette, and then the Systems Settings Change dialog box is displayed, as shown below:



Click the Yes button to restart the computer so the new driver can take effect.

11. Read Section 3•4, which provides information on configuring the MultiMaster Windows NT driver, and use the procedure provided there to configure the driver, if desired.

3•4

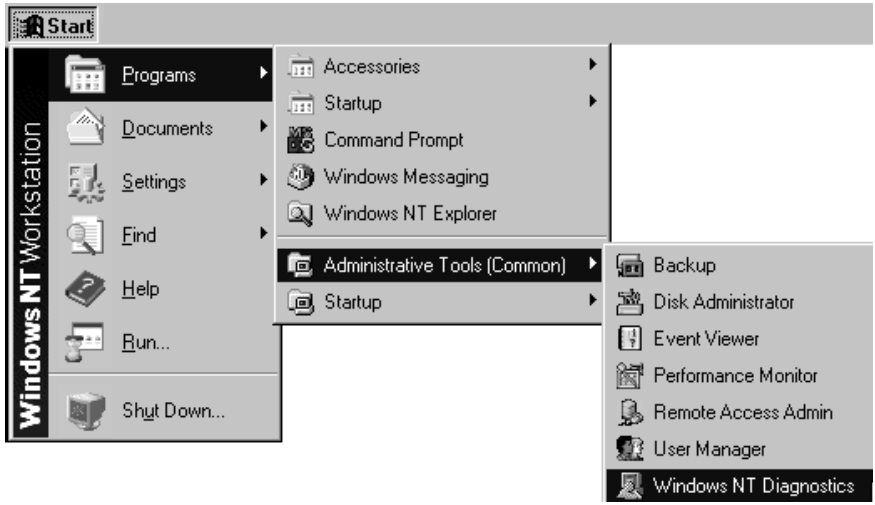
Configuring the Updated Windows NT Driver

The MultiMaster Windows NT driver accepts one user-configurable parameter, MaxQueueTags. This parameter controls the maximum queue-tag depth on tagged-queuing devices connected to a MultiMaster adapter. If this parameter is not used, the driver defaults to a tag-queue depth of eight. Values of 1 to 60 are valid.

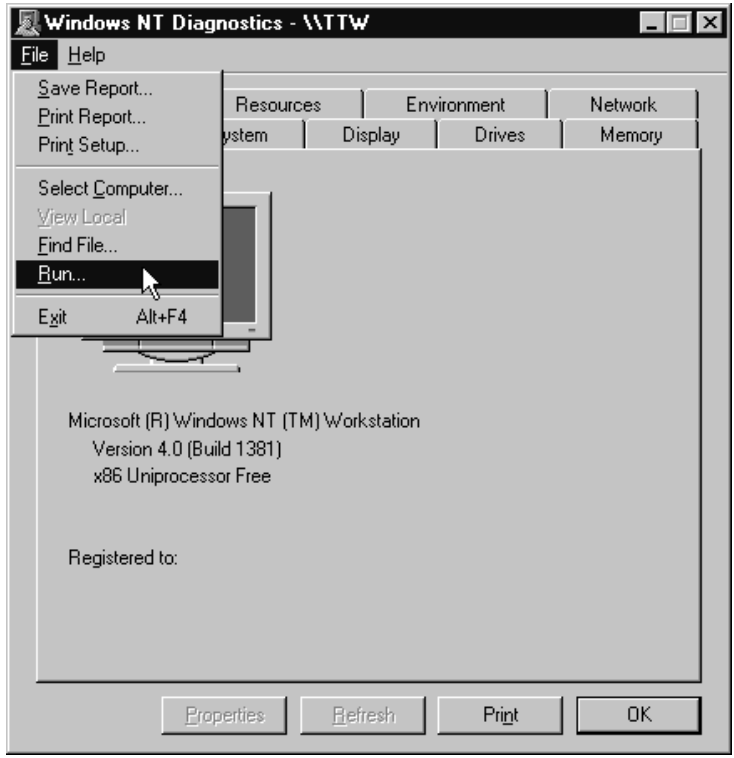
The MaxQueueTags parameter is implemented by adding or modifying a key in the Windows NT Registry file. This registry key specifies the value for MaxQueueTags.

This section provides a step-by-step procedure for editing the WindowsNT Registry file to add or modify the MaxQueueTags key. You must install the updated MultiMaster WindowsNT driver (see Section 3•3) before you use the following procedure.

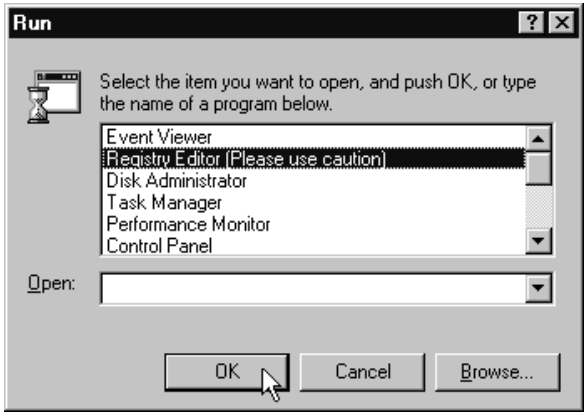
1. Click the Start button to open the Start menu, and place the mouse cursor on Programs. When the fly-out Programs menu opens, move the mouse cursor onto Administrative Tools, and then onto Windows NT Diagnostics in the Administrative Tools menu. Finally, click the left mouse button once on Windows NT Diagnostics.



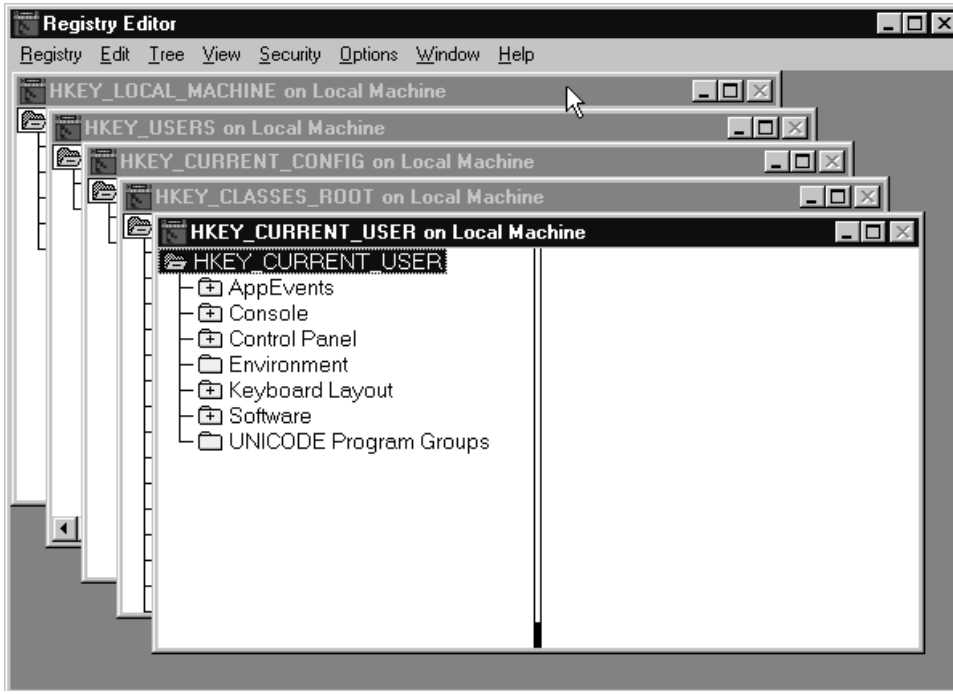
2. Click on File in the Windows NT Diagnostics menu bar, and then click on Run in the pull-down File menu, as shown below:



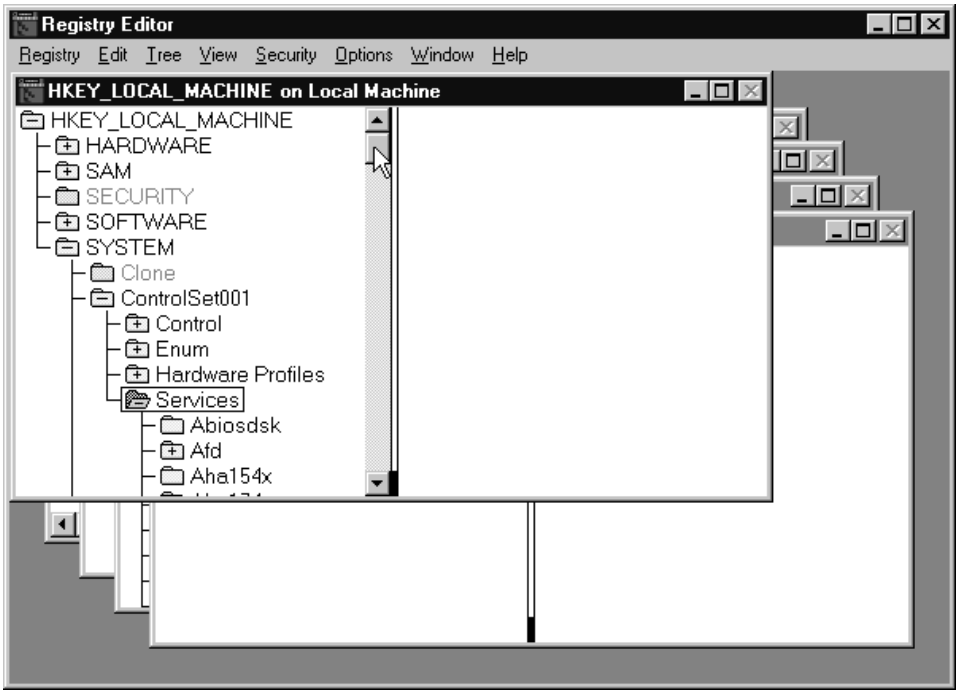
3. The Run dialog box contains a list box that includes a number of WindowsNT applets, including the Registry Editor:



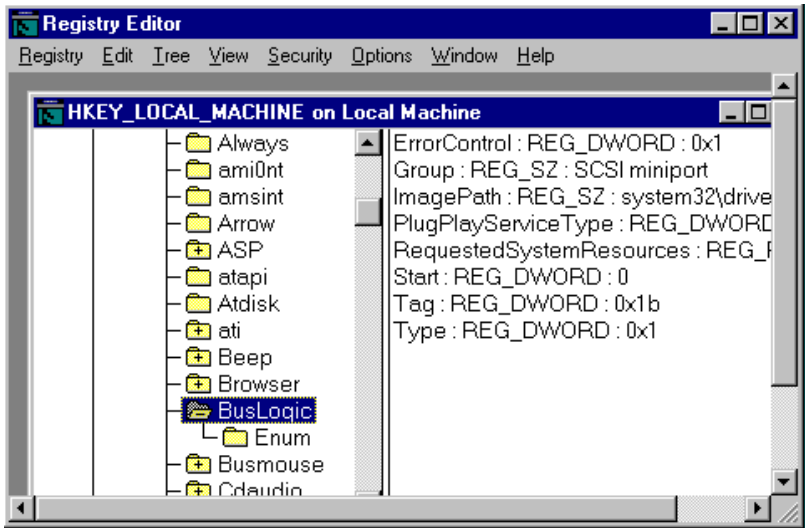
Click the left mouse button on Registry Editor, and then click the OK button. When the Registry Editor opens, it includes five open windows that each contain one of the top-level registry keys, as shown below:



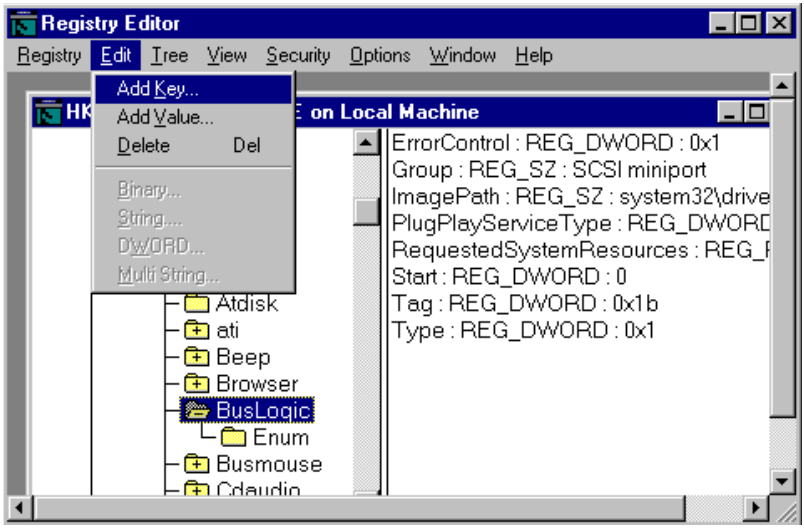
4. Click once on the title bar of the window containing the "HKEY_LOCAL_MACHINE on Local Machine" registry key to bring the window for this key to the foreground. Double-click the SYSTEM key, the ControlSet001 key, and the Services key to expand the tree so it looks like the illustration below.


Registry Editor
Registry Edit Tree View Security Options Window Help
HKEY_LOCAL_MACHINE on Local Machine
HKEY_LOCAL_MACHINE
HARDWARE
SAM
SECURITY
SOFTWARE
SYSTEM
Clone
ControlSet001
Control
Enum
Hardware Profiles
Services
Abiosdsk
Afd
Aha154x

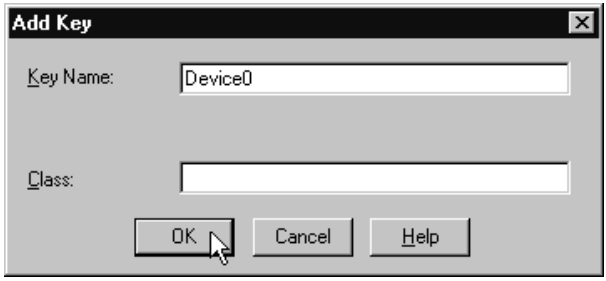
5. Use the scroll bar to move down the list of entries under the Services key until you locate the buslogic key. Click once on the buslogic key to highlight it.



6. Click Edit in the Registry Editor menu bar, and then click Add Key in the pull-down Edit menu.

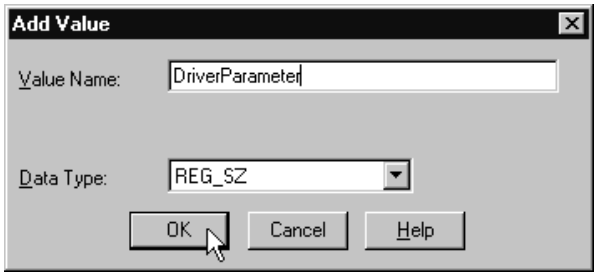


7. Enter Device0 (for the first MultiMaster SCSI host adapter in the system) in the Key Name field. Leave the Class field empty, and click the OK button.



To configure additional MultiMaster host adapters, repeat Step 7 for each one, using the appropriate number in the Key Name field (Device1 for the second MultiMaster adapter, Device2 for the third MultiMaster adapter, and so on). The new Device0 key is shown in the list under the buslogic key.

8. Click the Device0 key to highlight it, and select Add Value from the Edit menu.



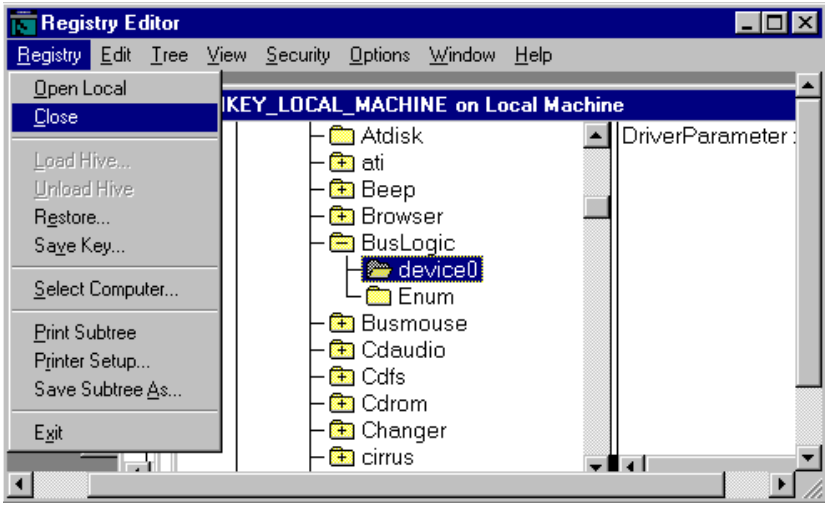
Enter "`DriverParameter`" in the Value Name field (enter DriverParameter carefully, as the key names are case-sensitive), and click the OK button (leave the default data type, REG_SZ, in the Data Type field).

9. In the String Editor dialog box, enter the following parameter:

```
MaxQueueTags=xx
```

where xx = the value you want to use for MaxQueueTags (valid values range from 1 through 60). Click the OK button.

10. The new value string appears in the right pane of the "HKEY_LOCAL_MACHINE on Local Machine" Registry Editor window, as shown below:



Click Registry in the Registry Editor menu bar, and then click Close in the Registry pull-down menu to save your changes to the Registry file.

11. Exit the Registry Editor, and restart the computer so the new version of the registry file can be read. This activates the parameter setting you just added to the registry each time the MultiMaster driver (BUSLOGIC.SYS) loads.

Chapter 4

NETWARE SOFTWARE MANAGER

Chapter 4: Contents

Preface

NetWare HAM Software Manager (Sections 4•1 through 4•5)

NetWare DSK Software Manager (Sections 4•6 through 4•10)

4•0

Preface

Chapter 4 of this manual describes how to install the *NetWare HAM Software Manager* and the *NetWare DSK Software Manager* (included on diskette number 2 of the Host Adapter Device Driver Software Package) on PC-compatible systems running Novell® NetWare® versions 3.11, 3.12, 4.00, 4.01, 4.02, 4.10, and 4.11. The *NetWare HAM Software Manager* and the *NetWare DSK Software Manager* provide a rich variety of NetWare drivers to suit various customer needs:

- Ongoing support for NetWare's traditional DSK drivers. DSK drivers are defined by Novell's DDFS interface specification and, up until recently, were the only drivers available to support storage devices under the various versions of NetWare. The DDFS/DSK interface remains a viable interface that adequately addresses the needs of many customers. The Host Adapter Device Driver Software Package contains our latest DSK driver upgrades for all NetWare platforms.
- Support for NetWare's HAM (Host Adapter Module) drivers. The HAM drivers, which are defined by Novell's NWPA (NetWare Peripheral Architecture) interface specification, represent a new driver design choice that is available to support storage devices under certain versions of NetWare. NWPA and HAM are extensions to the NetWare Media Manager that provide broader support for various storage devices and third-party applications than the older DDFS/DSK interface provided. For detailed information on the advantages of the NWPA/HAM module, please contact Novell.
- NetWare HAM drivers with special built-in support for customers running version 2.1 or above of Mylex's Global Array Manager (GAM) on their NetWare server. GAM is a popular client/server application that is used to monitor and manage disk-array subsystems attached to a Mylex disk-array controller. For additional information on HAM drivers with GAM support, see Appendix 4•A.

> ***Note:*** *For convenience, this manual uses the term NetWare 4.X to refer to NetWare versions 4.00, 4.01, 4.02 4.10, and 4.11, and NetWare 3.1X to refer to NetWare versions 3.11 and 3.12.*

Sections 1 through 5 of Chapter 4 are concerned exclusively with HAM drivers, and Sections 6 - 10 of Chapter 4 are concerned exclusively with DSK drivers:

Section 4•1, "Netware HAM Software Manager Overview," introduces the Netware HAM Software Manager and provides information about installing the software.

Section 4•2, "Netware 4.11," explains how to install Netware 4.11 for the first time using the *Netware HAM Software Manager* and also explains how to upgrade the driver on an existing Netware 4.11 server to the *Netware HAM Software Manager*.

Section 4•3, "Netware 4.10," addresses various upgrade paths from existing installations of Netware 4.10 to the *Netware HAM Software Manager*.

Section 4•4, "Netware 3.12," addresses various upgrade paths from existing installations of Netware 3.12 to the *Netware HAM Software Manager*.

Section 4•5, "Configuring the Netware HAM Software Manager," explains how to configure the HAM drivers by changing or specifying optional switches.

Section 4•6, "Netware DSK Software Manager Overview," introduces the *NetWare DSK Software Manager* and provides information about software and hardware installation requirements.

Section 4•7, "First-Time Installation of NetWare 3.11/3.12," explains how to install the *NetWare DSK Software Manager*, and includes information about loading and configuring the drivers in a variety of environments, including non-PCI host adapters, PCI host adapters, and with the ASPI support manager.

Section 4•8, "First-Time Installation of NetWare 4.X," provides installation instructions for systems running NetWare 4.X.

Section 4•9, "Updating Existing DSK Drivers," explains how to update DSK drivers already installed.

Section 4•10, "Configuring the DSK Drivers," explains how to configure the drivers by changing or specifying optional switches.

Appendix 4•A, "Mylex Global Array Manager," explains the purpose of the Global Array Manager (GAM) and provides additional information about installing this software.

Appendix 4•B, "NWPA Update Package and Novell-Provided OS Patches / File Updates," describes how to obtain and apply the Novell NWPA Update package and other Novell-supplied patches and updates.

Recommended Reference Material

The following additional reference material is useful when you are installing and using the software.

- Mylex documentation for the SCSI host adapter board
- Novell's NetWare 386 installation and user's guide
- The installation and setup guide for your computer
- The technical reference manual for your computer
- The documentation for the computer's peripherals
- Installation guides for any third party device drivers

Software Requirements

To install the *NetWare HAM Software Manager* and / or the *NetWare DSK Software Manager* you should have the following software:

- Diskette number 2 of the *Software Drivers* package
- One of the following versions of Novell's NetWare: 3.11, 3.12, 4.00, 4.01, 4.02, 4.10, or 4.11
- Appropriate third-party software — for example, tape backup and utility programs (if applicable)
- In some cases, the NetWare Peripheral Architecture (NWPA) upgrade package

Software Compatibility

The *NetWare Software Manager* is compatible with the following Novell software:

- Novell's NetWare Version 3.11, 3.12 or 4.X
- Novell's Sbackup™

In addition, the NetWare Software Manager supports third-party software such as tape backup and utility programs.

Hardware Requirements

You need the following hardware: an IBM PC or a PC-compatible computer with a 386, 486, Pentium, or Pentium Pro processor, or with a 386-class, 486-class, Pentium-class, or Pentium Pro-class processor.

Host Adapters Supported

For information about the host adapters supported by this software, see the "Introduction" at the front of this manual.

4•1

NetWare HAM Software Manager Overview

The *NetWare HAM Software Manager* is on diskette number 2 of the *Software Drivers* package. It runs on IBM PC (or PC-compatible) computers and works with versions 3.12 and 4.10, and 4.11 of Novell NetWare.

The *NetWare HAM Software Manager* provides software drivers that support SCSI devices such as SCSI hard disk drivers, SCSI tape drives, magneto-optical (MO) disk drives, scanners, and CD-ROMs. These drives allow NetWare 386 applications to communicate with the SCSI host adapter and to access the SCSI devices connected to it.

When you install the *NetWare HAM Software Manager*, you have support for:

- Multiple Mylex host adapters in a file server
- Up to fifteen SCSI devices (hard drives, etc.) per adapter
- Connectivity to SCSI tape drives, magneto optical (MO) disk drives, CD-ROM drives, and other devices
- Removable SCSI devices in a fault tolerant environment.

All NetWare System Fault Tolerant (SFT) features are also supported, such as mirroring and duplexing. These features provide valuable protection from hardware failures.

NetWare HAM Software Manager Components

Caution: *The* NetWare HAM Software Manager *is supplied on diskette number 2 of the* Software Drivers *package. This software package also includes device drivers for the other operating systems that are discussed in other parts of this manual. You do not need to use diskette number 3 unless you also use one of these other operating systems. If you do, refer to the part of this manual that discusses the operating system that you are using. If you are installing the* NetWare HAM Software Manager *from a CD-ROM drive that is connected to a Mylex host adapter, you may also need to use diskette number 1 to install DOS drivers to support the CD-ROM.*

The *Host Adapter Device Driver Software* contains two complete sets of the *NetWare HAM Software Manager* that support the following versions of NetWare:

- The *NetWare HAM Software Manager* (for NetWare 3.12, 4.10, and 4.11) contains the standard NetWare HAM Driver (filename BLMMz.HAM) and the Device Driver Information File (filename BLMMz.DDI).

  > ***Note:*** *The letter* **z** *in the filenames mentioned here represents the internal version number of the current driver. For example, for internal version 2 of the NetWare HAM Driver, the filename would be BLMM2.HAM.*

- The *NetWare HAM Software Manager* with GAM support (for NetWare 3.12, 4.10, and 4.11), which contains the NetWare 4.X Disk Driver (filename BLMMGAMz.HAM) and the Device Driver Information File (filename BLMMGAMz.DDI).

  > ***Note:*** *For additional information on GAM (Global Array Manager), see Appendix* 4•A.

Before Installing the Software

Before you start to install the software, make sure that you have the appropriate software, hardware, and reference material, as described in the Preface. In addition, take a few minutes to review the README file located on the *SCSI Host Adapter Software Device Drivers* diskette. This file contains additional information and may contain new information that was not available when this manual was printed.

Choosing a Driver

You can install and use either the embedded NetWare drivers that are included with your NetWare Operating System software package or the new Novell NWPA/HAM driver architecture.

Embedded Drivers

NetWare 4.11, 4.10, and 3.12 have NetWare drivers for all SCSI Adapter product families embedded in the operating system itself. That is, these drivers are included in your NetWare Operating System software package. In the vast majority of cases, you will obtain quite satisfactory results with the embedded Mylex drivers. To use these drivers, simply follow the instructions that come with the NetWare Operating System software package. If you use these drivers, you are done — you need not install any of the other NetWare drivers provided on the *SCSI Host Adapter Software Device Driver* diskette.

Driver Updates/Replacements

To take full advantage of Novell's new NWPA/HAM driver architecture and/or all the latest device driver features, bug fixes, and enhancements, choose one of the following driver update paths:

- Update an embedded HAM driver to the newest HAM driver (NetWare 4.11 only)
- Update a DSK driver to a HAM driver (NetWare 4.11, 4.10, or 3.12)
- Update an embedded DSK driver to the newest DSK driver (all versions of NetWare).

NetWare 4.11 ships with both embedded HAM drivers and DSK drivers. NetWare 4.10 and 3.12 ship with embedded DSK drivers. Sections 4•2 through 4•4 cover updates from both DSK drivers and HAM drivers to one of the NetWare HAM drivers contained in this release. DSK-to-DSK driver updates are covered in Section 4•9.

About the DSK Driver Interface

The DSK driver interface remains a very viable interface that addresses the needs of many customers quite adequately. The *Host Adapter Device Driver Software Package* contains our latest DSK driver upgrades for all NetWare platforms.

About the HAM Driver Interface

The HAM driver interface is a new driver design choice available to support storage devices under certain versions of NetWare. The HAM driver interface is part of an extension to the NetWare Media Manager that provides broader support for various storage devices and third-party applications than the older DSK interface provides. For detailed information on the advantages of the NWPA/HAM modules, please contact Novell.

4•2

NetWare 4.11

You should read the information in this section if you are installing the NetWare 4.11 operating system for the first time or are updating the driver on an existing NetWare 4.11 server.

You need the following items to install the NetWare 4.11 operating system and to configure the device driver on a NetWare file server:

- Diskettes 1 and 2 of the *Software Drivers* package
- The Novell NetWare 386 system diskettes or CD-ROM
- The Mylex host adapter installation manuals
- The Novell NetWare 386 manuals
- The appropriate disk-drive and/or disk-subsystem manuals

> ***Note:*** *For the latest product information, review the README.TXT file on the Host Adapter Software Device Drivers diskette.*

This section explains how to:

- Install NetWare 4.11 using the *NetWare HAM Software Manager* provided in this release.
- Get started with the NetWare installation and copy the device drivers to the appropriate directory on your system.
- Load and configure the drivers.
- Run the INSTALL program

Installing NetWare 4.11 for the First Time

To install the NetWare 4.11 server software with this release of the device drivers, you must use the drivers on the *Software Drivers* diskettes instead of the drivers on the NetWare 4.11 CD-ROM.

> ***Note:*** *If you are installing NetWare 4.11 from a SCSI CD-ROM drive that is connected to a Mylex SCSI host adapter, you must load the DOS device driver (BTDOSM.SYS) with the* **/m** *parameter and load the CD-ROM device driver (BTCDROM.SYS). Do this by installing the DOS device drivers (on diskette number 1 of the* Software Drivers *package) and then using a text editor to edit the* `device=` *commands that load the two device drivers in the CONFIG.SYS file. For additional information on the DOS device drivers, see Chapter 1 of this manual.*

When you have modified the CONFIG.SYS file (if required), reboot the computer, and use the following procedure to start installing the NetWare operating system and to install the NetWare HAM drivers:

1. Start installing the NetWare operating system following the instructions in the NetWare 4.11 operating system installation guide.

2. When you are prompted to select an installation type, choose "Custom Installation of NetWare 4.11."

3. When the screen shown in Figure 4-1. is displayed, press **<F3>** to continue *without* selecting a driver from the NetWare CD-ROM:

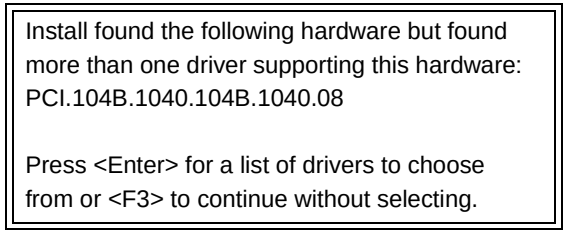


Figure 4-1. . NetWare Disk Driver Selection Message

Note that the hardware identification number in the message varies according to the system hardware configuration.

4. Continue the installation procedure until the screen shown in Figure 4-2. is displayed.

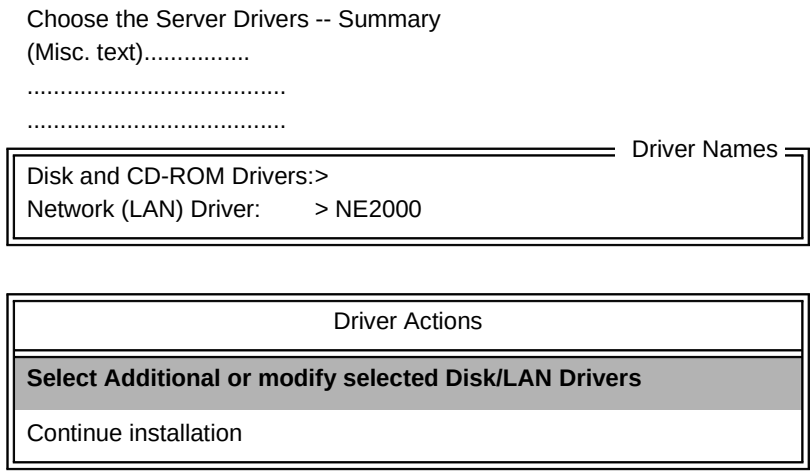


Figure 4-2. . NetWare Server Driver Selection Screen

5. Highlight "Select Additional or modify selected Disk/LAN Drivers," and press **<Enter>**.

6. Highlight "Disk and CD-ROM Drivers," and press **<Enter>**.

7. A screen that lists all of the disk drivers that are available on the NetWare CD-ROM is displayed. Press **<Ins>** to install a driver from a diskette.

8. Insert diskette number 2 of the *Software Drivers* package in the floppy drive (usually drive A).

9. Enter the path to the driver (on the diskette) that you want to install. For the standard HAM driver, enter:

   ```
   A:\netware\ham\standard
   ```

   For the HAM driver with GAM support, enter:

   ```
   A:\netware\ham\gam
   ```

10. One of the two Driver Selection screens shown in Figure 4-3. is displayed (the screen that is displayed corresponds to the type of HAM driver you chose in Step 9).

Select a Driver to Install	
BLMM2.HAM	MultiMaster non-PCI SCSI Adapter Ham Driver MultiMaster PCI SCSI Adapter Ham Driver

Select a Driver to Install	
BLMMGAM2.HAM	MultiMaster non-PCI SCSI Adapter Ham Driver w/GAM Support MultiMaster PCI SCSI Adapter Ham Driver w/GAM Support

Figure 4-3. . HAM and HAM/GAM Driver Selection Screens

> ***Note:*** *The* ***same driver*** *is listed twice in each of the Driver Selection screens — one listing is for the non-PCI version of the MultiMaster host adapter, and the second listing is for the PCI version.*

11. Move the highlight to the driver that matches the type of MultiMaster host adapter you have (PCI or non-PCI), and press **<Enter>**.

12. A configuration screen is displayed, as shown in Figure 4-4..

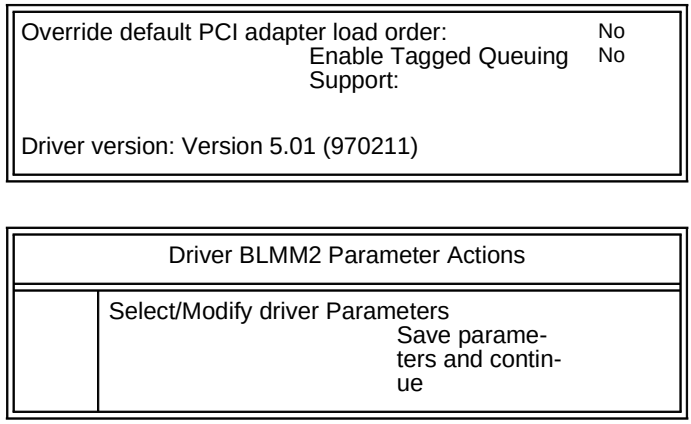


Figure 4-4. . Driver Configuration Screen

13. Move the highlight to "Select / Modify driver Parameters," and press **<Enter>**.

14. Move the highlight to the parameter(s) you want to adjust in the upper portion of the screen (for additional information on setting these parameters, press **<F1>**, and / or refer to Section 4•5).

15. When you finish configuring the driver, select "Save parameters and continue," and press **<Enter>**.

16. Continue to follow the instructions in the NetWare installation guide to complete the server installation.

Updating an Existing NetWare 4.11 Driver

To update an existing NetWare 4.11 driver to the HAM driver, deselect the current driver, select a new driver, check the STARTUP.NCF file, and shut down / restart the server. The following procedure shows how to do this:

1. With NetWare server 4.11 loaded and running a current driver, load the NetWare program INSTALL.NLM from the console prompt.

2. Choose "Driver Options" in the Installation Options menu.

3. Choose “Configure disk and storage device drivers.”
4. Choose “Deselect a selected driver” to display currently loaded drivers.
5. Choose the device driver you want to replace, such as BT4X.DSK (for a DSK driver) or BLGCMM01.HAM (for a HAM driver).
6. Since NetWare doesn’t normally allow you to unload a disk driver until all mounted volumes bound to the adapter are dismounted, the system console displays a warning message:

   ```
   Unload module anyway? n
   ```

   Enter **y** for yes in place of the “n,” and press **<Enter>** to dismount the volumes and unload the driver.
7. If ASPITRAN.DSK is included in the driver list, deselect it also.
8. Press **<Ins>** to install an unlisted driver.
9. Insert diskette number 2 of the *Software Drivers* package into the floppy drive (usually drive A).
10. Press **<F3>** to enter the path to the driver you want to install. For the standard HAM driver, the path is (the “Z” in the filenames shown below represents the version number of the driver being installed):

    A:\netware\ham\blmmZ.ham

    For the HAM driver with GAM support, the path is:

    A:\netware\ham\gam\blmmgamZ.ham
11. Follow the instructions provided on screen to load the driver, copy it to the appropriate directory on the hard disk, and configure the driver parameters (for additional information on setting these parameters, press **<F1>**, and/or refer to Section 4•5).
12. Press **<Esc>** repeatedly until the Installation Options menu is displayed, and select “NCF files options.” Review the contents of the STARTUP.NCF file to ensure that the correct drivers are specified, and make corrections if they are not.
13. Shut down and restart the server.

4•3

NetWare 4.10

You should read the information in this section if you are updating a NetWare 4.10 driver to the HAM driver.

You need the following items to update to the HAM driver and to configure the driver on a NetWare 4.10 file server:

- Diskette number 2 of the *Software Drivers* package
- The Novell NWPA (NetWare Peripheral Architecture) upgrade package (January 1997 or later)
- The Mylex host adapter installation manuals
- The Novell NetWare 386 manuals
- The appropriate disk-drive and/or disk-subsystem manuals

> ***Note:*** *For the latest product information, review the README.TXT file on the Host Adapter Software Device Drivers diskette.*

This section explains how to:

- Obtain and install the NWPA (NetWare Peripheral Architecture) Update package.
- Update the current disk driver(s) to the HAM driver.

Updating an Existing NetWare 4.10 Driver

To update an existing NetWare 4.10 driver to the HAM driver, you must first install the Novell NWPA (NetWare Peripheral Architecture) Update package, which is available on the Mylex Web site and on the Mylex BBS. For additional information on obtaining the NWPA Update package, see Appendix 4•B. When you have downloaded the update file (NPWA_UP.EXE), extract its contents to a diskette using the "-d" parameter (`nwpa_up -d`), and follow the instructions for updating NetWare 4.10 in the README.TXT file that is created on the NWPA update diskette.

Once the NWPA update is installed, you are ready to update the existing NetWare HAM driver. Use the following procedure to update and replace the currently installed BT4X.DSK driver:

1. At the console prompt, load the NetWare program INSTALL.NLM.
2. Choose Driver Options from the Installation Options menu.
3. Choose Configure disk and storage device drivers.
4. Choose Deselect a selected driver. The currently loaded drivers are displayed.
5. Choose the device driver you want to replace, such as BT4X.DSK.
6. Since NetWare doesn't normally allow you to unload a disk driver until all mounted volumes bound to the adapter are dismounted, the system console displays a warning message:

   ```
   Unload module anyway? n
   ```

   Enter **y** (for yes) in place of the "n," and press **<Enter>** to dismount the volumes and unload the driver.
7. Press **<Ins>** to install an unlisted driver.
8. Insert diskette number 2 of the *Software Drivers* package into the floppy drive (usually drive A).

9. Press **<F3>** to enter the path to the driver you want to install. For the standard HAM driver, the path is (the "**Z**" in the filenames shown below represents the version number of the driver being installed):

   A:\netware\ham\blmmZ.ham

   For the HAM driver with GAM support, the path is:

   A:\netware\ham\gam\blmmgamZ.ham

10. Follow the instructions provided on screen to load the driver, copy it to the appropriate directory on the hard disk, and configure the driver parameters.

11. Press **<Esc>** repeatedly until the Installation Options menu is displayed, and select NCF files options. Review the contents of the STARTUP.NCF file to ensure that the correct drivers are specified, and make corrections if they are not.

12. Shut down and restart the server.

4•4

Netware 3.12

You should read the information in this section if you are updating a NetWare 3.12 driver to the HAM driver.

You need the following items to update to the HAM driver and to configure the driver on a NetWare 3.12 file server:

- Diskette number 2 of the *Software Drivers* package
- The Novell NWPA Update Package (January 1997 or later)
- The Mylex host adapter installation manuals
- The Novell NetWare 386 manuals
- The appropriate disk-drive and / or disk-subsystem manuals

> ***Note:*** *For the latest product information, review the README.TXT file on the Host Adapter Software Device Drivers diskette.*

This section explains how to:

- Obtain and install the NWPA (NetWare Peripheral Architecture) Update package.
- Update the current disk driver(s) to the HAM driver.

Obtaining and Installing the NWPA Update Package

Before you can update a driver on an existing NetWare 3.12 server to the NetWare HAM Software Manager, you must first install the Novell NWPA (NetWare Peripheral Architecture) Update package, which is available on the Mylex Web site and on the Mylex BBS. For additional information on obtaining the NWPA Update package, see Appendix B. When you have downloaded the update file (NPWA_UP.EXE), extract its contents to a diskette using the "-d" parameter (`npwa_up -d`), and follow the instructions for installing the NWPA Update for NetWare 3.12 in the README.TXT file that is created on the NWPA update diskette.

Updating an Existing NetWare 3.12 Driver

Once the NWPA update is installed, you are ready to update the existing device driver. Use the following procedure to update and replace the currently installed BT31X.DSK driver:

1. Boot DOS, and change to the server bootup directory.

2. To install the standard HAM driver, enter the following command at the DOS prompt to copy the driver files from the NetWare Driver Diskette to the server bootup directory:

   ```
   copy a:\netware\ham\blmmZ.ham
   copy a:\netware\ham\blmmZ.ddi
   ```

3. To install the HAM driver with GAM support, enter the following commands at the DOS prompt to copy the driver files from the NetWare Driver Diskette to the server bootup directory:

   ```
   copy a:\netware\ham\gam\blmmgamZ.ham
   copy a:\netware\ham\gam\blmmgamZ.ddi
   copy a:\netware\ham\gam\budioctl.ham
   ```

4. Use a text editor to modify the STARTUP.NCF file to reflect the new driver. For example, replace:

   ```
   load bt31X.dsk parameters
   ```

   with

   ```
   load blmmZ.dsk parameter
   ```

   For information on specifying driver parameters, refer to Section 4•5 or the README file for the that driver.

5. Shut down and restart to run NetWare with the new driver.

4•5

Configuring the NetWare HAM Software Manager

When you have installed the appropriate drivers, as described in Sections 4•2, 4•3, and 4•4, you may need to configure them by using a text editor to change or specify the setting of a number of optional parameters. This section explains how to do this.

When you load the *NetWare HAM Software Manager* or the *NetWare HAM Software Manager* with GAM support, you may specify the following optional parameters:

Syntax:

```
load blmmZ [optional parameter]
```

where `blmmZ` is the *NetWare HAM Software Manager* filename ("`Z`" represents the internal version number) and *`[optional parameter]`* is one or more of the parameters described in this section. For example, in this release, you would type: `load blmm2 [optional parameter]`.

Parameters:

- `Enable_TQ`

  This parameter is used to enhance performance by allowing overlapped commands to a SCSI device. The Mylex SCSI host adapters provide support for this advanced SCSI-II feature. However, some SCSI devices do not.

  Note: *Both the host adapter and the SCSI device must support tagged queuing to take advantage of this feature.*

You can use this parameter to enable tagged queuing on a given Mylex host adapter. To do this, enter:

```
load blmm2 Enable_TQ
```

This affects only SCSI devices connected to this host adapter that support tagged queuing.

- `ShowSlots`

  If you have more than one Mylex PCI-compliant host adapter in the system, and you want to override the default auto-load ordering for these adapters, use this parameter to manually select from a list of available host adapters.

  Example:

  ```
  load blmm2 ShowSlots
  ```

- `Slot=`*`slot number`*

  If you want to load a MultiMaster PCI host adapter in a particular slot, you can specify that adapter with the Slot parameter (assuming you know which slot[s] contain the MultiMaster PCI adapter[s]).

  Example:

  ```
  load blmm2 Slot=10001
  ```

- Port=*`port number`*

  If you want to load a non-PCI MultiMaster host adapter (ISA, EISA, MCA, or VESA) that is configured at a particular I/O-port address, you can specify that adapter with the Port parameter (assuming you know the port address[es] assigned to the non-PCI MultiMaster host adapter[s]).

  Example:

  ```
  load blmm2 Port=330
  ```

If you are using a ISA host adapter, and there is more than 16 MB of RAM in the computer, you must use the following NetWare “set” command at the beginning of your STARTUP.NCF file:

```
Set Reserved Buffers Below 16 Meg=200
```

4•6

NetWare DSK Software Manager Overview

The *NetWare DSK Software Manager* is part of the *Software Drivers* package. It runs on IBM PC (or PC-compatible computers) and works with Novell NetWare 3.11, 3.12, and 4.X.

> ***Note:*** *For convenience, this manual uses the term NetWare 4.X to refer to NetWare versions 4.00, 4.01, 4.02 4.10, and 4.11, and NetWare 3.1X to refer to NetWare versions 3.11 and 3.12.*

The *NetWare DSK Software Manager* provides software drivers that support SCSI devices such as SCSI hard disk drives, SCSI tape drives, magneto-optical (MO) disk drives, scanners, and CD-ROMs. These drivers allow NetWare 386 applications to communicate with the SCSI host adapter and to access the SCSI devices connected to it.

When you install the *NetWare DSK Software Manager*, you will have support for:

- Multiple Mylex host adapters in a file server
- Up to fifteen SCSI devices (hard drives, etc.) per adapter
- Connectivity to SCSI tape drives, magneto optical (MO) disk drives, CD-ROM drives, and other devices
- Removable SCSI devices in a fault tolerant environment.

All NetWare System Fault Tolerant (SFT) features are also supported, such as mirroring and duplexing. These features provide valuable protection from hardware failures.

NetWare DSK Software Manager Components

Caution: *The NetWare DSK Software Manager is supplied on diskette 2 of the* Software Drivers *package. This diskette also includes software drivers for operating systems other than NetWare that are discussed in other parts of this manual. You need not concern yourself with files for other operating systems unless you have one of those operating systems.*

The *Software Drivers* package contains two sets of the *NetWare DSK Software Manager* software. support the following versions of Netware:

- The *NetWare 3.1X DSK Software Manager* (for NetWare 3.11 and 3.12) contains the NetWare DSK Driver (filename BT31X.DSK) and the *ASPI Support Manager* (filename ASPITRAN.DSK).
- The *NetWare 4.X DSK Software Manager* (for NetWare 4.00, 4.01, 4.02 4.10, and 4.11) contains the NetWare 4.X Disk Driver (filename BT4X.DSK) and the *ASPI Support Manager* (filename ASPITRAN.DSK).

Before Installing the Software

Before you begin to install the software, make sure that you have the appropriate software, hardware, and reference material, as described in the Preface. In addition, take a few minutes to review the README file for the driver you want to install. These files are on diskette number 2 of the *Software Drivers* package. This file contains additional information and may contain new information that was not available when this manual was printed.

If you are doing a first-time installation of the NetWare OS, refer to the information in the following section. If you are doing a driver update to an existing installation, refer to the information in “Updating Currently Installed NetWare DSK Drivers” on page 4-25.

First-Time NetWare OS Installation

NetWare 3.12 and 4.X have DSK drivers embedded in the NetWare operating system. The device drivers in the *NetWare DSK Software Manager* software package for NetWare 3.12 and 4.X are updates to these embedded drivers. In most cases, you will obtain satisfactory results with the embedded drivers.

If you plan to use the embedded version of the device drivers, follow the instructions that come with the NetWare operating system to complete the driver installation.

However, if you want to take full advantage of all of the latest device driver features and enhancements (such as full PCI compliance and Wide SCSI support), install the drivers included in your software driver kit, following the instructions in:

- Section 4•7 to install NetWare 3.11 and 3.12 with the latest device drivers
- Section 4•8 to install NetWare 4.X with the latest device drivers

Updating Currently Installed Netware DSK Drivers

If you are replacing the currently installed NetWare drivers in a running system with the latest device drivers, follow the installation instructions in Section 4•9. Once the drivers are installed, you must also update the STARTUP.NCF file to replace the existing device driver names with those of the newly installed drivers.

About the DSK Driver Interface

The DSK driver interface remains a very viable interface that addresses the needs of many customers quite adequately. The *Software Drivers* Package contains our latest DSK driver upgrades for all NetWare platforms.

4•7

First-Time Installation of Netware 3.11/3.12

You should read the information in this section if you are installing the NetWare 3.11/3.12 operating system for the first time.

You need the following items to install the NetWare 3.11/3.12 operating system and to configure the device driver on a NetWare file server:

- Diskette number 2 of the *Software Drivers* package
- The Novell NetWare 386 system diskettes and/or the NetWare OS CD
- The Mylex host adapter installation manuals
- The Novell NetWare 386 manuals
- The appropriate disk-drive and/or disk-subsystem manuals

> ***Note:*** *For the latest product information, review the README.TXT file on the* Software Drivers *diskette.*

This section explains how to:

- Install NetWare 3.11/3.12 using the *NetWare DSK Software Manager* provided in this release.
- Get started with the NetWare installation and copy the device drivers to the appropriate directory on your system.
- Load and configure the drivers.
- Run the INSTALL program

Getting Started

This section explains how to start installing the NetWare operating system, and copy the NetWare drivers to the appropriate directory. You should go through the following steps:

Loading and Configuring the Drivers

Note: *If you are installing from a CD-ROM, you must use the* `EXCLUDE_IDs` *parameter in your NetWare driver load command line. See Section 4•10 for a detailed description of this parameter. When you have finished NetWare installation, you can remove this parameter by editing its entry in the* STARTUP.NCF *file.*

1. If you have not already done so, set the `/m` switch for the DOS driver, BTDOSM.SYS. Do this by exiting the NetWare installation and editing the BTDOSM entry in CONFIG.SYS. See Chapter 1 of this manual for more information on the DOS driver.

2. Shut down and restart the system so the changes made in step one can take effect.

3. Start installing the NetWare operating system following the instructions in the NetWare operating system installation guide.

4. ***STOP*** when you reach the step where you are asked to execute SERVER.EXE to start the server software.

5. Copy the NetWare 3.11/3.12 driver, \NETWARE\DSK\NW31X\BT31X.DSK, from diskette number 2 of the *Software Drivers* package onto the DOS boot diskette or into the server boot directory (the DOS hard-disk directory) from which you expect to run SERVER.EXE. There are several ways of copying the driver, depending on the type of installation you're doing:

   - **During NetWare 3.11 installation**, copy BT31X.DSK to your NetWare server boot directory before invoking SERVER.EXE.
   - **During NetWare 3.12 installation from a floppy diskette**, exit the NetWare Install utility at the point where you are instructed to press **<Enter>** to execute SERVER.EXE (do not press **<Enter>**). Then, copy BT31X.DSK onto your NetWare server boot directory.
   - **During NetWare 3.12 installation from CD-ROM**, the NetWare Install utility automatically executes SERVER.EXE. When this occurs, type **DOWN <Enter>** and **EXIT <Enter>** at the console prompt. Then copy BT31X.DSK into your NetWare hard disk directory.

6. Once BT31X.DSK is copied into the appropriate directory, execute SERVER.EXE from that directory or floppy diskette and proceed with the remainder of NetWare installation.

Loading BT31X.DSK for Non-PCI Host Adapters

To load the BT31X.DSK driver onto the file server's hard disk for a non-PCI host adapter, and to set the I/O port address, use the following procedure.

1. If you are loading the driver from a hard disk, type:

   `load c:\<`*`NetWare server boot directory`*`>\bt31X.dsk`

   To load the driver from a diskette, insert the NetWare DOS boot diskette into drive A:, and type:

   `load a:\netware\dsk\nw31X\bt31X.dsk`

2. When BT31X.DSK is loaded, NetWare displays the following list of possible port addresses (the default port address is 330):

   ```
   Supported I/O port values are 330, 334, 230, 234, 130, 134
   I/O port: 330
   ```

3. By default address 330H is selected. Press **<Enter>** to select the default, or select another I/O port address for the installed Mylex host adapter board from the list provided. When you have made the selection, press **<Enter>**.

   Your I/O port address may be set by hardware jumper settings, or it may be configurable through software. The way it is set is dependent on the hardware, so refer to your hardware manual for further information.

4. Repeat Steps 1 through 3 for each additional host adapter board installed on the server.

Loading BT31X.DSK for PCI Host Adapters

To load the BT31X.DSK driver onto the file server's hard disk for a PCI host adapter, you need to include the PCI switch in the command line as described below.

1. If you are loading the driver from a hard disk, type:

   ```
   load c:\<NetWare server boot directory>\bt31X.dsk
   pci
   ```

   To load the driver from a diskette, insert the NetWare DOS boot diskette into drive A:, and type:

   ```
   load a:\netware\dsk\nw31X\bt31X.dsk
   ```

2. Repeat Step 1 for each additional host adapter board installed in the server.

Running the INSTALL Program

If you want to create a STARTUP.NCF file, you have to run the NetWare INSTALL program. Refer to the NetWare 386 manuals for instructions on how to use INSTALL.

The following procedure explains how to use INSTALL to create the STARTUP.NCF file.

1. At the NetWare prompt, type:

   ```
   load install
   ```

2. The NetWare 386 main installation menu is displayed:

   NetWare 386 Installation V*x.y* NetWare 386 Loadable Module

   Installation Options

   Disk Options
   Volume Options
   System Options
   Product Options
   Exit

   Use the arrow keys to highlight an option, then press <ENTER>.

3. Select System Options and press **<Enter>**.

4. The System Options Menu is displayed.

5. Select the Create STARTUP.NCF file option and press **<Enter>**.

6. A message similar to the following appears on the screen. The directory name reflects the name you have selected.

```
Path for STARTUP.NCF File
C:\<YourDirectoryName>\STARTUP.NCF
```

7. Enter your own directory name to establish the correct path, or simply press **<Enter>** to accept the default pathname displayed.

8. The system then displays the newly created configuration file, as shown in the following example.

```
File Server STARTUP.NCF File

Load BT31X port=330 int=B dma=5
```

9. If you have installed the PCI host adapter, be sure that the STARTUP.NCF entry includes the PCI command line parameter in the driver load line. Add the switch if it is missing, as shown in the following example:

```
File Server STARTUP.NCF File

Load BT31X PCI port=D000H int=B
```

10. When you have finished editing, press **<Esc>** to continue.

11. Save your changes when prompted.

12. Complete the installation of your NetWare 386 software as described in your NetWare 386 manuals. After you have installed the customized NetWare 386 operating system on the computer, and all the network hard disk drives have been initialized for the NetWare 386 operating system, reboot the computer as the NetWare file server. At this point, the file server is ready to service your network.

4•8

First-Time Installation of NetWare 4.X

You should read the information in this section if you are installing the NetWare 4.X operating system for the first time.

You need the following items to install the NetWare 4.X operating system and to complete device driver configuration on a NetWare file server:

- Diskette number 2 of the *Software Drivers* package
- Novell's NetWare 386 system diskettes
- Mylex host adapter installation manuals
- Novell's NetWare 386 manuals
- Disk-drive and disk-subsystem manuals

> ***Note:*** *For the latest product information, check the README.TXT file for the driver you want to install on diskette number 2 of the* Software Drivers *package.*

This section explains how to install the NetWare operating system and how to copy the device drivers to the appropriate directory on your system.

Installing the NetWare Operating System

This section explains how to start installing the NetWare operating system and how to copy the NetWare drivers to the appropriate directory. To do this, perform the following procedure:

1. Set the **/m** switch for the BTDOSM.SYS driver by editing the BTDOSM entry in CONFIG.SYS from DOS. See Chapter 1 of this manual for more information on this DOS driver.

2. Follow the instructions in your NetWare operating system installation guide to start NetWare installation.

3. When the disk driver Installation Options screen is displayed, select Install an unlisted driver <Ins>."

Load a disk driver	
. . BT4X.DSK .	. . (ISA/EISA/MCA/VESA/PCI) NetWare 4.X SCSI driver Load a disk driver not listed <ins> .

> ***Note:*** *The screen examples shown in this section are based on a NetWare 4.10 installation. Although NetWare 4.11 installations are basically the same, the installation screens in NetWare 4.11 may be slightly different than the NetWare 4.10 screens shown here.*

4. Insert diskette number 2 of the *Software Drivers* package into Drive A.

5. The system prompts you for the path for the drivers. Press **<F3>** to enter the correct path. The path shown below is then displayed on the screen. This indicates that the NetWare 4.X driver is in Drive A.

   ```
   a:\netware\dsk\nw4x
   ```

6. Press **<Enter>** to continue.

7. The system then lists the drivers found in the specified directory (`a:\netware\dsk\nw4X`) as shown in the following example:

Select a new disk driver to install	
BT4X.DSK	(ISA/EISA/MCA/VESA/PCI) NetWare 4.X SCSI driver

8. The system may ask whether you want to save previously installed drivers. Select Yes to save copies of the embedded versions of the device drivers.

9. The system displays the following screen to allow you to configure the BT4X driver:

Driver BT4X Parameters Version 1.XX (yy/mm/dd)
Install PCI-compliant Card: No
Port Value: 330
Enable Above 16 MB Memory Support: No
Enable Tagged Queuing Support: No
Maximum Requests Outstanding per Device: 1
SCSI targets to hide from NetWare:
15 SCSI Target (Wide) Device Support: No
Number of SCSI LUNs: 8
ASPI No-Rescan option: No

Refer to the Help information displayed at the lower portion of the screen to learn more about each driver configuration option. The settings shown in the above screen are default settings. You may need to make the following modifications:

- If you are installing a PCI host adapter,
  Enter Yes after Install PCI-Compliant Card:

  ```
  Install PCI-compliant Card: Yes
  ```

- If you are installing NetWare from a CD-ROM, you must remove it from NetWare's list of targets by entering its SCSI ID at the SCSI targets to hide from NetWare option:

  ```
  SCSI targets to hide from Netware: <Your SCSI ID>
  ```

  When you have completed the NetWare installation, you can remove the `Exclude_ID` parameter by using a text editor to change its entry in the STARTUP.NCF file.

10. When you have finished configuring drivers, press **<F10>** to proceed. The system displays.:

```
Loading BT4X driver.
Please wait.
```

11. When the drivers are loaded, the following confirmation is displayed:

```
Driver BT4X was successfully loaded.
```

12. Proceed with normal NetWare installation as described in your NetWare 386 manual. Note that a STARTUP.NCF file is automatically created during driver installation. This file contains each driver and its configuration switches. Use this file to make any configuration changes to the NetWare drivers.

4•9

Updating Existing DSK Drivers

If your system has previously installed, embedded drivers for NetWare 3.1X, or 4.X, and you want to upgrade to the DSK drivers in this release, follow the procedure described in this section. Upgrading to the device drivers allows you to take advantage of the latest features they provide, including full PCI compliance and wide SCSI support.

Installation Procedure

Use the following procedure to upgrade existing drivers.

1. Insert diskette number 2 of the *Software Drivers* package, into the floppy drive (usually drive A).

2. At the DOS prompt, manually copy the required files to the ServerBoot directory on drive C, as shown below:

   - For the NetWare 3.12 drivers, use the following command lines:

```
copy a:\netware\dsk\nw31X\bt31X.dsk c:\<your directory name>
copy a:\netware\dsk\nw31X\aspitran.dsk c:\<your directory name>
```

   - For the NetWare 4.X drivers, use the following command lines:

```
copy a:\netware\dsk\nw4X\bt4X.dsk c:\<your directory name>
copy a:\netware\dsk\nw4X\bt4X.ddi c:<your directory name>
copy a:\netware\dsk\nw4X\aspitran.dsk c:\<your directory name>
```

   Press **<Enter>** after each entry.

3. Once you have copied the required files, use a text editor to make the following changes to the STARTUP.NCF file:

   - If you have installed drivers for NetWare 3.1X, change:

     BT311.DSK to BT31X.DSK
     BT312.DSK to BT31X.DSK

   - If you have installed drivers for NetWare 4.X, change:

     BT40.DSK to BT4X.DSK

4. Reboot your server to load the new drivers.

4•10

Configuring the DSK Drivers

When you have installed the appropriate drivers, as described in Sections 4•7, 4•8, and 4•9, you may need to configure them by changing or specifying the setting one or more optional parameters. This section explains how to do this.

When you load the *NetWare DSK Software Manager*, you can specify the following optional parameters:

Syntax:

For NetWare 3.11 or 3.12: `load bt31X [optional parameter]`

For NetWare 4.X: `load bt4X [optional parameter]`

where `bt31X` or `bt4X` is the *NetWare DSK Software Manager* filename and [*optional parameter*] is one or more of the parameters described below:

Parameters:

- `Over16Meg`

  This switch is used to support one or more ISA host adapters in a system with more than 16 MB of memory. You must specify the `Over16Meg` option when you *first* load the *NetWare DSK Software Manager* using the following command:

  ```
  load bt31X Over16Meg
  ```

  You must specify this parameter only once, even if you have more than one ISA host adapter. If this parameter is specified on subsequent loads, it is ignored.

When you specify this parameter, you must add the following line to the STARTUP.NCF file to enlarge the pool of available buffers below 16 MB:

```
SET RESERVED BUFFERS BELOW 16 MEG=200
```

Use a text editor to edit the STARTUP.NCF file.

- `Exclude_IDs=`*`SCSI target ID, SCSI target ID`*

  When you set this parameter, the disks or CD-ROM SCSI devices identified by the *SCSI target ID* are not reported to NetWare when they are found by the device driver.

  In most cases, to install NetWare 3.12 and 4.X from CD-ROM successfully, you must do the following:

  1. Specify this driver parameter for the CD-ROM drive from which you are installing the software. When you complete the installation, you can modify your NetWare STARTUP.NCF file to remove this parameter for this device if you wish to use it under NetWare 4.0X in conjunction with Novell's CDROM.NLM module.

  2. Use the **/m** switch with the DOS Manager (BTDOSM.SYS) in your DOS CONFIG.SYS file.

  Excluded devices can be reserved for ASPI NetWare applications, such as disk-array software, that need to present several SCSI devices as a single, logical device to the operating system or for third-party software that controls CD-ROM devices through an ASPI interface.

  To indicate which devices are to be hidden on the host adapter, enter one or more SCSI target IDs separated by commas. For example, to hide SCSI target 1 and target 2 from the NetWare operating system enter:

  ```
  load bt31X Exclude_IDs=1,2
  ```

- `Enable_TQ`

  This parameter is used to enhance performance by allowing overlapping commands to be sent to a SCSI device. The DSK host adapters provide support for this advanced SCSI-II feature. However, many SCSI devices do not.

  Note: *Both the host adapter and the SCSI device must support tagged queuing to take advantage of this feature.*

  You can use this parameter to enable tagged queuing on a specific Mylex host adapter. To do this, enter:

  ```
  load bt31X Enable_TQ
  ```

  This affects only the SCSI devices that support tagged queuing and are connected to the specified host adapter. The maximum number of tagged requests outstanding is specified by the `MaxActive` switch, as described below.

- `MaxActive`*=maximum number of outstanding tagged requests*

  This parameter is provided for backward compatibility, and Mylex recommends that you use the AutoMax parameter instead (see AutoMax on page 4-42). The MaxActive parameter allows you to specify the maximum number of outstanding requests allowed per device at any time. You can modify this parameter to tune the driver for maximum performance based on your specific configuration. For example:

  ```
  load bt4X MaxActive=2
  ```

  Modifying this parameter allows you to tune the driver for maximum performance based on your specific configuration. Valid values are `1` through `60`. If this option is not specified, the default value is `1`.

  If this option is specified in conjunction with the `Enable_TQ` switch, it actually controls the maximum number of tagged-queue requests outstanding. For example, to specify four tagged queue requests, enter:

  ```
  load bt31X Enable_TQ MaxActive=4
  ```

If the MaxActive parameter is specified without specifying the Enable_TQ parameter, the MaxActive parameter actually controls the maximum number of non-tagged requests outstanding (queued at the host adapter rather than at the device level). For some disk-array applications, assigning larger values to MaxActive may result in optimal performance.

If this parameter is not used, the driver uses either the default value of 1 (in many cases, best performance may be achieved by using the default) or a built-in algorithm that adjusts itself and optimizes performance.

Note: MaxActive *and* AutoMax *are mutually exclusive.*

- AutoMax=auto-adjusted maximum # of outstanding requests

  This parameter allows you to modify the upward boundary of the range used by the built-in, auto-adjusting, queue-depth algorithm used to optimize performance. AutoMax and MaxActive are mutually exclusive, and if MaxActive is specified on the command line, it overrides the AutoMax parameter. Unless you have a problem with backward compatibility, you should use the more flexible AutoMax parameter. The following is an example of an AutoMax setting:

  ```
  load bt4X AutoMax=48
  ```

- LongTimeout

  This parameter is used to increase the amount of time the driver's watchdog timer routine waits before attempting to abort an unfinished CCB.

  If this option is not specified, the default timeout is 10 seconds. If this option is specified, the timeout value is increased to 60 seconds. To do this, enter:

  ```
  load bt31X LongTimeout
  ```

Note: *Only hardware applications that anticipate long periods of time during which a device may remain busy will benefit from this parameter. Generally, this option should not be specified.*

- `No_Rescan`

  This parameter should be used in conjunction with ASPI applications only when the ASPI software / supplier specifically recommends it.

- `Verbose`

  This parameter enables more detailed information about specific driver-configuration options to be displayed.

- `Wide`

  This parameter enables support for up to 15 SCSI targets, provided the specified host adapter also provides this level of support. If it does not, this parameter is ignored, and up to eight targets are supported.

- `NumLuns=`*`number of LUNs`*

  This parameter specifies the number of Logical Units (LUNs) the host adapter scans (tries to detect). If this parameter is not specified, the default is 1. The valid range is from 1 to 64. If the host adapter has only embedded SCSI targets attached (that is, all attached devices are at LUN 0), you should set the value of this parameter to 1 to turn off LUN support for LUNs other than LUN 0.

  Example 1:

  ```
  load bt4X NumLuns=1
  ```

  This command line limits support to LUN 0 on each SCSI target.

  Example 2:

  ```
  load bt4X WIDE NumLuns=64
  ```

  This command line enables support for 16 targets with 64 LUNs-per-target.

- `PCI`

  This parameter enables PCI-compliant host adapters that have not yet been registered with NetWare to be detected automatically and to be registered with NetWare. If you attempt to register a PCI-compliant host adapter in a legacy address range (330, 334, etc.), you are prompted to reload the driver using the PCI parameter.

  Example:

  ```
  load bt4X PCI
  ```

- `ShowPorts`

  If you have multiple PCI-compliant host adapters in a system, and you want to override the default auto-load ordering for these adapters, use this parameter to manually select from a list of available host adapters.

  Example:

  ```
  load bt4X PCI ShowPorts
  ```

4•A

Mylex Global Array Manager (GAM)

Mylex Global Array Manager (GAM) is a popular client/server application that is used to configure, monitor, and manage disk array subsystems that are connected to a Mylex Disk Array Controllers (DAC). The *NetWare HAM Software Manager* includes a special version of the NetWare HAM driver (BLMMGAMZ.HAM) that provides built-in support for GAM version 2.10 or above on NetWare servers.

> ***Note:*** *The "*`Z`*" in the driver filename represents the internal version number of the driver. To determine the actual filename, review the README file on the* Software Drivers *NetWare diskette, or view a directory listing of the diskette. During installation, you must always use the actual driver filename.*

Both the standard Netware HAM driver (BLMMZ.HAM) and the GAM version of the HAM driver (BLMMGAMZ.HAM) are fully compliant with Novell's HAM driver specification. The GAM version of the driver differs only in that it contains additional support specific to GAM 2.10 or above.

To install the GAM version of the HAM driver, substitute the file name BLMMGAMZ.HAM for BLMMZ.HAM throughout the installation procedures described in Sections 4•1 through 4•5 (use the actual filename, not the name containing the "`Z`"). It is important that you substitute BLMMGAMZ.HAM for every occurrence of BLMMZ in the installation procedures.

During installation, another file BUDIOCTL.NLM is copied to your server's hard disk. This is part of the normal installation procedure for the GAM version of the HAM driver. The GAM version of the HAM driver is located in the \NETWARE\HAM\GAM directory on diskette number 2 of the *Software Drivers* package. When you are installing the GAM driver, enter `a:\netware\ham\gam` whenever you are asked to supply the driver path.

4•B

NWPA Update Package and Novell-Provided OS Patches/File Updates

Novell NWPA Update Package

NetWare Peripheral Architecture (NWPA) updates are available for download from the Mylex Web site. To locate these updates, do the following:

- Use your browser to connect to the Mylex Web server at:

  http://www.mylex.com

- Select Tech Support.
- Select Mylex FTP server.
- Select Other, and then select the file called NWPA_UP.EXE. This file is a self-extracting archive that contains the NWPA update.

You can also obtain the NWPA update file (NWPA_UP.EXE) from the Mylex BBS, which can be reached at 510-793-3491.

When you have downloaded the self-extracting NWPA Update file (NWPA_UP.EXE), label a formatted blank diskette "NWPA Update Package," and extract the files onto this diskette using the "-d" parameter. For example, if the NWPA_UP.EXE file is located on C:\, type the following commands:

```
cd a:\
c:\nwpa_up -d
```

The -d parameter is necessary, because it causes the correct directory structure to be created on the diskette to receive the files. If you fail to use the "-d" option, the NWPA Update diskette will not function properly.

Follow the instructions in the README.TXT file on the NWPA Update Package diskette to install the NWPA Update onto your NetWare 3.12 or NetWare 4.10 server.

Novell OS Patches and File Updates

Novell NetWare Operating System patches are available for download from Novell's technical-support Web site. The latest OS, NLM, and Utility updates are listed in a file called PATLST.TXT. The current NetWare OS patch files (as of January 1997) are called 312PTA.EXE (for NetWare 3.12) and 410PT6.EXE (for NetWare 4.10). The following access information is excerpted from the Novell PATLST.TXT file:

- To obtain PATLST.TXT, which includes file-download links, via the Web, use your browser to connect to:

  http://support.novell.com/search/patlst.htm

- To search for files on the web, connect to:

  http://support.novell.com/search/

- To search for files on CompuServe, GO NOVFF, and select "Access File Finder."
- To use the Novell CompuServe forums, GO NETWARE, select "File Updates," and select the appropriate forum areas.
- To download files using an FTP client, connect to:

  ftp.novell.com/pub/updates

Chapter 5

OS/2 DEVICE DRIVER

Chapter 5: Contents

Preface

5•0

Preface

The MultiMaster SCSI Adapter Driver, BTSCSI.ADD, is on diskette number 2 of the *Software Drivers* package. It runs under IBM OS/2 versions 2.1 and 2.11 and OS/2 WARP versions 3.0 and 4.0 and allows the OS/2 operating system to communicate with SCSI host adapters and attached peripherals.

Chapter 5 of this manual describes how to install the OS/2 version 2.1x and WARP drivers on platforms running OS/2 applications.

Chapter 5 consists of three sections:

- **Section 5•1**, "Installing the Driver," explains how to install the software during a new OS/2 installation, and how to install it on systems that already have OS/2 installed. It also explains the differences in installation procedures between floppy diskette and CD-ROM.
- **Section 5•2**, "Configuring the Device Driver," explains how to set various global and host-adapter-specific optional switches in the drivers.
- **Section 5•3**, "Troubleshooting," provides supplementary information to help you deal with problems that may arise during installation or when you boot the system.

Recommended Reference Material

The following additional reference material is useful when you are installing and using the software.

- Mylex documentation for the SCSI host adapter board
- The OS/2 installation and user's guide
- The installation guide and technical reference manual for your computer
- Documentation for the system's peripherals (if applicable)

Software Requirements

To install the OS/2 Device Driver, you require the following software:

- Diskette number 2 of the *Host Adapter Device Driver Software*.
- IBM's OS/2 version 2.1X or OS/2 version 3.0 or 4.0 (WARP) operating system.

Hardware Requirements

You need the following basic hardware: an IBM PC, or a 100% PC-compatible computer, with a 286, 386, 486, Pentium, or Pentium Pro processor, or with a 286-class, 386-class, 486-class, Pentium-class, or Pentium Pro-class processor.

CD-ROMs and Host Adapters Supported

For information about the CD-ROMs and host adapters supported by this software, refer to the "Introduction" at the front of this manual.

5•1

Installing the Driver

This section describes how to install the MultiMaster SCSI Adapter Driver, BTSCSI.ADD, under the following conditions:

- First-time installation of the driver
- Upgrade installation
- Installation where the IDE is the primary adapter
- Installing third-party ASPI drivers

> ***Note:*** *Before starting installation, check the README file included on the driver diskette for current device driver updates.*

First-Time Installation

The BTSCSI.ADD driver is embedded in OS/2 version 2.1X and 3.0/4.0 (WARP). If you want to upgrade to the new BTSCSI.ADD driver, follow the procedure described in "Upgrade Installation" on page 3.

However, the embedded driver may be incompatible with certain PCI motherboards and may prevent the installation of OS/2. This section describes how to replace the embedded driver with the latest device driver.

Caution: *Because OS/2 version 2.1X does not have built-in support for PCI in OS2LDR, make sure the ISA-compatible port is set for Primary or Alternate. You can check or change the setting using AutoSCSI.*

The purpose of the installation is to replace the BTSCSI.ADD file on the new OS/2 diskette with the \OS2\WARP\BTSCSI.ADD file from diskette number 2 of the *Software Drivers* package. The driver can also be used with OS/2 version 2.1X.

1. Make a copy of Diskette 1 of the OS/2 WARP (3.0 or 4.0) Installation diskettes.

2. On the copy of Diskette 1, replace the BTSCSI.ADD file with the Mylex file, \OS2\WARP\BTSCSI.ADD, from diskette number 2 of the *Software Drivers* package.

3. You will now install the complete OS/2 operating system either from CD-ROM or from floppy diskette. You should refer to the OS/2 installation manual for supplementary information. When all the packages have been extracted from the CD-ROM or floppy diskette, you will be prompted to reboot from the hard disk. At this point insert the OS/2 WARP Installation diskette, and boot the system using this diskette. When prompted insert the copy of Diskette 1 into the floppy drive.

4. Press **<F3>** or **<Esc>** to go to the command prompt. Then insert diskette number 2 of the *Host Adapter Device Drivers Software*, and copy \OS2\WARP\BTSCSI.ADD from the diskette to the root directory of drive C.

5. Remove the *Software Drivers* diskette from the drive and reboot the system.

Upgrade Installation

If you have installed MultiMaster host bus adapters after the OS/2 operating system was installed, you will need to install the OS/2 driver, BTSCSI.ADD, that is part of the *Software Drivers* package. In addition, you can install the update package if you want to take advantage of the new features provided by this latest version of the software.

To install the upgrade, use the following procedure.

1. Insert diskette number 2 of the *Software Drivers* package in the floppy drive.

   Note: *As with all software installations, you should back up the original diskette and do the installation from the backup diskette.*

2. Boot up your system, and when the main OS/2 screen appears, click twice on the OS/2 System icon.

3. This opens the OS/2 System Folder. In this folder, click twice on the System Setup icon.

4. When the System Setup Folder opens, click twice on the Device Driver Install icon.

5. This opens the OS/2 Device Driver Install screen. Click on Change in the Source directory.

6. From this directory, select the following in the order shown:

   – On OS/2 WARP, the OS/2 and WARP directories.
   – On OS/2 version 2.1X, the OS/2 and 2.1X directories.

7. Click on the Install button.

8. Select the MultiMaster driver and click on OK. OS/2 now automatically updates the CONFIG.SYS file for the new driver.

9. Eject the *Software Drivers* diskette from the floppy drive.

10. Reboot the system.

Installing with an IDE Primary Boot Drive

There are some special installation requirements if you are booting from an IDE drive. In addition, the installation differs, depending upon whether the installation medium is a floppy diskette or a CD-ROM.

Installing from Floppy Diskette

If you are installing the OS/2 driver from a floppy diskette, use the following procedure:

1. Install OS/2 using the embedded INT 13 driver. Refer to the documentation provided with OS/2 for further information on this subject.
2. When this part of the installation is complete, proceed with installation as described in "Upgrade Installation," beginning on page 3.

Installing from CD-ROM

If you are installing the OS/2 driver from a CD-ROM, use the following procedure:

1. Follow the procedure described in "First-Time Installation," beginning on page 1, until the System Configuration screen is displayed.
2. Continue with the installation as described in "Upgrade Installation," beginning on page 3.
3. Reboot the system using **<Ctrl>**+**<Alt>**+**<Del>,** without closing the System Configuration window.
4. When you reboot, you are prompted with the System Configuration window. This time, the MultiMaster driver appears in the SCSI Adapter Support list box.
5. Proceed with the installation as instructed in the screens displayed by the software.

Third Party ASPI Drivers

To use a third-party ASPI driver, such as Corel SCSI, on a particular SCSI ID, you must disable the OS/2 DASD and SCSI managers. You do this by modifying the BASEDEV line in CONFIG.SYS, as shown below:

```
basedev=btscsi.add /!dm:3 /!sm:3
```

This example shows how to disable the DASD and SCSI managers for SCSI ID 3.

5•2

Configuring the Device Driver

The MultiMaster OS/2 Adapter Device Driver supports a number of command line parameters. There are two types: global, and per-host adapter. Global parameters must be specified before per-host adapter parameters.

Global Parameters

When you set any one of the following parameters, the value(s) set apply globally to all host bus adapters attached to your system.

/v This parameter enables driver verbosity (long menu) at initialization.

/qu This parameter suppresses warnings or errors messages that reference nonexistent targets or LUNs specified on the ADD driver command line.

/o This parameter provides a work-around for an early version of the Opti PCI chip set, which *can* generate spurious interrupts. Do not use this parameter unless your system hangs at boot-time and you are using an Opti chip set.

Per-Host Adapter Parameters

When you set any one of the following parameters, the value applies only to the host bus adapter specified by the adapter identification parameter, **/a.**

/a:x This is an adapter identification parameter. The value x is between 0 and 3 and identifies the adapter being referenced. You must set this parameter before you set any of the following parameters. In the descriptions of the following parameters, the term 'this unit' is used to describe the host bus adapter specified by the **/a** parameter.

/<!>dm:xx

This is the DASD Manager support parameter. Defined by IBM, it is used to enable / disable support for this unit by the IBM-supplied DASD Manager (OS2DASD.DMD).

/<!>SM:xx

As defined by IBM, the SCSI Manager Support parameter enables or disables support for this unit by the IBM-supplied SCSI Manager (OS2SCSI.DMD).

/<!>bon:xx , and **/<!>boff:xx**

These are the bus on and bus off parameters. The value xx is between 2 and 15, and specifies, in microseconds, the required bus on and bus off times.

/tq This parameter supports tagged queuing for all targets on the host adapter specified by the **/a:** parameter, provided that the targets can support tagged queuing. This is an advanced SCSI-II feature that allows overlapped commands to a SCSI device, resulting in enhanced bus performance. While Mylex provides support for this important SCSI-2 feature, not all SCSI devices support tagged queuing.

The OS/2 driver by default has tagged queuing disabled for all devices.

Example 1:

```
basedev = btscsi.add /a:0 /tq
```

This example enables tagged queuing on host adapter 0 on all targets that support it. Targets attached to host adapter 0 that do not support tagged queuing are not affected.

Example 2:

You may specify more than one host adapter in the command line. As shown below:

```
basedev = btscsi.add /a:0 /tq /a:1 /tq
```

This example shows tagged queuing enabled on all targets on host adapters 0 and 1 that support tagged queuing.

For devices that support tagged queuing, the following command line parameters are provided to manage tagged queuing support on a finer device-specific level.

/tq: x,y,z,...

Enables tagged queuing support on a specified list of SCSI targets. The list **x**, **y**, and **z** represents embedded SCSI targets, with commas separating each target listed. The Logical Unit Number (LUN) is presumed to be 0.

Example:

```
basedev = btscsi.add /a:0 /tq:0,2,3 /a:2 /tq: 0,1
```

This example enables tagged queuing on the specified targets on host adapters 0 (targets 0, 2 and 3) and 2 (targets 0 and 1) that support it.

/tq: (a,b), (c,d), ...

Enables tagged queuing support on a specified list of pairs for SCSI targets/LUNs (0,0), (2,1).

Example 1:

```
basedev = btscsi.add /a:0 /tq: (0,0),(2,1)
```

This example enables tagged queuing on the specified pairs of targets on host adapter 0, specifically, target 0, LUN 0 and target 2, LUN 1. If any of the target/LUN combinations are not attached or do not support tagged queuing, those devices are ignored.

Example 2:

```
basedev = btscsi.add /a:0 /tq
```

This example enables tagged queuing on host adapter 0, for all targets that support it. If any of the target/LUN combinations are not attached or do not support tagged queuing, those devices are ignored.

Example 3:

```
basedev = btscsi.add /a:0 /tq /a:1 /tq
```

This example enables tagged queuing on the specified pairs of targets on host adapters 0 and 1, where the targets support it. If any of the target/LUN combinations are not attached or do not support tagged queuing, those devices are ignored.

Example 4:

```
basedev = btscsi.add /a:0 /tq: 0,2,3 /a:2 /tq:0,1
```

This example enables tagged queuing on targets 0, 2, and 3, on host adapter 0, and on targets 0 and 1 on host adapter 2. If any of the target/LUN combinations are not attached or do not support tagged queuing, those devices are ignored.

/luns:xx

This parameter specifies the maximum number of logical units (LUNs) the host adapter will support (try to detect). If the parameter is not specified, the default is 8. The valid range is from 1 to 64. If the adapter has only embedded SCSI targets attached (i.e., all attached devices are at LUN 0), you should set this parameter to 1 to turn off LUN support for LUNs other than 0.

Example 1:

```
basedev = btscsi.add /a:0 /luns:1
```

This example disables LUN support on host adapter 0.

Example 2:

```
basedev = btscsi.add /a:0 /luns:4
```

This example scans up to four LUNs on host adapter 0.

/to:xx

This parameter specifies the command timeout value in seconds for each I/O request. It takes a decimal digit input between 1 and 99. A value of 0 turns off command timeout handling. The driver default is 15 seconds when this parameter is not used. Setting the value to 0 turns off the timeout mechanism. This parameter has no effect on tape requests.

Example:

```
basedev = btscsi.add /a:0 /to:10
```

This example causes the driver to wait 10 seconds before timing out an outstanding request.

/mr:xx

This parameter sets the maximum number of active requests that can be pending on each device on the host adapter. The valid range is 1 to 64. The default is 8. Adjusting this value may possibly increase performance in your environment.

/ma:xx

This parameter specifies the maximum number of active requests that can be outstanding on each device on the adapter. The valid range is 1 through *Max Request*, which is number set by the **/mr** parameter. The default is 8. You can adjust this value to increase performance.

5•3

Troubleshooting

This section provides troubleshooting information that may be useful to you during installation or when you are booting the system.

During Installation

During installation, if OS/2 attempts to write to the hard disk and reports that no hard disk(s) is present, it may indicate one of the following problems:

- The SCSI drive is not connected properly.
- No power is being supplied to the drive.
- The floppy diskette drive that is reading the installation diskettes may not be configured properly.

To deal with these types of problems:

1. Make sure that the cables to the SCSI drive are installed properly, and that power is being supplied to the drive.

2. Check the system configuration in the BIOS for the floppy diskette drive:

   – Make sure that drive letters are assigned properly.
   – Make sure the capacity of the installed floppy drive is entered properly. For example, problems will occur if a 3.5" 1.44 MB floppy diskette drive has been configured as a 1.2" MB floppy diskette drive.

During Booting

If OS/2 reports that the file COUNTRY.SYS was not found while booting from a SCSI hard disk drive, ensure that the BTSCSI.ADD device driver is specified in the CONFIG.SYS file and that the driver is located in either the root directory or in C:\OS2\BOOT.

Chapter 6

SCO UNIX BOOT-TIME LOADABLE DRIVER (BTLD)

Chapter 6: Contents

Preface

6•0

Preface

Chapter 6 describes how to install the SCO UNIX Boot-Time Loadable Driver (BTLD) to support the MultiMaster family of SCSI host adapters.

Chapter 6 consists of three sections:

- **Section 6•1**, "Overview," introduces the SCO UNIX Boot-Time Loadable Driver and defines its features.
- **Section 6•2**, "Driver Installation," takes you step by step through several types of installation.
- **Section 6•3**, "Feature Notes," provides supplementary information on enhancement features, and also gives some installation tips.

Recommended Reference Material

The following additional reference material is useful when you are installing and using the software.

- The Mylex manual for the SCSI host adapter board
- The SCO UNIX operating system installation guide
- The SCO UNIX software user's guide
- The installation guide and reference manuals for your computer
- The installation guide for any third-party peripheral devices such as CD-ROMs or tape drives.

Software Requirements

To install the MultiMaster BTLD on your system, you need one of the following software packages:

- Diskette number 3 of the *Software Drivers* package
- Open Desktop 2.0
- Open Desktop 3.0
- OpenServer Release 5.0

> ***Note:*** *The device driver for releases of SCO Unix prior to OpenServer 5.0 is not included in this software package. It can, however, be downloaded from the Mylex Web site and BBS. For additional information on accessing these sites, see Appendix B.*

Hardware Requirements

You need the following hardware: an IBM PC or a PC-compatible computer with a 386, 486, Pentium, or Pentium Pro processor, or with a 386-class, 486-class, Pentium-class, or Pentium Pro-class processor.

CD-ROMs and Host Adapters Supported

For information about the CD-ROMs and host adapters supported by this software, refer to the Introduction near the front of this manual.

6•1

Overview

The MultiMaster Boot-Time Loadable Driver (BTLD) (filename: blc) allows the SCO UNIX ™ operating system to communicate with the SCSI host adapter(s), and attached peripherals, as shown in Figure 6-1.

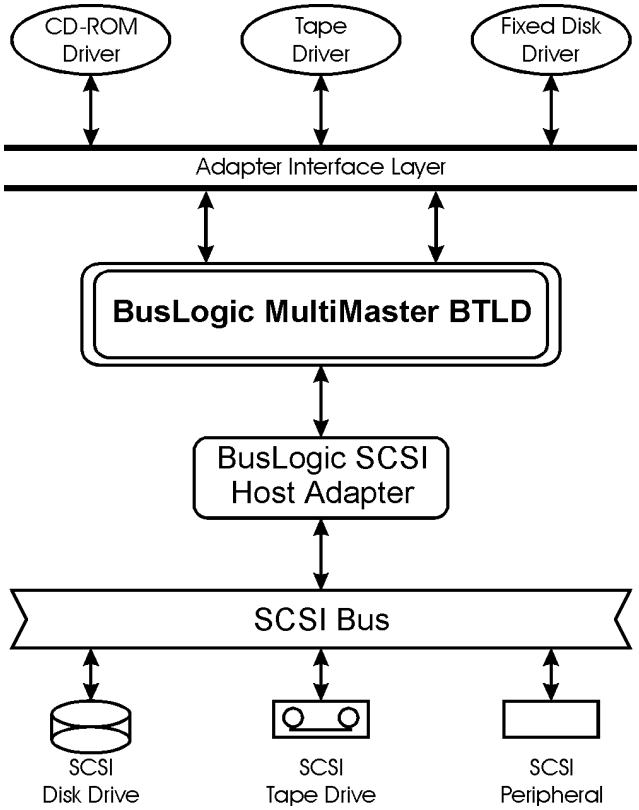


Figure 6-1. Role of the MultiMaster BTLD

Features

The MultiMaster BTLD has the following features:

- Plug & Play PCI configuration
- Supports the SCO MPX multiprocessing option
- SCSI bus reset handling
- I/O port address selectability at installation time
- Tag Queuing option
- Command timeout handling
- Extended device support for BT-75xC and BT-95xC wide SCSI host adapters

See the “Feature Notes” section on page 6-15 for further information.

6•2

Driver Installation

This section describes how to install the MultiMaster Boot-Time Loadable Driver (BTLD). Instructions are include for the following types of installations:

- First-time installation of the driver
- Upgrade installation
- Adding a second host adapter where the primary adapter is a Mylex host adapter
- Adding a second host adapter where the primary adapter is an IDE or other non-Mylex host adapter

Before Starting Installation

Mylex suggests that you back up all of the diskettes in the *Software Drivers* package and the SCO Unix operating system installation software before you begin installation, and use only the backup diskettes throughout the installation.

First-Time Installation

The installation procedure allows you to load the MultiMaster Boot-Time Loadable Driver (BTLD) dynamically during an SCO Unix 3.2.4.X or OpenServer 5 installation and to configure the driver permanently into your kernel. The procedure below describes the installation with OpenServer release 5.0.0. Your installation may be slightly different.

1. If you are installing a non-PCI Mylex host adapter, configure the adapter for any nonconflicting I/O port address, IRQ, and DMA setting. This version of the device driver installation allows you to specify the I/O port address mapping during installation. Refer to the Mylex host adapter user's guide for instructions.

2. Boot the system with the SCO Unix Boot Diskette.

3. At the boot prompt (`Boot:`), type **link**, then press **<Enter>**.

4. When the system prompts for the package name, enter **blc** at the prompt, then press **<Enter>**.

```
What packages do you need linked in the system,
or q to quit?: blc
```

5. You are then prompted to insert the SCO UNIX BTLD diskette:

```
Please insert the fd(60) blc volume and press
<Enter>, or "q" to quit:
```

   Insert diskette number 3 of the *Software Drivers* package, and press **<Enter>**. The screen displays a series of status messages while loading

the driver, as shown below:

```
blc.blc: Loading module fd(60) /blc/driver/blc/
Driver.o.text
......
blc.blc: Loading module fd(60) /blc/driver/blc/
Driver.o.data
...
blc.blc: Loading module fd(60) /blc/driver/blc/
Space.o.data
.
blc: Driver 'blc' successfully loaded.
    Character major = 6
```

6. Follow the installation instructions in subsequent screens until you are requested to reinsert the BTLD diskette, as shown below:

```
The BTLD package will now be extracted.

Please insert the floppy for BTLD package: blc
and press <ENTER>.
```

Insert the diskette and press **<Enter>**.

7. The screen displays the following message:

```
Extracting BTLD distribution for blc... Done.
```

8. After the SCO UNIX files have been read from the installation media (tape or CD-ROM), the procedure that statistically links the device driver to the kernel starts. You are then presented with a list of the packages on the BTLD diskette:

```
The following packages are on this disk:

NAME    DESCRIPTION
blc     BusLogic SCSI Host Adapter driver for SCO UNIX
flashpt BusLogic FlashPoint SCSI HBA driver for SCO UNIX

Please enter the names of the packages do you
wish to install, or q to quit:

[default: blc]: blc
```

   Type **blc** and press **<Enter>**.

9. You are then asked to select whether you want to replace the 'auto' entries in **mscsi** with **blc**.

```
Would you like to replace the 'auto' entries
in mscsi with BusLogic driver 'blc'? (y/n):
```

   Type **y**, and press **<Enter>**.

10. At the next prompt, you are asked whether you are using a PCI host adapter:

```
Are you installing on a PCI-compliant host adapter?
(y/n):
```

   If you are using a PCI host adapter, such as a BT-946C, BT-956C, BT-948, or BT-958, Mylex recommends that you type **y** and press **<Enter>**. If you are not using a PCI host adapter, type **n**.

11. You are prompted to select the I/O port address you want to use from the list shown below:

```
The BusLogic SCSI host adapter can be set for
the following I/O port addresses:

  1. 0x330 (default)   5.  0x130
  2. 0x334             6.  0x134
  3. 0x230
  4. 0x234

Please select (1-6) or press <Enter> for default:
```

Type the number shown for the I/O port address you wan to use, and press **<Enter>**.

12. The next screen allows you to enable Tag Queuing support. If you enable this option, tag commands are sent to hard disks supporting Tag Queuing.

```
Tag Queuing allows hard disks to queue and sort
multiple I/O requests from the BusLogic host adapter,
possibly resulting in enhanced performance.

Some hard disks, however, do not thoroughly support
Tag Queuing and may have problems if this option is
enabled.

If you decide not to turn on Tag Queuing now, you can
do so later by setting 'blc_do_tag = 1' in

        /etc/conf/pack.d/blc/space.c

Do you want to enable Tag Queuing now? (y/n):
```

13. For an OpenServer 5 installation, skip this Step. For other installations, the driver contains support for Mylex Wide SCSI host adapters, which allow access to up to 15 target IDs (taken from 0-15) and 64 LUNs (0-63). Two `mkdev` scripts must be modified to bypass the current 0-7

limitations for both IDs and LUNs. The next prompt allows you to automatically make the necessary changes to these shell scripts if you are using the Wide SCSI adapters and want to take advantage of the extended device support.

```
BusLogic BT-75xC and BT-95xC Wide SCSI Host Adapters
are capable of supporting up to 15 devices with up to
64 LUNs. To support the extended devices, the
following files need to be modified:

   /usr/lib/mkdev/hd
   /usr/lib/mkdev/.scsi

The original files will be backed up in the following
directory:

   /usr/lib/mkdev/Orig

If you have a BT-75xC or BT-95xC and wish to provide
support for extended devices, type 'y'; otherwise,
type 'n'. (y/n):
```

Type **y** to have the `mkdev` scripts modified.

14. You are now given the opportunity to rebuild the kernel:

```
You will need to rebuild the kernel for the changes
to take effect

Do you want to rebuild the kernel now? (y/n):
```

Enter **n**, since the SCO UNIX installation program performs a kernel rebuild soon after the device driver installation is complete. This option is presented for users upgrading to the new device driver.

The BTLD driver installation is complete.

Upgrade Installation

The following upgrade procedure allows you to upgrade an older version of the device driver (btk or blc) or to replace third-party emulation drivers that you may have used previously with your SCSI Host Adapter:

1. Insert the BTLD duplicate diskette into the floppy drive and type **installpkg** at the shell prompt:

   ```
   # installpkg
   ```

2. A screen is displayed that lists the packages available on the BTLD diskette (Diskette number 3 of the *Host Adapter Device Driver Software*):

   ```
   The following packages are on this disk:

   NAME      DESCRIPTION
   blc       BusLogic MultiMaster HBA driver for SCO UNIX.
   flashpt   BusLogic FlashPoint HBA driver for SCO UNIX.

   Please enter the names of the packages you wish to
   install, or q to quit:
   ```

   Type **blc,** and press **<Enter>**.

3. The next screen asks you to confirm that you want to replace an existing blc driver:

   ```
   There is already a blc installed. Do you want to replace
   it with the version in blc? (y/n/q):
   ```

   Type **y**, and press **<Enter>**.

4. Another screen is displayed that allows you to preserve the current host-adapter configuration information:

```
A previous installation of the BusLogic driver 'blc' has
been detected. Do you want to preserve the host adapter
configuration information? (y/n):
```

Type **y**, and press **<Enter>**.

Note: ***Third-party driver emulation upgrade —***
The next portion of this procedure is for upgrading third-party emulation drivers used with Mylex non-PCI host adapters.

5. If you are upgrading from an emulation driver ('ad'), you are asked to confirm that you want to replace the 'ad' entries in mscsi:

```
Would you like to replace the 'ad' entries in mscsi with
BusLogic driver 'blc'? (y/n):
```

Type **y,** and press **<Enter>**.

6. You are asked if you wish to keep the same settings as the previous driver:

```
Would you like to use the BusLogic driver with the same
I/O port address settings as 'ad'? (y/n):
```

Type **y,** and press **<Enter>** to use the current I/O port address setting or **n** to specify a different port address.

Note: ***Device driver upgrade —*** *The next portion of this procedure is for upgrading from the* `btk` *driver.*

7. If you are upgrading from the `btk` driver, the following message is displayed:

```
The current 'btk' will be replaced with the new BusLogic
'blc' driver.

Do you want to set up the new BusLogic 'blc' driver with
the same settings as the btk' driver? (y/n):
```

   Type **y** to keep the current settings or **n** to specify a new setting.

8. The next prompt allows you to enable Tag Queuing support. If you enable this option, tag commands are sent to hard disks that support this feature.

```
Tag Queuing allows hard disks to queue and sort multiple
I/O requests from the BusLogic host adapter, possibly
resulting in enhanced performance.



Some hard disks, however, do not thoroughly support Tag
Queuing and may have problems if this option is enabled.

If you decide not to turn on Tag Queuing now, you can do
so later by setting 'blc_do_tag = 1' in

     /etc/conf/pack.d/blc/space.c

Do you want to enable Tag Queuing now? (y/n):
```

   Type **y** to enable Tag Queuing, or **n** to pass on this option.

9. For an OpenServer installation, skip this step. For other installations, the driver includes support for Mylex Wide SCSI host adapters that allow access to 15 target IDs (taken from 0-15) and 64 LUNs (0-63). Two mkdev scripts must be modified to bypass the current limitations (0-7) for both IDs and LUNs. If you are using a Wide SCSI adapter, and you want to take advantage of this feature, the next prompt allows you to make the necessary changes to the shell scripts automatically:

```
BusLogic BT-75xC and BT-95xC Wide SCSI Host Adapters are
capable of supporting up to 15 devices with up to 64 LUNs.
To support the extended devices, the following files need
to be modified:

  /usr/lib/mkdev/hd
  /usr/lib/mkdev/.scsi

The original files will be backed up in the following
directory:

   /usr/lib/mkdev/Orig

If you have a BT-75xC or BT-95xC and wish to provide
support for extended devices, type 'y'; otherwise, type
'n'. (y/n):
```

Type **y** and press **<Enter>** to make the necessary modifications for extended device support.

10. The next message asks if you are ready to rebuild the kernel:

```
You will need to rebuild the kernel for the changes to
take effect.

Do you want to rebuild the kernel now? (y/n):
```

Type **y** and press **<Enter>** to link the device driver permanently with the kernel.

Adding Host Adapters When a Mylex Adapter is the Primary Adapter

This section explains how to add host adapter(s) when the currently installed primary adapter is a Mylex host adapter. Up to eight SCSI host adapters can be configured by running the appropriate **mkdev** script (**hd**, **tape**, or **cdrom**) to add a device to the new adapter(s). These scripts automatically modify the `/etc/conf/sdeviced.d/blc` file and then rebuild the kernel.

Adding Host Adapters When an IDE or Other Adapter is the Primary Adapter

Use the "Upgrade Installation" procedure on page 6-9 to add host adapters to a system that uses an IDE or other type of adapter as the primary adapter.

6•3

Feature Notes

This section describes some of the features of this release of the MultiMaster BTLD. It also contains some hints that might be useful during installation.

I/O Port Addressing Selectability at Installation

The MultiMaster BTLD scans the range of supported I/O port addresses at installation time in the order of PCI-compliant I/O addresses 0x330, 0x334, 0x230, 0x234, 0x130, and 0x134. It selects the first one found as the boot controller.

Tag Command Queuing

The Tag Queuing option allows multiple disk requests to be sent to and sorted by devices that support this feature.

> ***Note:*** *Tag Queuing may not improve performance in all environments. However, the driver provides an option to enable Tag Queuing for those environments that benefit from it.*

To enable this option, set the `blc_do_tag` in `/etc/conf/pack.d/blc/space.c` to **1**, and relink the kernel

```
int blc_do_tag     = 0;/* 1 = do command queuing     */
```

Command Timeout Handling

By default, an I/O request is given up to 15 seconds to complete. A request that does not return during that time limit is aborted and retried twice. You can also set the number of retries, but the upper limit is two retries. If there is still no response, the controller is reset and the outstanding I/O requests are reset. The following tunable parameters can be changed in `/etc/conf/pack.d/blc/space.c` to the required values.

```
int blc_timeout       = 1; /*  1 = do timeout handling         */

int blc_timeout_period= 15;/* number of secs to wait for I/O  */

                           /* request before timing out       */

int blc_retry_max     = 2; /*  number of times to retry request
*/

                           /*  before resetting the controller */
```

> ***Note:*** *Note: If the I/O request is started just after the timer is called, the actual timeout period can be twice that specified in* `blc_timeout_period`.

Selecting Boot-Time Hard Reset ON/OFF

By default, the driver will not perform hard/SCSI reset at boot-time. If your application requires a reset at boot-time, set `blc_inittime_hard_reset` to **1** in `etc/conf/pack.d/blc/space.c` and relink the kernel.

```
int blc_inittime_hard_reset = 0; /* 1 = do hard reset at boot-
time  */
```

Extended Device Support for Mylex Wide SCSI Adapters

The MultiMaster driver provides support for up to 16 SCSI IDs and 64 LUNs on the BT75xC and BT-95xC Wide SCSI host adapters. `/usr/lib/mkdev/hd` and `/usr/lib/mkdev/.scsi` files are modified during installation, if requested, to allow you to specify a SCSI ID and LUN beyond 7.

Installation Hints

During installation, it is a good idea to observe the following practices:

- Always keep a backup of your working copy of the UNIX kernel before attempting to boot off a newly-compiled kernel.
- Keep a set of Emergency Boot diskettes containing the working system kernel.
- For an extensive list of troubleshooting tips, refer to the SCO UNIX documentation.
- For a first-time installation, the default parameters should be selected for the primary controller.
- If you are extracting SCO UNIX from tape, the tape drive should be at ID=2 and the SCSI hard disk drive should be at ID=0 for SCO UNIX to recognize it.
- If you are installing SCO UNIX from CD-ROM, the CD-ROM drive should be at ID=5 and the SCSI hard disk drive should be at ID=0 for SCO UNIX to recognize it.

You should be aware of the following features of the MultiMaster BTLD:

- The MultiMaster BTLD fully supports the 32-bit addressing mode of Mylex's host adapters. This allows maximum system performance when you are configuring a system with more than 16MB of system RAM.
- The MultiMaster BTLD supports all of the currently supported SCSI peripheral devices which are supported in SCO UNIX.

Chapter 7

UNIXWARE DEVICE DRIVER

Chapter 7: Contents

7•0

Preface

The MultiMaster IHV HBA Driver for UnixWare 2.x consists of a single common driver that supports the MultiMaster family of PCI Ultra SCSI host adapters. This driver includes support for:

- Multiprocessor systems
- Plug & Play PCI configuration
- Tagged command queueing (see the “Feature Notes” section for information on this feature)
- Fault handling

Software Requirements

To install the UnixWare drivers, you should have the following software:

- The UnixWare diskette (diskette number 3) of the *Software Drivers* package
- The UnixWare operating system diskettes, CD-ROM or tape

Reference Documents

To install the UnixWare drivers, you should have the following documentation:

- The Mylex manual for the MultiMaster host adapter
- The UnixWare 2.X installation and user’s guide
- The system’s installation and setup guide
- The system’s reference manual (optional)
- Manuals for the system’s peripherals (if required)

7•1

Installing the UnixWare Driver

This section provides instructions for installing the UnixWare device driver. Procedures are provided for installing the driver when installing UnixWare and for installing the driver on an existing UnixWare system.

Installing the Driver During a New UnixWare Installation

This installation procedure allows you to dynamically load the MultiMaster IHV HBA Driver during a first-time UnixWare 2.X installation and to permanently configure the driver into your kernel. UnixWare 2.X utilizes an auto-configuration method for detecting the MultiMaster host adapter, thereby eliminating the necessity of configuring the I/O port, IRQ, and other adapter settings.

Use the following procedure to install UnixWare 2.X using diskette number 3 of the *Software Drivers* package. (This diskette contains drivers for SCO Unix OpenServer 5 and the MultiMaster IHV HBA driver for UnixWare 2.X.)

1. Boot the system with the UnixWare Install Diskette.
2. At the Install Host Bus Adapter Drivers prompt, insert diskette number 3 of the *Software Drivers* package, and press **<Enter>**.
3. At the Install Another HBA Diskette prompt, insert the UnixWare 2.X Host Bus Adapter Drivers diskette, and press **<Enter>** to load other drivers, or select Continue Installation to skip this step.
4. Continue the installation from the CD-ROM or tape until you are prompted to reinsert the HBA driver. Insert diskette number 3 of the *Software Drivers* package, and press **<Enter>**.

5. When the message “UnixWare 2.x installation is complete...” appears, remove the diskette, and reboot the system by pressing **<Enter>**.

6. The installation of the MultiMaster IHV HBA driver is complete.

Installing the Driver on an Existing UnixWare System

The procedure below allows you to install or update the MultiMaster driver on an existing UnixWare 2.X system. This might be necessary if you install a MultiMaster adapter as a secondary host adapter or if you need to upgrade an existing MultiMaster driver.

1. Boot the system and log in as root.

2. Insert diskette number 3 of the *Software Drivers* package, and type:

```
# pkgadd -d diskette1
```

3. The following message is displayed. This message lists the MultiMaster drivers on the diskette:

```
The following packages are available
  1 blc     BLC IHV HBA
            (i386) 1
  2 flashpt FlashPoint IHV HBA
            (i386) 1
Select package(s) you wish to process (or ‘all’ to process
all packages). (default: all) [?,??,quit]:
```

4. Type **1** and press **<Enter>**.

5. Remove the diskette after exiting the ‘pkgadd’ utility.

6. The next time you reboot the system, the kernel is automatically rebuilt with the new MultiMaster driver.

7•2

Configuring Additional MultiMaster Host Adapters

UnixWare 2.X provides an auto-configuration feature that detects newly added MultiMaster adapters during the boot procedure. It is not necessary to modify any of the system files when adding these adapters, if the primary adapter is already using the MultiMaster IHV HBA driver.

7•3

Feature Notes

This section briefly describes some of the configurable parameters that are incorporated in this MultiMaster IHV HBA driver release.

Tag Queuing Option

The Tag Queuing option allows multiple disk requests to be sent to and sorted by devices that support this feature. Since Mylex implements job scheduling in the HBA driver, tag queuing may not provide any benefit over job scheduling in some environments. However, the driver includes an option to disable the Tag Queuing feature for those environments that may not benefit from tag queuing. This option is enabled by default. To disable it, set `blc_do_tag in /etc/conf/pack.d/blc/space.c` to 0, and relink the kernel.

```
int     blc_do_tag              =1;
```

Command Timeout Handling

By default, an I/O request is given 15 seconds to complete. A request that does not return in that time limit is aborted and retried up to 2 times. If there is still no response, the controller is reset and the outstanding I/O requests are resent. The timeout parameters can be changed in `/etc/conf/pack.d/blc/space.c` to the desired values:

```
int     blc_timeout_period      =15;    /* number of secs to    */
                                        /* wait for I/O request */
                                        /* before timing out    */
                                        /* 0 disables cmd       */
                                        /* timeout              */

int     blc_retry_max           =2;     /* number of times to   */
                                        /* retry request        */
                                        /* before resetting     */
                                        /* controller           */
```

Note: *If the I/O request is started just after the timer is called, the actual timeout period can be up to twice that specified in* `blc_timeout_period.`

A

Using the >1 GByte Option

All versions of DOS support up to 1024 cylinders per disk drive. SCSI adapter-disk address-translation schemes emulate 64 heads and 32 sectors per track. This provides a maximum accessible capacity of 1 MB per cylinder or 1 GB (gigabyte) per disk drive.

The “greater than one gigabyte” (>1 GB) option enables the onboard BIOS to support up to 8 GB of DOS disk space. This appendix describes the “> 1 GB” option that you can set using the SCSI host adapter onboard configuration. Refer to the host adapter user’s manual for information on how to use the configuration utility to access the ">1 GB" option.

Enabling this option causes the adapter BIOS translation scheme to enlarge the effective size of each cylinder, allowing drives of up to 8 GB capacity to be supported under DOS 5.0 or above. Table A-1 shows the effect of the BIOS translation scheme on cylinder capacity.

Table A-1. SCSI Adapter BIOS Translation Option Summary

Option Used	Max. DOS Accessible Capacity	Number of Heads	Sectors/Track	Cylinder Capacity
No	0-1 GB	64	32	1 MB
Yes	1-2 GB	128	32	2 MB
Yes	2-8 GB	255	63	8 MB

This Appendix explains how to use the “>1 GB” option in these environments:

- DOS systems
- Windows NT
- OS/2
- SCO UNIX
- NetWare and other operating systems
- Drives with multiple operating systems

When the option is enabled in a DOS environment, the BIOS will activate the >1 GB translation scheme only if:

- The capacity of the selected drive is greater than 1 GB, and
- The drive does not have a partition already formatted for less than 1 GB.

In systems that do not meet these requirements, the “<1 GB” option is used regardless of the option setting.

When the BIOS recognizes a drive with a formatted partition already using a translation scheme, this scheme is used regardless of option settings. If you want to override the formatted partition and use the option setting scheme instead, you must

- first delete the partition by running FDISK
- then create a new partition.

Caution: *Back up your data before you delete the partition.*

Windows NT, OS/2, SCO UNIX

Windows NT v3.1, OS/2 v2.X, and SCO Unix v3.2.4 can support drive capacities of >1 GB without enabling the “>1 GB” option in AutoSCSI. However, the “>1 GB” option *must* be enabled when a partition greater than 1 GB is used as a *boot* partition.

The “>1 GB” option is supported only when running Mylex device drivers. If third-party device drivers are used for any of these operating systems, the boot partition is limited to 1 GB and this option must be disabled.

FAT file systems: Note that there is a 2 GB limitation on FAT file system partitions.

UnixWare, NetWare and Other Operating Systems

NetWare and most other non-DOS operating systems do not require “>1 GB” option to support drive capacities of >1 GB. For these operating systems, you *must set this option to No* to disable ">1 GB". The full drive capacity over 1 GB is still recognized. Most third party drivers only support the <1 GB translation scheme. Since these operating systems do not impose a 1024 cylinder limitation, they will recognize drive capacities over 1 GB. In these operating system environments you must make sure that your boot partition is under 1 GB in both capacity and location on the physical drive.

Multiple Operating Systems On One Drive

When NetWare (or other supported operating systems) is combined with DOS on the same drive, then the size and locations of any and all the DOS partitions must not exceed the 1 GB size limitation and / or the address boundary, unless drivers which include support for >1 GB translation are available for *both* operating systems.

When multiple operating systems are installed on one drive, only one translation scheme can be used across both operating systems. If either the location or size of any DOS partition on the drive must exceed the 1 GB boundary, then the installed driver for the second operating system sharing the drive with DOS must also include support for the >1 GB translation scheme. When the “>1 GB” option is enabled, operation under both operating systems is the same except for the effective cylinder size (see the cylinder sizes listed in the Table A-1).

B

Customer Service and Warranty

Mylex Customer Service

Mylex provides a number of services for customer convenience. These services include the following:

- You can reach Mylex's **Technical Support** for host adapter products at 510-608-2400, Monday through Friday, from 6:00 AM to 6:00 PM PST. Before you call, please complete the Product Support Record on the back of this page.
- Mylex's Technical Support **Bulletin Board System** (BBS) for host adapter products is available 24 hours a day, seven days a week. It provides information on software updates and new releases, technical bulletins, and other information.

  You can reach the BBS for host adapter products at 510-793-3491. For access, all you need is a modem and communications software of your choice. Set your modem to 14.4 k baud, 8 data bits, 1 stop bit and no parity. Once connected, log on with your name and a password of your choosing.
- **FAX** requests will be answered within 24 hours. Send your FAX requests regarding host adapter products to 510-745-7715. Please include a completed Product Support Record (on the back of this page).
- **E-Mail Addresses:**

  Internet: support@mylex.com
  FTP Site: ftp.mylex.com
  WWW Home Page: http://www.mylex.com
- **US Mail:**
  Mylex Corporation
  34551 Ardenwood Blvd.
  Fremont, CA 94555-3607
- To order Mylex software or additional manuals, call 510-796-6100.

Product Support Record

The information on this page should be compiled and provided to your supplier in writing to obtain technical support assistance. This will enable your supplier to respond more rapidly and more appropriately to your problem.

Mylex Product:

Mylex Product No: _____
Serial Number: _____
Date of Purchase: _____
Firmware Version Number: _____
BIOS Version Number: _____

Purchased From:

Company: _____
Address: _____
_____

Purchased By:

Name / Title: _____
Company: _____
Address: _____
_____
Telephone #: _____
Fax #: _____

About System Hardware Configuration:

System Manufacturer: _____
System Model and Speed: _____
_____
System BIOS Manufacturer: _____
Memory in System: _____
Hard Drives on System: _____

About System Software Configuration:

Operating System / Version: _____
Application Program / Version: _____

Detailed Description of Problem: _____
_____
_____
_____
_____
_____