



Application Storage Manager™ Windows NT®/2000 Edition

Getting Started Guide

**ASM for Windows
Version 5.20**

P/N: 313473301

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ASM uses the License Server to store and validate ASM licenses. During installation, you are prompted to choose whether you are installing an evaluation copy of the product or a licensed copy of the product.

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Once the ASM license is entered in the License Server, use the Setup wizard to update the licensing information for ASM. Select the Edit product license information option in the Setup wizard and enter the name for the License Server computer into the wizard on the Licensing Information page.

For further information about registering license information in the License Server, refer to the *License Server System Guide*.

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APPLICATION STORAGE MANAGER AND DISKXTENDER

The Windows NT/2000 edition of Application Storage Manager™ (ASM) was developed for StorageTek by OTG Software and is based on their DiskXtender (DX) product. With ASM and a full line of world-class tape drives and tape libraries, StorageTek can deliver **A COMPLETE SOLUTION** for cost-effective storage management of your standalone and distributed Windows NT/2000 systems.

BENEFITS

DISKXTENDER allows you to extend the capacity of NTFS volumes by automating migration of files to storage media. DISKXTENDER uses separate media services to manage media in storage devices, so that all drive, library, and media specific issues are handled and optimized by the media service (like MEDIASTOR). This enables DISKXTENDER to focus specifically on the management of files, allowing clients to simply save and retrieve files to and from any extended NTFS volume.

DX allows you to make large amounts of data storage available on an NTFS volume without adding to the physical capacity of the hard disk where the volume is located. DX can be used to represent the contents of multiple pieces of media as folders on a single volume, keeping track of the exact location of all files on media. CD-ROM, Erasable-Optical (also called Magneto-Optical), WORM, DVD, and Tape media can all be managed easily and effectively, using a variety of file systems.

DISKXTENDER adds value to the NTFS file system and enhances Windows native capabilities by providing file migration services. Because of the design of DISKXTENDER, file migration can be added without losing any Windows features. Windows NT/2000 still manages all issues like security, long file name support, and network connectivity.

DX provides a rule-based system for file storage management. Rather than simply migrating all files to media without distinction between files, DX allows you to set criteria that govern which files will be stored where. Using the rules you create, DX manages file storage locations in the background, moving files to media and purging their data to make space on the extended drive. To the end user, however, all files appear to be located on the drive extended by DX.

DX provides comprehensive file management capabilities, a single point of administration, and scheduling features to optimize system performance. Time-consuming processes that compete for system resources – such as media restore, media compaction, and file movement to media – can be set to occur at convenient

times. DX also monitors system warnings and errors, and can be configured to send alerts to specific users or computers.

This getting started guide explains how to install and upgrade DX, and discusses the types of storage media and file systems available for use with DX. In addition, the Media Services chapter of this guide provides detailed information and instructions for setting up and configuring all four types of media services supported for use with DISKXTENDER.

CHAPTER SUMMARY

The following table summarizes each chapter of this document:

Table 1: Chapter Summary

CHAPTER:	DESCRIPTION:
Chapter One: <i>Introduction</i> on page 1.	This chapter provides a brief overview of the system, including its concepts and components.
Chapter Two: <i>Planning Your DX System</i> on page 21.	This chapter contains planning recommendations, system requirements and hardware specification worksheets for your DX system.
Chapter Three: <i>DISKXTENDER Installation</i> on page 33.	This chapter contains instructions for installing the DISKXTENDER software (full installation and remote administrator), and for upgrading from previous versions of DX2000.
Chapter Four: <i>Working in the Administrator</i> on page 61.	This chapter describes the Administrator interface and basic DX functionality.
Chapter Five: <i>Storage Media</i> on page 79.	This chapter describes supported media types and supported file systems for DX.
Chapter Six: <i>Media Services</i> on page 89.	This chapter describes the media services available for use by DX, and how to configure them to your DX system.
Chapter Seven: <i>Converting to DX2000 from DiskExtender 3.2</i> on page 151.	This chapter describes the basic differences between the DE 3.2 system and the DX2000 system, and provides instructions on converting your DX system from version 3.2 to DX2000.
Chapter Eight: <i>Converting to DX2000 from DISKXTENDER 4.2</i> on page 195.	This chapter describes the basic differences between the DX 4.2 system and the DX2000 system, and provides instructions on converting your DX system from version 4.2 to DX2000.

RELATED DOCUMENTATION



Refer to the following additional documentation:

- ↵ DISKXTENDER Data Management Guide
- ↵ DISKXTENDER System Guide
- ↵ MEDIASTOR System Guide if using OTGMS as a media service
- ↵ SANXTENDER System Guide if using SANX to migrate file data over a SAN
- ↵ ACSLS documentation if using ACSLS as a media service
- ↵ Tivoli Storage Management documentation if using TSM as a media service

DOCUMENTATION CONVENTIONS

Consistent formatting is used throughout all DX2000 guides to represent certain information.

Table 2: Documentation Conventions

THIS CUE:	REPRESENTS:
monospaced text	Characters that must be typed on your screen exactly as they appear in this document.
<SMALL CAPITALS>	Keys on your keyboard used in combination or sequence. For example <ALT>+B means to hold down the <ALT> key while pressing B, and <ALT>, F, X means to press and release each of the keys in order: first <ALT>, then F, then X.
ALL CAPITALS	Directory names, filenames, and acronyms.
<i>italics</i>	References to manual titles, chapter titles, and section headings; placeholders; and emphasis.
WARNING 	Warnings about actions that could have adverse affects on the functionality of the DX system.
Precautionary note between two lines.	
NOTE 	Additional information needed as you follow the step-by-step operations in this manual.
Explanatory note between two lines.	

ONLINE HELP

Help is available online from any DISKXTENDER dialog box. For a description of the dialog box, press the <F1> key. A Help window appears, outlining the dialog box parameters and fields.

A knowledgebase help file with error descriptions, tech notes, software notes, fixed/known bugs is also available in the OTG DISKXTENDER program group on the Start menu. All DX2000 guides, including this one, are also available in PDF format on the installation CD.

CHAPTER ONE

INTRODUCTION

DISKXTENDER (DX) is a storage management system that provides support for multiple media types, flexible media and data organization, and rules-based file migration. DX accomplishes this through an easy-to-navigate interface, and transparent communication with storage locations and device management software.

DISKXTENDER allows you to extend the storage capabilities of NTFS volumes by using DX file migration services to move files from the NTFS volume to other, less-expensive storage media. For example, users on your network may typically save data to an NTFS volume on your Windows NT/2000 file server. You can vastly expand file storage capabilities by extending one or more of the file server's drives with DISKXTENDER. File data on a drive extended by DX can be moved to media through a media service (e.g., to tape in a library managed by OTG's MEDIASTOR) without affecting the file listing seen by the end user.

You are the architect of the DISKXTENDER system. DISKXTENDER allows you to leverage your existing hardware configuration or create a new one. The powerful features of DX, combined with an easy-to-use graphical user interface, allow you to fine-tune a file storage strategy for any type of application requirement. Because DX supports several media services, media types and file systems, you can select a storage configuration most suited to your available resources and your storage needs. You can design move rules that control the transfer of files to media, using detailed criteria such as file age, file size, file type, and file attributes. You can choose which folders on the extended drive will contain DX files and what media will be used to hold files moved under a particular move rule. You can then purge file data that has already been moved to media in order to maintain available space on the extended drive.

Before designing a storage strategy, you should be comfortable with DISKXTENDER terminology and concepts. In addition, many of the issues discussed in this system guide should be carefully planned before implementing a DX storage strategy. Take

the time to read all sections, as this will help you attain the best performance, functionality, and organization for your storage solution.

This section identifies key terminology and concepts that are vital for you to understand. Included are descriptions of DX modules, conceptual and practical definitions, as well as guidelines for planning and implementing your DX storage strategy.

A DISKXTENDER GLOSSARY

To make it easier for you to follow the discussion of the DX architecture in this chapter, here are brief descriptions of key terms used in the DX Concepts section. You can either read this glossary first or refer to it as needed while you read about DX.

Table 3: DISKXTENDER Glossary

TERM:	DEFINITION:
ACSLS	ACSLS is a device management software product that runs on a UNIX platform. DX can use an ACSLS installation as a media service. ACSLS has the ability to manage retrieval of media in some StorageTek tape libraries.
Data Management	DX manages the location of the file data for DX files. DX can manage the contents of a file separately from the file tag for that file. The file tag for a DX file is always displayed on the DX extended drive. In the background, transparent to the user, DX controls the location of the file data for each file managed by DX.
Drive	A drive is a hardware device through which media can be read or written to.
Extended Drives	DX can extend any stationary media volume (also commonly referred to as a hard drive) that has been formatted with the NTFS file system, as long as that drive is located on a computer where DX is installed.
File Data	A file's data is the contents of a file.
File Tag	A file tag is the identifying information for a file. The file tag includes such information as file location, file attributes, file size, and file age.
File Migration	DX moves, or "migrates," files and file data from one type of media (a hard drive) to other types of media (removable media, such as optical or tape media, or logical media, such as a network share to a location on a RAID array).

TERM:	DEFINITION:
File System	A file system is software that provides an interface for saving and retrieving files on storage media. File systems control all aspects of media management, including directory/file structures, data layout, and data transfer.
Hard Drive	A hard drive is a stationary piece of media.
Hardware Device	A hardware device is a device that contains drives where media can be accessed.
Jukebox/ Library	A jukebox or library is a hardware device containing one or more removable media drives, shelves for pieces of media, and a mechanism for moving pieces of media between the shelves and the drives.
	The terms “jukebox” and “library” are interchangeable. In most instances in this manual, the term “library” is used to refer to libraries or jukeboxes.
Logical Media	A “logical” piece of media is a piece of media that is defined by its location on a piece (or pieces) of media rather than by the physical constraints of the media itself.
	For example, a network share that shares a single folder to the network could be treated as a piece of media in DX. In contrast, a RAID device, which has multiple drives, could also be treated as a single piece of media if the entire device was shared as a single network share.
Media	Media refers to a physical medium on which data is written and from which data can be retrieved. Depending on the type of media, the medium may be different and the information may be recorded in different ways.
	In most instances in this manual, the term “media” refers to the storage media to which DISKXTENDER files are migrated.
Media Pool	A media pool is a reserve of pieces of media available for use with a particular extended drive.
Media Service	A media service provides access to media to which DX migrates files. In some cases, the media service is a network share. In other cases, a media service is a device management service that will retrieve a specific piece of media and mount the media in a device such as a library when requested to do so.
Media Type	The type of a piece of media is determined by the composition of the media and the method used to record information on that media. Some examples of media types are optical media, CD-ROM media, DVD-RAM media, and tape media.

TERM:	DEFINITION:
Network Attached Storage (NAS)	Network Attached Storage is logical media that has been shared to the network to allow network users to access the media. DX can point to any network share as a Network Attached Storage media service.
NTFS Volume	An NTFS volume is a piece of stationary media or a partition on a piece of stationary media that has been formatted with the NTFS file system.
OTG MEDIASTOR (OTGMS)	OTGMS is a device management package that can be used as a media service by DX. OTGMS has the ability to manage retrieval of media in a wide variety of hardware devices.
Removable Media Drive	A removable media drive is a drive where different pieces can be inserted and removed as needed, such as a CD-ROM drive.
Removable Media	Removable media is media that must be mounted in a drive before it can be accessed. Removable media can be inserted and removed as needed to allow for access to multiple pieces of media.
Stationary Drive	A stationary drive is a drive where the same piece of media is always mounted, such as the hard drive on your computer.
Stationary Media	Stationary media is media that is always mounted in a drive and cannot be removed without removing the entire drive.

DX CONCEPTS

The architecture, components, and data management tools of DISKXTENDER are discussed in this section. For an overview of each of the following concepts, see the following sections:

- ↗ *DISKXTENDER Components* - see below
- ↗ *DISKXTENDER'S Distributed Storage Model* – see page 7
- ↗ *Media Services* – see page 10
- ↗ *Types of Media Used by Media Services*– see page 16
- ↗ *Extended Drives* – see page 17
- ↗ *Client Connectivity* – see page 18

DISKXTENDER COMPONENTS

DISKXTENDER is comprised of several components, or modules, and each have specific functionality within the system. The DiskXtender Setup and DiskXtender Remote Administrator Setup modules install the components that make up the DX system. The DX System includes the DX Administrator or the DX Remote Administrator, and the Online Help. In addition, your installation CD contains a copy of the OTG License Server program.

The DX Administrator and the DX Remote Administrator allow you to view and configure the underlying structure of the DX System on both the local and remote DX computers. The DX Remote Administrator provides only the necessary interface components needed to remotely configure any DX computer(s) visible on the network from any Windows NT/2000 workstation. This allows you to administer remote DX computers without requiring a full installation of DiskXtender. The Online Help, which is installed with both a full installation of DX and Remote Administrator installations, contains context-sensitive help links.

The OTG License Server is the program through which the licenses for your OTG products are registered. Once a DX license is registered, you can use the DX Setup program to point to the License Server computer in order to license your copy of DX.

DISKXTENDER Setup

The DISKXTENDER Setup module is used to install DISKXTENDER and to upgrade from previous versions of DX2000. The DISKXTENDER Setup module installs the DX Administrator, Online Help, and Explorer Add-ons. The module remains in the DISKXTENDER program group where it can be used to modify registration and license information. If necessary, the module can also be used to uninstall DISKXTENDER.

DISKXTENDER Remote Administrator Setup

The DISKXTENDER Remote Administrator Setup module is used to install the DISKXTENDER Remote Administrator, and to upgrade from previous versions of the DX2000 Remote Administrator. The DISKXTENDER Remote Administrator Setup module will install the DX Administrator interface only. The module remains in the DISKXTENDER program group where it can be used to modify registration information. If necessary, the module can also be used to uninstall the DISKXTENDER Remote Administrator.

OTG License Server

Licensing information for your DX system is managed on the OTG License Server. The License Server is the program through which the licenses for your OTG products are registered and maintained. The OTG License Server program is included on the DISKXTENDER CD, and can be installed on the DX computer or on a

separate computer, as long as that computer is visible to the DX computer through the network.

Use the Edit product license information option in the Setup wizard (accessed through the OTG DiskXtender program group) to point to the License Server computer once your DX licensing information has been registered in the License Server.

DX Administrator

The Administrator allows you to view and configure the underlying structure of the DX system, providing a single interface for managing one or more DX computers and the extended drives on those computers. Through this module, you can manage all major aspects of the DX system, such as:

- ↗ Media services connectivity (connections to the device management software that manages the hardware devices that contain the storage media)
- ↗ Drive saver and timeslice settings (for drives in the storage devices managed by the media services)
- ↗ Functionality of extended drives (the NTFS volumes for which DX provides data management services)
- ↗ File migration (creation and management of move groups, and move and purge rules used to migrate files from the extended drive to storage media)

The Administrator has an intuitive “tree” view where DX extended drives and the configuration items for those extended drives are grouped as sub-trees for ease of use.

All aspects of extended drive functionality can be configured through the Administrator. You can assign pieces of media to media folders on an extended drive and then define rules to control the management of files in the media folder. You can set up schedules to control when events, such as file migration and processing of media management tasks, occur. You can configure alerts to send messages alerting a particular user or set of users to DX errors or warnings relating to the extended drive. In addition, you can view event, warning, and error logs and run reports on various aspects of DX system functionality.

Enterprise (Remote) Administration

Regardless of whether you are running a full installation of DX or only the Remote Administrator, the Administrator interface for DX can be used to configure any DX computer visible on the network (provided security settings allow access). Because enterprise (remote) administration capability is automatically installed when you install DISKXTENDER, you can remotely administer any DX computer from any other DX computer. You can also use the DX Remote Administrator Setup to install only remote administration components, if that is all you need on the administration computer. DX (full installation) needs only to be installed on computers containing the NTFS volumes that DX will use as extended drives. It is important to be sure, however that the same version of DX (or DX Remote Administrator) is installed on both the administering computer and the remote DX computers it is being used to administer.

Online Help

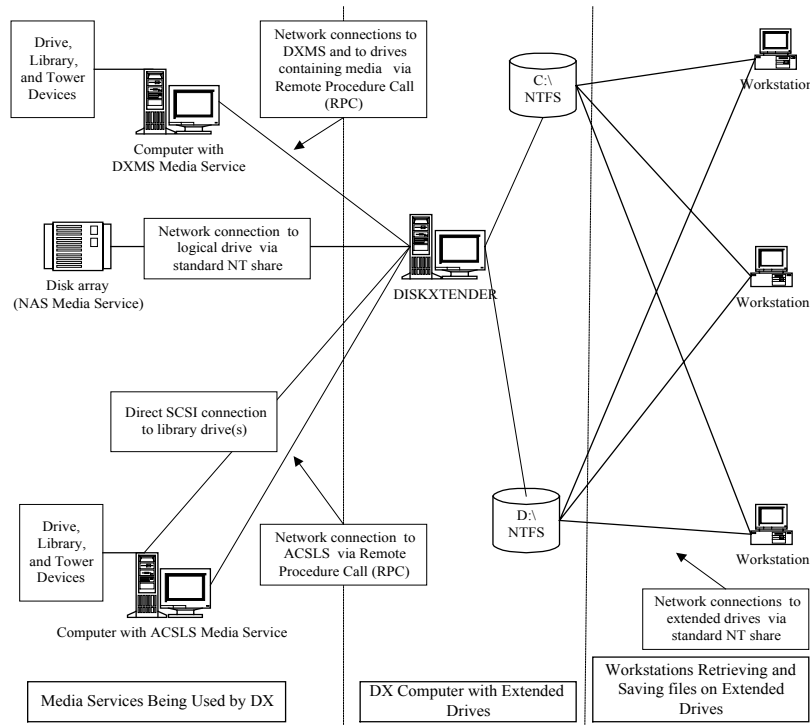
DX contains context-sensitive help links that provide instructional help and examples. The Online Help is automatically installed with DX and with the DX Remote Administrator). Press the <F1> key at any time to get help on the currently displayed dialog box, window or wizard page. There is also a knowledge base available from the OTG DISKXTENDER program group in the Start menu.

DISKXTENDER'S DISTRIBUTED STORAGE MODEL

DISKXTENDER is one component of a distributed storage system. Within this system, DX is responsible for managing the movement of data from NTFS volumes to a pool of storage media. Once a media service has provided access to media, DX communicates directly with the media to read and write data and perform media tasks.

Various media services can be responsible for providing access to media pools. Four types of media services are available for use with DX: Network Attached Storage (NAS), OTG MEDIASTOR (OTGMS), StorageTek's ACSLS, and Tivoli Storage Manager (TSM). DX connects with these media services either through a network share or through Remote Procedure Calls (RPC). DX transfers files to the media provided by the media services, and sends requests for pieces of media to the media services as needed.

Figure 1: DISKXTENDER Architecture



This architecture allows you to set up the components of your storage solution on several computers and avoid the bottleneck of a single-server/multiple-client architecture. You can configure remote storage of files distributed across a network, while maintaining a high level of scalability and administrative flexibility.

DX monitors activity on extended NTFS volumes and then communicates with media services for media to be retrieved as needed. DX relays each request for a piece of media to the appropriate media service, and the media service mounts the media so DX can retrieve or store files or carry out media tasks. DISKXTENDER transparently manages the connections between DX and the media services and the movement of files between the extended drive and the media pools. The client (i.e., end user) connection to the NTFS volume is managed entirely by Windows NT/2000; DISKXTENDER is not involved in client connectivity at all.

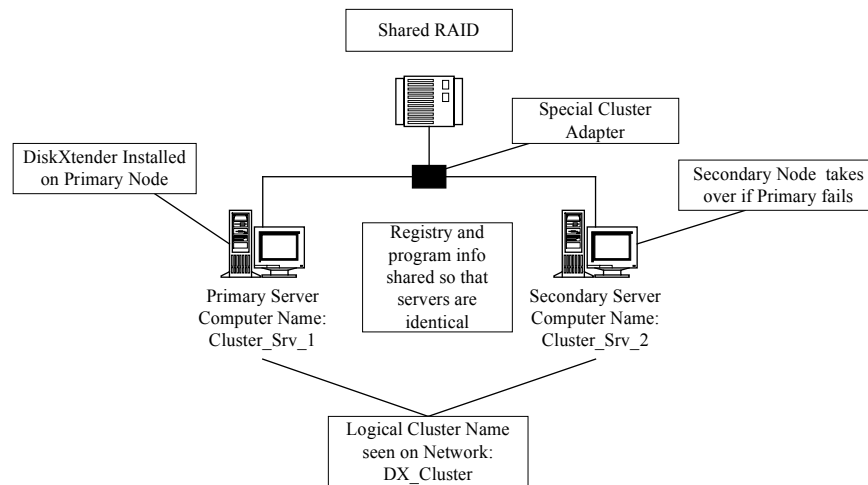
This configuration allows you as the administrator to “extend” the capacity of hard drives on your network servers, seamlessly to the end user. The end user saves files to and retrieves files from the NTFS volume, unaware that that volume has been extended by DX. Because clients connect to Windows NT/2000 rather than DX, the extensive connectivity offered by Windows NT/2000 remains in effect. Any client that can connect to a Windows NT/2000 server can access files on an extended drive.

CLUSTERING

Clustering is the process of connecting two or more computers together in such a way that they behave like a single computer, and so that they share a single storage device. The server computers that are part of the cluster are called *nodes* or *systems*.

A typical clustered environment consists of two servers and a RAID array. One of the servers is called the Primary node; the other is called the Secondary node. The figure below shows a basic clustered environment.

Figure 2: Example of Clustered Architecture



Because the cluster is designed to function as a single computer, users and programs do not access individual nodes when connecting to the cluster. Instead, they access a *logical cluster name*. The logical cluster name represents the “single computer” that all of the individual components within the cluster have formed to create.

The Primary node constantly updates the Secondary node with registry information so it can intervene when needed. The Secondary node assumes the functions of the Primary node if the Primary ever goes off-line.

The ability of a cluster to transfer functions to a Secondary node when the Primary fails is called *fault tolerance*. The act of transferring functions to the Secondary nodes is called *fail-over*. If the Primary node fails or is paused for repairs, the processes will fail-over to the Secondary node. Because the Secondary node has the same configuration as the Primary node, the Secondary node can run cluster operations with little or no disruption of server activity.

When the Primary node comes back on-line, it is now available to take over the processing functions if/when necessary, and effectively becomes the Secondary node. In the event the *new* Primary node (which was the Secondary node before the fail-over) fails, the Cluster operations will return to the original Primary node. The act of transferring functions *back* to the original Primary node is called *fail-back*.

DISKXTENDER has the capability to run on a clustered environment. The administrator needs little interaction, because the installation procedure recognizes that the program is being installed on a cluster, and modifies the installation appropriately. The Windows operating system handles all other special cluster-related functions.

DX cluster installation is supported on a Windows NT Enterprise Edition or Windows 2000 Advanced Server Edition cluster server using Microsoft Cluster Server in active/passive mode.

If you are planning to run DISKXTENDER in a clustered environment, you must install the DX program either from a remote machine or directly on the Primary server (the server node currently in control). If installing from a remote machine, make sure to select the logical cluster name to add to the list of computers for install. If installing directly on the Primary server, be advised that the installation program can detect whether the computer is the current Primary server, and will fail if initiated on a machine other than the Primary server of the cluster.

In addition, you must obtain a cluster-enabled DX license when licensing a cluster-installed copy of DX. Be sure to inform your sales representative when purchasing your DX license that you will be running DISKXTENDER in a clustered environment.

Remote administrators and DISKXTENDER clients will access the DX program by connecting to the logical cluster name via the network.

MEDIA SERVICES

When you configure a DX computer, you must configure media services for that computer before you can move files to media. Media services provide access to media. When you configure a media service in DX, you point to the location where the media for the media service resides and, where appropriate, to the device management software that controls the device(s) where the media will be accessed.

DX manages all functions relating to the transfer of information to and from media. The only role of a media service is to place pieces of media in a location where DX can work with the media. DX performs all movement and fetching of files and all media tasks through direct communication with media and media drives.

When DX needs a piece of media, it sends a request to the appropriate media service for that media. If the media service is a network share (NAS media), the media is already available and DX can proceed with the function that needs to be performed.

If the media service involves a device management product, the media service will cause the device being managed to retrieve the media or will prompt the administrator of the media service to insert the appropriate piece of media. For example, if OTGMS is being used to manage an optical library, OTGMS will cause the picker arm of the library to retrieve the correct piece of media and insert that media in a drive where the media can be read or written to. Once the media is in the drive, DX can write files to the media, fetch files from the media, or carry out media tasks such as formatting or labeling the media.

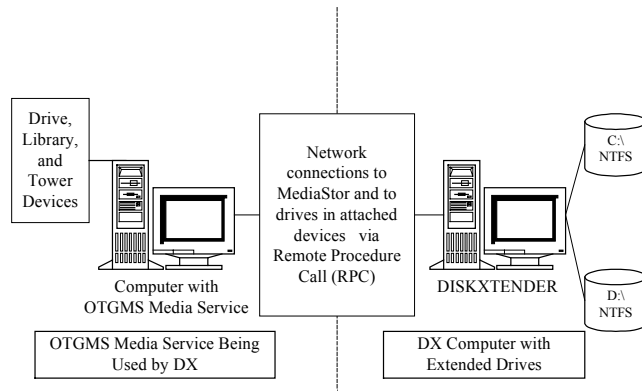
The following types of media services available for DX file storage:

- ↗ OTG MEDIASTOR - For more information, see the *OTG MEDIASTOR (OTGMS)* section below.
- ↗ ACSLS media services - For more information, see the *StorageTek's ACSLS Media Services* section on page 12.
- ↗ NAS media service - For more information, see the *Network Attached Storage Media Service* section on page 13.
- ↗ Tivoli® Storage Manager – For more information, see the *Tivoli Storage Manager (TSM)* section on page 14.

OTG MEDIASTOR (OTGMS)

OTG MEDIASTOR is a device management product that works on a Windows NT/2000 platform to manage the retrieval, mounting, and dismounting of removable media in a variety of hardware devices. OTGMS includes an easy-to-navigate administrative interface that lets you manage several devices on the same computer if needed.

Figure 3: DISKXTENDER with MEDIASTOR



To use OTGMS as a DX media service, you install MEDIASTOR on the computer where the hardware device you want to use for extended storage is attached. You then add the device to MEDIASTOR and add media to the device. After you install

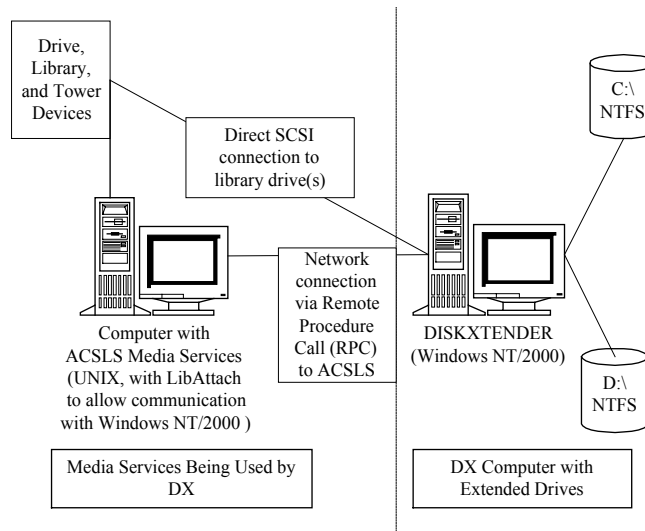
DX, you can then configure an OTGMS media service connection through DX that points to the MEDIASTOR computer.

Once the connection between DX and OTGMS is configured, you can assign specific pieces of media to the available media pools for configured DX extended drives.

STORAGETEK'S ACSLS MEDIA SERVICES (ACSL)

DISKXTENDER can use StorageTek's ACSLS media services to access tape media within StorageTek tape libraries. ACSLS is a UNIX-based device management product that manages StorageTek tape libraries and provides device sharing between applications. Organizations that have already invested in ACSLS can purchase DISKXTENDER and migrate files from Windows NT/2000 computers to tape media managed by the ACSLS server.

Figure 4: DISKXTENDER with ACSLS



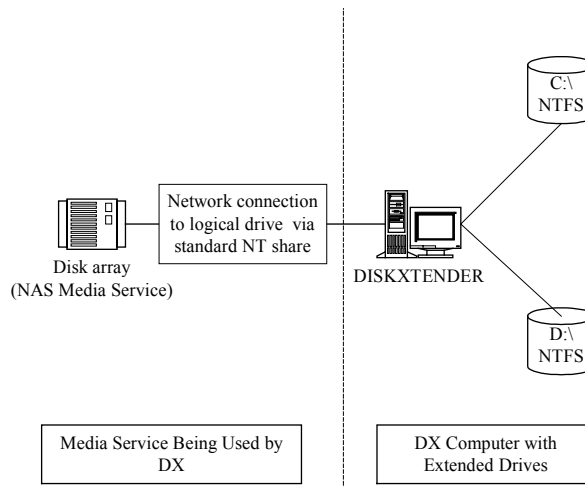
ACSL runs on a computer using the UNIX operating system. In order for ACSLS to communicate with DX, which runs on a Windows NT/2000 platform, you must install StorageTek's LibAttach product on the DX computer. LibAttach translates commands from Windows-based products into a syntax that the UNIX-based ACSLS understands.

The ACSLS computer is connected to the device controller for one or more StorageTek tape libraries. ACSLS controls the picker arm for each library device and manages retrieval of media within the library. However, in order to allow device sharing, StorageTek constructs some of their library devices in a way that allows individual applications to directly connect with particular drives in a library.

NETWORK ATTACHED STORAGE MEDIA SERVICE (NAS)

DISKXTENDER lets you define pieces of “virtual” media to be controlled by a media service. These virtual pieces of media can be located on any storage device attached to your local network. Virtual pieces of media are logical devices defined by how they are shared to the network. The logical device can be a share to a server’s hard drive, or to shares on any network appliance that provides share-level access to storage.

Figure 5: DISKXTENDER with NAS



RAID Devices

RAID (Redundant Array of Inexpensive Drives) devices are storage devices that contain several magnetic drives. Because data can be stored redundantly across the drives, when a single drive fails, the information on the other drives can be used to restore the information on the damaged drive without loss of data.

You can use DX to move files from users’ local hard drives to a RAID device by using shares on the RAID device as DX media services. Files can be moved immediately or you can use DX to perform periodic backups to the more stable RAID storage media. By configuring periodic file movement, you can reduce network traffic and allow users to work on files on their local hard drive, and yet back up those files to a safe data storage location as needed. Use of a RAID for a NAS media service ensures that files that have been purged of their file data on the DX extended drive can be fetched almost instantaneously when they are requested.

NAS Devices

NAS (Network Attached Storage) devices are storage devices that contain several high-capacity magnetic drives and manage storage of data to those drives in a way

that is seamless to the user. NAS devices have a built-in controller that tracks the location of files within the NAS device.

You can use DX to move files from users' local hard drives to a NAS device by using shares on the NAS device as DX media services. Files can be moved immediately or you can use DX to perform periodic backups to the higher-capacity NAS device. By configuring periodic file movement, you can reduce network traffic and allow users to work on files on their local hard drive, and yet back up those files to a second data storage location as needed. Use of a NAS media service ensures that files that have been purged of their file data on the DX extended drive can be fetched almost instantaneously when they are needed.

DX to DX configurations

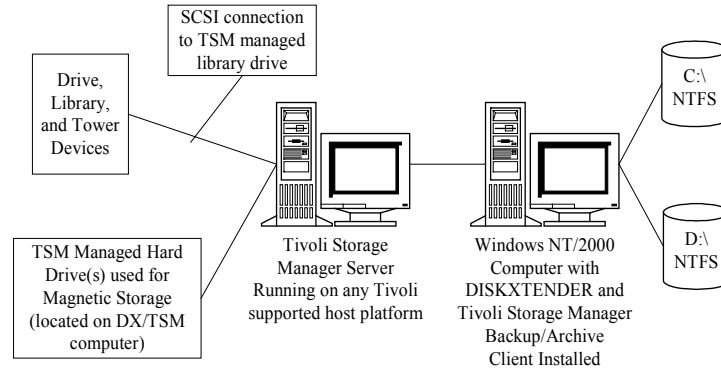
You can set up a DX media service for any network share. This capability allows you to move files from one DX computer to another if needed. You can configure movement of files from a media folder on one DX computer that stores DX files to a particular type of media, such as a RAID device or optical media, to a media folder on another DX computer that stores files to a less-expensive medium such as tape media.

TIVOLI STORAGE MANAGER (TSM)

If you already use or plan to use Tivoli Storage Manager Server 3.7.4 (or higher) as a data storage or data backup system, DX allows you configure your Tivoli Storage Manager system as a DISKXTENDER media service, allowing you to migrate files from DX to a Tivoli Storage Manager server. This method utilizes the storage devices supported and managed by the TSM server.

The Tivoli Storage Manager media service requires that TSM Backup/Archive Client version 4.1 (or higher) be installed and configured on the DX computer.

Figure 6: DISKXTENDER with Tivoli Storage Manager



DX can be configured to migrate files to a configured Tivoli Storage Manager (TSM) system by adding a Tivoli Storage Manager media service. In order to use Tivoli Storage Manager as a media service you must first have TSM Backup/Archive Client set up and configured appropriately on the same computer as DX is installed. When you configure a TSM media service, you create virtual media that represents TSM and acts as the media to which DX migrates files.

When you configure a TSM media service, you create virtual media that represents TSM and acts as the media to which DX migrates files. You create a list of “virtual” media in the properties for the Tivoli Storage Manager media service in DX. You can then assign that media to the appropriate extended drive, making that virtual media available for DX for file migration. TSM media can be managed similarly to NAS media through the DX interface, however the TSM server is managing the actual physical removable media, and tasks like labeling, compacting migration and copy media are done through TSM rather than through DX.

TYPES OF MEDIA USED BY MEDIA SERVICES

DX supports many high capacity storage media types for the media to which files will be migrated. The functionality accessible through a media service depends on the type of media used in the device for that media service. The following table defines all media types currently supported:

Table 4: Currently Supported Media Types

MEDIA TYPE:	SUPPORT TYPE:
NAS (Network attached storage available through network shares)	Read/Write
WORM	Read/Write
Erasable Optical	Read/Write
CD-ROM	Read Only
Tape (DLT, AIT 9840, Magstar, 8mm DAT)	Read/Write
DVD-RAM	Read/Write

FILE SYSTEMS ON DX MEDIA

When a piece of media is formatted, a file system must be selected for that piece of media: either a Windows Native file system or an OTG file system. A file system is software that provides an interface for saving and retrieving files on storage media. File systems control all aspects of media management, including directory/file structures, data layout, and data transfer. Media can be formatted for any file system supported by the device in which the media is located.

NOTE

If you are using OTG MEDIASTOR, once a file system is selected for a device, *all* DX media in the device must be formatted for that file system. If media in the device is formatted for a different file system, DX will identify it as Foreign media, and the media will need to be reformatted before DX can use it.

Windows NT/2000 installs Native File Systems, which include CDFS, FAT, and NTFS file system drivers. DISKXTENDER installation includes OTG File Systems that can be used on optical, WORM, CD-ROM or tape media. The following table lists DX file system support by media type:

Table 5: DX File System Support by Media Type

MEDIA TYPE:	SUPPORTED FILE SYSTEMS:
NAS	Windows Native file system
WORM	OTG File System
Erasable Optical	OTG File System
	Windows Native file system
DVD-RAM	OTG File System
CD-ROM	OTG File System
	Windows Native file system
Tape	OTG File System

Depending on the media type(s) and portability requirements of the storage solution, certain file systems should be chosen over others. This basic decision depends on your performance and media portability concerns. DX file systems provide maximum performance, while Windows Native file systems provide media portability.

OTG File Systems

OTG file systems are optimized for performance. Unlike Windows file systems, which are more generic and feature-rich, OTG 'storage subsystems' implement the minimum set of features required to store and retrieve data. As a result, runtime overhead is very low, data is contiguously organized, and overall performance is enhanced.

As a rule, if portability of storage media is not a concern, choose the OTG file system to provide the best overall system performance. In addition, some types of media are *only* supported with OTG file systems. Those media include tape, DVD and WORM media.

EXTENDED DRIVES

An extended drive is an NTFS volume (hard drive) for which DISKXTENDER provides file migration services by moving files to media and fetching files from media according to the parameters you set. Frequently used files can be kept on the NTFS volume, while less active files can be moved to storage media. It is the

addition and configuration of the storage media through DX that “extends” the space on the NTFS volume by moving files to storage media and purging the file data, while making the file appear to still reside on the extended drive.

To a client retrieving files from a drive extended by DX, all files, whether on the extended NTFS volume or on the storage media, appear to be present on the NTFS volume. According to move and purge rules that you configure, DX moves files to removable media and then purges the file data from the extended drive. When the file data is purged, DX leaves a file “tag” on the extended drive containing file information, such as the size and time and date of creation or modification. The file tag also contains an attribute left by DX, that points to the location of that file on storage media. When viewing the extended drive through Windows Explorer, the entire file appears to still be stored on the drive, even if the file data has actually been purged.

Every DX computer must have at least one extended drive. DX uses the extended drive to define relationships between directories, media, and ultimately where new or modified files are moved.

CLIENT CONNECTIVITY

The extended drive is a partitioned volume, which resides on a computer using Windows NT or Windows 2000 as the operating system. The volume is shared through a network, so that it is visible and accessible to other users. The client computers that save and retrieve files to and from the shared drive can use virtually any operating system to read and write the extended drive files.

FILE STREAM SUPPORT

Because NTFS supports file streams, many applications now take advantage of file streams to store their data. In addition, MAC and NFS file systems use file streams to store private data.

Support for file streams ensures that DISKXTENDER can protect all application data in files (not just the primary data). File streams are moved and fetched along with the primary file data. In addition, file streams can be restored from storage media (along with primary file data) for disaster recovery purposes.

File stream properties can be viewed through the Explorer Add-ons, if the file selected contains file streams.

CLIENT FILE SYSTEM SUPPORT

Because DX uses the extended NTFS volume to store files before migration, and is capable of migrating file streams, all clients that can connect to an NTFS drive can store and access DX files on an extended drive.

FAT (File Allocation Table)

DX2000 supports FAT as a read-only file system. Operating systems that use FAT as a file system include Windows 3.x, Windows 95, and Windows 98, Windows NT and Windows 2000. DX cannot format media with the FAT file system and since FAT is supported as read-only, FAT media cannot be added to move groups.

NTFS (Native Transport File System)

Clients using Windows NTFS can read and write files on DX extended drives. Windows NT/2000 uses NTFS or FAT as file systems.

MAC (MacIntosh)

MacIntosh and Apple computers use the MAC file system. Because DISKXTENDER protects file stream data, client connectivity drivers for MAC can be used to connect to DX extended drives.

NFS (New File System)

UNIX and LINUX applications have NFS as a file system. Because DISKXTENDER protects file stream data, client connectivity drivers for NFS can be used to connect to DX extended drives.

CHAPTER TWO

PLANNING YOUR DX SYSTEM

Setting up and running your DISKXTENDER system involves several steps, which include assembling the media service(s) being used with DISKXTENDER, installing Windows NT/2000, and installing DISKXTENDER. This chapter discusses several aspects you should consider, and provides information and suggestions for how to plan your DX system before you install the DISKXTENDER program. You can use the System Requirements and other recommendations that follow as guidelines for your setup. Consult your Windows NT/2000 documentation for information on installing the operating system.

Before installing DISKXTENDER, certain system components should be checked, such as the hardware connections, media services and network configuration. This helps ensure the program installation and setup will run smoothly, and minimizes the time it will take you to get your system up and running.

SYSTEM REQUIREMENTS

DISKXTENDER is a service that extends local NTFS volumes by using portable storage media to store file data. The DISKXTENDER service manages the movement of files to and from the storage media based on the criteria you set. To determine your hardware requirements for installation and optimal performance of DISKXTENDER, you will need to decide whether the DX service and your media service(s) will be installed on the same machine, or whether there will be separate machines administering DX and your media service(s).

The following sections list system requirements and recommendations for the DX computer:

✎ *DX Computer Specifications* on page 23

✎ *Recommended Upgrades for Optimization* on page 23

The drives extended by DX must be located on the machine where DX is installed, and must be NTFS volumes. The extended drive volume should be separate from the volume where the system files are stored. An extended drive sizing guide is provided in the *Sizing Your Extended Drive* section on page 28 to help you determine what size NTFS volume you will need as your extended drive.

NOTE

If you are planning to use SANXTENDER with your DX system, your extended drive must be a fibre RAID drive, mapped to the DX computer.

DISKXTENDER requires the Windows NT 4.0 Server (or higher) operating system with Service Pack 6a or greater, or Windows 2000 operating system with Service Pack 1 or greater, to be installed on the DX computer. Because DISKXTENDER functions as a Windows service, we recommend using the Windows NT Server edition or any of the Windows 2000 editions for optimal performance of your DX system. If you are running on a Windows NT system lower than Windows NT 4.0 with Service Pack 6a, you must upgrade to Windows NT 4.0 and apply Service Pack 6a or greater *before* installing DX.

In addition, if you are planning to install DISKXTENDER on a clustered environment, be sure to check your operating system requirements, and make sure the hardware in your cluster meets or exceeds the minimum specifications noted by the operating system documentation. DX cluster installation is supported on Windows NT Enterprise Edition or Windows 2000 Advanced Server Edition cluster server using Microsoft Cluster Server in active/passive mode.

NOTE

If you are planning to use SANXTENDER with your DX system, you must be running the Windows 2000 operating system with Service Pack 1.

NOTE 

For information on the latest Windows service packs and hot fixes certified for use with DX, contact your technical support representative. For information on operating system issues that may affect performance on your DX system, consult the DX Knowledge Base.

To access the DX knowledge base:

- From the Windows Start menu, select Programs, then DISKXTENDER and then Help. From the Help menu, select DISKXTENDER Knowledge Base.

DX COMPUTER SPECIFICATIONS

DX computers should have the following minimum configurations (based on the total number of files that will be stored on the computer):

Table 6: Minimum Configurations

NUMBER OF FILES:	MINIMUM CONFIGURATION – WINDOWS NT:	MINIMUM CONFIGURATION – WINDOWS 2000:
<500,000	200-MHz Pentium processor, 128 MB of RAM	200-MHz Pentium processor, 256 MB of RAM
<1,000,000	300-MHz Pentium processor, 128 MB of RAM	300-MHz Pentium processor, 256 MB of RAM
<10,000,000	400-MHz Pentium processor, 256 MB of RAM	400-MHz Pentium processor, 256 MB of RAM
>10,000,000	450-MHz Pentium II processor, 512 MB of RAM	450-MHz Pentium II processor, 512 MB of RAM

RECOMMENDED UPGRADES FOR OPTIMIZATION

In order to optimize the performance of DISKXTENDER, we recommend that the DX computer:

- ↵ Have a faster than minimum CPU to improve processing speed.
- ↵ Have as much memory as possible to provide faster data access.
- ↵ *Not* be a Primary Domain Controller or a Backup Domain Controller for your network. While DX *can* be run on a PDC or BDC, for performance reasons it is not recommended.
- ↵ Have space planned on the NTFS volume (or contain additional NTFS volumes) for future expansion of the system. (For information, see *Sizing Your Extended Drive* on page 28.)

MAXIMIZING DISKXENDER PERFORMANCE

Following are some suggestions for maximizing Windows NT/2000 performance. Although not required, implementation of these methods will help you achieve greater system efficiency.

INCREASING DX COMPUTER PERFORMANCE

The system resources on the DX computer should be taken into consideration when planning a DX system. The size and number of hard drives, amount of available RAM, processing power, and network cabling and configuration can all affect the performance of the DX system.

Dedicated DX Computers

If many other processes are running on the same machine as DX, performance may decrease. System resources may become overloaded if other programs are running on the same computer, particularly if the DX computer is running the media service as well. Therefore, you may want to consider installing DX on a machine specifically for DX and nothing else.

Two Hard Drives on the DX computer

If you do decide to install DX on the same computer where you install your media service, two hard drives – one containing Windows NT/2000 program files and the media service software and one for use as an extended drive by DX– will maximize performance. Data can be written to one drive, while system processes use the other drive. Dedicating one drive for data storage provides better read/write performance, especially in a system where large amounts of data are being saved to DX (e.g., heavy scanning environment). If possible, avoid extending a system drive.

As Much RAM as Possible

The more memory on the DX computer, the faster Windows NT/2000 and DISKXENDER will perform.

Multiple-Processor Machines

DISKXENDER fully supports the use of multiple-processor machines. Using a multiple-processor machine for the DX computer improves DX performance, because multiple tasks can be performed at the same time with each processor carrying out a separate task concurrently.

Fast Network Topology

DISKXTENDER uses a dedicated RPC connection for communication between DX and the media services it uses. DX will detect and enable RPC settings during installation. Because DX handles the RPC connection, no optimization of the DX connection is necessary. However, network topology and Windows NT/2000 configuration can affect throughput between network DX computers and their media services, and between DX computers and their clients.

In cases where network DX computers are installed, network cabling designed for high volume throughput, such as Fast Ethernet or fiber optic, can improve file transfer speeds between DX and its media services.

ENSURING DATA SECURITY

The data in your DX system is copied out to media to archive the data. However, to ensure that all data in the system is safeguarded against system failure (including Windows NT/2000 failure), certain data security measures are recommended. Some of these recommendations are discussed briefly in the sections below.

Running Regular Drive Scans

Extended Drive Scans inventory the contents of the extended drive and determine what files are to be written to the move and purge lists. The primary purpose of drive scans is to write files that qualify for move rules with an age delay to the move list. Files that qualify against move rules with no age delay are typically written to the move list as soon as they are saved to the extended drive.

WARNING

While files qualifying for a move rule with no time delay are automatically added to the move list, file-sharing issues or sharing violations can prevent files from being added to the move list when appropriate. DX must have full access to a file in order to obtain information required for the move list. If the file is open or is otherwise being accessed by a program or user, DX cannot add it to the move list.

Because files may not be added to the move list due to file-sharing issues, regular drive scans are required to be sure that all appropriate files are written to the move list when they qualify, and as such, are being written out to storage media (in coordination with your Move files to media schedule). DX allows you to force drive scans at any time, and to set a regular schedule for drive scans. Because drive scans for very large extended drives can be time consuming, and to make sure files due to be added to the move list are not currently being accessed, you may want to schedule your drive scans to occur during times of low extended drive and system traffic.

Backing Up the Extended Drive

It is recommended that you periodically back up your extended drive, to preserve any file data on the drive that has not yet been moved out to media. DX contains an extended drive backup utility, which is accessed through the properties of each extended drive. The extended drive backup function allows you to schedule regular full and incremental backups of all data on the extended drive.

In addition, because DISKXTENDER is very specific about the information it uses to locate and retrieve files, the DX extended drive backup utility is designed to ensure that all required information is saved during a backup. For this reason, we recommend scheduling regular backups of your extended drive using the Extended Drive Backup utility. For detailed information and procedures relating to the extended drive backup function, see the Extended Drive Administration chapter of the DX2000 System Guide.

Using Repair Disk to Backup the DX Registry

The Repair Disk feature backs up the DX registry settings for the DX computer. This provides a way to recover DX settings without reconfiguring them in the event of a system failure on the DX computer. As with any repair disk backup, you should save the backup of the DX registry settings on a separate volume from the system files, and ideally on a separate computer.

Windows NT/2000 Partitioning

When you extend a drive, the drive being extended should always be a separate drive from the drive where the computer's system files are located. If the computer on which you plan to install DX contains only one drive, you may wish to partition that drive to create a separate NTFS volume using Windows NT/2000. This allows you to extend the partition that does not contain the system files, separating system files from data to be migrated.

Disk Redundancy for DX Computers

Disk redundancy (i.e., RAID arrays or disk mirroring) is recommended for DX drives if DX functionality and data are mission-critical. Use of disk redundancy significantly reduces disaster recovery time for a DX system. With a redundant system, you will be able to recover data while the system is still running, giving you uninterrupted service.

Installing DISKXTENDER in a Clustered Environment

Clustering is the process of connecting two or more computers together in such a way that they behave like a single computer, and so that they share a single storage device. The ability of a cluster to transfer functions between a Primary and Secondary server is called *fault tolerance*. If the Primary node fails or is paused for

repairs, the processes will fail-over to the Secondary node. Because the Secondary node has the same configuration as the Primary node, the Secondary node can run cluster operations with little or no disruption of server activity. When the Primary node comes back on-line, it is now available to take over the processing functions if/when necessary, and effectively becomes the Secondary node. In the event the *new* Primary node (which was the Secondary node before the fail-over) fails, the Cluster operations will return to the original Primary node.

DISKXTENDER has the capability to run in a clustered environment. The administrator needs little interaction, as the Windows operating system handles all other special cluster-related functions. The DX installation procedure recognizes that the program is being installed on a cluster, and modifies the installation appropriately.

DETERMINING DX HARDWARE

Before installing DX, you will want to consider the overall storage needs for the system. Should you buy several DX licenses to allow for extended drives on several different machines? Or, will it be more efficient to centralize your DX files on one computer? Will you be using SANXTENDER with your DX system?

You should decide before installation how many DX computers and extended drives to use, and how to organize the data on each drive. You can also plan in anticipation of the traffic patterns on the DX system: how and when will files be moved? How long do you want to keep files? To how many files will you want immediate access? When will the system be used most? When will it be used least?

Some issues to consider include:

- ↵ The number of DX computers to use
- ↵ The total volume of files in your DX system
- ↵ The optimal distribution of data in your DX system
- ↵ When files should be moved to media
- ↵ What/how many files should be available for immediate access
- ↵ DX traffic patterns

Some organizations have existing file storage systems, and may have already decided on an optimum arrangement for file servers. There is no need, in implementing DX, to modify your chosen arrangement. Simply install DX on each of the file servers, and DX will extend your existing hard drives with long-term storage on the media services for DX.

If an existing file server already has multiple hard drives, extending a new file server might provide more efficient client access. DX could be installed on the new file server, and file organization planned.

Additional DX computers can be added to a DX system as file storage needs on a network increase. DX scalability allows you to start, for example, with DX and its media service installed on a single machine (preferably with two hard drives). The DX system can later be expanded as needed by adding new hard drives and other DX computers.

MULTIPLE VS. SINGLE EXTENDED DRIVES

DISKXTENDER requires that the basis for an extended drive is an NTFS volume. If you want to create multiple extended drives on a single physical hard drive, you can use Windows NT disk administration or Windows 2000 computer management utilities to partition the drive into multiple NTFS volumes.

DISKXTENDER offers extended drives, media folders, move groups and move and purge rules to provide the most flexible data organization available. You should take into consideration the goals of the entire storage solution when making the decisions about multiple extended drives and/or multiple media folders.

SIZING YOUR EXTENDED DRIVE

The general rule for an extended drive is: more is better. NTFS volumes should be selected based on system activity and required response time. The larger the extended drive is, the faster the system performance will be, due to the greater chance that any file requested will already be on the drive. For many systems with large volumes of data, extended drives should be sized to accommodate, at a minimum, an entire day's processing for the clients connecting to the drive. This allows you to work at full speed during the day, with DISKXTENDER performing time-costly file migration and other media tasks at night.

Each extended drive, whether associated one-on-one with a DX computer, or one of multiple extended drives on a given DX computer, must be sized separately. Calculating extended drive size will help you determine the hardware requirements for your DX system. If you determine that you require a very large amount of space to store your DX files, you might consider distributing the files over more than one DX computer.

As a general rule of thumb, 1,000,000 files require 1.5 gigabytes of hard drive space. This rule of thumb should be used only for a general estimate of required drive size. Use the following sizing guidelines for a more accurate size estimate.

Table 7: Space Requirements

NUMBER OF FILES:	ESTIMATED SPACE NEEDED:
1,000,000	1.5 GB
5,000,000	5.9 GB

NUMBER OF FILES:	ESTIMATED SPACE NEEDED:
10,000,000	11.8 GB
20,000,000	23.6 GB

The Sizing Formula

Extended Drive size can be calculated using the following formula:

$$\begin{aligned}
 &\text{File Overhead (see } \textit{Calculating File Overhead} \text{ below)} \underline{\hspace{2cm}} \text{ MB} \\
 &+ \\
 &\text{Active File Space (amount of data stored on drive)} \underline{\hspace{2cm}} \text{ MB} \\
 &+ \\
 &\text{New File Space (amount of data input daily)} \underline{\hspace{2cm}} \text{ MB} \\
 &+ \\
 &\text{Move List Size (see } \textit{Calculating Move List Size} \text{ below)} \underline{\hspace{2cm}} \text{ MB} \\
 &+ \\
 &\text{Purge List Size (see } \textit{Calculating Purge List Size} \text{ below)} \underline{\hspace{2cm}} \text{ MB} \\
 &+ \\
 &\text{Log File Space} \underline{\hspace{1.5cm}} \text{100} \text{ MB} \\
 &= \\
 &\text{Extended Drive Size} \underline{\hspace{2cm}} \text{ MB}
 \end{aligned}$$

A log file space estimate is provided. Using the sections below, you can calculate the values for the remaining blanks above.

Calculating File Overhead

NTFS, the file system used to format the volume to be used as your extended drive, uses a specific number of bytes to store the attributes of each file on an NTFS drive. If you are running Windows NT, the number of bytes used is 1276. If you are running Windows 2000, the number of bytes used is 1500. As part of calculating required space, you need to account for this Windows NT/2000 file overhead. File overhead is calculated by multiplying the total number of files by either 1276 or 1500, depending on your operating system.

$$\begin{aligned}
 &\text{Total files on drive} \underline{\hspace{2cm}} \text{ MB} \\
 &* \hspace{10cm} \text{1276 bytes or 1500 bytes} \\
 &= \\
 &\text{File Overhead} \underline{\hspace{2cm}} \text{ (in bytes)}
 \end{aligned}$$

$$\begin{array}{r}
 / \\
 1,048,576 \quad \text{(divide to convert to megabytes)} \\
 = \qquad \qquad \qquad \qquad \qquad \underline{\hspace{2cm}} \text{ MB}
 \end{array}$$

Calculating Move List Size

The size of the move list can be estimated by multiplying the number of new files input between drive scans by 561 (the number of bytes required to record each file on a move list). A multiplier of 561 represents this figure in the following formula:

$$\begin{array}{r}
 \text{Files written since last drive scan} \quad \underline{\hspace{2cm}} \\
 * \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad 561 \text{ bytes} \\
 = \\
 \text{Move List Size} \quad \underline{\hspace{2cm}} \text{ (in bytes)} \\
 / \\
 1,048,576 \quad \text{(divide to convert to megabytes)} \\
 = \qquad \qquad \qquad \qquad \qquad \underline{\hspace{2cm}} \text{ MB}
 \end{array}$$

NOTE 

DX writes files to the move list during drive scans. Drive scans can be run on an hourly, daily, weekly, or monthly basis. Before completing this formula, it will be useful to think about how often it will be feasible to run drive scans on your extended drives. Take the estimated number of files your users will write daily and multiple by the number of days between scans (or divide by the number of hours between scans if running hourly drive scans) to get the number of files written between drive scans.

Calculating Purge List Size

The size of the purge list can be estimated by multiplying the number of retrieved files by 561 (the number of bytes required to record the file on the list). A multiplier of 561 represents this figure in the following formula:

$$\begin{array}{r}
 \text{Files retrieved since last drive scan} \quad \underline{\hspace{2cm}} \\
 * \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad 561 \\
 = \\
 \text{Purge List Size} \quad \underline{\hspace{2cm}} \text{ (in bytes)} \\
 /
 \end{array}$$

$$1,048,576 \quad (\text{divide to convert to megabytes}) \\ = \quad \underline{\hspace{2cm}} \quad \text{MB}$$

WINDOWS NT/2000 SECURITY

Because Windows NT/2000 security protects the DX computer, security issues need to be addressed in certain situations.

REMOTE ADMINISTRATION

Remote administration of DX computers works through a Remote Procedure Call (RPC) connection, that enables communication between a remote DX Administrator and the DX computer. Security for that connection is managed by managing membership of the DXAdministrators group on the DX computer.

Verifying that Remote Administrators are DXAdministrators Members

In order to prevent unauthorized users from connecting to DISKXTENDER computers, DISKXTENDER creates a local DXAdministrators group on the DX computer. To administer the DX system through a remote installation of the DX Administrator, you must be a member of that group.

DISKXTENDER automatically adds the Domain Admins group for the DX computer's primary domain to the DXAdministrators group. By default, Windows NT/2000 adds administrators to this group when an administrative account is created. Therefore, if an administrative account is on the same primary domain as the DX computer, and no users have been removed from the Domain Admins group, no configuration may be necessary. You can verify that a user is a member of DXAdministrators in a few steps.

NOTE

If you are running DX in a clustered environment, changes or additions to the DXAdministrators group must be configured on *each* of the servers in the cluster.

To access the DXAdministrators group and users for Windows NT:

- On the DX computer, open the Windows 2000 Computer Manager. From the Start menu, select Programs → Administrative Tools → User Manager.

To access the DXAdministrators group and users for Windows 2000:

- On the DX computer, open the Windows NT User Manager. From the Start menu, select Programs → Administrative Tools → Computer Management.

The groups for the local domain are listed in the Groups list. The DXAdministrators group was automatically added to this list when DISKXTENDER was installed. Double-click the DXAdministrators group name (or highlight the name in the list and select Properties from the User menu), and the Local Group Properties dialog box for DXAdministrators appears.

The Members list for the group lists all of the users and groups that are members of the DXAdministrators group. In order for users to remotely administer the DX computer, their user names must be listed here, or they must be members of a group listed here.

If a user is not listed and does not belong to any groups listed, you must add them to the group.

To add a user:

- 1 Double-click the DXAdministrators group in the Groups list. The Local Group Properties box appears.
- 2 Click Add. The Add Users and Groups dialog box appears.
- 3 Select the appropriate domain from the drop-down list of domains.
- 4 From the Names list, select the user name.
- 5 Click Add to add the user to the Members list for the DXAdministrators group.

NOTE

To view the members of a group, you can double-click the name of the group in the Names list in the Add Users and Group dialog box. A list of the current members of the group appears.

CHAPTER THREE

DISKXTENDER INSTALLATION

Installing DISKXTENDER (DX) is an easy process, with system prompts that guide you through every step of the installation process. After DX is installed, and you open the DX Administrator for the first time, you will be able to add the basic components necessary to get your DX system up and running. You may create them at this time or choose to do it later.

If you are planning to run DISKXTENDER in a clustered environment, you must install the DISKXTENDER program either from a remote machine or directly on the Primary server (the server node currently in control). If installing from a remote machine, be sure to select the logical cluster name to add to the list of computers for install. If installing directly on the Primary server, be advised that the installation program can detect whether the computer is the current Primary server, and will fail if initiated on a machine other than the Primary server of the cluster.

In addition, during the installation of DISKXTENDER you will be prompted to select whether you are installing a licensed version of DX or a 30-day evaluation version. OTG Software product licenses are managed through the OTG License Server, which is a separate product and installed separately from DISKXTENDER, though the License Server software is included on the DISKXTENDER CD. For information on installing and configuring your license server, see the License Server System Guide.

The first section of this chapter contains step-by-step instructions for installing DISKXTENDER using the Setup wizard. After the installation instructions you will find a brief section on opening the DX Administrator for the first time with procedures for configuring a media service, adding an extended drive, and creating a media folder.

The second section of this chapter has information and instructions for upgrading to DX2000 version 5.2 from previous versions of DX2000.

The third section of this chapter has information and instructions for installing the Remote Administrator, and a brief section on opening the Remote Administrator for the first time.

DISKXTENDER 2000 requires the Windows NT 4.0 (Service Pack 6a or greater) or Windows 2000 operating system on the DX computer. Consult your Windows NT/2000 documentation for information on installing the operating system.

NOTE

If you are planning to use DISKXTENDER on a SAN environment, in conjunction with SANXTENDER, please review the SANX System Guide before installing DX. Operating system requirements and pre-installation configuration information for a SAN installation of DX is slightly different than with a standard installation of DX.

WARNING

If you are converting your system from version 3.2 or 4.2 to DX2000, please see either the *Converting to DX2000 from DiskExtender* 3.2 chapter beginning on page 151, or the *Converting to DX2000 from DISKXTENDER* 4.2 chapter beginning on page 195 **before installing DX**. Each of these conversions requires different installation procedures that must be followed in the proper order.

INSTALLING DISKXTENDER

The following sections describe how to install DISKXTENDER using DX Setup. DX Setup is a wizard that leads you through the necessary steps for installing DISKXTENDER. The Next button continues to the following step; the Back button (when active) returns to the preceding step. The Cancel button exits Setup, canceling the process.

For your convenience, the setup wizard allows you select to install DISKXTENDER on multiple computers at once, provided those computers are visible on your network and you have Administrator privileges and rights to log onto the destination computers as a service. To take advantage of this feature, you may want to determine which computers are to have DISKXTENDER installed on them (and configure the appropriate rights if necessary) before you run the installation wizard, enabling you to only run the installation once rather than multiple times. To configure the appropriate rights, see *Verifying that Remote Administrators are DXAdministrators Members* on page 31.

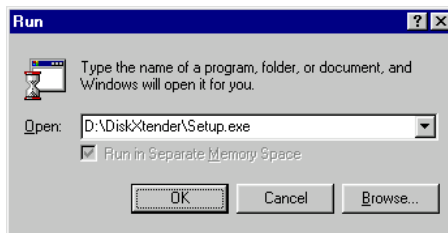
NOTE

Exit all applications before running Setup. If other software is running, Setup may not be able to write to all necessary files.

To install DX:

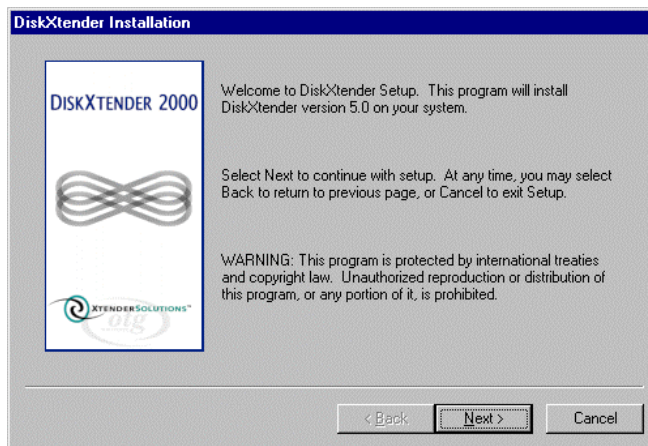
- 1 Insert the DISKXTENDER setup CD-ROM into the drive. From the Windows Start menu, select Run. The Run dialog box appears.

Figure 7: Run Dialog Box



- 2 You can either browse to the file or type the path in the Open text box:
D : \DX2000 . XXX \DISKXTENDER \SETUP . EXE
(In this path, D represents the drive holding the setup CD-ROM and XXX represents the DX2000 version number.)
- 3 Once the file/path appears in the Open text box, click OK. DISKXTENDER setup is initiated (which may take up to two minutes), and then the DISKXTENDER Setup wizard appears, starting with the DISKXTENDER Installation page.

Figure 8: DISKXTENDER Installation Page



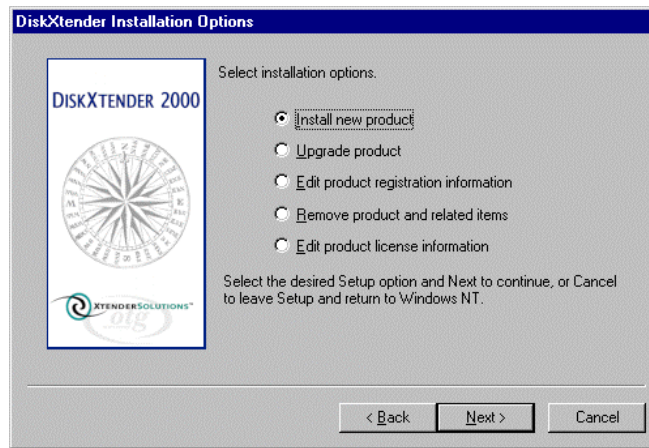
The DISKXTENDER Installation page briefly describes the installation process.

WARNING 

If you are converting your system from version 3.2 or 4.2 to DX2000, please see either the *Converting to DX2000 from DiskExtender 3.2* chapter beginning on page 151, or the *Converting to DX2000 from DISKXTENDER 4.2* chapter beginning on page 195 **before installing DX**. Each of these conversions requires different installation procedures that must be followed in the proper order.

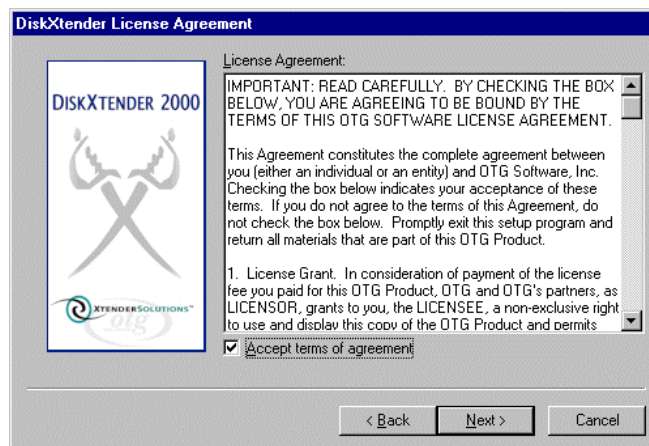
- 4 Click Next. The DISKXTENDER Installation Options page appears.

Figure 9: DISKXTENDER Installation Options Page



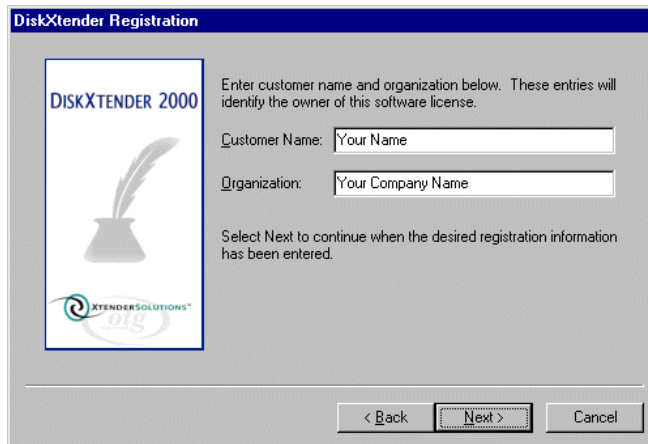
- 5 Select Install new product. Click Next. The DISKXTENDER License Agreement page appears.

Figure 10: DISKXTENDER License Agreement Page



- 6 You must accept the terms of the license agreement before you can proceed with the installation. Click the checkbox next to Accept terms of agreement. Click Next. The DISKXTENDER Registration Information page appears.

Figure 11: DISKXTENDER Registration Information Page



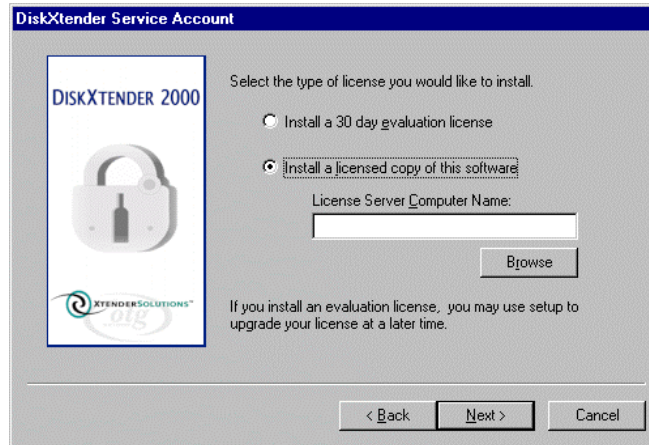
- 7 Enter the customer name and organization name. Click Next. The DISKXTENDER Service Account page appears.

Figure 12: DISKXTENDER Service Account Page



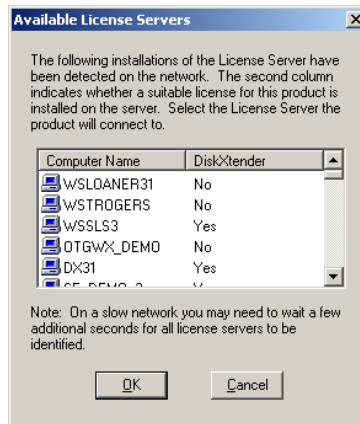
- 8 Enter the account information for the account that you want to use as the DX Service Account. Click Next. The Service Account Type of Install page appears.

Figure 13: Service Account Type Page



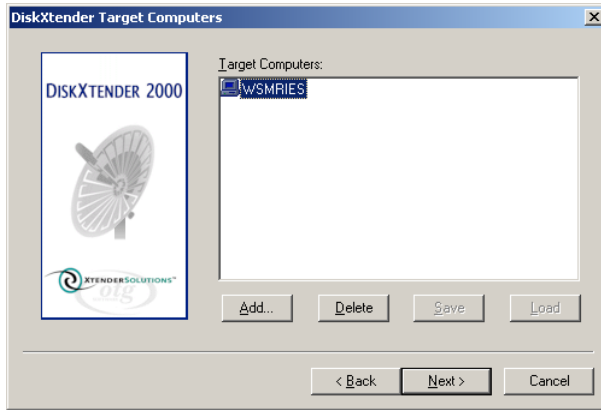
- 9 You have two choices:
 - ✎ Select the Install a 30-day evaluation license option to install DX without using a license server. This allows you to use DISKXTENDER for 30 days. After the 30-day evaluation period, you can use the Setup option in the OTG DiskXtender Program group to update your license.
 - ✎ Select the Install a licensed copy of the software option if you have installed and configured the DX license server already. Type in the name of the computer where the license server is installed, or use the Browse button to find the License Server computer on the network.
- 10 If you select to install a licensed copy of DX and click Browse, a dialog box appears listing all network computers where License Server is installed, and noting with each computer whether or not there is a DX license configured on that License Server.

Figure 14: Available License Servers Dialog Box



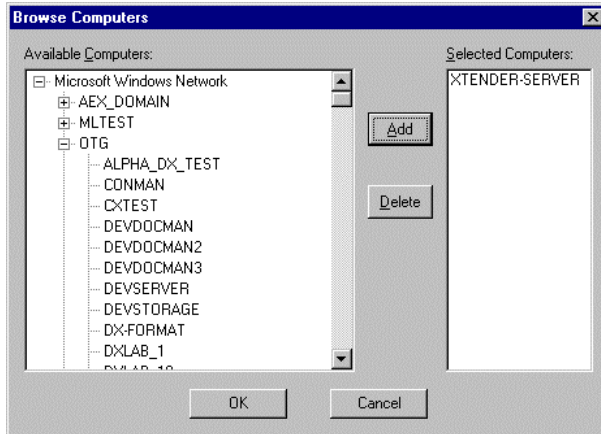
- 11 Highlight the License Server computer to be used to license this installation of DX and click OK. The Product License page returns, displaying the selected License Server computer in the License Server Computer Name text box.
- 12 When finished, click Next. The Select Target Computers page appears.

Figure 15: Select Target Computers Page



- 13 The local computer is automatically listed as a Target Computer. If you want to install DX on more computers, click Add. The Browse Computers dialog box appears.

Figure 16: Browse Computers Dialog Box



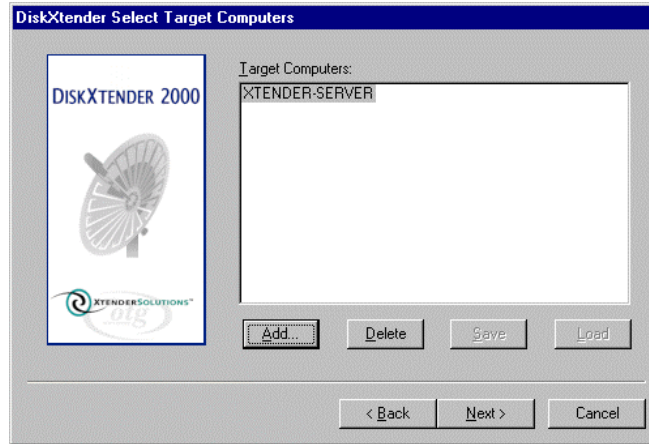
- 14 Under Available Computers, navigate to and select the computer on which you want to install DX. Click Add. The computer you have selected is listed under Selected Computers. Repeat this step for each additional computer on which you want to install DX.

NOTE 

If you are using a remote computer to install DISKXTENDER to a clustered environment, be sure to select the logical cluster name to add to the list of computers for install.

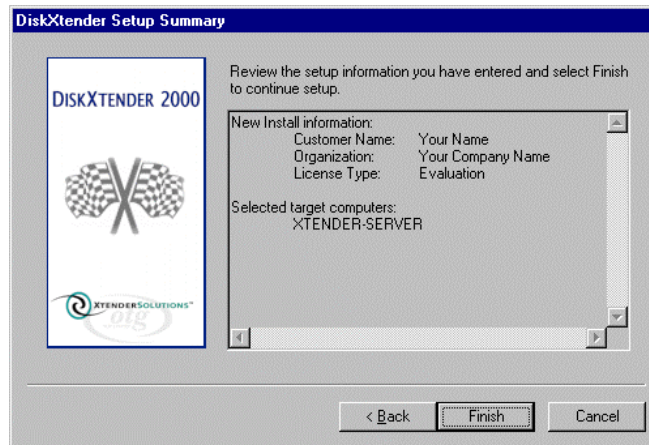
- 15 Click OK. You are returned to the Select Target Computers page.

Figure 17: Select Target Computers Page



- 16 When the Target Computers list is complete, click Next. The DISKXTENDER Setup Summary page appears. This page shows the customer name and organization and lists the target computers for the DISKXTENDER installation.

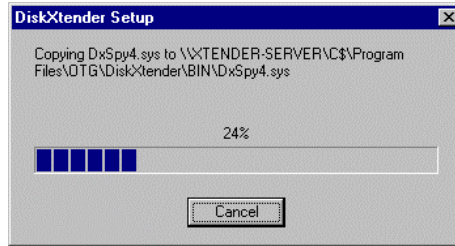
Figure 18: DISKXTENDER Setup Summary Page



- 17 Verify the accuracy of the information. If all information is correct, click Finish. DX Setup copies all program files into the Windows NT/2000 system directory,

and adds DISKXTENDER configuration entries and the program group to the system configuration of every target computer selected. A dialog box displays the status of the operation, while a DISKXTENDER window displays information about DX, its components, and utilities.

Figure 19: DISKXTENDER Setup Progress Box

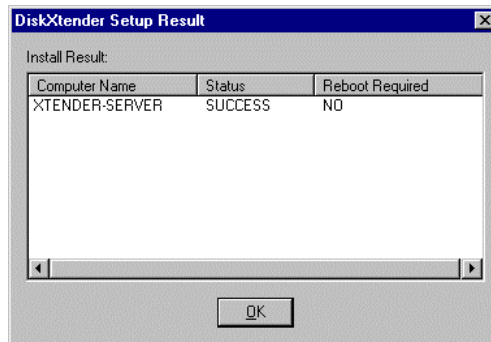


NOTE 

If necessary, you can cancel the setup procedure at anytime by clicking Cancel.

The DISKXTENDER Setup Result dialog box appears, listing the installation results for each computer you specified.

Figure 20: DISKXTENDER Setup Result Dialog Box



- 18 Take note of any computers where a Reboot is required (or computers on which the installation failed). Click OK.

If you are not required to restart the computer, a message appears, indicating that the DISKXTENDER installation has been successfully completed. You have the following choices:

- ➔ Click Start to close the DX Setup wizard and start DISKXTENDER.
- ➔ Click Exit to close the DX Setup wizard without starting DISKXTENDER.

Once Setup is complete, the DISKXTENDER program group is installed. When you enter DX for the first time, the Administrator module opens and attempts to connect to all target computers to which DISKXTENDER was installed.

STARTING THE DX ADMINISTRATOR THE FIRST TIME

The first time you start the Administrator, if you installed DISKXTENDER to any target computers (other than the local computer), DISKXTENDER will automatically register those computers in the Administrator. All registered computers will be listed in the Computer drop-down list and in the Tree View, regardless of whether they successfully connect or not. If connected successfully, each registered computer will appear with configured extended drives listed below the computer name. If no extended drives have been configured to those computers yet, the computer is listed with a status of (connected, no extended drives).

Until you configure a media service and add an extended drive to your DX system, DISKXTENDER cannot begin file migration. The following sections show you how to configure a media service and add an extended drive. You may want to refer to the DX2000 Data Management Guide for further information on file migration.

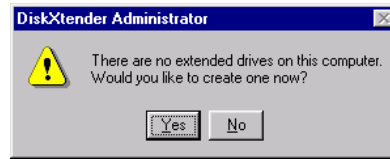
WARNING

If you are converting your DX system from version 3.2 to DX2000, please refer to *Installing/Setting up DX2000 and MEDIASTOR for Conversion* section on page 169, and use the instructions contained there for opening the DX Administrator for the first time and configuring the DX elements prompted by the system.

To open and configure the administrator:

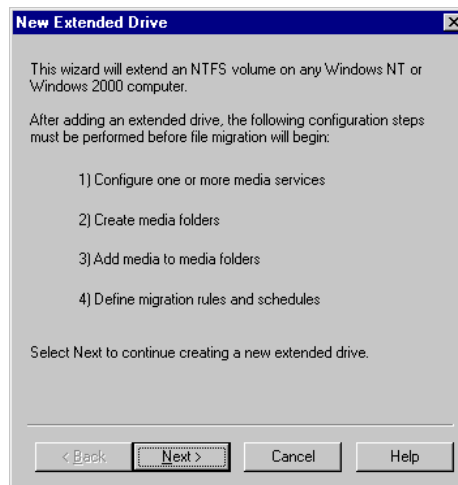
- 1 You have two options for starting the Administrator:
 - ↳ Immediately after DX installation, when the Installation Complete message appears, asking if you would like to start DISKXTENDER, click Start.
 - ↳ From the Windows Start menu, select Programs and then OTG DISKXTENDER. From the DISKXTENDER menu, select Administrator.
- 2 In the tree view of the administrator, highlight the DX computer for which you want to configure a media service. Select Configure Media Services from the Service Menu.
- 3 The media service wizard appears. For more information on configuring a media service, see the *Media Services* chapter beginning on page 89.
- 4 When you have completed configuring a media service, a message appears asking whether you want to create an extended drive.

Figure 21: DX Administrator: Create Extended Drive?



Click Yes. The Extended Drive wizard appears starting with the New Extended Drive page.

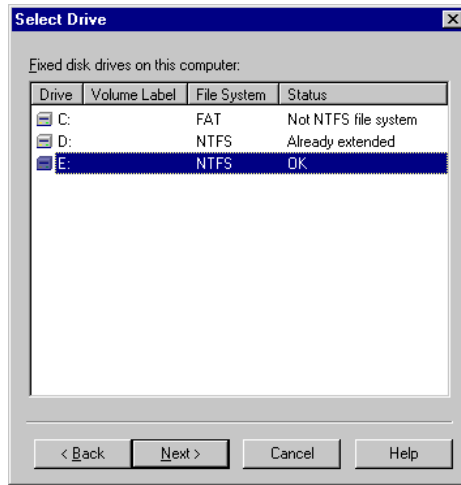
Figure 22: New Extended Drive Page



The New Extended Drive page lists the steps that must be performed after an extended drive has been created in order to begin file migration

- 5 Click Next. The Select Drive page appears.

Figure 23: Select Drive Page



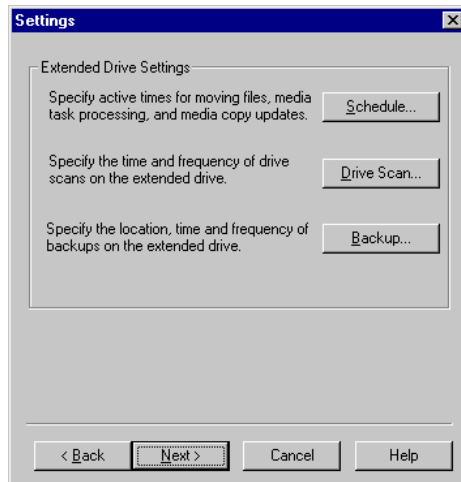
The Select Drive page lists all partitioned drives on the computer where DX is installed, along with the File System and Status of each drive. Only drives listed with a status of OK can be extended.

- 6 From the Select Drive page, select the NTFS volume you want to extend and click Next. The Settings page appears.

NOTE 

If you are using SANXTENDER with your DX system, be sure to select a mapped fibre RAID drive as your extended drive.

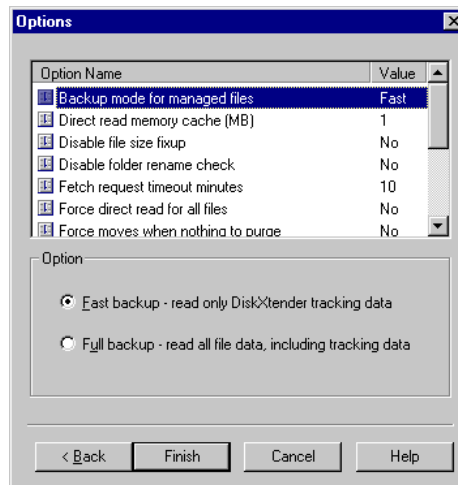
Figure 24: Extended Drive Settings Page



The Settings page contains three buttons: Schedule, Drive Scan and Backup. See the DX2000 Data Management Guide for details on configuring these settings.

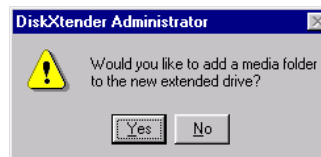
- 7 Click Next. The Options page appears. See the DX2000 Data Management Guide for details on each of the available extended drive options.

Figure 25: Extended Drive Options Page



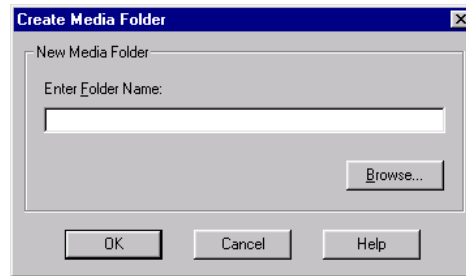
- 8 Click Finish. The extended drive is created and now appears in the Administrator tree view.
- 9 When you have completed adding your extended drive(s), a message appears asking if you would like to add a media folder to the new extended drive.

Figure 26: DX Administrator: Add Media Folder To Extended Drive?



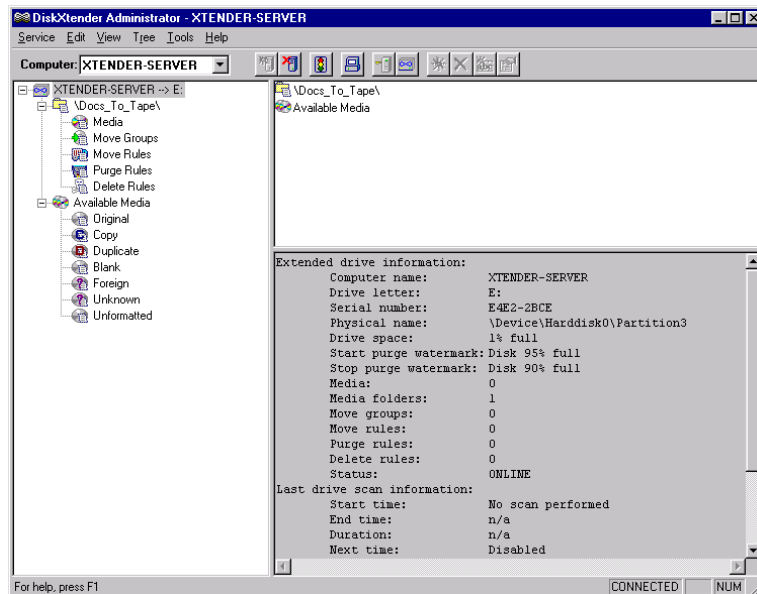
- 10 Click Yes. The Create Media Folder dialog box appears.

Figure 27: Create Media Folder Dialog Box



- 11 You have the following choices:
 - ✎ Create a new folder on the extended drive by typing the media folder name in the Enter Folder Name text box.
 - ✎ Use a folder that already exists on the extended drive as a media folder by clicking Browse and selecting the folder from the Select Folder dialog box. The folder name appears in the Enter Folder Name text box.For more information on creating media folders and their components, see the DX2000 Data Management Guide.
- 12 Click OK. The DISKXTENDER Administrator window appears with a tree showing the extended drive you created. Within that tree is a node containing the media folder you added to the extended drive.

Figure 28: DISKXTENDER Administrator



In Figure 28 above, the extended drive is the partitioned NTFS volume E: drive on the XTENDER-SERVER computer. This is represented in the tree as an extended

drive named: XTENDER-SERVER -> E:. The media folder is named \DOCS_TO_TAPE\ and can be found on the E: drive on that computer if you view it through Explorer. There are currently no media assigned to this extended drive.

After you configure a media service and add an extended drive, you will want to assign media to the extended drive. For more information, see *Configuring Media Services* on page 95. Also refer to the DX2000 Data Management Guide for detailed information and instructions for setting up all aspects necessary for file migration.

UPGRADING TO VERSION 5.2 FROM PREVIOUS VERSIONS OF DX2000

The following section describes how to upgrade to DISKXTENDER 2000 version 5.2 from previous versions of DX2000, using DX Setup. The DX Upgrade maintains all current DX information, including service login and licensing information. You will not have to fill that information into the upgrade wizard, as you did when you first installed DISKXTENDER.

NOTE

The steps in this section pertain only to upgrading from previous versions of DX2000. Upgrades from older versions of DX (4.2 or 3.2) are considered to be conversions and require a different set of steps. For conversion information, see *Converting to DX2000 from DiskExtender 3.2* beginning on page 151, or *Converting to DX2000 from DiskXtender 4.2* beginning on page 195, as appropriate.

DX Setup is a wizard that leads you through the necessary steps for upgrading DISKXTENDER. The Next button continues to the following step; the Back button (when active) returns to the preceding step. The Cancel button exits Setup, canceling the process.

For your convenience, the setup wizard allows you select to upgrade DISKXTENDER on multiple computers at once, provided those computers are visible on your network and you have Administrator privileges and rights to log onto the destination computers as a service. To take advantage of this feature, you may want to determine which computers are to have DISKXTENDER upgraded on them before you run the installation wizard, enabling you to only run the upgrade once rather than multiple times.

NOTE

Before running Setup, exit all applications. Setup may not be able to write to all necessary files if other software is running.

To upgrade DX to version 5.2:

- 1 Insert the DISKXTENDER CD-ROM into the drive. From the Windows Start menu, select Run.
- 2 In the Run dialog box, you can either browse to the file or type the path in the Open text box:

D:\DX2000.XXX\DISKXTENDER\SETUP.EXE

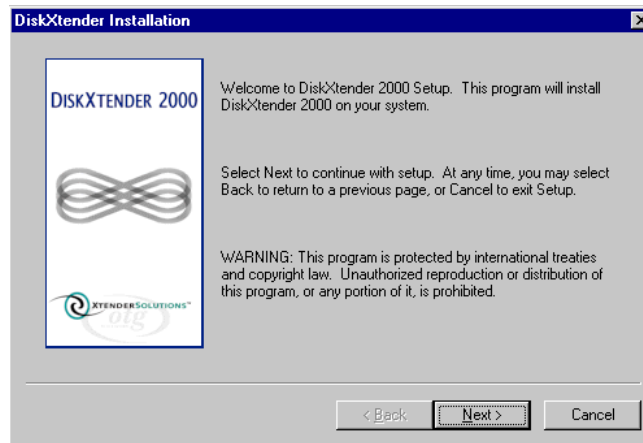
(In this path, D represents the drive holding the setup CD-ROM and XXX represents the DX2000 version number.)

NOTE

The upgrade steps for the remote administrator and the explorer add-ons are almost identical to those provided here. The only difference is the path in which the setup.exe file is found. For those upgrades, use the Remote Administrator or Explorer Add-Ons folder instead of the DiskXtender folder as described in the step above.

- 3 Once the file/path appears in the Open text box, click OK. DiskXtender setup is initiated (which may take up to two minutes), and then the DiskXtender Setup wizard appears, starting with the DiskXtender Installation page.

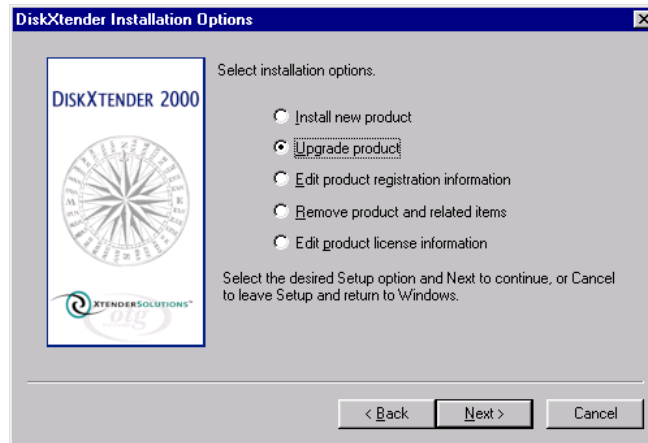
Figure 29: DiskXtender Installation Page



The DiskXtender Installation page briefly describes the installation process.

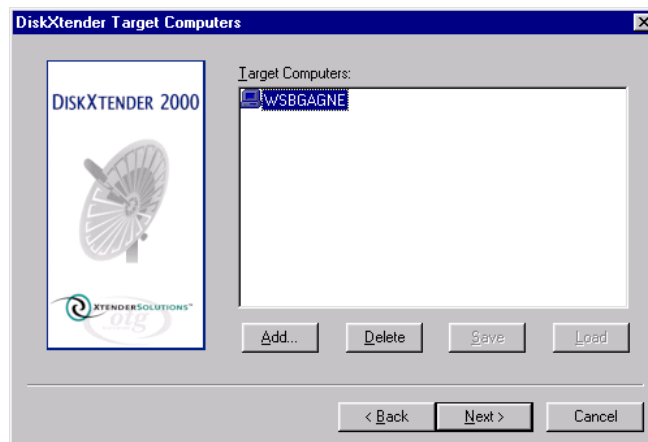
- 4 Click Next. The DiskXtender Installation Options page appears.

Figure 30: DiskXtender Installation Options Page



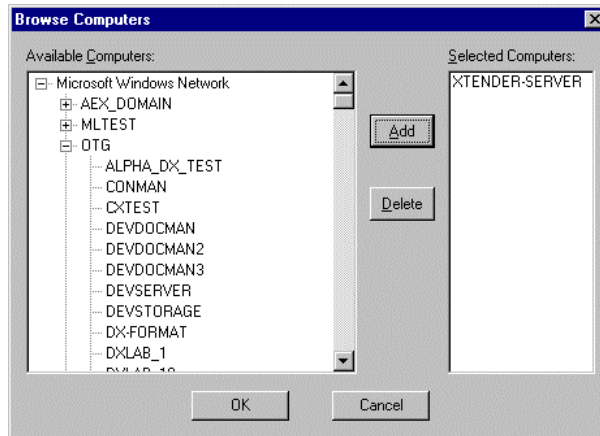
- 5 Select Upgrade product. Click Next. The Select Target Computers page appears.

Figure 31: Select Target Computers Page



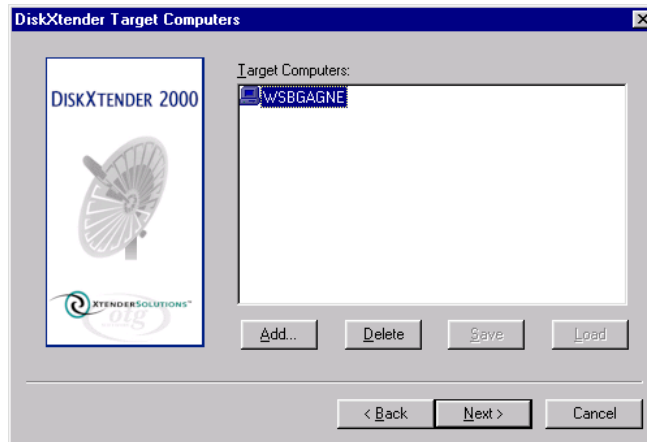
- 6 If you want to upgrade DX on more computers, click Add. The Browse Computers dialog box appears.

Figure 32: Browse Computers Dialog Box



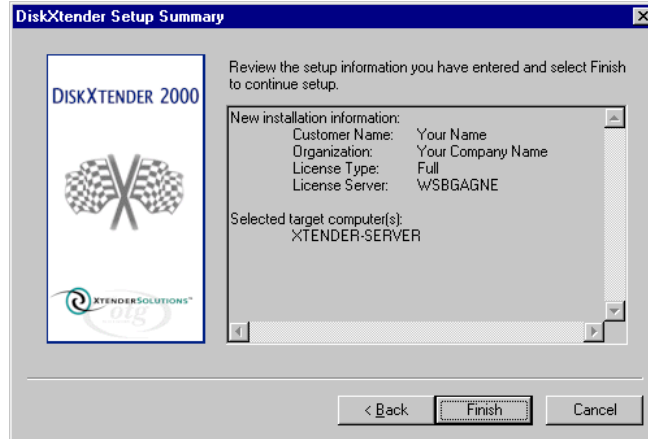
- 7 Under Available Computers, navigate to and select the computer(s) on which you want to upgrade DX. Click Add. The computer you have selected is listed under Selected Computers. Repeat this step for each additional computer for which you want to upgrade DX.
- 8 Click OK. You are returned to the Select Target Computers page.

Figure 33: Select Target Computers Page



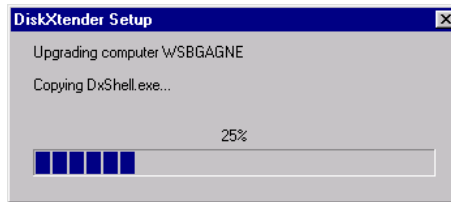
- 9 When the Target Computers list is complete, click Next. The DiskXtender Setup Summary page appears. This page shows the carried over registration and licensing information, and lists the target computers for the upgrade.

Figure 34: DiskXtender Setup Summary Page



- 10 Verify the accuracy of the information. If all information is correct, click Finish. A dialog box displays the status of the upgrade.

Figure 35: DiskXtender Setup Progress Box

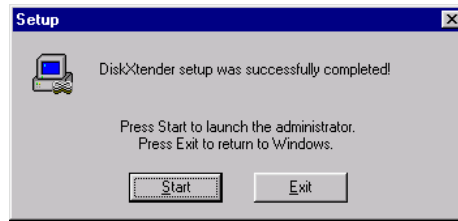


NOTE 

If necessary, you can cancel the setup procedure at anytime by clicking Cancel.

- 11 If you are upgrading DX on more than one computer, a Setup Results dialog box may appear, listing the upgrade results for each computer you specified. Take note of any computers where a Reboot is required (or computers on which the upgrade failed). Click OK.
- 12 If you are upgrading only the local computer, a message appears, indicating that the DISKXTENDER installation has been successfully completed.

Figure 36: DiskXtender Setup Complete Dialog Box



You have the following choices:

- Click Start to close the DX Setup wizard and start DISKXTENDER.
- Click Exit to close the DX Setup wizard without starting DISKXTENDER.

REMOTE ADMINISTRATION

DISKXTENDER (DX) allows you to administer the DX system both from the computer on which DX is installed and from remote computers. You can use the Administrator function that comes with a full installation of DISKXTENDER to administer other DX computers, or you can install the Remote Administrator, which simply provides you with the Administrator interface and the registration capability to attach remotely to one or more networked DX computers. The remote administration function is the same whether you use a DX Administrator (full installation) or a Remote Administrator.

This chapter covers installation of the Remote Administrator, and briefly outlines procedures for starting the Remote Administrator for the first time.

Installing DISKXTENDER (DX) Remote Administrator is an easy process, with system prompts that guide you through every step of the installation process. After the Remote Administrator is installed, and you open it for the first time, the Administrator will prompt you to register one or more DX computer(s) for remote administration.

DISKXTENDER 2000, including the Remote Administrator, requires the Windows NT 4.0 (Service Pack 6a or greater) or Windows 2000 operating system on the computer. Consult your Windows NT/2000 documentation for information on installing the operating system.

INSTALLING THE REMOTE ADMINISTRATOR

For Remote Administrator workstations connecting to a DX computer, a full DISKXTENDER setup is not necessary. Connecting workstations need access to the Administrator only. A Remote Administrator installation sets up the Administrator

interface as well as online help on the computer. Remote Administrator can be run on a Windows NT/2000 server or workstation.

Below you will find a step-by-step guide to installing DISKXTENDER Remote Administrator using the Remote Administrator Setup. Remote Administrator Setup is a wizard that leads you through the necessary steps for installing the DX Remote Administrator. The Next button continues to the following step, the Back button (when active) returns to the preceding step. The Cancel button exits Setup, canceling the process.

For your convenience, the setup wizard allows you select to install the Remote Administrator on multiple computers at once, provided those computers are visible on your network and you have Administrator privileges on those computers. To take advantage of this feature, you may want to determine which computers are to have the Remote Administrator installed on them and make sure you have administrative privileges on those machines before you run the installation wizard. This will enable you to only run the installation once rather than multiple times.

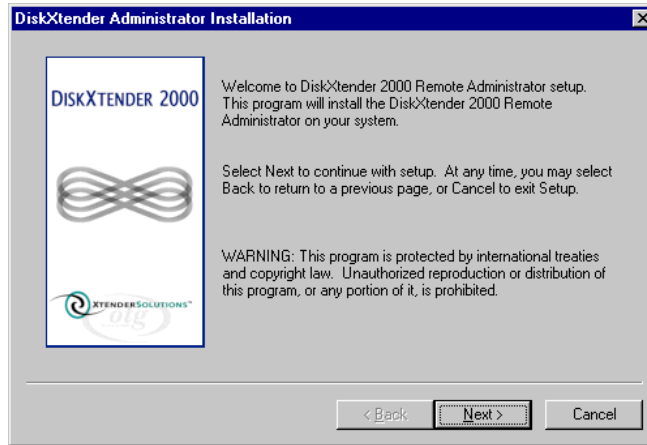
NOTE 

Before running Setup, exit all applications. Setup may not be able to write to all necessary files if other software is running.

To install the remote administrator:

- 1 Insert the DISKXTENDER CD-ROM into the drive. From the Start menu, select Run. The Run dialog box appears.
- 2 You can either browse to the file or type the path in the Open text box:
`D:\DX2000.XXX\DISKXTENDER_REMOTE
ADMINISTRATOR\SETUP.EXE`
(In this path, D represents the drive holding the setup CD-ROM and XXX represents the DX2000 version number.)
- 3 Once the file/path appears in the Open text box, click OK. DiskXtender Remote Administration setup is initiated (which may take up to two minutes). The DiskXtender Setup wizard appears, starting with the DiskXtender Administrator Installation page.

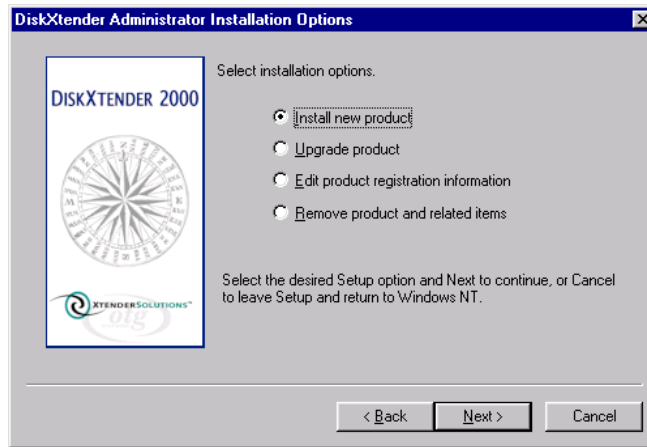
Figure 37: Administrator Installation Page



The DiskXtender Administrator Installation page briefly describes the installation process.

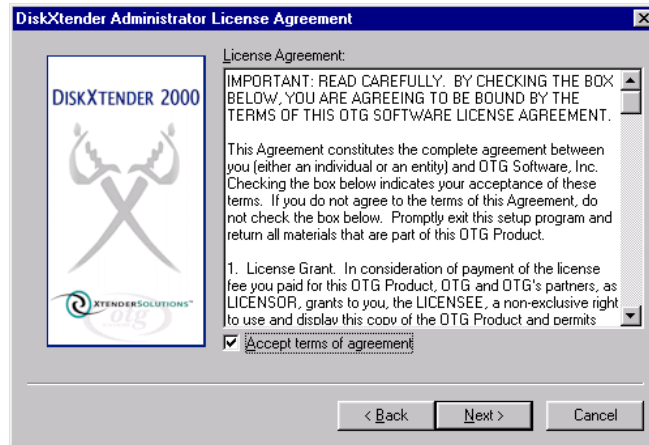
- 4 Click Next. The DiskXtender Administrator Installation Options page appears.

Figure 38: Administrator Installation Options Page



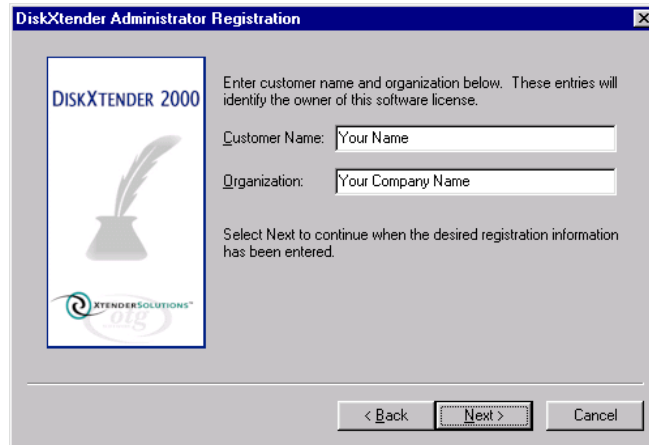
- 5 Select Install new product. Click Next. The DiskXtender Administrator License Agreement page appears.

Figure 39: Administrator License Agreement Page



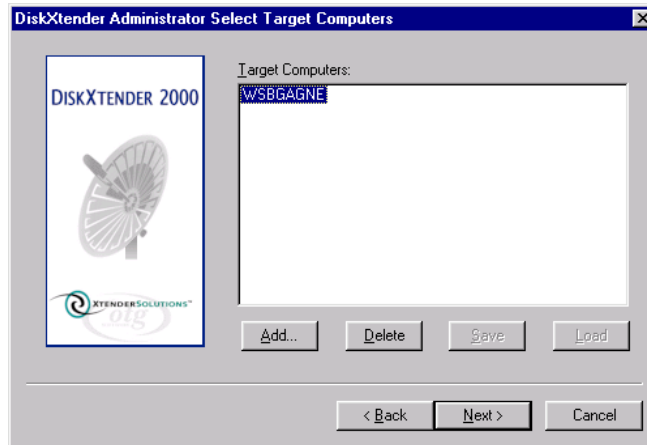
- 6 You must accept the terms of the license agreement before you can proceed with the installation. Click the checkbox next to Accept terms of agreement. Click Next. The DiskXtender Administrator Registration Information page appears.

Figure 40: Administrator Registration Page



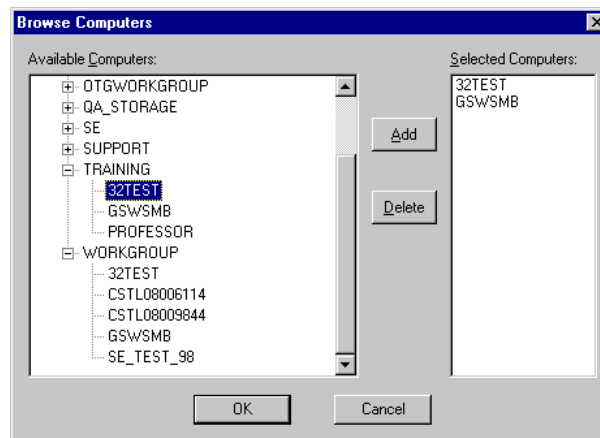
- 7 Enter the customer name and organization name. Click Next. The DiskXtender Administrator Select Target Computers page appears.

Figure 41: Administrator Select Target Computers Page



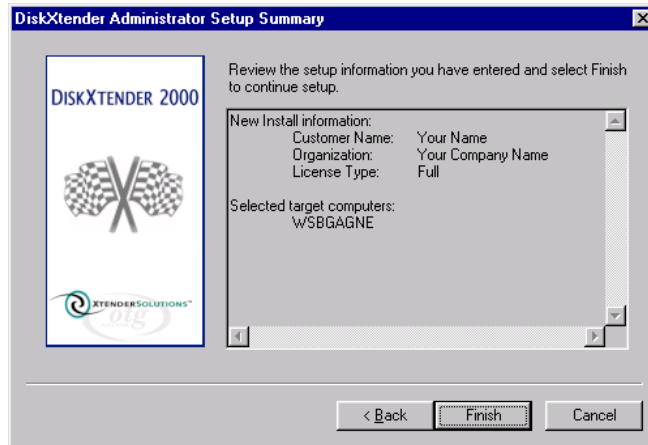
- 8 If you want to install the Remote Administrator on more computers, click Add. The Browse Computers dialog box appears.

Figure 42: Browse Computers Dialog Box



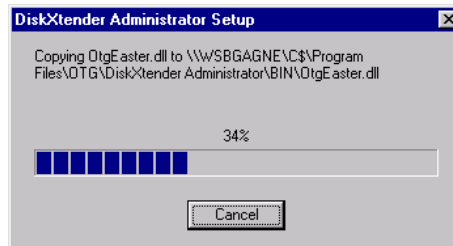
- 9 Under Available Computers, navigate to and select the computer on which you want to install the Remote Administrator. Click Add. The computer you have selected is listed under Selected Computers. Repeat this step for each additional computer on which you want to install the Remote Administrator.
- 10 Click OK. You are returned to the Select Target Computers page.
- 11 In the DiskXtender Administrator Select Target Computers page, click Next. The DiskXtender Administrator Setup Summary page appears. This page shows the customer name and organization and lists the target computers for the Remote Administrator installation.

Figure 43: Administrator Setup Summary Page



- 12 Verify the accuracy of the information. If all information is correct, click Finish. Remote Administration Setup copies all program files onto the system, and adds DiskXtender Administrator entries and the program group to the system configuration for each target computer selected. A progress bar displays the status of the operation, while a window displays information about DX, its components, and utilities.

Figure 44: Administrator Setup Progress Box

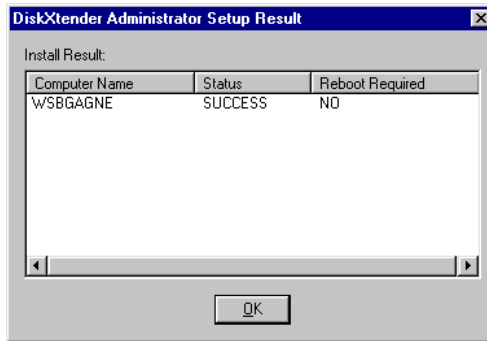


NOTE 

If necessary, you can cancel the setup procedure at any time by clicking Cancel.

The Administrator Setup Results dialog box appears, listing the installation results for each computer you specified.

Figure 45: Administrator Setup Results Dialog Box



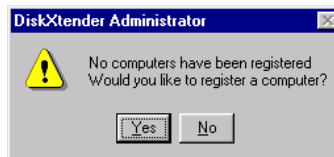
- 13 Take note of any computers that need to be restarted (or computers on which the installation failed). Click OK.
- 14 If you are not required to restart the computer, a message appears, indicating that the Remote Administration installation has been successfully completed. You have the following choices:
 - Click Start to close the Remote Administration Setup wizard and open the Administrator.
 - Click Exit to close the Remote Administration Setup wizard without starting the Administrator.

The OTG DiskXtender Administrator program group is installed. The Administrator is now ready for use by the remote workstation.

STARTING THE REMOTE ADMINISTRATOR THE FIRST TIME

Because the Remote Administrator functions as an interface for DISKXTENDER services installed on other machines, you must register the other computers through the administrator in order to use the remote functionality. The first time you start the Remote Administrator, a message appears prompting you to register a DX computer to the Remote Administrator.

Figure 46: Register a Computer?



To respond to the computer registration message:

- You have the following choices:
 - ↪ To close the message box, but leave the empty Administrator window open, click No.
 - ↪ To start the computer registration wizard (through which you can add one or more connections to remote computers where DISKXTENDER is installed), click Yes.

For more information and detailed instructions on registering DX computers, see *Registering a DX Computer for Remote Administration* on page 70.

CHAPTER FOUR

WORKING IN THE ADMINISTRATOR

Because DISKXTENDER (DX) is a Windows-based package, the same navigational standards apply to all of its components. The Administrator provides a user-friendly interface that allows you to easily create and configure DISKXTENDER components as well as manage DX computer and extended drive properties on one or more DX machines.

The Administrator has an intuitive “tree” view that displays the underlying structure of the DX system. Each extended drive appears as a primary tree node and the configuration items for those extended drives are grouped as sub-trees for ease of use.

The Administrator is the interface through which you can configure all aspects of extended drive and DX functionality. Using the Administrator you can:

- ↗ Create an extended drive and configure/manage its properties.
- ↗ Create media folders for your extended drive.
- ↗ Assign pieces of media to media folders and then define rules to control the management of files in the media folder.
- ↗ Set up schedules to control when events, such as file migration and processing of media management tasks, occur.
- ↗ Configure alerts to send messages alerting a particular user or workstation to DX errors or warnings relating to the extended drive.
- ↗ View event, warning, and error logs and run reports on various aspects of DX system functionality.

The Administrator can be run on the same computer where DX is installed or from a remote workstation using the Remote Administrator. This chapter explains the basic layout of the Administrator, as well as its general functionality. For more detailed information on specific functional settings, please refer to the DX2000 System Guide or the DX2000 Data Management Guide.

STARTING THE ADMINISTRATOR

Starting the Administrator allows you access to extended drives and their associated media and media information. You can connect to local or remote DX computers through the Administrator interface and extend drives on those computers. Using the Administrator, you can manage DX file organization and directory structure, manage media, and set event schedules on multiple DX computers.

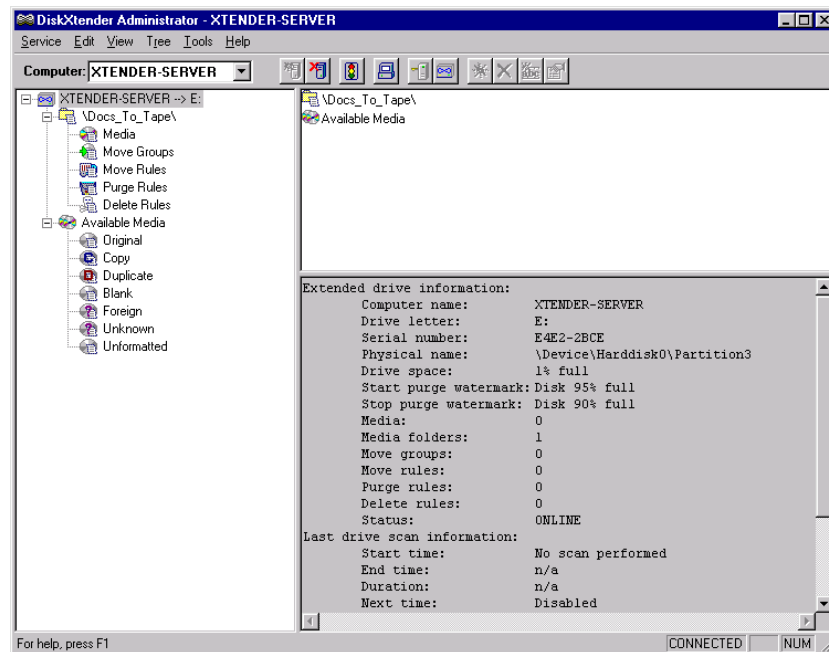
Upon successful connection to one or more DX computer(s), the tree view of the Administrator displays all configured DX components in a tree-like structure. The tree structure contains a primary Extended Drive node with two secondary nodes for each extended drive: Media Folders and Available Media.

NOTE

The Extended Drive and Media Folders nodes will not appear until extended drives and media folders are created. Media will not appear until you configure a media service and allocate media to the DX extended drive. See *Starting the DX Administrator the First Time* on page 42.

To open the administrator:

- From the Windows Start menu, select Programs and then OTG DISKXTENDER. From the DISKXTENDER menu, select Administrator. The Administrator window appears.

Figure 47: DISKXTENDER Administrator

When the Administrator opens, it automatically connects to all registered DX computers. If this is a full installation of DX (as opposed to a Remote Administrator installation) the local computer is automatically registered, and therefore automatically appears in the Administrator. In addition, if you installed DX on multiple target computers, DX automatically registers and attempts to connect to all target computers identified during DX install. Once these connections have been made, the Administrator displays information relevant to each connected DX service.

If you want to administer the DX service on computer(s) other than those currently connected, you must register the DX computers through the Administrator. For more detail on registering DX computers, see *Registering a DX Computer for Remote Administration* on page 70.

THE ADMINISTRATOR WINDOW

The Administrator window is made up of several components: a menu bar, a Computer drop-down list box, a tool bar and a status bar. The menu bar contains the main menu commands and can be found at the top of the window. The Computer

drop-down list box can be found just below the menu bar on the left, and the toolbar can be found just below the menu bar to the right of the list box. The status bar can be found at the bottom of the window.

The main portion of the window is for navigation and information display. The main portion of the window is split into three panes. The left pane of the window contains the tree-like structure from which most commands are performed. The top right pane displays the contents of the item currently selected in the tree. The bottom right pane displays a description or detailed properties of the item selected.

Split bars separate the panes of the Administrator window. These split bars can be moved to change the size of each pane.

To move the split bar:

- Drag the bar to its new location.

THE TREE VIEW: EXPLORING DX

The left pane of the Administrator window contains a tree showing all extended drives configured for registered DX computers. Commands for managing DX functionality can be accessed from the tree. When you right-click on a tree node, a shortcut menu for performing DX functions appears. The shortcut menu items will vary, depending on what item you selected in the tree view.

Each node in the tree indicates whether it is expandable; that is, whether it contains items beneath it. A plus sign (+) marks a node that is expandable. Once a node has been expanded, the plus sign changes to a minus sign (-), indicating that it has been expanded and can now be collapsed.

To expand a node:

- Click the plus sign, or double-click the item.

To collapse a node:

- Click the minus sign, or double click the item.

If a node appears with neither sign, that means it currently contains no items within it. For example, if the Blank node of the Available media tree does not have a plus (+) or minus (-) sign in front of it, there are no Blank media available for that extended drive.

THE CONTENTS VIEW: NODE DETAILS

The top right pane of the Administrator window contains the contents of the node currently selected in the tree on the left. These contents include the same information displayed underneath the node in the tree, when the node is expanded. For example, selecting the Original node of the Available Media tree will list all available formatted and labeled media in the Contents view. The same information is listed underneath the Original node when that node is expanded. You can select an item

either in the tree view or in this Contents view to make the appropriate commands available.

THE DESCRIPTION VIEW: ITEM DETAILS

The bottom right pane of the Administrator window contains details about the item currently selected in the tree on the left. This section provides helpful information about the current configuration and settings. For example, if a move rule is selected, the description view shows the following information about the move rule: directory, file type, size and attribute settings, and move settings.

TOOLBAR

The DX toolbar is located directly beneath the main menu, to the right of the Computer drop-down list. The toolbar contains buttons that provide quick access to many of the Administrator commands and features. To identify the function of a button, point to the button with the mouse. The button's function appears in the status bar at the bottom of the window, and as a pop-up tool-tip when the mouse is held over the button. The toolbar button is grayed out if it is not available for the item you have selected in the Administrator.





To show or hide the toolbar:







- From View menu, select Toolbar. A checkmark beside the command indicates that the toolbar is displayed.

Figure 48: DX Administrator Toolbar



Table 8: DX Administrator Toolbar Buttons

BUTTON:	NAME:	MENU OPTION:	FUNCTION:
	Connect	From the Service menu, select Connect	Connects to the selected DX computer.
	Disconnect	From the Service menu, select Disconnect	Disconnects from the currently active DX computer.
	Service Manager	From the Tools menu, select Service Manager	Opens Service Manager.
	Register Computer	From the Service menu, select Register	Displays the Register Computers dialog box, which allows you to register DX computers.

BUTTON:	NAME:	MENU OPTION:	FUNCTION:
	Configure Media Services	From the Service menu, select Configure Media Services	Opens the Configure Media Services dialog box, which allows you to add, delete and configure media services.
	New Extended Drive	From the Service menu, select New Extended Drive	Opens the New Extended Drive Wizard, which allows you to create an extended drive.
	New Object	From the Edit menu, select New	Displays a dialog box that allows you to create a new object. The dialog box that appears is determined by the current selection.
	Delete Object	From the Edit menu, select Delete	Deletes or removes the selected object.
	Rename Object	From the Edit menu, select Rename	Allows you to rename the selected object.
	Object Properties	From the Edit menu, select Properties	Displays the Properties dialog box for the selected object.

MAIN MENU BAR

The menu bar or main menu consists of a list of options containing commands for carrying out functions in the Administrator. Although functions are easily performed using shortcut mouse clicks, all functions can be performed through the main menu commands as well. When you select a node, the Edit menu changes to contain the same commands available on the shortcut menu for that node.

COMPUTER DROP-DOWN LIST

The Computer drop-down list displays the name of the currently active computer. You can use the drop-down feature of this text box to activate a different DX computer in the Administrator. Selecting a computer from this list has the same effect as clicking on or highlighting a different computer in the tree view of the administrator.

In order for a computer to appear in the Computer drop-down list, the computer must be registered through the administrator. For additional information on registering DX computers to add them to this list box, see *Registering a DX Computer for Remote Administration* on page 70.

STATUS BAR

The status bar is located at the bottom of the Administrator window and displays information about a command or toolbar button. Translations of certain commands or important messages to the user appear on the status bar.

To show or hide the status bar:

- ➔ From View menu, select Status Bar. A check mark beside the command indicates that the status bar is displayed.

EXTENDED DRIVES

The DX Administrator tree view displays all current DX extended drives for all registered and connected DX computers. Under each extended drive, the available media and the media folders created for each extended drive are listed. Under each media folder, the move groups, and move, purge, and delete rules for the media folder appear.

MEDIA FOLDERS

Extended drives contain media folders to logically group the media. Media folders provide a virtual directory structure for media. The media folder is a directory that defines a point in the directory tree (from the root of the extended drive) where the media's files are located. In order to be used by DX all media must be assigned to a media folder. This folder is created as a physical folder (or subfolder) on the extended drive, and can be viewed as such through Windows Explorer.

Under each extended drive, a node appears for each media folder created for that drive. Under each media folder is a Media node listing all media assigned to that folder. Media folders and their media are listed in alphabetical order. A folder icon represents each folder and a media icon represents each piece of media.

MOVE GROUPS

A move group is a subset of the media in a media folder. When you configure file migration, you select target media for each move group and a target move group for each move rule. Selecting a move group specifies that only media in that move group will be used to store files moved under that rule. At least one move group must exist in order to create move rules. This being the case, DX allows you to create a move group at the same time you create a move rule.

In the tree view, move groups are listed under the Move Groups node underneath each media folder.

MOVE RULES

Move rules regulate the movement of files to media. When a move rule is created, you specify which files should be moved and which target move group of media will be used to store them. You can either select an existing move group or you can create one at the time you create the move rule. At least one move rule must be configured in order for files to be moved to media.

Move rules are created from and listed in the Move Rules node, underneath each media folder.

PURGE RULES

Purge rules help regulate the amount of file space on the extended drive. When a purge rule is created, you specify which moved files should be purged from the extended drive and when. Purging files reclaims file space on the extended drive. You have two options with respect to purging files. You can enable the Purge files matching as disk space is needed, or Purge files during extended drive scans options as necessary.

Purge rules are created from and listed in the Purge Rules node, underneath each media folder.

DELETE RULES

Delete rules can be added to permanently delete files from the extended drive and from media. A delete rule defines a specific folder, file type, and file age. Delete rules are carried out during an extended drive scan, at which time all files matching the configured delete rules are automatically and permanently deleted from the extended drive and from the storage media containing those files.

Delete rules are created from and listed in the Delete Rules node underneath each media folder.

NOTE

Once files are deleted using a delete rule, DX can no longer access those files. Whether the files are physically deleted on the media is determined by the properties of the media itself (optical rewritable, tape, DVD-RAM).

AVAILABLE MEDIA

The Available Media node contains all media allocated for the extended drive not yet assigned to a media folder. Media is grouped by type into seven nodes in the Available Media tree: Original, Copy, Duplicate, Blank, Foreign, Unknown and Unformatted Media.

Original Media

All media that have been prepared for use and allocated to an extended drive, but are not currently assigned to a media folder, appear in the Original Media node. In order for a piece of media to appear in this list, the media must be all of the following:

- ↳ Formatted for the file system for which the hardware device is configured
- ↳ Labeled
- ↳ Not currently assigned to a media folder

Media appearing in this list is ready to be assigned to a media folder when necessary. In addition, Original media can be reformatted, deleted (if offline), or renamed, and its media properties viewed.

Copy Media

Copy media are media that are identical copies of other media in the DX system. The only difference between an original piece of media and its copy is the serial number for each piece of media. If an original piece of media becomes unreadable, the copy of the media can be promoted to replace the Original piece of media once the damaged media is removed from the DX system.

Duplicate Media

Duplicate media is any media with the same serial number as another piece of media in the DX system. Duplicate media is unusable with DX and must be reformatted in order to have another serial number assigned to it.

Blank Media

Blank media is media that has been formatted for use with DISKXTENDER but not labeled. Blank media can be labeled, reformatted, deleted (if offline), or renamed, and its media properties viewed.

Foreign Media

Any media that has been formatted for a file system other than that of its current device, or media unsupported by DISKXTENDER is considered by DX to be “foreign” media and is placed in the Foreign node. Media in this list can be formatted (if the media is of a type that DX supports), and its media properties viewed.

Unknown Media

Media that is either an unsupported media type or media that has been formatted with a file system not recognized by DX will be placed in the Unknown media node.

Unknown media is unusable with DX, and DX will not allow any commands to be performed on this media.

Unformatted Media

All unformatted media are listed under the Unformatted Media node. Media in this list can be formatted, and its media properties viewed.

REGISTERING A DX COMPUTER FOR REMOTE ADMINISTRATION

DISKXTENDER (DX) allows you to administer the DX system both from the computer on which DX is installed and from remote computers. You can use the Administrator function that comes with a full installation of DISKXTENDER to administer other DX computers, or you can install the Remote Administrator, which simply provides you with the Administrator interface and the registration capability to attach remotely to one or more networked DX computer(s). The remote administration function is the same whether you use a DX Administrator (full installation) or a Remote Administrator.

In order to access another DISKXTENDER computer remotely, you have to register the remote DX computer in order to add the DX computer's name to the Computer drop-down list, and to allow the Administrator you are running to find and connect to the remote DX computer.

Only computers where DISKXTENDER is currently installed can be registered. The Register command is available through the Service menu of the Administrator.

Registering DX computers can be done either using the Auto-Detect function or by adding the DX computer manually by browsing for it through the register function. For procedures, see the *Registering DX Computers using Auto Detect* section below, or the *Registering DX Computers manually* section on page 74.

NOTE

If you need to register a DISKXTENDER service that is installed on a clustered environment, be sure to register the logical cluster name of the DX cluster.

REGISTERING DX COMPUTERS USING AUTO DETECT

For large systems with several DX computers, the normal registration process becomes unwieldy, since you must browse and select each computer on the network. The Auto-Detect feature lets you detect and select all currently running DX services on the network without browsing the system to find DX computers.

The Auto-Detect function works as a wizard that leads you through the registration process.

To start the Auto-Detect Wizard:

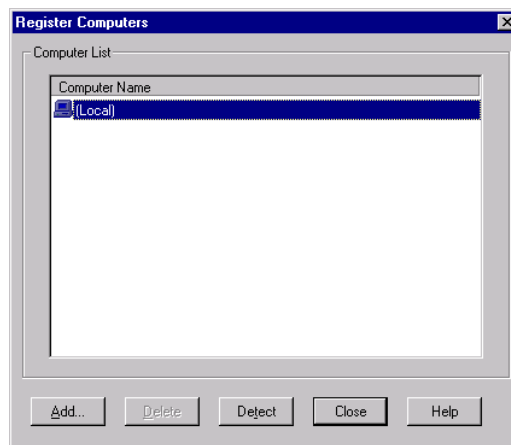
- 1 In the Administrator, select the Register option from the Service menu or click the Register Computer icon on the toolbar.

Figure 49: Register Computer Icon



The Register Computers dialog box appears.

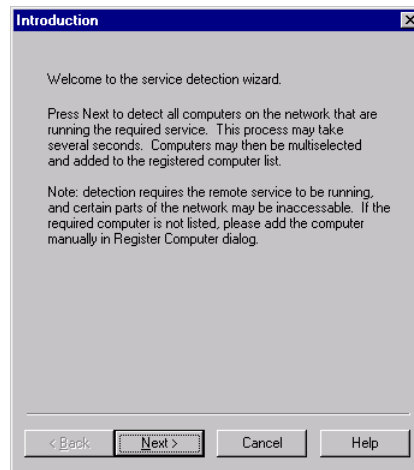
Figure 50: Register Computers Dialog Box



All computers already registered with the currently open Administrator will appear in the Register Computers dialog box, to include the local computer. If you are registering through a Remote Administrator, and you have not yet registered any DX computers, the Register Computers dialog box is blank.

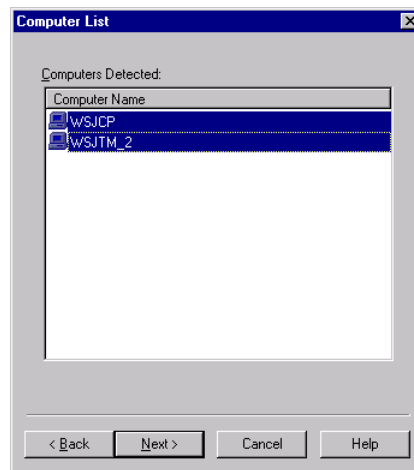
- 2 Click Detect to start the Auto-Detect wizard. The Introduction Page appears.

Figure 51: Introduction Page



- 3 Read the Introduction and click Next. The Computer List page appears.

Figure 52: Computer List Page



The Auto-Detect wizard detects all computers on which DX is installed and where the DX service is actively running (stopped services and powered-off DX computers will not be detected).

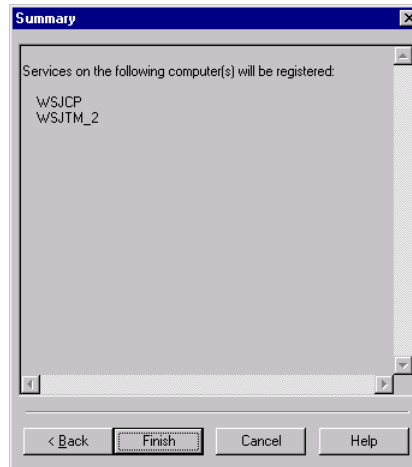
- 4 Select the computer(s) you want to register and click Next. To select two or more computers in sequence, select the first computer, then press and hold the <SHIFT> key while selecting the last computer. To select two or more computers out of sequence, press and hold the <CTRL> key while selecting computers.

NOTE 

If a computer that you want to register does not appear in the Computers Detected list, you will have to register the computer manually. See *Registering DX Computers manually* on page 74.

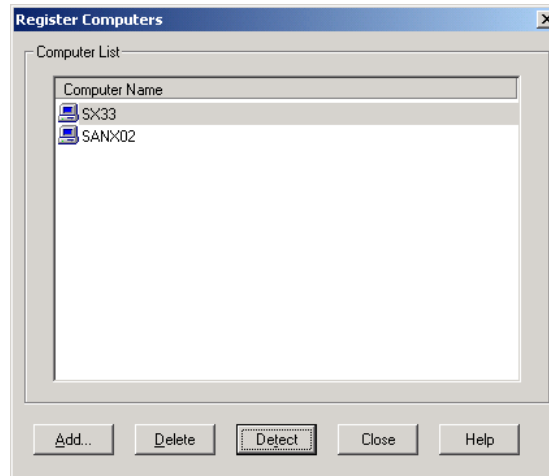
- 5 Click Next. The Summary page appears.

Figure 53: Summary Page



- 6 The Summary page lists the computers selected for registration. Review the list to make sure the computers you want to register are listed. Click Back to return to the computer list to make different selections.
- 7 If the information in the summary is correct, click Finish. The selected computers are registered and now appear in the Computer List in the Register Computers dialog box.

Figure 54: Register Computers Dialog Box



- 8 If you inadvertently list a computer you do not want to use as a DISKXTENDER service, or you wish to delete a previously registered computer, select that computer and click Delete. The computer is removed from the list.
- 9 Once the appropriate computers appear in the Register Computers dialog box, click Close. The Administrator attempts to connect to all registered DX computers. All registered computer name(s) now appear in the Computer drop-down list located directly beneath the main menu in the Administrator, and in the tree view of the administrator window.

The Administrator can now be used to manage the DISKXTENDER service on all registered and connected DX computer(s). You can switch between registered computers by selecting different ones from the Computer drop-down list, or by clicking on and highlighting the computers in the tree view of the Administrator.

REGISTERING DX COMPUTERS MANUALLY

To manually register a DX computer:

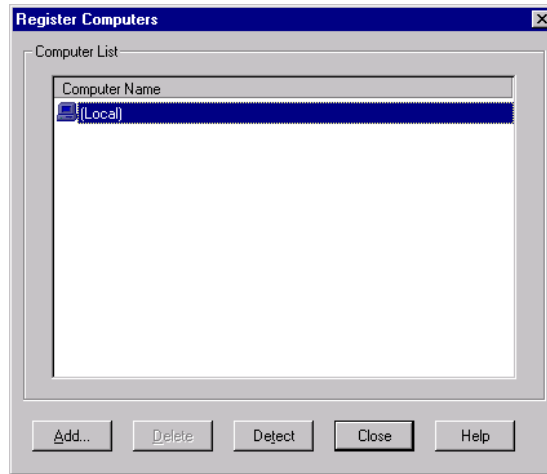
- 1 In the Administrator, select the Register option from the Service menu or click the icon on the toolbar.

Figure 55: Register Computer Icon



The Register Computers dialog box appears.

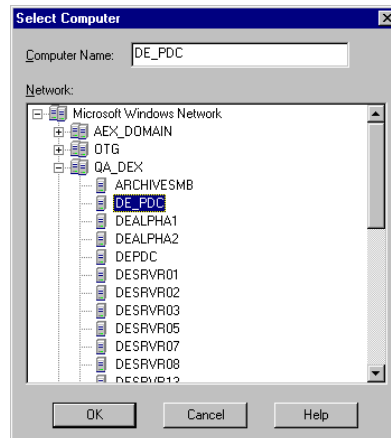
Figure 56: Register Computers Dialog Box



All computers already registered with the currently open Administrator will appear in the Register Computers dialog box, to include the local computer. If you are registering through a Remote Administrator, and you have not yet registered any DX computers, the Register Computers dialog box is blank.

- 2 Click Add to register a new DX computer. The Select Computer dialog box appears.

Figure 57: Select Computer Dialog Box



This dialog box contains a list of machines on the current network. DX must be installed on the remote computer before it can be registered for remote administration.

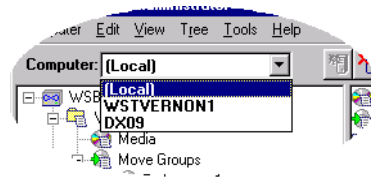
- 3 In the Select Computer dialog box, highlight the DX computer you want to register and click OK. The Register Computer dialog box appears, listing the selected computer.
- 4 Repeat steps 2 and 3 for each computer you want to register.
- 5 If you inadvertently list a computer you do not want to use as a DISKXTENDER service, or you wish to delete a previously registered computer, select that computer and click Delete. The computer is removed from the list.
- 6 Once the appropriate computers appear in the Register Computers dialog box, click Close. The Administrator attempts to connect to all registered DX computers. All registered computer name(s) now appear in the Computer drop-down list located directly beneath the main menu in the administrator, and in the tree view of the administrator window.

The Administrator can now be used to manage the DISKXTENDER service on all registered and connected DX computer(s). You can switch between registered computers by selecting different ones from the Computer drop-down list, or by clicking on and highlighting the computers in the tree view of the Administrator.

CONNECTING TO DX COMPUTERS

When the Administrator is opened, it attempts to connect to all registered DX computers (to include the local computer for full installations of DX). Once these connections have been made, the window displays information pertaining to each DX service. The Administrator allows you to switch easily between registered DX computers by clicking on and highlighting the computers in the tree view, or by selecting different computers from the Computer drop-down list.

Figure 58: Computer Drop-Down List



Remember, in order to successfully connect to a DX computer, you must have administrator rights on the selected DX computer.

DISCONNECTING THE ACTIVE SERVER

You may wish to disconnect from the currently active DX computer. Disconnecting from the active service removes that computer's DX components from the tree view, though the computer will still appear, listed with a status of (Disconnected).

To disconnect from the active DX computer:

- Highlight the computer/extended drive from which you want to disconnect, and select Disconnect from the Service menu, or click the Disconnect toolbar button.

Figure 59: Disconnect Toolbar Button



RECONNECTING THE ACTIVE SERVER

Disconnected DX computers appear in the tree view with a status of (Disconnected) . Reconnecting DX computers will re-display their configured extended drives and extended drive components.

To reconnect to a DX computer:

- Highlight the computer to which you want to connect, and select Connect from the Service menu, or click the Connect toolbar button.

Figure 60: Connect Toolbar Button



CHAPTER FIVE

STORAGE MEDIA

Throughout the DISKXTENDER interface and documentation, the term “media” refers to storage media. Storage media is an integral part of your DX file management system and what type of storage media you use determines how your media and therefore your files must be managed.

When file migration takes place, files saved on the extended drive are moved to storage media. The storage media is configured to each extended drive through a media service. The media service manages the physical storage media and makes it available for file transfer to and from the DISKXTENDER extended drive. The storage media to which files are migrated are the pieces of media contained within the devices managed by the media service.

DISKXTENDER supports a number of storage media types, and file systems for those media types. This chapter discusses the supported media types and file systems, and provides a brief explanation of each.

For information on adding and configuring media services, and adding their associated media to your DISKXTENDER system, see the *Media Services* chapter beginning on page 89.

TYPES OF MEDIA

DX supports many high capacity storage media types. Once added to the DX system, these media are the storage to which your DX files are migrated. The functionality accessible through a media service depends on the type of media used in the device for that media service. The following table defines all media types currently supported:

Table 9: Currently Supported Media Types

MEDIA TYPE:	SUPPORT TYPE:
NAS (Network attached storage available through network shares)	Read/Write
Erasable Optical	Read/Write
WORM	Read/Write
CD-ROM	Read Only
Tape (DLT, AIT, 9840, Magstar, 8mm DAT)	Read/Write
DVD-RAM	Read/Write

NAS MEDIA

NAS or Network Attached Storage is a type of media that is directly accessible through the network as opposed to being accessed through a removable media device. NAS media is typically comprised of a microprocessor, an operating system and storage, like a hard drive.

ERASABLE OPTICAL MEDIA

Optical media refers to removable media that is written to by lasers. Erasable Optical media (also often called Magneto Optical) are optical disks that can be written to, erased, and loaded with new data.

WORM MEDIA

WORM stands for Write Once Read Many. WORM is an optical disk technology that allows you to write data to a disk only once, but read that data back as often as needed. Once written to, WORM media acts just like CD-ROM media, in that the data on the media is permanent.

CD-ROM MEDIA

CD-ROM stands for Compact Disc – Read Only Memory. As its name indicates, CD-ROM media is read only and cannot be written to. The data is stamped onto the CD by the vendor and cannot be erased.

TAPE MEDIA

Tape media are electromagnetic data storage devices that are typically both readable and writable. Tape media are read by tape drives that mount, write to and read from the tape. Tape media is often encased in a tape cartridge that protects the magnetic tape itself and makes it easily portable.

DISKXTENDER supports the following types of tape media: 8mm DAT, AIT, 9840, Magstar and DLT.

DVD-RAM MEDIA

DVD-RAM is a rewritable, high-density optical disc media. DVD originally stood for Digital Versatile Disc or Digital Video Disc, but is now simply referred to as DVD. RAM, or Random Access Memory, refers to the way data is written to and read from the disk. RAM media can be written to and read from randomly, as opposed to sequentially, accessing files and space wherever necessary.

TYPES OF MEDIA FILE SYSTEMS

When a piece of media is formatted, a file system must be selected for that piece of media: either a Windows Native file system or an OTG file system. A file system is software that provides an interface for saving and retrieving files on storage media. File systems control all aspects of media management, including directory/file structures, data layout, and data transfer. Media can be formatted for any file system as long as the device used by the media service where the media resides supports it.

Windows NT/2000 installs the CDFS, FAT, and NTFS file system drivers. DISKXTENDER installs three additional OTG file system drivers: OSS, CSS, and TSS. The following table lists DX file system support by media type:

Table 10: DX File System Support by Media Type

MEDIA TYPE:	SUPPORTED FILE SYSTEMS:
NAS	NTFS (New Technology File System)
Erasable Optical/ Magneto Optical	OSS (Optical Storage Subsystem) NTFS (New Technology File System) FAT (File Allocation Table) (read-only)

MEDIA TYPE:	SUPPORTED FILE SYSTEMS:
WORM	OSS (Optical Storage Subsystem)
CD-ROM	CDFS (CD-ROM File System) CSS (CD-ROM Storage Subsystem)
Tape	TSS (Tape Storage Subsystem)
DVD-RAM	OSS (Optical Storage Subsystem)

NOTE

The DISKXTENDER interface only refers to “OTG File System” where media file systems are noted. The media type determines which OTG File System is applied.

Each file system has benefits and limitations relating to the features and performance of the media to which it is applied. DX provides a wide variety of file system and media support to give you flexibility to select file systems to suit your needs.

Media portability refers to the ability to read and write to media on Windows NT/2000-managed devices outside of DISKXTENDER. If, for example, media used to archive files through DISKXTENDER will be distributed to locations that do not have a DISKXTENDER installation, media portability is a concern and should be considered when determining what file system and type of storage media you will use.

Media performance refers to the speed with which DISKXTENDER can write to and read from storage media. For example, Erasable Optical media can use either NTFS, a Windows Native file system, or OSS, an OTG file system. While non-DISKXTENDER programs do not recognize OTG file systems, the DX read/write speed for the media will be faster with OSS than with NTFS.

Depending on the media type and portability requirements of the storage solution, certain file systems should be chosen over others. This basic decision depends on your performance and media portability concerns. DX file systems provide maximum performance, while Windows Native file systems provide media portability.

WARNING

FAT and NTFS cannot be used with WORM media. For optical media, FAT and NTFS are not recommended unless media portability is essential. Windows Native file systems are not designed for use with optical media. Formatting optical media with Windows Native file systems can cause significant performance degradation.

WINDOWS NATIVE FILE SYSTEMS

Windows Native file systems are provided with Windows NT/2000 and are loaded onto the system at the time of the operating system installation. These are feature-

rich file systems meant for hard drives, but may be desirable for storage media if you have portability concerns.

As a general rule, if portability of optical media is a concern, choose Windows Native file systems to achieve this goal. While these file systems have a significant performance disadvantage for optical media in comparison to OTG file systems, they are 100% portable (media written in these formats can be read on any Windows system, with or without DISKXTENDER). See the following descriptions for a detailed overview of each.

WARNING 

For optical media, FAT and NTFS are not recommended unless media portability is essential. Windows Native file systems are not designed for use with optical media. Formatting DX media with Windows Native file systems can cause significant DX performance degradation. WORM media cannot be used with any Windows Native file system.

NTFS - New Technology File System

This file system is supported only by Windows and provides an optimized file system for large volume media. It is specially designed to provide fast access and management of very large volumes of information (gigabytes or even terabytes) and is used primarily for magnetic disks (like hard drives).

FAT - File Allocation Table

This file system is supported by many different operating systems including DOS, Windows 95/98, and Windows NT/2000. It is an older file system that was designed for small-volume (less than 4GB) management, and is not widely used in Windows NT/2000 server environments.

This file system is not recommended for optical storage management. It is based on older file system technology and does not handle large volume sizes that today's media capacities require. In addition, the data storage strategy is prone to fragmentation and, over time, would deteriorate DX read/write performance.

NOTE 

The FAT file system is supported by DX as a read-only file system. This means that DX2000 cannot write (migrate files) to media formatted using FAT.

CDFS - CD-ROM File System

This file system reads two types of CD-ROM formats: ISO 9660 and High Sierra. These formats are supported by many different operating systems, and are supported natively by Windows. The CDFS driver does not support extended CD-ROM formats including multiple-session media and Kodak Photo-CD.

OTG FILE SYSTEMS

OTG file systems are optimized for DX media performance. Unlike Windows Native file systems, which are more generic and feature-rich, DX 'storage subsystems' implement the minimum set of features required to store and retrieve data. As a result, runtime overhead is very low, and data is contiguously organized, which enhances overall performance.

As a general rule, if portability of storage media is not a concern (see *Windows Native File Systems* on page 82), choose DX file systems to provide the best overall system performance. The following descriptions of OTG file systems provide an overview of each.

OSS - Optical Storage Subsystem

The OSS file system supports WORM, DVD-RAM and Erasable Optical media. Files are stored contiguously from the beginning to the end of each piece of media, with single-seek read and write access. This file system provides the best overall read/write performance of all optical file systems supported by DISKXTENDER.

OSS-formatted media requires DX for reading and writing. This type of media may be moved from one DX service to another, but cannot be read without DISKXTENDER.

When a Delete command is issued, files written to OSS-formatted media are not deleted; only the file tags on the extended drive are actually deleted. Deleted files are marked as deleted on the media, but deleted file space cannot be reclaimed until the media is compacted (all files not marked for deletion are moved to the extended drive) and the media is reformatted. In addition, files marked as deleted on the media are not restored when media is restored to a media folder.

Many of the newer erasable optical drives today support the ERASE command, which can be used instead of format. This command takes the same amount of time as format, but pre-erases all sectors on the media. Pre-erased media can be written to faster than non-erased media, since the optical drive does not have to erase sectors on the media as they are written. For drives that support this functionality, the ERASE command will be used on media format to improve write performance. This feature is only supported on OSS.

If WORM or DVD-RAM media support is required, the OSS file system *must* be used, as it is the only one supported by DISKXTENDER for these types of media.

TSS - Tape Storage Subsystem

TSS is the only file system provided for tape media management. Specifically, DISKXTENDER supports Digital Audio Tape (DAT) and Digital Linear Tape (DLT). Files are stored contiguously from the beginning to the end of each tape, as with all tape file systems.

TSS-formatted media requires DX for reading and writing. This type of media may be moved from one DX service to another, but cannot be read without DISKXTENDER.

CSS - CD-ROM Storage Subsystem

This file system supports CD-ROM media. This file system is provided to allow use of certain devices that cannot use the CDFS file system. It is recommended that you try to use the CDFS file system for a device and then use CSS if CDFS will not work with the device.

UNDERSTANDING MEDIA TRANSACTION LOGGING

Some transactions can be performed on files on the extended drive but will not be performed on the corresponding files on media. For example, a file from CD-ROM can be deleted from the extended drive, but will not be deleted from the CD-ROM media. If that piece of media is restored to DX at any time, the deleted file will be restored because it remains on the media.

Transaction logging is dependent on the type of media and the file system selected for the media. For each media type, the following tables specify what operations can be performed on the extended drive for files moved to media and which transactions are updated on the media.

Table 11: Extended Drive Operations Allowed

	DELETE	RENAME FILE	RENAME DIR	SET ATTRIBUTES
OSS-WORM	YES	NO	NO	YES
OSS-RW < DX4.0	YES	NO	NO	YES
OSS-RW > DX4.0	YES	YES	NO	YES
TSS	YES	NO	NO	YES
CSS	YES	NO	NO	YES

Table 12: Transactions Generated

	DELETE	RENAME FILE	RENAME DIR	SET ATTRIBUTES
OSS-WORM	NO	NO	NO	NO
OSS-RW <	YES	NO	NO	YES

	DELETE	RENAME FILE	RENAME DIR	SET ATTRIBUTES
DX4.0				
OSS-RW > DX4.0	YES	YES	NO	YES
TSS	NO	NO	NO	NO
CSS	NO	NO	NO	NO

Transactions are only generated when the operation can be performed on the physical media, for example, you can delete files on OSS, so a transaction will be generated, but you cannot delete files on CSS, so no transaction will be generated.

If a directory is renamed, a transaction is logged so the media can be updated to reflect the directory structure of the extended drive. The handling of these transactions will vary depending on the media's file system.

NTFS file systems support directory rename transactions. The transactions are performed on the media the next time it is mounted or when the media maintenance schedule is active. Rename transactions for empty directories are ignored. If the media is restored, the files appear in their original directories.

Tape and OTG Optical file systems do not support directory rename transactions. When the transactions are performed, a warning will be produced to notify that the transaction is not supported.

FLUSHING TRANSACTIONS TO MEDIA

When changes are made to file attributes on the extended drive, the piece of media where that file is stored is not always immediately mounted to change the file on the media. Instead, DX will log the change to the file in a transaction log for the piece of media, and save that information until the next time the media is mounted. The transaction log is an area reserved on the DX computer's hard drive to automatically record all changes that are made. When the media is mounted, DX will "flush" the transaction logs out to media and the file changes will be reflected on the media.

NOTE

Certain types of transactions are possible on the extended drive but not possible on certain types of media. For more details on transaction logging, see the *Understanding Media Transaction Logging* section above.

For currently mounted media in a library drive, DX will always flush transaction logs to media before responding to fetch requests, moving files, or processing media tasks. Transaction logs for media mounted in a standalone drive or tower are flushed automatically every minute (or immediately when a media rename occurs).

In libraries, DX can use the library robotics to mount and dismount media without requiring manual insertion and removal of media by the administrator. For this reason, DX will mount media in a library specifically to flush transaction logs to the media and keep the media updated. DX uses the following rules for dismounting media currently in a library drive and mounting media on shelves in a library to transfer logged information to the media:

- ↵ Media currently mounted in the drive for fetch - transactions will be flushed when drive becomes available after timeslice expires.
- ↵ Media currently mounted in the drive mounted for move - transactions will be flushed when nothing left to move (or schedule inactive).
- ↵ Media mounted for media task - transactions will be flushed when no tasks left (or schedule inactive).
- ↵ Media mounted for copy - transactions will be flushed when no copies left to update (or schedule inactive).

CHAPTER SIX

MEDIA SERVICES

Media is made accessible to DISKXTENDER through media services. These media services control the workings of the hardware devices used to access the media. This leaves DX free to focus entirely on file read/write responsibilities. In order to have storage media available for file migration, you must have at least one media service configured for your DX system.

There are four types of media services available for use with DISKXTENDER: OTG MEDIASTOR (OTGMS or MS), StorageTek's Automated Cartridge System Library Software (ACSL), Network Attached Storage (NAS), and Tivoli Storage Manager (TSM).

Determining what media service(s) you plan to use with DX is an important part of planning and setting up your DISKXTENDER system. This chapter describes each media service in detail and provides step-by-step instructions for configuring each of them to use with your DX system.

MEDIA SERVICES

When you configure a DX computer, you must configure media services for that computer before you can move files to media. Media services provide access to storage media. When you configure a media service in DX, you point to the location where the media for the media service resides, and where appropriate, to the device management software that controls the device where the media is stored.

DX manages all functions relating to the transfer of information to and from media. The only role a media service plays is to place pieces of media in a location where DX can access them. DX performs all movement and fetching of files and all media tasks through direct communication with the media. The media service makes the media available to DX.

When DX needs a piece of media, it sends a request to the appropriate media service for that media. If the media service uses network attached storage (NAS) media or Tivoli Storage Manager (which uses “virtual” media), the media is already available and DX can proceed with the function that needs to be performed.

If the media service involves a device management product, the media service will cause the device being managed to retrieve the media or will prompt the media service administrator to insert the appropriate piece of media. For example, if OTGMS is being used to manage an optical library, OTGMS will cause the picker arm of the library to retrieve the correct piece of media and insert that media into a drive where the media can be read from or written to. Once the media is in the drive, DX can write files to the media, fetch files from the media, or carry out media tasks such as formatting or labeling.

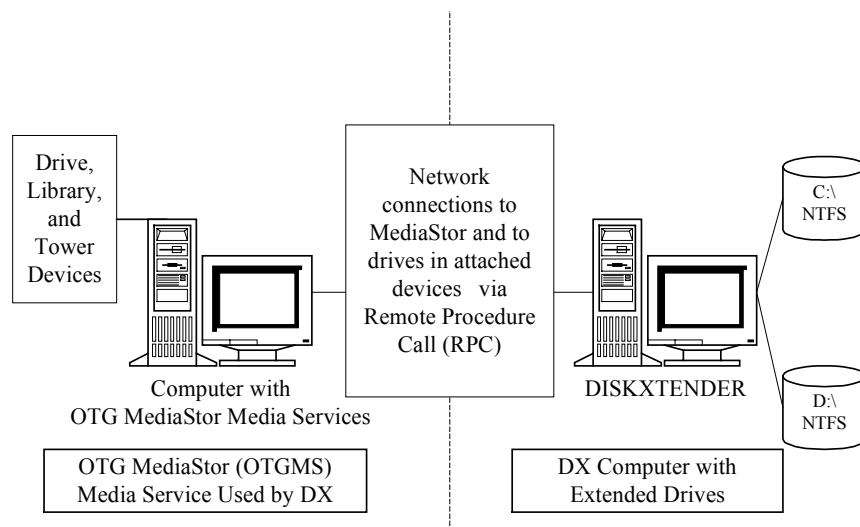
There are four types of media services available for DX file storage:

- ↪ *OTG MEDIASTOR (OTGMS)* - see page 90
- ↪ *StorageTek's ACSLS Media Services (ACSL)* - see page 91
- ↪ *Network Attached Storage Media Service (NAS)* - see page 93
- ↪ *Tivoli Storage Manager (TSM)* – see page 94

OTG MEDIASTOR (OTGMS)

OTG MEDIASTOR is a device management product that works on a Windows NT/2000 platform to manage the retrieval, mounting, and dismounting of removable media in a variety of hardware devices. OTGMS includes an easy-to-navigate administrative interface that lets you manage several devices on the same computer if needed.

Figure 61: DISKXTENDER With OTG MEDIASTOR



To use MEDIASTOR as a DX media service, you install MEDIASTOR on the computer where the hardware device you want to use for extended storage is attached. You then add the device to MEDIASTOR and add media to the device. Once you install DX, you then configure an OTG MEDIASTOR media service connection that points to the OTGMS computer. To assign specific pieces of media to an extended drive, you can allocate them through DX, or assign them to an Application media pool for that extended drive through MEDIASTOR. For instructions, see *Allocating/Deallocating OTGMS Media for an Extended Drive* on page 113.

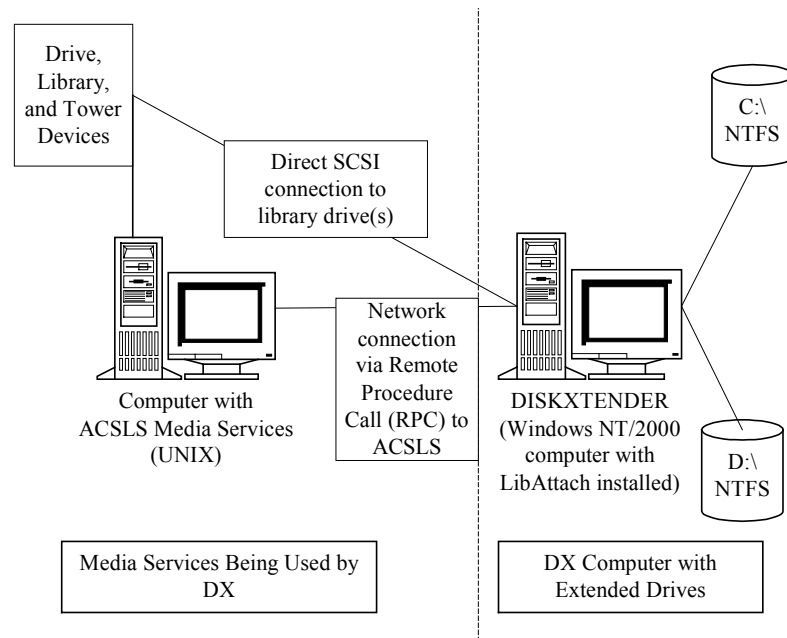
NOTE ✎

You must use the OTGMS Media Service if you are using SANXTENDER with your DX system. In addition, SANX must be installed on the MEDIASTOR computer.

STORAGETEK’S ACSLS MEDIA SERVICES (ACSL)

DISKXTENDER can use StorageTek’s ACSLS media services for access to tape media within StorageTek tape libraries. ACSLS is a UNIX-based device management product that manages StorageTek tape libraries and provides device sharing between applications. Organizations that have already invested in ACSLS can use DISKXTENDER to migrate files from Windows NT/2000 computers to tape media managed by the ACSLS server.

Figure 62: DISKXTENDER With ACSLS



ACSL runs on a computer using the UNIX operating system. In order for ACSLS to communicate with DX, which runs on a Windows NT/2000 platform, you must

install StorageTek's LibAttach product on the DX computer. LibAttach translates Windows-based product commands into a syntax that the UNIX-based ACSLS understands.

The ACSLS computer is connected to the device controller for one or more StorageTek tape libraries. ACSLS controls the picker arm for each library device and manages retrieval of media within the library. However, in order to allow device sharing, StorageTek constructs some of their library devices in a way that allows individual applications to communicate directly with particular drives in a library.

When you are setting up a connection to an ACSLS media service, you connect the DX computer directly to a drive or drives in the StorageTek library device. A SCSI connection is exposed on the back of the library device and you attach a SCSI cable from that connection to a SCSI port on the DX computer. When you configure an ACSLS media service in DX, you designate the drive(s) you are connected to as drives to be used by DX. When DX requires a particular piece of media, DX requests that media from ACSLS. ACSLS retrieves the media and places it in the drive connected to the DX computer. DX then communicates directly with the drive, performing all media-related tasks without any involvement from ACSLS.

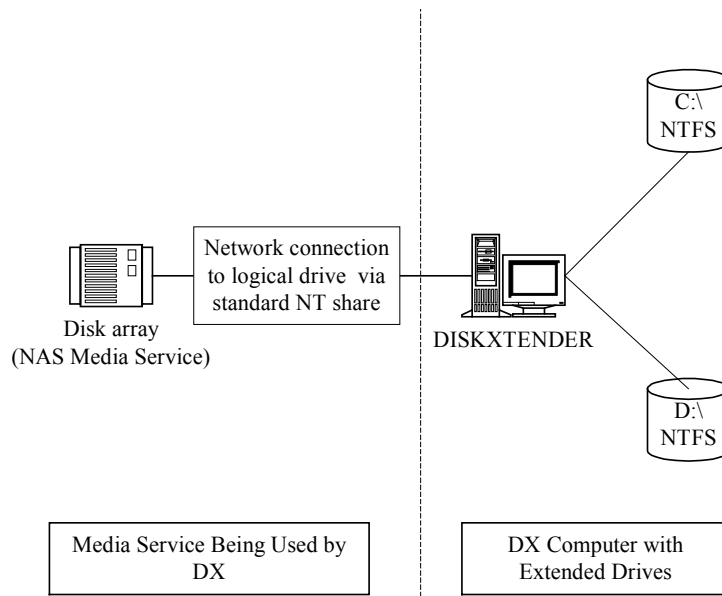
Once you physically connect a drive in a StorageTek library to a DX computer, the DX computer "owns" that drive. Other computers cannot access that drive. However, other computers could be connected to other drives in the StorageTek library; these direct connections allow multiple computers to share the tape library's storage capabilities, and yet insure that each computer always has access to a drive.

NETWORK ATTACHED STORAGE MEDIA SERVICE (NAS)

DISKXTENDER lets you define pieces of “virtual” media to be controlled by a media service. These virtual pieces of media can be located on any storage device attached to your local network. Virtual pieces of media are logical devices defined by how they are shared to the network. These logical devices can be a share to a server’s hard drive or shares on any network appliance that provides share-level access to storage.

The primary benefit to using a NAS media service is that it allows for file migration and storage in a single consolidated location. In addition, file retrieval from NAS is generally much faster than with other media types.

Figure 63: DISKXTENDER With NAS



RAID Devices

RAID (Redundant Array of Inexpensive Drives) devices are storage devices that contain several magnetic drives and store data to those drives by writing across the drives. Because data is stored redundantly across the drives, when a single drive fails, the information on the other drives can be used to restore the information on the damaged drive without loss of data.

You can use DX to move files from DX extended drives to a RAID device by using shares on the RAID device as media in a NAS media service. Files can be moved immediately or you can use DX to perform periodic backups to the more stable RAID storage media. By configuring periodic file movement, you can reduce network traffic and allow users to work on files on the extended drive(s), and yet back up those files to a secondary data storage location as needed. Use of a RAID media service ensures that files that have been purged of their file data on the DX extended drive can be fetched almost instantaneously when needed.

NAS Devices

NAS (Network Attached Storage) devices are storage devices that contain several high-capacity magnetic drives and manage storage of data to those drives in a way that is seamless to the user. NAS devices have a built-in controller that tracks the location of files within the NAS device.

You can use DX to move files from DX extended drives to a NAS device by using shares on the device as media in a NAS media service. Files can be moved immediately or you can use DX to perform periodic backups to the higher-capacity NAS device. By configuring periodic file movement, you can reduce network traffic and allow users to work on files on the extended drive(s), and yet back up those files to a second data storage location as needed. Use of a NAS media service ensures that files that have been purged of their file data on the DX extended drive can be fetched almost instantaneously when needed.

DX to DX Configurations

You can set up a DX media service for any network share. This capability allows you to move files from one DX extended drive to another if needed. You can configure movement of files from a media folder on one DX computer that stores DX files to a particular type of media, such as a RAID device or optical media, to a media folder on another DX computer that stores files to a less-expensive medium such as tape media.

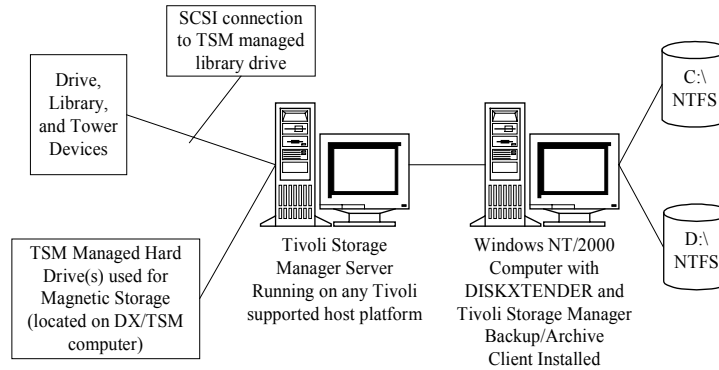
TIVOLI STORAGE MANAGER (TSM)

If you already use or plan to use Tivoli Storage Manager Server 3.7.4 (or higher) as a data storage or data backup system, DX allows you configure your Tivoli Storage Manager system as a DISKXTENDER media service, allowing you to migrate files

from DX to a Tivoli Storage Manager server. This method utilizes the storage devices supported and managed by the TSM server.

The Tivoli Storage Manager media service requires that TSM Backup/Archive Client be installed and configured on the DX computer.

Figure 64: DISKXTENDER with Tivoli Storage Manager



DX can be configured to migrate files to a configured Tivoli Storage Manager (TSM) system by adding a Tivoli Storage Manager media service. In order to use Tivoli Storage Manager as a media service you must first have TSM Backup/Archive Client 4.1 or higher set up and configured appropriately on the same computer as DX is installed.

When you configure a TSM media service, you create “virtual” media that represents TSM and acts as the media to which DX migrates files. You create a list of virtual media in the properties for the Tivoli Storage Manager media service in DX. You can then assign that media to the appropriate extended drive, making that virtual media available for DX for file migration. TSM media, as seen through DX, is managed similarly to NAS media, particularly with respect to the functional restrictions for labeling, compacting and copying. This is because the TSM Server performs the actual physical tasks for the removable media. DX simply acts as a client writing to the TSM server.

CONFIGURING MEDIA SERVICES

The following sections describe how to configure each of the media services, and provide references to instructions for editing those media services once they have been configured to DISKXTENDER.

Media services are added or configured to DISKXTENDER using a wizard that leads you step-by-step through the configuration process. Some aspects of your media service(s) may need to be configured separately, prior to adding the service to DX. Information specific to each available type of media service is contained in the sections below.

CONFIGURING A NAS MEDIA SERVICE

DX can be configured to use Network Attached Storage (NAS) as a media service. The media service wizard allows you to configure one NAS media service for each DX computer, but allows you to use multiple network shares as pieces of NAS media for that service.

Configuration of network shares as pieces of NAS media is done by configuring the NAS media service first, then editing the media service properties after configuration. Allocation of the created media to each extended drive is also done through the NAS media service properties. In addition, the properties function allows you to change the extended drive to which the NAS media is allocated (if you have more than one).

If you create your media for the NAS media service *before* creating your extended drive, you will have an opportunity to allocate that media to the extended drive when it is created.

Instructions and procedures for editing the NAS media service properties, can be found in the *Editing a Configured NAS Media Service* section beginning on page 99.

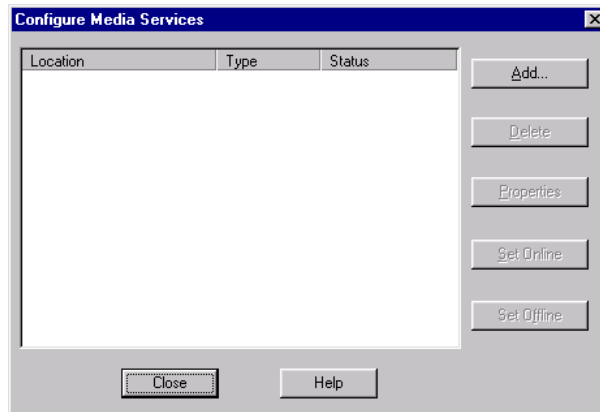
The only preliminary setup required is to make sure that you have created one or more network shares and that those shares are visible to the DX computer.

NOTE

You cannot create NAS storage using a drive or folder resident on the same machine on which the DX service using that media is installed.

To configure a NAS media service:

- 1 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.

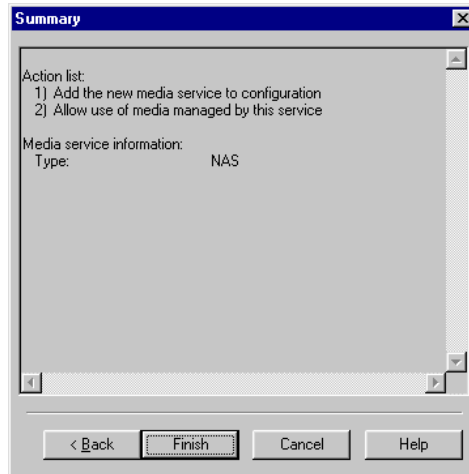
Figure 65: Configure Media Services Dialog Box

- 2 Click Add to add a media service. The media service wizard appears, starting with the Select Media Service Type page.

Figure 66: Select Media Service Type Page

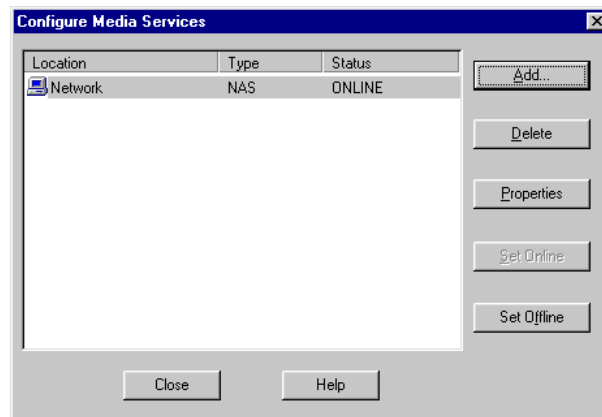
- 3 Select the Network Attached Storage option and click Next. The Summary page appears.

Figure 67: Summary Page



- 4 On the Summary page, click Finish. Once the media service is created, the Configure Media Services dialog box appears, showing the media service you just created (along with any others you may have created previously).

Figure 68: Configure Media Services Dialog Box



- 5 From the Configure Media Services dialog box, you may add another media service, view the properties of the selected service, set the service online or offline, and delete a media service.
The following sections provide further instructions for the NAS media service:

- ↪ *Editing a Configured NAS Media Service* below. This section describes how to create a new piece of virtual NAS media, allocate a piece of NAS media to an extended drive, and delete a piece of NAS media.
If you have not yet created an extended drive for your DX service, consider waiting until doing so to configure your NAS media service properties.
 - ↪ *Setting the NAS Media Service Online or Offline* on page 104.
 - ↪ *Deleting the NAS Media Service* on page 105.
- 6 When you are finished configuring media services, click Close.

Editing a Configured NAS Media Service

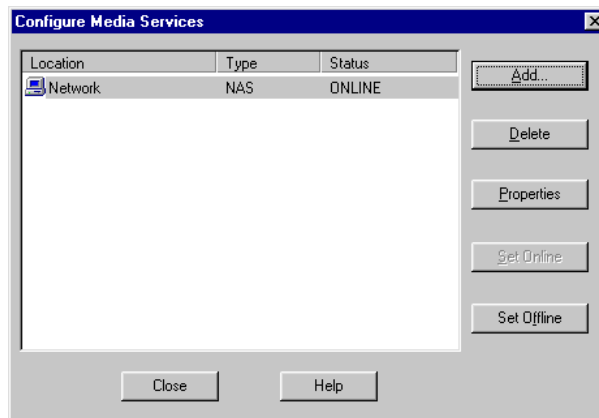
The properties for each media service, accessed through the Configure Media Services dialog box, provide access to viewing certain information about the media service, and allow you to make edits to the configuration of the media in the media service.

For example, if you configured your NAS media service after you created your extended drive, you can use the media service properties to allocate the NAS media to the newly created extended drive. In addition, the Media Service Property dialog box allows you to change to which extended drive the NAS media is allocated (if you have configured more than one).

To edit configured media service properties:

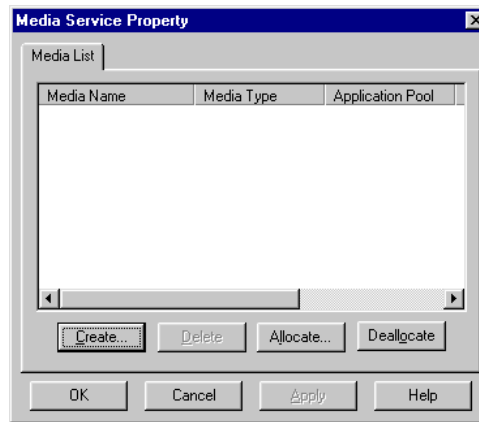
- 1 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 69: Configure Media Services Dialog Box



- 2 Select the NAS media service and click Properties (or double-click the media service). The Media Service Property dialog box appears.

Figure 70: NAS Media Service Property Dialog Box



- 3 The NAS Media Service Property dialog box provides access to:
 - ↳ *Creating a Piece of NAS Media*, see page below.
 - ↳ *Allocating/Deallocating NAS Media for an Extended Drive*, see page 103.
 - ↳ *Removing Media from the NAS Media Service*, see page 104.
- 4 When you are finished making changes to the NAS media service for DX, click OK. The Configure Media Services dialog box reappears.
- 5 When you are finished making changes to all of the media services for DX, click Close. The Configure Media Services dialog box closes and you are returned to the Administrator.

Creating a Piece of NAS Media

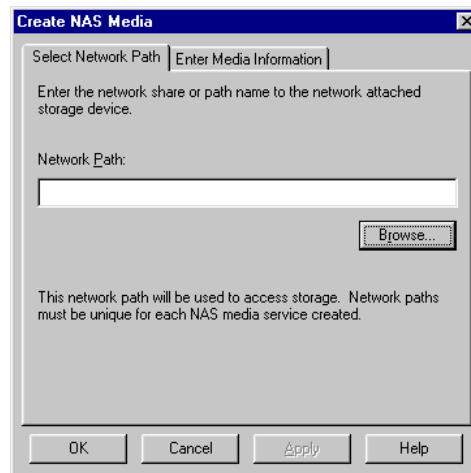
The Media Service Property dialog box allows you to use a shared network folder to act as a piece of virtual NAS media. Before creating the NAS media, make sure that you have created one or more network shares and that those shares are visible to the DX computer. In addition, the media service *must* be online to create NAS media.

NOTE

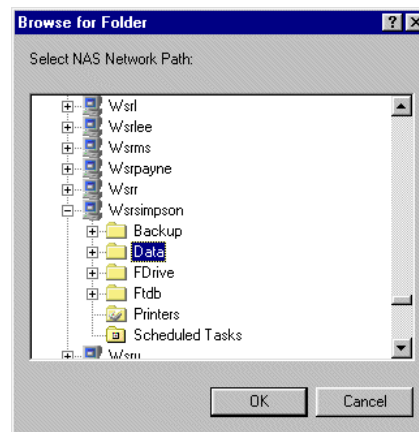
You cannot configure shares on the local computer as NAS storage media.

To create a piece of NAS media:

- 1 In the Media Service Property dialog box, click Create. The Create NAS Media dialog box appears, containing two tabs: Select Network Path and Enter Media Information.

Figure 71: Create NAS Media Dialog Box: Select Network Path Tab

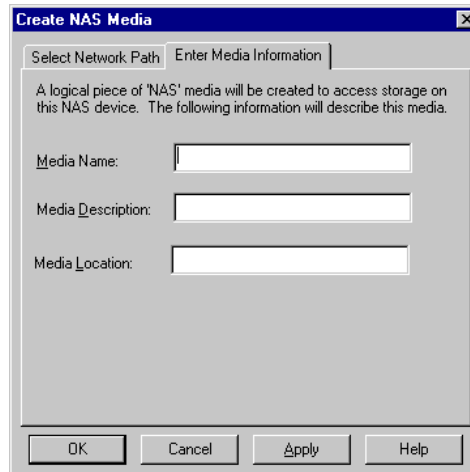
- 2 Click the Select Network Path tab to make it active (if necessary).
- 3 In the Network Path text box, enter the path to the network share you want to use. You can type in the path to the folder or you can browse for the folder by clicking Browse. If you click Browse, the Browse for Folder dialog box appears.

Figure 72: Browse for Folder Dialog Box

- 4 Navigate to the network share you want to use and click OK. You are returned to the Select Network Path tab.

- 5 Click the Enter Media Information tab to make it active. The Enter Media Information tab allows you to provide identification and descriptive information about the piece of NAS media you are creating. This information allows you to recognize the media later.

Figure 73: Create NAS Media Dialog Box: Enter Media Information Tab



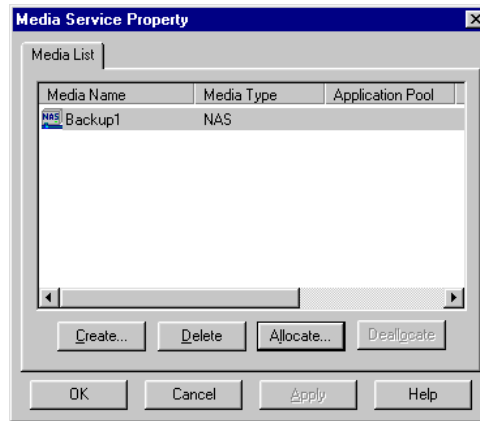
- 6 In the Media Name text box, type a name for the media. The name can be up to 32 characters. This is the name that will identify the media in the Administrator.
- 7 In the Media Description text box, type a description for the media. The description can be up to 64 characters.
- 8 In the Media Location text box, type the location for the network share. The location description can be up to 64 characters.
- 9 When you are finished entering the information for the created NAS media, click OK. The Media Service Property dialog box reappears, listing the new NAS media.

Allocating/Deallocating NAS Media for an Extended Drive

The Media Service Property dialog box allows you to allocate and deallocate NAS media to and from extended drives. To allocate NAS media, the media service *must* be online.

If you want to *change* which extended drive the media is allocated to, you must deallocate the media, then allocate it to a different extended drive.

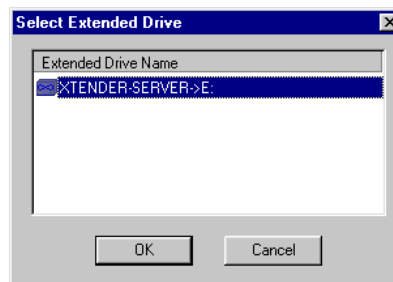
Figure 74: NAS Media Service Property Dialog Box with Media



To allocate NAS media to an extended drive:

- 1 In the Media Service Property dialog box, you have the following choices:
 - ↳ Double-click the media you want to allocate.
 - ↳ Highlight the media and click Allocate. You can use the standard Windows <SHIFT> or <CTRL> select function to highlight multiple pieces of media.
 The Select Extended Drive dialog box appears listing available extended drives.

Figure 75: Select Extended Drive Dialog Box



- 2 Select the extended drive to which you want to allocate the selected NAS media and click OK.

The Media Service Property dialog box reappears, listing the NAS media and the extended drive to which it was allocated.

Allocated media appears in the Original node of the Available Media tree for the extended drive.

To deallocate NAS media from an extended drive:

- In the Media Service Property dialog box, you have the following choices:
 - ↳ Highlight the allocated media and click Deallocate. You can use the standard Windows <SHIFT> or <CTRL> select function to highlight multiple pieces of media.
 - ↳ Double-click the media you want to deallocate.

The Media Service Property dialog box reappears, listing the NAS media, but the extended drive field of the window is now blank.

Removing Media from the NAS Media Service

The Media Service Property dialog box allows you to delete a piece of NAS media, however you must be a member of the DXAdministrators group to delete media. In addition, unless unavoidable, the media service should be online when removing media. If you attempt to delete media while the media service is offline, the changes may not take effect.

To delete a piece of NAS media:

- 1 Make sure that the media has been deallocated from the extended drive.
- 2 In the Media Service Property dialog box, highlight the media you want to delete. You can use the standard Windows <SHIFT> or <CTRL> select function to highlight multiple pieces of media.
- 3 Click Delete. A message appears allowing you to confirm the deletion.
- 4 Click Yes. The Media Service Property dialog box reappears, without the deleted NAS media.

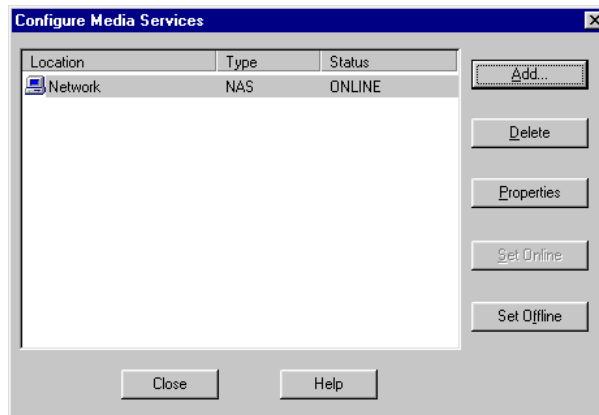
Setting the NAS Media Service Online or Offline

The Configure Media Services dialog box allows you to set the NAS media service online or offline.

To set a configured NAS media service online or offline:

- 1 From the Service menu in the DX Administrator, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 76: Configure Media Services Dialog Box



- 2 Highlight the NAS media service. If the selected service is online, the Set Offline button is active. If the selected service is offline, the Set Online button is active.
- 3 Click Set Online or Set Offline as appropriate. A message appears asking you to confirm the setting.
- 4 Click Yes. The new status appears in the Configure Media Services dialog box.

NOTE

Setting a media service offline makes the storage media for that media service unavailable for read/write requests from DISKXTENDER.

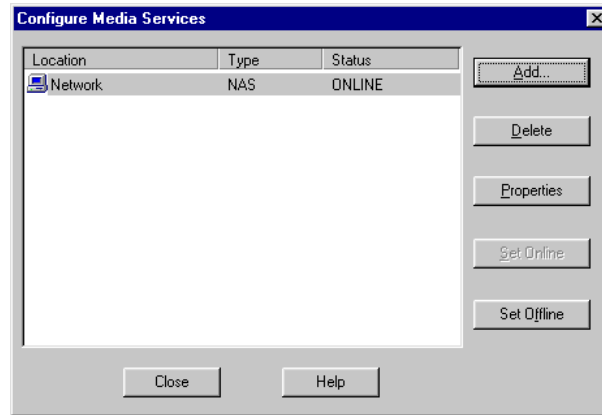
Deleting the NAS Media Service

The Configure Media Services dialog box allows you to delete the NAS media service.

To delete a configured NAS media service:

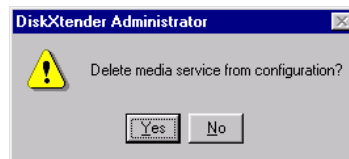
- 1 Make sure that all NAS media has been deallocated from extended drives. For instructions, see *Allocating/Deallocating NAS Media for an Extended Drive* on page 103.
- 2 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 77: Configure Media Services Dialog Box



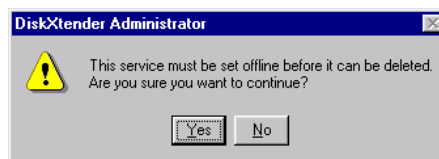
- 3 Highlight the NAS media service and click Delete. A confirmation message appears, verifying you want to delete the service.

Figure 78: Verification Message



- 4 Click Yes. If the service is still online when you attempt to delete it, another message appears informing you the service must be set offline first.

Figure 79: Set Service Offline Verification Message



- 5 Click Yes. The media service (and its associated media) is removed and the Configure Media Services dialog box reappears without the deleted service.

CONFIGURING AN OTG MEDIASTOR MEDIA SERVICE

DX can be configured to point to any computer where OTG MEDIASTOR is installed. The DX system then uses the media in the OTGMS media service for allocation to DX extended drives, assignment to media folders, and then for file migration. You

may choose to install MEDIASTOR on the same computer where DX is installed or install MEDIASTOR on a different computer and point to it through the network.

DISKXTENDER requires that you install MEDIASTOR on the appropriate computer before trying to add OTGMS as a media service through DX. In addition, we recommend that you add media to the media service before configuration to DX. This makes the OTGMS media available for allocation to the DX extended drive as soon as the media service is configured. See the MEDIASTOR System Guide for detailed information on installing and setting up the MEDIASTOR service.

NOTE 

Configuring an OTG MEDIASTOR media service will fail if you attempt to select a computer where MEDIASTOR is not installed.

NOTE 

You must use the OTGMS Media Service if you are using SANXTENDER with your DX system. In addition, SANX must be installed on the MEDIASTOR computer.

To configure an OTG MEDIASTOR media service:

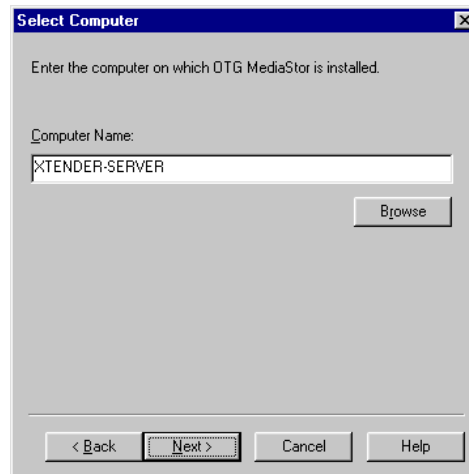
- 1 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.
- 2 Click Add to add a media service. The media service wizard appears, starting with the Select Media Service Type page.

Figure 80: Select Media Service Type Page



- 3 Select the OTG MediaStor option and click Next. The Select Computer page appears with the local computer listed by default.

Figure 81: Select Computer Page



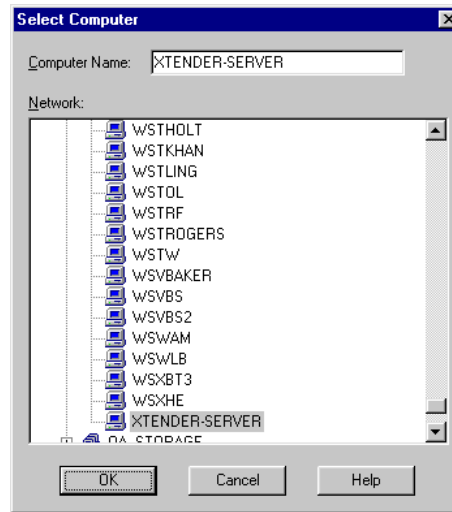
The Select Computer page allows you to specify the computer on which MEDIASTOR has been installed and to which you want to connect. If MEDIASTOR is installed on the local computer, the local computer appears in the Computer Name text box by default.

- 4 In the Computer Name text box, enter the computer name of the OTGMS computer you want to use. You can type in the path to the computer or you can browse for the computer by clicking Browse. If you click Browse, the Select Computer dialog box appears.

NOTE 

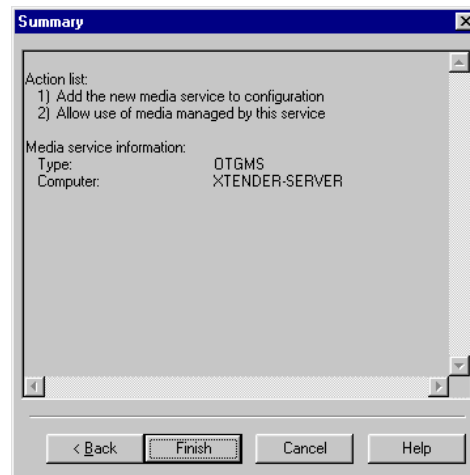
If you are connecting to a MEDIASTOR service that is installed in a clustered environment, be sure to enter or browse to the logical cluster name for the cluster on which MEDIASTOR is installed.

Figure 82: Select Computer Dialog Box



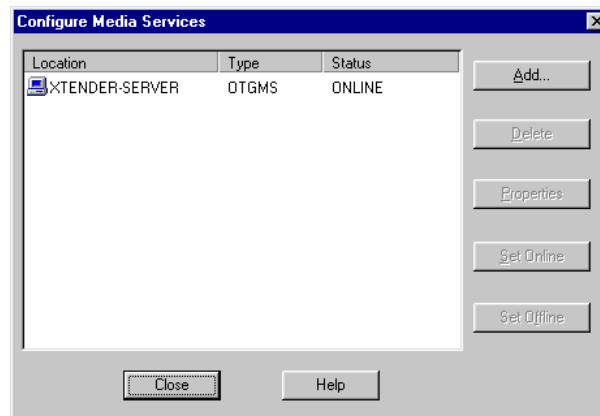
- 5 Navigate to the OTGMS computer and click OK. You are returned to the Select Computer page.
- 6 Click Next. The Summary page appears.

Figure 83: Summary Page



- 7 On the Summary page, review the information you have provided through the media service wizard.
- 8 If the information is correct, click Finish. A progress message appears. Once the media service is created, the Configure Media Services dialog box appears, showing the media service you just created (along with any others you may have created previously).

Figure 84: Configure Media Services Dialog Box



From the Configure Media Services dialog box, you may add another media service, view the properties of the selected service, set the service online or offline, and delete a media service.

The following sections provide further instructions for the OTGMS media service:

✎ *Editing Configured OTG MEDIASTOR Media Service* on page below. This section describes how to view configured media service properties, and how to allocate and deallocate OTGMS media to and from extended drives.

In order to use the media managed by the OTGMS media service, you must assign the media to an extended drive. If you have not yet created an extended drive for your DX service, consider waiting until you have done so to configure your OTGMS media service properties.

✎ *Setting the OTGMS Media Service Online or Offline* on page 115.

✎ *Deleting the OTGMS Media Service* on page 115.

- 9 When you are finished configuring media services, click Close.

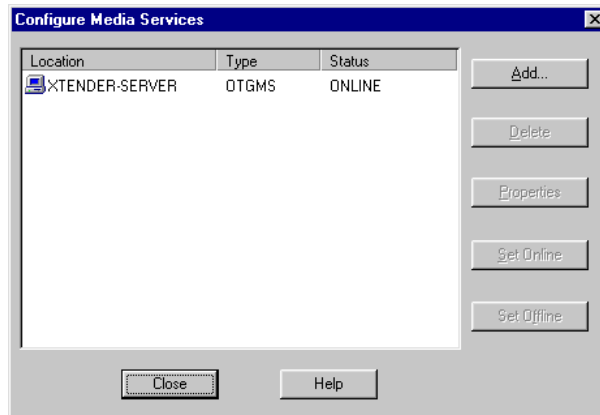
Editing Configured OTG MEDIASTOR Media Service

The Configure Media Services dialog box provides you with access to all the necessary media service functions. Through this window, you can add media services, delete media services, view properties of media services, and set media services online and offline as necessary.

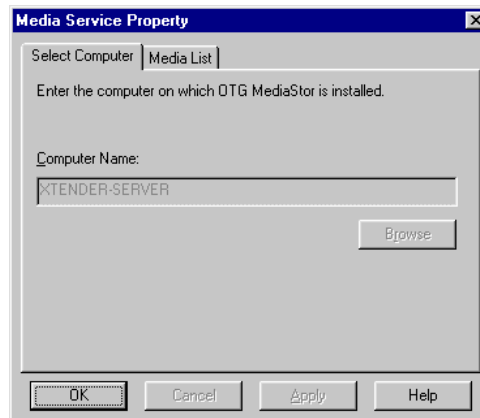
The Properties dialog box allows you to allocate and deallocate OTGMS media for the extended drive. You can also view the network path to the OTGMS computer.

To view configured media service properties:

- 1 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 85: Configure Media Services Dialog Box

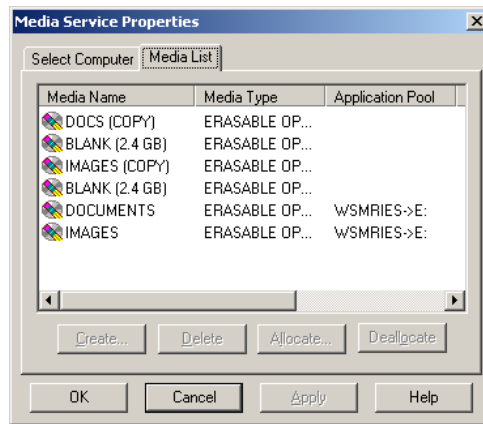
- 2 Select the OTGMS media service whose properties you want to view and click Properties (or double click the media service). The Media Service Property dialog box appears, with the Select Computer tab forward by default.

Figure 86: OTGMS Media Service Property Dialog Box: Select Computer Tab

The Select Computer tab displays the Computer Name of the machine providing the OTGMS media service. This is non-editable on this tab. To change the computer providing the media service, you must add a new OTGMS media service pointing to the different computer, and delete the old OTGMS media service (if applicable).

- 3 Click the Media List tab to activate it.

Figure 87: OTGMS Media Service Property Dialog Box: Media List Tab



The Media List tab lists all available media in the media service, along with media type and to what (if any) extended drive (application pool) that media is currently allocated.

- 4 After you are finished viewing or changing the properties, click OK. The Configure Media Services dialog box reappears. If you are finished, click Close to return to the Administrator.

If you want to allocate or deallocate OTGMS media for an extended drive, see *Allocating/Deallocating OTGMS Media for an Extended Drive* on page below.

Allocating/Deallocating OTGMS Media for an Extended Drive

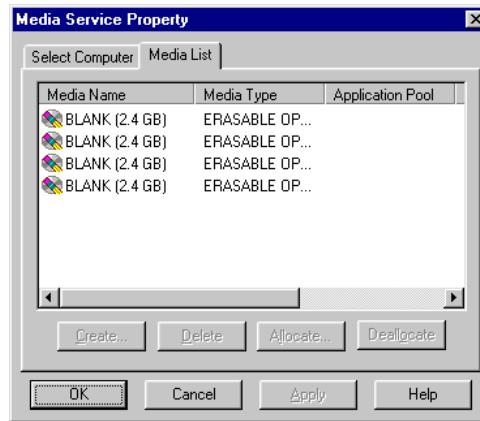
The Media Service Property dialog box allows you to allocate and deallocate OTGMS media for an extended drive. To allocate OTGMS media, the media service *must* be online. To deallocate OTGMS media, the media service *should* be online. If you attempt to deallocate media while the media service is offline, the changes might not take effect.

If you want to *change* which extended drive the media is allocated to, you must deallocate the media, then allocate it to a different extended drive.

To allocate OTGMS media to an extended drive:

- 1 In the Media Service Property dialog box, click the Media List tab.

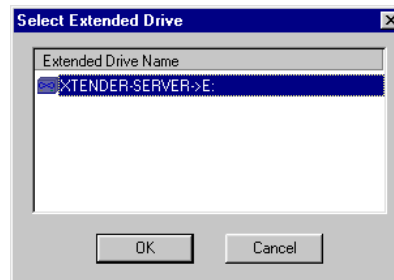
Figure 88: OTGMS Media Service Property Dialog Box: Media List Tab



- 2 You have the following choices:
 - ↳ Double-click the media you want to allocate.
 - ↳ Highlight the media and click Allocate. You can use the standard Windows <SHIFT> or <CTRL> select function to highlight multiple pieces of media.

The Select Extended Drive dialog box appears listing all available extended drives.

Figure 89: Select Extended Drive Dialog Box



- 3 Select the extended drive to which you want to allocate the selected media and click OK. The Media List tab of the Media Service Property dialog box reappears, listing the media and the extended drive to which it was allocated.

Allocated media appears in the appropriate node of the Available Media tree for the extended drive.

To deallocate OTGMS media from an extended drive:

- In the Media Service Property dialog box, you have the following choices:
 - Highlight the allocated media and click Deallocate. You can use the standard Windows <SHIFT> or <CTRL> select function to highlight multiple pieces of media.
 - Double-click the media you want to deallocate.

The Media List tab of the Media Service Property dialog box reappears, listing the OTGMS media, but the extended drive field of the window for the selected media is now blank.

You can also allocate and deallocate OTGMS media on the MEDIASTOR server. In MEDIASTOR, media is allocated or deallocated for the Available Media pool for the extended drive through the MEDIASTOR interface. Once you have allocated or deallocated media for the extended drive Application Pool, the corresponding change will appear in the DX Administrator. For more information on MEDIASTOR, refer to your MEDIASTOR System Guide.

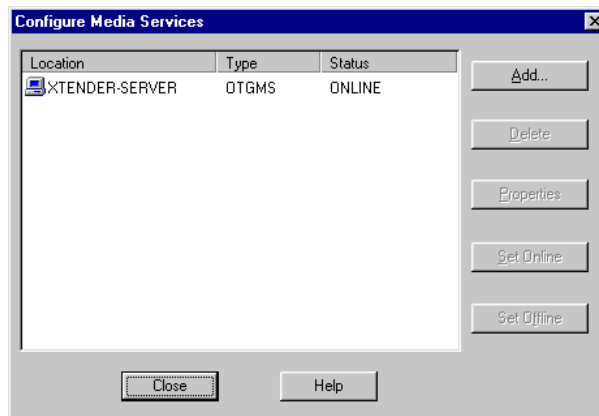
Setting the OTGMS Media Service Online or Offline

The Configure Media Services dialog box allows you to set the OTGMS media service online or offline.

To set a configured OTGMS media service online or offline:

- 1 From the Service menu in the DX Administrator, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 90: Configure Media Services Dialog Box



- 2 Select the OTGMS media service you want to set online or offline. If the selected service is online, the Set Offline button is active. If the selected service is offline, the Set Online button is active.
- 3 Click Set Online or Set Offline as appropriate. A message appears asking you to confirm the setting.
- 4 Click Yes. The new status appears in the Configure Media Services dialog box.

NOTE

Setting a media service offline makes the storage media for that media service unavailable for read/write requests from DISKXTENDER.

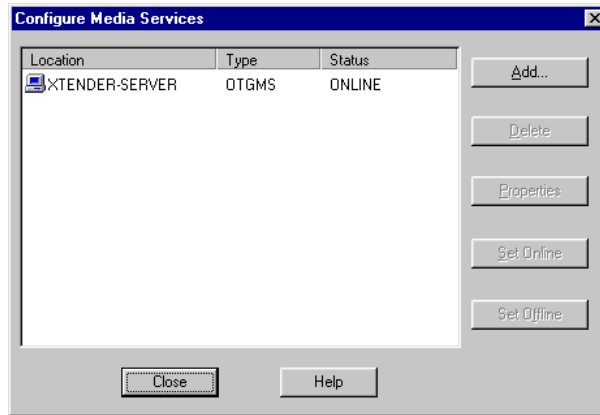
Deleting the OTGMS Media Service

The Configure Media Services dialog box allows you to delete the OTGMS media service.

To delete a configured OTGMS media service:

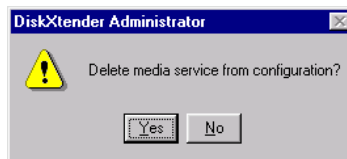
- 1 Make sure that all OTGMS media has been deallocated from extended drives.
- 2 From the Service menu in the DX Administrator, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 91: Configure Media Services Dialog Box



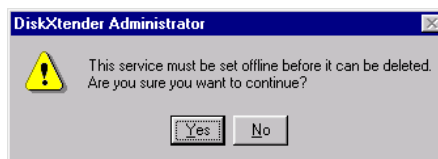
- 3 Select the OTGMS media service you want to delete and click Delete. A confirmation message appears verifying you want to delete the service.

Figure 92: Verification Message



- 4 Click Yes. If the service is still online when you select to delete it, another message appears informing you the service must be set offline first.

Figure 93: Set Service Offline Verification Message



- 5 Click Yes. The media service (and its associated media) is removed and the Configure Media Services dialog box reappears without the deleted service.

CONFIGURING A STORAGE TEK ACSLS MEDIA SERVICE

DX can be configured to point to any computer where StorageTek's ACSLS program is used to manage a StorageTek library or libraries. Because ACSLS is designed for UNIX operating system, you must have installed StorageTek's

LibAttach product on the DX computer before you can configure the ACSLS media service.

To set up ACSLS and the ACSLS media service in DX:

- 1 Physically connect the DX computer and the library drives via SCSI cable. For a description, glossary, and diagram of ACSLS concepts and architecture, see *ACSL System Concepts* on page 117.
- 2 Power on the libraries. The system will not recognize the libraries if they are not initialized before the Sun computer comes online.
- 3 Start the Sun computer. If necessary, open the ACSSS Console. For instructions, see *Starting the ACSSS Console* on page 118.
- 4 On the Sun computer, configure the changer or changers. For instructions, see *Configuring the Changers* on page 119.
- 5 On the Sun computer, assign media to an extended drive. For instructions, see *Assigning ACSLS Media to an Extended Drive* on page 121.
- 6 Start the DX computer. Make sure that StorageTek's LibAttach is installed. LibAttach allows DISKXTENDER to communicate with ACSLS, which is a UNIX program. LibAttach translates Windows-based product commands into a format that the UNIX-based ACSLS program understands.
- 7 On the DX computer, in the DX Administrator, use the media service creation wizard to create an ACSLS media service. For instructions, see *Configuring an ACSLS Media Service* on page 124.
- 8 On the Sun computer, request drive information, including the drive name. For instructions, see *Requesting Drive Information* on page 128.
- 9 On the DX computer, use the drive name to determine the SCSI device name in the Windows registry. For instructions, see *Finding the Device Name Using the Windows Registry* on page 129.
- 10 On the DX computer, use the drive information and device name to add a drive to the ACSLS media service. For instructions, see *Adding a Drive to the ACSLS Media Service* on page 132.

These sections provide only brief instructions on setting up ACSLS for the purpose of configuring an ACSLS media service on the DX Server. For more information on configuring ACSLS, refer to the documentation provided with your copy of ACSLS.

ACSL System Concepts

The Sun computer runs a UNIX operating system. Its purpose is to keep track of the library and the drives. The library receives information from the drives via a serial connection. A Windows server (the DX Computer) is connected to the drives via a SCSI cable. This allows DISKXTENDER to use the media that is reported by the Sun computer. Two or more Library Storage Media (LSM) devices can be connected using a "pass through" connection. When two or more LSMs are connected, they are called an Automated Cartridge System (ACS).

DISKXTENDER's role in ACSLS is to communicate with the LSM's drives. DISKXTENDER controls the migration and fetching of data from the media.

Table 13: ACSLS Glossary

TERM:	DEFINITION:
ACS (Automated Cartridge System)	One or more LSM's attached together that act as one device. LSM's are attached using a pass-through cable.
Drive	The device used to write data to media. Drives are connected to the library using a serial connection.
LSM (Library Storage Media)	A single device that contains drives, shelves, and a transport mechanism.
Panel	The area inside the LSM where drives and shelves are mounted.
Shelf	Houses the media when it is not mounted in a drive

The Sun Computer

When you log on to the Sun computer, three windows should appear, as described in the following table:

Table 14: Windows on the Sun Computer

WINDOW NAME:	DESCRIPTION:
The ACSSS Console	UNIX commands are entered in the ACSSS Console. The commands are entered at the command prompt, which is similar to a DOS prompt.
The ACSSS Command Processor Window	Processes ACSLS commands and displays the results.
The Event Log Tail Window	Displays information about the processes generated in the UNIX command window.

Starting the ACSSS Console

If the ACSSS Console does not appear when you log on to the Sun computer, use the following procedure:

To start the ACSSS Console:

- Right-click the background, select Programs, and then select Terminal. The ACSSS Console opens.

Configuring the Changers

This section describes how to configure the changer or changers for use with DX. All commands described in this procedure are entered in the ACSSS Console on the Sun computer where ACSLS is installed.

To configure the changers:

- 1 If the ACS Service is running, you must terminate it before adding or modifying a changer. To stop the ACS Service, type `kill .acsss` and press <RETURN>.
- 2 Once the service has stopped, type `acsss_config` and press <RETURN>. A menu appears with the following six options.
 1. Set CSI tuning variables
 2. Set event logging variables
 3. Set general product behavior variables
 4. Set access control variables
 5. Rebuild Access Control Information.
 6. Exit menu
- 3 Type 4 and press <RETURN>. You are prompted to verify a series of values. The following table lists the values that should be displayed. If the correct value is displayed, press <RETURN>. If the wrong value is displayed, type the correct value and press <RETURN>.

Table 15: Changer Configuration Prompts

PROMPT:	USE THIS VALUE:
Access control is active for commands	FALSE
Default access for commands	ACCESS
Access control is active for volumes	TRUE
Default access for volumes	NOACCESS
Messages will be logged when access to commands or volumes is denied	TRUE (recommended value)

The menu with six options appears again.

- 4 Type 5 and press <RETURN>. All library modification settings are saved.

- 5 Type 6 and press <RETURN>. You are prompted to answer a series of questions. The following table lists the questions and the answers. Type each answer and press <RETURN>.

Table 16: Changer Configuration Questions

QUESTION:	TYPE THIS ANSWER:
Configure library communications (y or n)?	Y
Library server data base exists and will be overwritten, continue (y/n)?	Y
Number of ACSs to be supported:	(You must determine this value.)
Number of connections to ACS #0:	(You must determine this value.)
Device name - ACS #0, device #0:	/dev/mchangerx (In this path, x represents the ID of the changer.)
Build/Verify library configuration (y or n):	Y
Library server data base exists and will be overwritten, continue (y/n)?	Y
Configure client system interfaces? (y or n):	N

The following message appears: “Prepare for database backup...Insert database backup tape. [Hit RETURN to continue]”

- 6 You have the following choices:
- ↳ Press <RETURN> to back up the database.
 - ↳ Press <CONTROL>+<C> to exit from the tape backup prompt.
- 7 Restart the ACS Service. To start the ACS Service, type `rc .acsss` and press <RETURN>. In a moment, the following message appears in the Event Log Tail window: “Server system running”.

Assigning ACSLS Media to an Extended Drive

This section describes how to assign media to an owner, such as a DX extended drive. All commands described in this procedure are entered on the Sun computer where ACSLS is installed.

To assign media to an extended drive:

- 1 In the ACSSS Console, change to the appropriate directory. Type the following command and press <RETURN>:

```
cd /export/home/ACSSS/data/external/volrpt
```

- 2 In the ACSSS Console, request owner information to find available media. Type the following command and press <RETURN>:

```
volrpt -f owner_id.volrpt -a x
```

The placeholder *x* represents the ACS ID. A list will be displayed showing the owner of each media. Refer to the following example:

```

                                VOLUME REPORT UTILITY
2000-10-05 11:06:52
TOTAL VOLUMES: 2  SEQUENCE: sort by volume identifier
Volume      Volume      Owner
Label:      Status:      ID:
000182     VOLUME_HOME  SYSTEM
004022     VOLUME_HOME  DX_BENCH_E

```

In this example, the media with volume label 000182 is currently unassigned. The media with volume label 004022 is currently assigned to DX_BENCH_E (the extended drive E on the computer BENCH).

- 3 In the ACSSS Command Processor Window, assign the media. Type the following command and press <RETURN>:

```
set owner "DX_MachineName_ExtDriveLetter" VOL
MediaRange
```

The following table indicates what each placeholder in this format represents:

Table 17: Placeholders in the Command to Assign Media

PLACEHOLDER:	REPRESENTS:
<i>MachineName</i>	The computer name that contains the extended drive
<i>ExtDriveLetter</i>	The drive letter of the extended drive
<i>MediaRange</i>	The range of numbers for the media that you want to extend.

The following example assigns the media numbered from 060945 to 060948 to extended drive G on the DX29 computer:

```
set owner "DX_DX29_G" VOL 060945-060948
```

When the new assignment is completed, the following message appears in the ACSSS Command Processor Window: "Set: set completed, Success."

Once you have assigned ownership for a piece of media to your extended drive through ACSLS and once that media has been added to the ACSLS media service, the media will appear in the appropriate node of the Available Media tree for your extended drive.

Deallocating ACSLS Media from an Extended Drive (Assigning ACSLS media back to the system)

Deallocating ACSLS media from an extended drive is done by reassigning that media back to the system (making the “system” the owner of the media). This section describes how to assign media to the system, effectively removing it from the DX extended driven (and the DX system altogether). All commands described in this procedure are entered on the Sun computer where ACSLS is installed.

To assign media from DX back to the system:

- 1 In the ACSLS Console, change to the appropriate directory. Type the following command and press <RETURN>:

```
cd /export/home/ACSSS/data/external/volrpt
```

- 2 In the ACSLS Console, request owner information to find the media that you want to deallocate. Type the following command and press <RETURN>:

```
volrpt -f owner_id.volrpt -a x
```

The placeholder *x* represents the ACS ID. A list will be displayed showing the owner of each media. Refer to the following example:

```
VOLUME REPORT UTILITY
2000-10-05 11:06:52
TOTAL VOLUMES: 2 SEQUENCE: sort by volume identifier
Volume      Volume      Owner
Label:      Status:      ID:
000182    VOLUME_HOME SYSTEM
004022    VOLUME_HOME DX_BENCH_E
```

In this example, the media with volume label 000182 is currently unassigned. The media with volume label 004022 is currently assigned to DX_BENCH_E (the extended drive E on the computer BENCH).

- 3 In the ACSLS Command Processor Window, assign the media to system. Type the following command and press <RETURN>:

```
set owner "System" VOL MediaRange
```

In this command, the placeholder *MediaRange* represents the range of numbers for the media that you want to deallocate. The following example assigns the media numbered from 060945 to 060948 to the system, which deallocates it from the extended drive to which it had been allocated:

```
set owner "System" VOL 060945-060948
```

When the new assignment is completed, the following message appears in the ACSLS Command Processor Window: “Set: set completed, Success.”

Locked Volumes and Drives

This section describes how to perform commands having to do with locked volumes and drives. All commands described in this section are entered in the ACSSS Command Processor window on the Sun computer where ACSLS is installed.

To query locks on drives:

- Type the following command and press <RETURN>:
query lock drive all

To query locks on volumes:

- Type the following command and press <RETURN>:
query lock volume all

To unlock all drives:

- 1 Type the following command and press <RETURN>:
clean lock drive
- 2 Type the drive identifier for each locked drive and press <RETURN>.
- 3 Press <RETURN> on a blank line to stop entering drive identifiers.

To unlock all volumes:

- 1 Type the following command and press <RETURN>:
clean lock volume
- 2 Type the volume identifier for each locked volume and press <RETURN>.
- 3 Press <RETURN> on a blank line to stop entering volume identifiers.

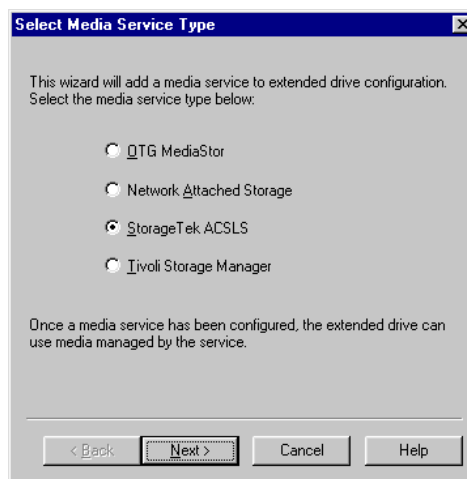
Configuring an ACSLS Media Service

This section describes how to use the media service wizard to create an ACSLS media service.

To configure an ACSLS media service:

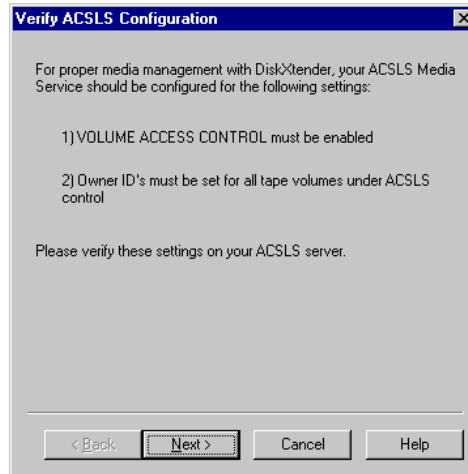
- 1 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.
- 2 Click Add to add a media service. The media service wizard appears, starting with the Select Media Service Type page.

Figure 94: Select Media Service Type Page



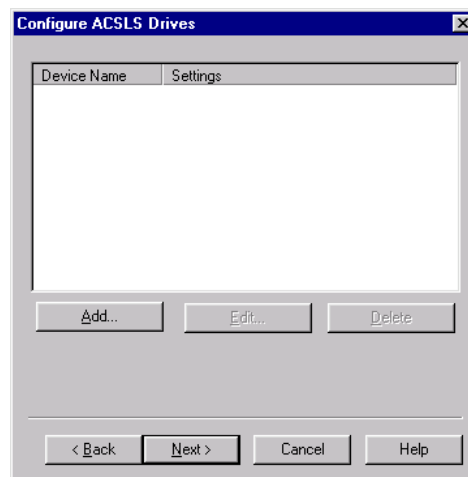
- 3 Select the StorageTek ACSLS option and click Next. The Verify ACSLS Configuration page appears.

Figure 95: Verify ACSLS Configuration Page



- 4 On the ACSLS server, verify settings as described on this page. (For instructions, see *Configuring the Changers* on page 119.) Click Next. The Configure ACSLS Drives page appears.

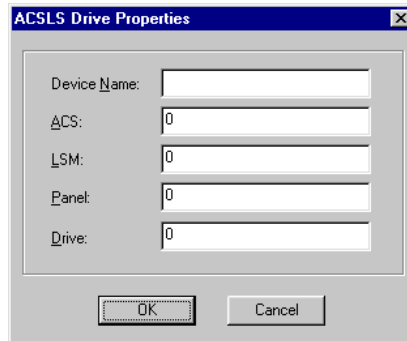
Figure 96: Configure ACSLS Drives Page



The Configure ACSLS Drives page allows you to add the StorageTek library drives setup in ACSLS to your DX system.

- 5 Click Add to add an ACSLS Drive. The ACSLS Drive Properties dialog box appears.

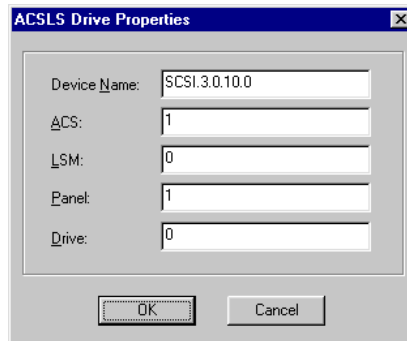
Figure 97: ACSLS Drives Properties Dialog Box



The ACSLS Drive Properties dialog box allows you to enter the SCSI address appropriate for the library drives configured in ACSLS for use by DX.

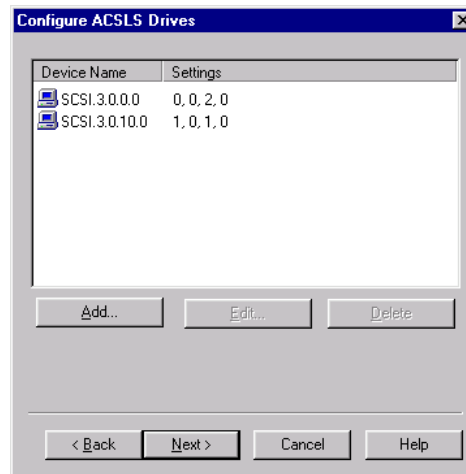
- 6 Enter the Device Name and SCSI address that corresponds with the ACSLS library drive. For instructions on gathering this information, see *Requesting Drive Information* on page 128 and *Finding the Device Name Using the Windows Registry* on page 129.

Figure 98: ACSLS Drives Properties Dialog Box



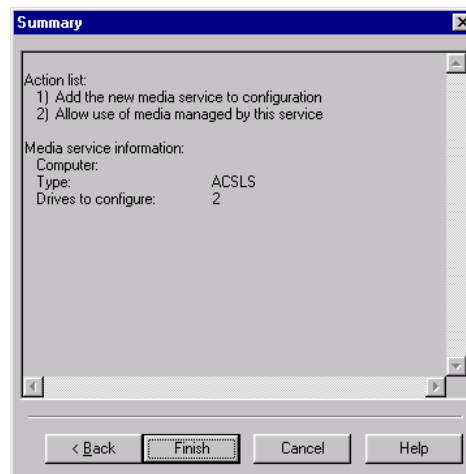
- 7 Click OK. The Configure ACSLS Drives Page reappears with the drive listed.

Figure 99: Configure ACSLS Drives Page



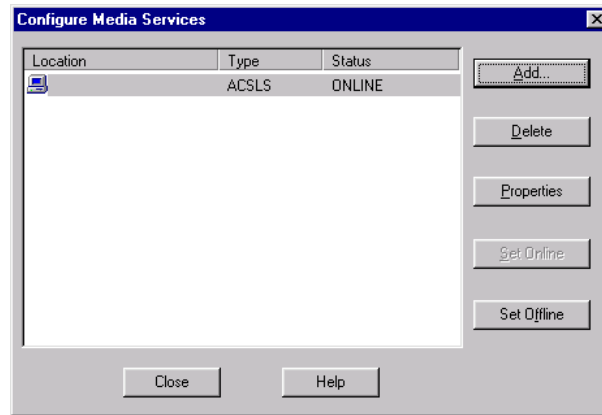
- 8 For each drive that should be added to the ACSLS media service for DX, repeat steps 5 - 7.
- 9 Click Next. The Summary Page appears.

Figure 100: Summary Page



- 10 Review the information in the summary page.
- 11 If the information in the summary page is correct, click Finish. A progress message appears. Once the media service is created, the Configure Media Services dialog box appears, showing the media service you just created (along with any others you may have created previously).

Figure 101: Configure Media Services Dialog Box



From the Configure Media Services dialog box, you may add another media service, view the properties of the selected service, set the service offline, or delete a media service.

The following sections provide further instructions for the ACSLS media service:

✎ *Editing Configured ACSLS Media Services* on page 130. This section describes how to add a drive to the ACSLS media service, make changes to an existing ACSLS drive, and remove a drive from the ACSLS media service. In order to use the ACSLS media service, you must create media for DX to use and assign that media to an extended drive. If you have not yet created an extended drive for your DX service, consider waiting until doing so to configure your ACSLS media service properties.

✎ *Setting the ACSLS Media Service Online or Offline* on page 135.

✎ *Deleting the ACSLS Media Service* on page 135.

12 When you are finished configuring media services, click Close.

Requesting Drive Information

This section describes how to request drive information, which you need to add media to the ACSLS media service.

To request drive information:

- In the ACSSS Command Processor Window, type the following command and press <RETURN>:
`query drive all`

All drives currently in the system are listed, as in the following example:

```
2000-10-04 16:07:54
Identifier  State      Status      Volume      Type
  0, 0, 1, 0 online    available   9840
  0, 0, 1, 1 online    available   9840
  0, 0, 1, 2 online    available   DLT7000
  0, 0, 1, 3 online    available   DLT7000
```

The drive information that you should look for is in bold in this example. The numbers listed in the Identifier column represent the ACS, LSM, panel, and drive, in that order. The value in the Type column represents the drive name. You need this information in order to add media to the ACSLS media service in DX.

Finding the Device Name Using the Windows Registry

This section describes how to determine the device name, which you need to add media to the ACSLS media service.

To determine the device name:

- 1 On the Sun computer, request drive information. For instructions, see *Requesting Drive Information* on page 128. This action should provide you with a drive name.
- 2 On the DX Server, from the Windows Start menu, select Run. The Run dialog box appears.
- 3 In the Open text box, type `regedit` and click OK. The Registry Editor appears.
- 4 Navigate to `HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\Scsi`. Select the Scsi key.
- 5 From the Edit menu, select Find. The Find dialog box appears.
- 6 In the Find What text box, type the drive name that you requested on the Sun computer (for example, 9840). You should be able to find at least one path from the Scsi key that contains the drive name.
- 7 Use one of the paths that you find to construct the device name in the following format:

SCSI.Port.Bus.Target.LogicalUnit

The following table indicates what each placeholder in this format represents:

Table 18: Placeholders in the Device Name Format

PLACEHOLDER:	REPRESENTS:
<i>Port</i>	In the path that was found, the value at the end of the Scsi Port key name.
<i>Bus</i>	In the path that was found, the value at the end of the Scsi Bus key name.

PLACEHOLDER:	REPRESENTS:
<i>Target</i>	In the path that was found, the value at the end of the Target Id key name.
<i>LogicalUnit</i>	In the path that was found, the value at the end of the Logical Unit Id key name.

For example, to construct the device name for a drive 9840, you might find the value 9840 in the following registry path:

HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 0\Target Id 2\Logical Unit Id 0

The device name that you would construct from this path would be SCSI.2.0.2.0. You need this device name in order to add media to the ACSLS media service in DX.

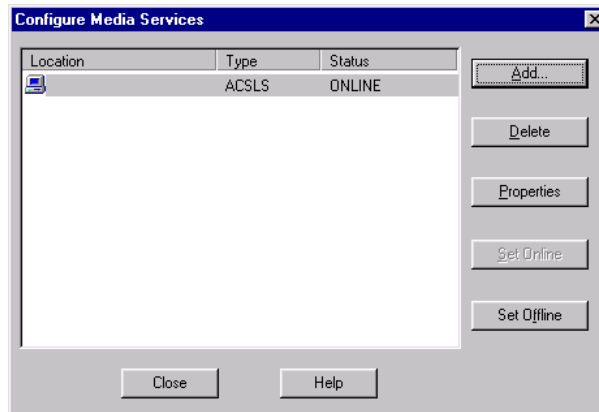
Editing Configured ACSLS Media Services

The Configure Media Services dialog box provides you with access to all the necessary media service functions. Through this window, you can add media services, delete media services, view properties of media services, and set media services online and offline as necessary.

Once the ACSLS media service has been added to DISKXTENDER, you may choose to add or delete drives within the StorageTek library for use with DX. If this happens, you can add and delete drives through the ACSLS properties rather than having to delete and reconfigure the entire media service. However, you will also have to change the physical SCSI connections between the DX computer and the library drives.

To edit configured media service properties:

- 1 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 102: Configure Media Services Dialog Box

- 2 Select the ACSLS media service and click Properties (or double click the media service). The Media Service Property dialog box appears.

The ACSLS Media Service Property dialog box allows you to add, edit, or delete ACSLS configured library drives from the ACSLS media service.

- 3 You have the following choices:

- ↗ If you want to add a drive to the ACSLS media service, see *Adding a Drive to the ACSLS Media Service* on page 132.
- ↗ If you want to make changes to an existing ACSLS drive, see *Editing ACSLS Drive Configuration* on page 133.
- ↗ If you want to allocate an ACSLS drive to an extended drive, see *Assigning ACSLS Media to an Extended Drive* on page 121.
- ↗ If you want to deallocate an ACSLS drive from an extended drive, see *Deallocating ACSLS Media from an Extended Drive (Assigning ACSLS media back to the system)* on page 122.
- ↗ If you want to remove a drive from the ACSLS media service, see *Removing a Drive from the ACSLS Media Service* on page 134.

NOTE

To add, edit, or delete a drive, the media service *must* be offline.

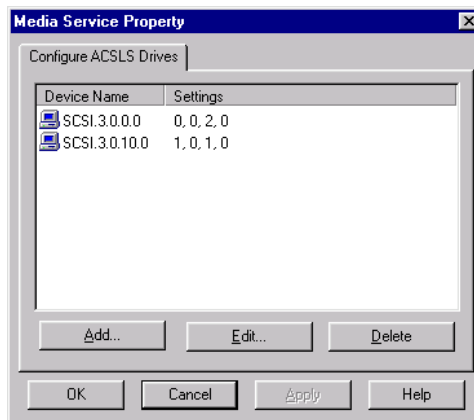
- 4 When you are finished making changes to the ACSLS media service properties, click OK. If the ACSLS media service had been set offline while you made changes to the media service properties, a message appears asking whether you want to set the service back online.

- 5 Click Yes. The Configure Media Services dialog box reappears.
- 6 When you are finished making changes to the media services for DX, click Close. The Configure Media Services dialog box closes and you are returned to the Administrator.

Adding a Drive to the ACSLS Media Service

The Media Service Property dialog box allows you to add a drive to the ACSLS media service.

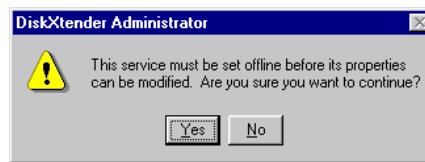
Figure 103: ACSLS Media Service Property Dialog Box



To add a drive to the ACSLS media service:

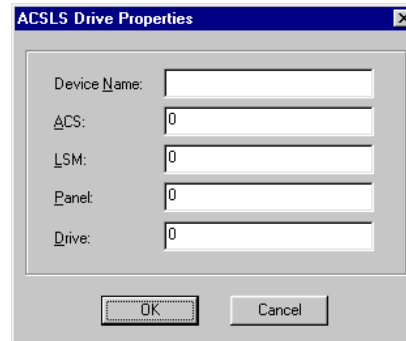
- 1 In the Media Service Property dialog box, click Add. If the ACSLS media service is still online, a message appears indicating that the service must be set offline first.

Figure 104: Set Service Offline Verification Message



- 2 Click Yes. An ACSLS Drive Properties dialog box appears.

Figure 105: ACSLS Drives Properties Dialog Box



- 3 Enter the Device Name and SCSI address that corresponds with the ACSLS library drive. For instructions on gathering this information, see *Requesting Drive Information* on page 128 and *Finding the Device Name Using the Windows Registry* on page 129.
- 4 Click OK. The new drive appears in the Media Service Property dialog box.

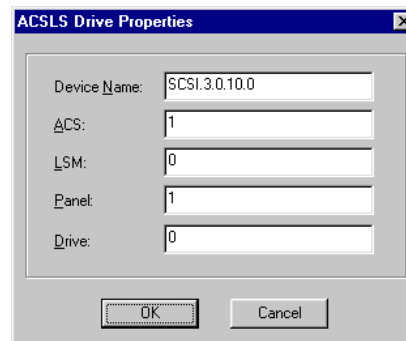
Editing ACSLS Drive Configuration

The Media Service Property dialog box allows you to edit a configured ACSLS drive.

To edit a drive configuration:

- 1 In the Media Service Property dialog box, select the appropriate drive and click Edit. If the ACSLS media service is still online, a message appears indicating that the service must be set offline first.
- 2 Click Yes. The ACSLS Drive Properties dialog box appears containing the drive SCSI configuration.

Figure 106: ACSLS Drives Properties Dialog Box



- 3 Edit the drive information. For instructions on gathering this information, see *Requesting Drive Information* on page 128 and *Finding the Device Name Using the Windows Registry* on page 129.
- 4 Click OK. The new information appears for that drive in the Media Service Property dialog box.

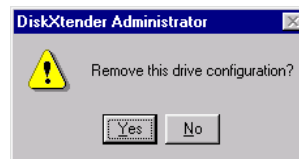
Removing a Drive from the ACSLS Media Service

The Media Service Property dialog box allows you to remove a drive from the ACSLS media service.

To remove a drive from the ACSLS media service:

- 1 In the Media Service Property dialog box, select the drive you want to remove.
- 2 Click Delete. If the ACSLS media service is still online, a message appears indicating that the service must be set offline first.
- 3 Click Yes. A confirmation message appears.

Figure 107: Drive Deletion Confirmation Message



- 4 Click Yes. The Media Service Property dialog box appears without the deleted drive.

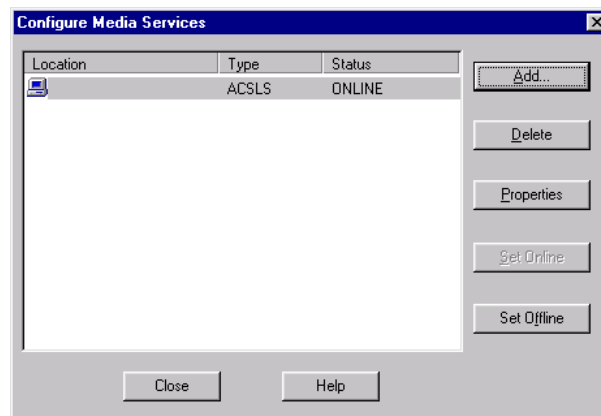
Setting the ACSLS Media Service Online or Offline

The Configure Media Services dialog box allows you to set the ACSLS media service online or offline.

To set a configured ACSLS media service online or offline:

- 1 From the Service menu in the DX Administrator, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 108: Configure Media Services Dialog Box



- 2 Select the ACSLS media service. If the selected service is online, the Set Offline button is active. If the selected service is offline, the Set Online button is active.
- 3 Click Set Online or Set Offline as appropriate. A message appears asking you to confirm the setting.
- 4 Click Yes. The new status appears in the Configure Media Services dialog box.

NOTE

Setting a media service offline makes the storage media for that media service unavailable for read/write requests from DISKXTENDER.

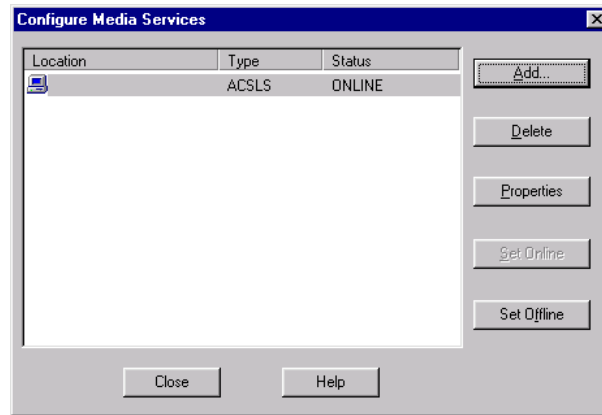
Deleting the ACSLS Media Service

The Configure Media Services dialog box allows you to delete the ACSLS media service.

To delete a configured ACSLS media service:

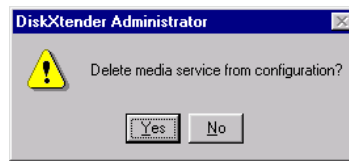
- 1 Make sure that all ACSLS drives have been removed from extended drives.
- 2 From the Service menu in the DX Administrator, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 109: Configure Media Services Dialog Box



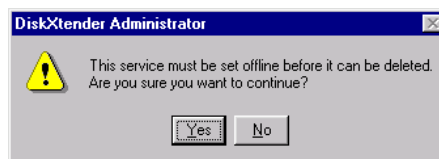
- 3 Select the ACSLS media service and click Delete. A confirmation message appears verifying you want to delete the service.

Figure 110: Verification Message



- 4 Click Yes. If the service is still online when you select to delete it, another message appears informing you the service must be set offline first.

Figure 111: Set Service Offline Verification Message



- 5 Click Yes. The media service (and its associated media) is removed and the Configure Media Services dialog box reappears without the deleted service.

CONFIGURING A TIVOLI STORAGE MANAGER MEDIA SERVICE

In order to use Tivoli Storage Manager as a media service you must first have TSM server version 3.7.4 (or higher) and TSM Backup/Archive Client 4.1 (or higher) set

up and configured appropriately on the same computer as DX is installed. You must then copy the DSM.OPT file from the BACLIENT directory where Tivoli is installed to the DISKXTENDER\BIN directory on the DX computer. In addition, some minor edits must be made to the DSM.OPT file copied to the DISKXTENDER\BIN directory.

To prepare Tivoli Storage Manager for use with DX:

- 1 Copy the DSM.OPT file from the BACLIENT directory where Tivoli is installed to the DISKXTENDER\BIN directory.
- 2 Edit the copied DSM.OPT file and change the following information in that file:
 - ✎ tcpserveraddress - Type in the IP Address of TSM Server computer.
 - ✎ nodename – Type in the nodename that has been defined on the TSM Server for storage of DISKXTENDER data. The recommended nodename is *DX-Computername*, where *Computername* is the name of the local DX machine name.
 - ✎ passwordaccess – Type in the word *generate*.

You can refer to the following example:

```
*=====
* tcp/ip
*=====
commmethod          TCPIP
tcpport             1500
tcpserveraddress    xx.x.xx.xxx
nodename            DX-node44
passwordaccess      generate
```

- 3 For each additional TSM Server computer that you want to use, create a copy (with different filenames) of each server’s DSM.OPT file in the DISKXTENDER\BIN directory. Repeat step 2 with each option file.
- 4 Start and stop the DX service using the Service Manager in the DX Administrator. This step is necessary to allow DX to recognize the TSM media service.

After completing these preliminary steps, you may configure the Tivoli Storage Manager media service in DISKXTENDER. If you are connecting to more than one TSM Server computer, you must create one TSM media service for each TSM Server computer, and point to the differently named dsm.opt files, as indicated in step 3 above.

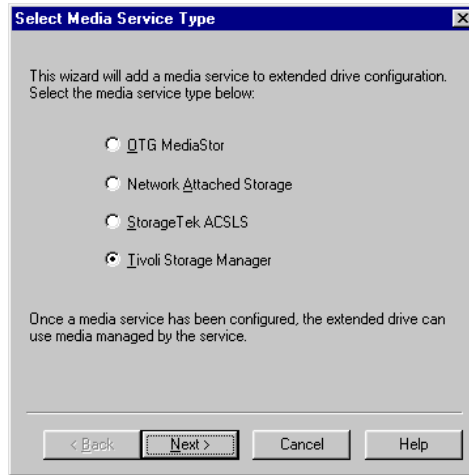
NOTE 

If the `tcpserveraddress` information in the `dsm.opt` file on the TSM server changes, the change must also be made to the `dsm.opt` file on the DX computer (meaning this information in these files must be identical for both). Differences will impact the ability of DX to migrate and fetch files from the TSM Server.

To configure a Tivoli Storage Manager media service:

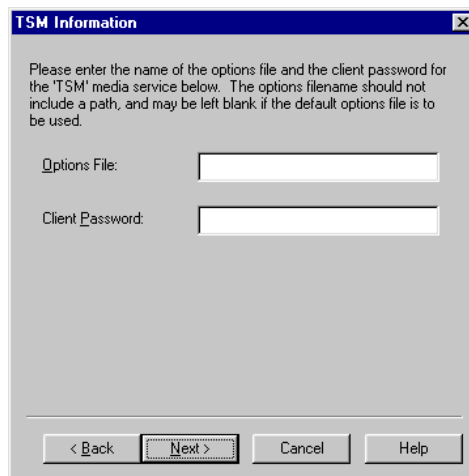
- 1 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.
- 2 Click Add to add a media service. The media service wizard appears, starting with the Select Media Service Type page.

Figure 112: Select Media Service Type Page



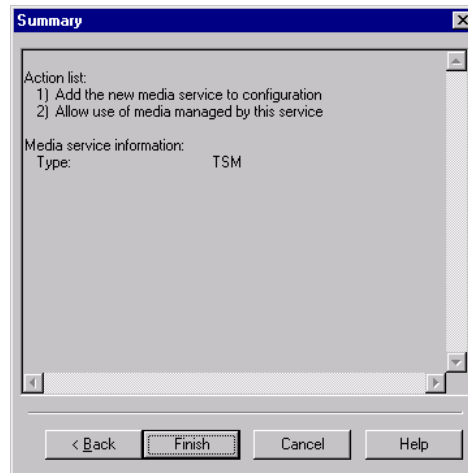
- 3 Select the Tivoli Storage Manager option and click Next. The TSM Information page appears.

Figure 113: TSM Information Page



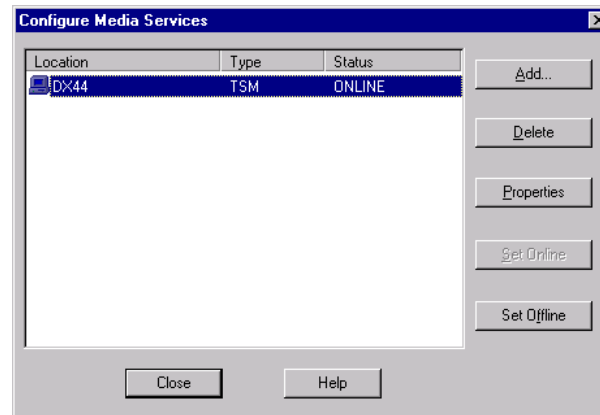
- 4 In the Options File text box, specify the options file that specifies the TSM Server computer that you want to use with this TSM media service. You have the following choices:
 - ↵ If you want to use the default options file, DISKXTENDER\BIN\DSM.OPT, leave the text box blank.
 - ↵ If you want to use a different options file in the DISKXTENDER\BIN directory, type the file name.
- 5 In the Client Password text box, type in a client password. This is the password the DX service will use to log in to the Tivoli Storage Manager node defined in the DSM.OPT file.
- 6 Click Next. The Summary page appears.

Figure 114: Add TSM Media Service Summary Page



- 7 If the information in the summary page is correct, click Finish. A progress message appears.
- 8 Once the media service is created, the Configure Media Services dialog box appears, showing the media service you just created (along with any others you may have created previously).

Figure 115: Configure Media Services Dialog Box



- 9 From the Configure Media Services dialog box, you may add another media service, view the properties of the selected service, set the service offline or delete a media service.

The following sections provide further instructions for the TSM media service:

✎ *Editing Configured/Added TSM Media Services* on page 140. This section describes how to create a new piece of virtual TSM media, allocate a piece of TSM media to an extended drive, and delete a piece of TSM media.

In order to use the Tivoli Storage Manager media service, you must create virtual media for DX to use and assign that media to an extended drive. If you have not yet created an extended drive for your DX service, consider waiting until doing so to configure your TSM media service properties.

✎ *Setting the TSM Media Service Online or Offline* on page 147.

✎ *Deleting the TSM Media Service* on page 148.

- 10 When you are finished configuring media services, click Close to return to the Administrator.

Editing Configured/Added TSM Media Services

The Configure Media Service dialog box allows you to access the properties for each configured media service. The Media Service Property dialog box contains configuration information about the media service. The TSM Media Service Property dialog box contains two tabs: the Media List tab and the TSM Information tab.

The Media List tab allows you to create ‘virtual’ media for the TSM media service. This virtual media represents TSM storage and acts as the media to which DX will migrate files. The physical media is controlled by the TSM server. You specify which type of physical media you want DX to migrate to by specifying the corresponding TSM management class. Tivoli manages the handling of files after DX migrates the files to TSM.

If you configured your Tivoli Storage Manager media service(s) before you created your extended drive, you have to assign the virtual media to the extended drive after the extended drive is configured. This is also done through the Media List tab.

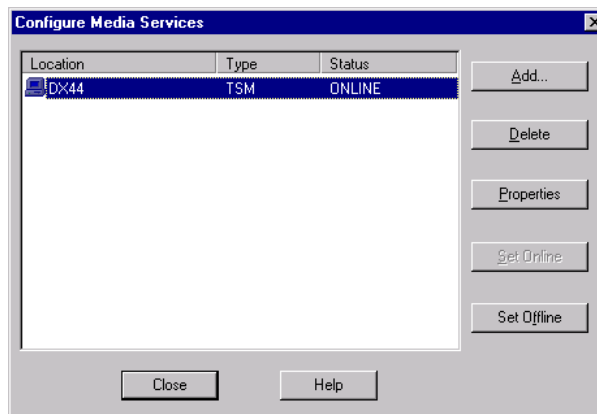
The TSM Information tab allows you to change the Client Password configured when the media service was created. You must know the original password in order to change it.

Editing the properties of a configured Tivoli Storage Manager media service is the same regardless of whether you are creating your virtual TSM media for the first time or if you are changing a property of an existing piece of virtual TSM media.

To edit TSM media service properties:

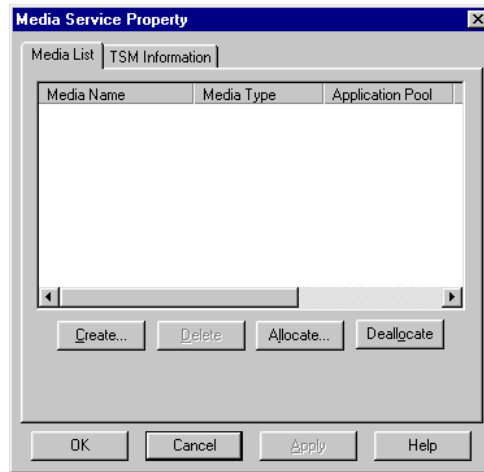
- 1 From the DX Administrator's Service menu, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 116: Configure Media Services Dialog Box



- 2 Select the Tivoli Storage Manager media service that you want to edit and click Properties (or double-click the media service). The Media Service Property dialog box appears, with the Media List tab forward by default.

Figure 117: TSM Media Service Property Dialog Box: Media List Tab



The Media List tab allows you to create ‘virtual’ media for the TSM media service. This virtual media represents TSM storage and acts as the media service media to which DX will migrate files.

The first time you enter this dialog box, the media list is empty because no media has been created.

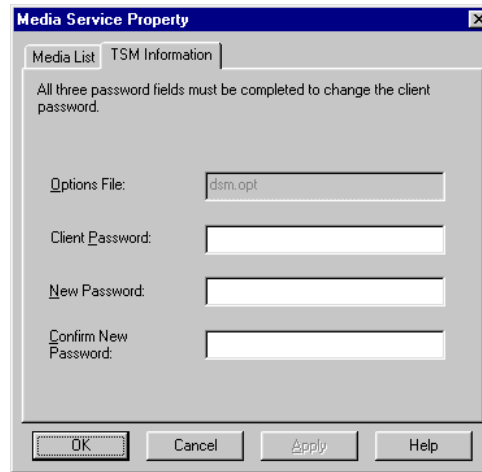
- 3 In the Media List tab, you have the following choices:
 - ✎ If you want to create a new piece of virtual TSM media, see *Creating a Piece of Virtual TSM Media* on page 143.
 - ✎ If you want to allocate/deallocate a piece of virtual TSM media for an extended drive, see *Allocating/Deallocating TSM Media for an Extended Drive* on page 145.
 - ✎ If you want to delete a piece of virtual TSM media, see *Removing Media from the TSM Media Service* on page 146.

NOTE ✎

Only a member of the DXAdministrators group on the DX computer may delete media. To create or allocate TSM media, the media service *must* be online. To delete or deallocate TSM media, the media service *should* be online. If you attempt to delete or deallocate media while the media service is offline, the changes might not take effect.

- 4 To change the Client Password, click the TSM Information tab.

Figure 118: TSM Media Service Property Dialog Box: Information Tab

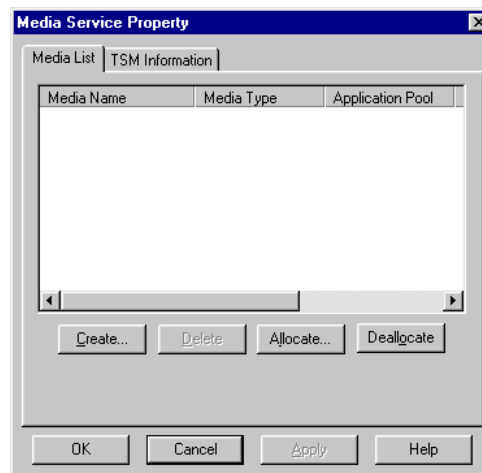


- 5 In the TSM Information tab, enter the current and new password information.
- 6 When you are finished making changes to the TSM media service for DX, click OK. The Configure Media Services dialog box reappears.
- 7 When you are finished making changes to all of the media services for DX, click Close. The Configure Media Services dialog box closes and you are returned to the Administrator.

Creating a Piece of Virtual TSM Media

The Media List tab of the Media Service Property dialog box allows you to create a piece of virtual TSM media.

Figure 119: TSM Media Service Property Dialog Box: Media List Tab



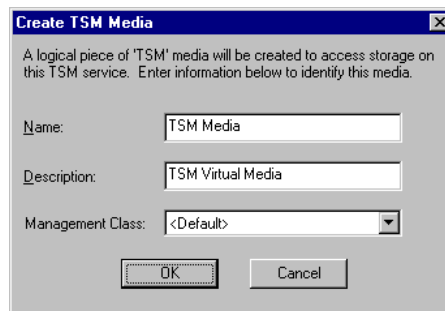
NOTE 

To create TSM media, the media service *must* be online.

To create a piece of virtual TSM media:

- 1 In the TSM Media Service Property dialog box, click Create. The Create TSM Media dialog box appears.

Figure 120: Create TSM Media Dialog Box



The Create TSM Media dialog box allows you to provide a name and description of the virtual media you are creating to represent the TSM media service. The name you enter is the name that will appear for the media in the DX administrator.

- 2 In the Name and Description text boxes, enter a name and a description for the virtual piece of media. The name is what will appear in the extended drive tree as the name of the media.
- 3 Select a management class from the Management Class drop-down list box. The management class you select associates the media with a policy domain, policy set, and migration destination on the Tivoli Storage Manager server.

NOTE 

For more information on the use of management classes in Tivoli Storage Manager, refer to your TSM documentation.

- 4 Click OK. You are returned to the Media List tab.

NOTE 

If you configured your Tivoli Storage Manager media service(s) before you created your extended drive, you have to assign the virtual media to the extended drive after the extended drive is configured. For instructions, see the *Allocating/Deallocating TSM Media for an Extended Drive* section, below.

Allocating/Deallocating TSM Media for an Extended Drive

The Media Service Property dialog box allows you to allocate and deallocate TSM media for an extended drive. To allocate NAS media, the media service *must* be online. To deallocate TSM media, the media service *should* be online. If you attempt to deallocate media while the media service is offline, the changes might not take effect.

If you want to *change* which extended drive the media is allocated to, you must deallocate the media, then allocate it to a different extended drive.

Figure 121: TSM Media Service Property Dialog Box with Media

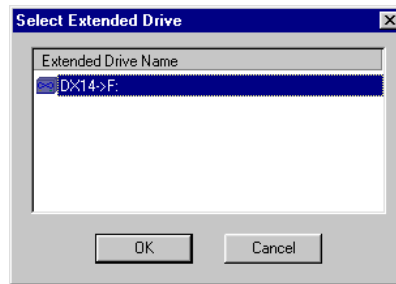


To allocate virtual TSM media to an extended drive:

- 1 In the TSM Media Service Property dialog box, in the Media List tab, you have the following choices:
 - ✎ Double-click the piece of TSM media that you want to allocate to an extended drive.
 - ✎ Highlight the piece of media you want to allocate. You can use the standard Windows <SHIFT> or <CTRL> select function to highlight multiple pieces of media.
- 2 Click Allocate.

The Select Extended Drive dialog box appears, listing all of the configured extended drives on the DX computer.

Figure 122: Select Extended Drive Dialog Box.



- 3 Select the extended drive to which you want to allocate the virtual TSM media.
- 4 Click OK. You are returned to the Media List tab. The piece of TSM media appears listed with the extended drive to which it is allocated.

The media appears in the Original node of the Available Media tree for the selected extended drive.

To deallocate virtual TSM media from an extended drive:

- In the TSM Media Service Property dialog box, in the Media List tab, you have the following choices:
 - ↳ Highlight the allocated media you want to deallocate. You can use the standard Windows <SHIFT> or <CTRL> select function to highlight multiple pieces of media.
 - ↳ Double-click the allocated media that you want to deallocate.

The Media Service Property dialog box reappears, listing the TSM media, but the extended drive field of the window is now blank.

Removing Media from the TSM Media Service

The Media Service Property dialog box allows you to delete a piece of virtual TSM media.

NOTE 🗑️

The appropriate delete privileges must be set for the client node in the Tivoli Storage Manager before you can remove TSM media from DX. If the media has the backup attribute, for example, you need to make sure the backup delete option is enabled.

NOTE 🗑️

Only a member of the DXAdministrators group on the DX computer may delete media. To delete TSM media, the media service *should* be online. If you attempt to delete media while the media service is offline, the changes might not take effect.

To delete a piece of virtual TSM media:

- 1 Make sure that the media has been deallocated from the extended drive.
- 2 In the Media Service Property dialog box, highlight the media. You can use the standard Windows <SHIFT> or <CTRL> select function to highlight multiple pieces of media.
- 3 Click Delete. A message appears allowing you to confirm the deletion.
- 4 Click Yes. The Media Service Property dialog box reappears, without the deleted TSM media.

WARNING 

Deleting media from the TSM media service will delete the file space on the TSM Server that stored data migrated by DISKXTENDER. Any data migrated to this virtual media will no longer be available.

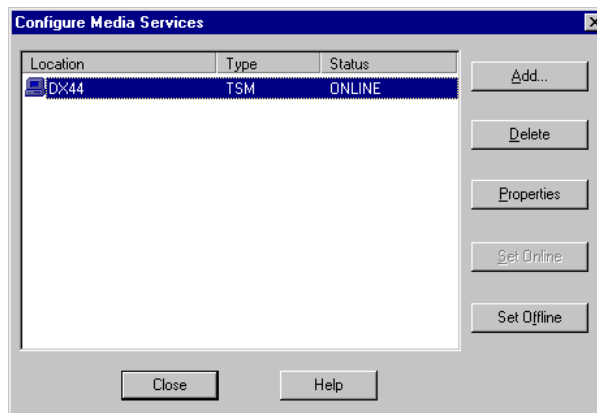
Setting the TSM Media Service Online or Offline

The Configure Media Services dialog box allows you to set the TSM media service online or offline.

To set a configured TSM media service online or offline:

- 1 From the Service menu in the DX Administrator, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 123: Configure Media Services Dialog Box



- 2 Select the TSM media service that you want to set online or offline. If the selected service is online, the Set Offline button is active. If the selected service is offline, the Set Online button is active.
- 3 Click Set Online or Set Offline as appropriate. A message appears asking you to confirm the setting.

- 4 Click Yes. The new status appears in the Configure Media Services dialog box.

NOTE 

Setting a media service offline makes the storage media for that media service unavailable for read/write requests from DISKXTENDER.

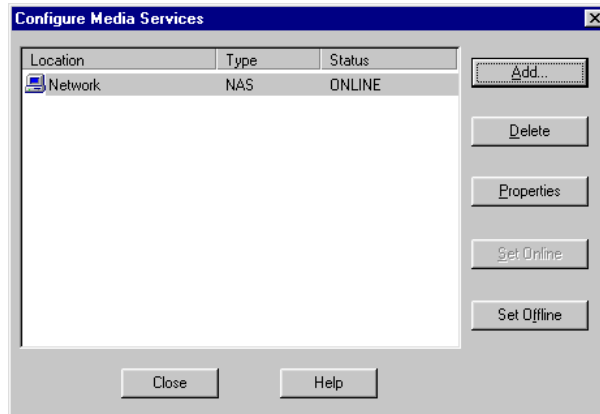
Deleting the TSM Media Service

The Configure Media Services dialog box allows you to delete the TSM media service.

To delete a configured TSM media service:

- 1 Make sure that all TSM media has been deallocated from extended drives.
- 2 From the Service menu in the DX Administrator, select Configure Media Services. The Configure Media Services dialog box appears.

Figure 124: Configure Media Services Dialog Box



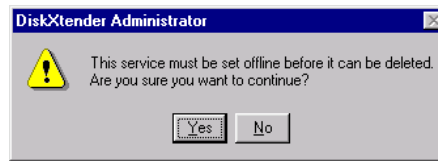
- 3 Select the TSM media service that you want to delete and click Delete. A confirmation message appears verifying you want to delete the service.

Figure 125: Verification Message



- 4 Click Yes. If the service is still online when you attempt to delete it, another message appears informing you the service must be set offline first.

Figure 126: Set Service Offline Verification Message



- 5 Click Yes. The media service (and its associated media) is removed and the Configure Media Services dialog box reappears without the deleted service.

CHAPTER SEVEN

CONVERTING TO DX2000 FROM DISKEXTENDER 3.2

The conversion process for upgrading from *DiskExtender 3.2* to DISKXTENDER 2000 has been designed to accommodate the needs of users with existing 3.2 systems. *DiskExtender 3.2* (*DE 3.2*) uses a database to track files and system parameters. DISKXTENDER 2000 (DX2000) no longer requires a separate database. DX now uses the Windows registry to track system parameters, and the Windows Master File Table to track DX file attributes. The conversion process will transfer information from the *DE 3.2* database to the Windows Master File Table on an NTFS volume “extended” by DX2000, and will transfer media hardware duties to the MEDIASTOR program.

The conversion process requires that the DX2000 and MEDIASTOR software NOT be installed on the same computer as *DE 3.2*. DX2000 and MEDIASTOR can be installed on a single machine, as long as it is the computer to which your hardware devices will be attached.

The basic steps for the conversion from *DE 3.2* to a DX2000 system are:

- ✎ Install OTG MEDIASTOR on the computer to which your media will physically be attached. This must be a *different* computer than the machine on which *DE 3.2* is currently running. See the MEDIASTOR System Guide for information on installing MEDIASTOR.
- ✎ Install DISKXTENDER 2000 on the computer where the NTFS volume(s) that will become the extended drive(s) reside. This must be a different computer than the machine on which *DE 3.2* is currently running. You may install DX2000 on the same computer as MEDIASTOR. You may also install DX2000 on multiple machines if you choose. See *Installing DiskXtender* on page 34 for more information on DX installation.

Chapter Seven: Converting to DX2000 from DiskExtender 3.2

- ✎ Configure an OTGMS media service in DISKXTENDER. If you have MEDIASTOR installed on multiple machines, and want to use multiple MEDIASTOR services on a single DX2000 computer, you must configure one OTGMS media service on the DX computer for each MS service you want to use. See *Creating the Media Service and Extended Drive(s)* on page 170 for brief procedural information, or *Configuring an OTG MediaStor Media Service* on page 106 for more detailed information.
- ✎ Create at least one extended drive in DISKXTENDER. You may create multiple extended drives if you choose. This may be done on multiple DX machines if necessary, though a single machine can have multiple extended NTFS volumes. See *Creating the Media Service and Extended Drive(s)* on page 170 for brief procedural information, or the DX2000 Data Management Guide for more detailed information.
- ✎ Install the DX 3.2 Conversion Utility onto the computer on which DE 3.2 is currently running. See *Installing DX Version 3.2 Conversion Utility* on page 176 for more information.
- ✎ Stop the DE 3.2 service. Make sure no clients can access the service while the conversion is taking place.
- ✎ Run the conversion utility installed on the DE 3.2 computer. During the conversion, you will be required to select a target DX computer and extended drive for each 3.2 partition. You will also be required to select the 3.2 media in each partition to covert. See *Converting a Database Using the DX 3.2 Conversion Utility* on page 181 for more information.
- ✎ Run the conversion utility's Setup function to uninstall the DX 3.2 Conversion Utility. See *Removing the Conversion Utility* on page 186 for more information.

Once the conversion has been completed, you can delete the hardware device(s) from the DE 3.2 server and move them to the MEDIASTOR computer. Because the database of file location information has been copied to the Windows Master File table, DX2000 can locate files on the media used by the DE 3.2 system.

WHAT'S NEW IN DISKXTENDER 2000?

DISKXTENDER 2000 provides the same mass storage flexibility and utility provided in DE 3.2, with a multitude of added features that increase its power and efficiency.

- ✎ *DiskExtender 3.2* Conversion Utility for database conversion
- ✎ Long filename support
- ✎ UNICODE foreign language character set support
- ✎ No separate cache

DX2000 can extend file storage on NTFS volumes on a file-by-file basis, removing the need for a separate cache.

- ✧ No separate database

DX2000 can store DISKXTENDER extended file attributes in the Windows Master File Table, removing the need for a separate database. System settings are maintained in the Windows registry.
- ✧ Share-, directory- and file-level security and network connectivity managed through Windows NT/2000

Kernel-level integration with Windows NT/2000 allows direct use of Windows NT security and networking functionality for files in the DX2000 system.
- ✧ Serverless Architecture

The DX2000 architecture avoids server bottlenecks by allowing each DX computer to handle its own data and media management tasks. Yet DX2000 still allows several DX computers to share media service resources.
- ✧ Media grouping

Move groups allow you to group media within a media folder, then target file movement to a specific group of media.
- ✧ Automated media management

Move group automation features allow you to automatically label media for a move group when needed and compact media within a move group when needed.
- ✧ Enhanced control over file migration

Move rules and purge rules let you use file extensions, size, attributes, and age when creating rules for movement of files to media, and rules for garbage collection (purge) of moved files.
- ✧ Media Task Queue Manager

You can manage media tasks within a queue where all media scheduled for processing are displayed.
- ✧ Prefetch Request Manager

You can set up prefetch requests to retrieve files before they are needed. Frequently used files can be fetched at times when other use on the system is minimal. The Prefetch Request Manager lets you manage your requests as needed from one central place.
- ✧ Media Prepare Manager

You can perform formatting and labeling for many media at once through the Media Prepare Manager.
- ✧ Simplified media copy

DISKXTENDER now automatically updates and synchronizes copy media with original media; you only have to add and label the copy and then schedule times for media updates.
- ✧ Increased system reporting capabilities

The Reports feature allows you to keep configuration records and to analyze activity on your DX system by running reports on various aspects of the DX system. Alert configuration lets you set up DX to send messages to users or workstations whenever an error or a warning (or both) occurs.

WHAT'S THE SAME IN DISKXTENDER 2000?

- ↵ File caching on the extended drive (based on move rules and purge rules you set) for reduced hardware usage and faster access.
- ↵ Time-based migration of files.
- ↵ Garbage collection watermarks to insure free space on extended drives.
- ↵ Extensive list of supported devices.
- ↵ Event scheduling for unattended file migration, media compaction and system administration.
- ↵ SCSI Manager and Jukebox Manager utilities, as well as other command line utilities for ease of administration.
- ↵ Service management from within the DX interface.

DE 3.2 vs. DX2000 TERMINOLOGY

Several components of DISKXTENDER 2000 are similar to components of *DiskExtender 3.2*. Aspects of the functionality for the two programs are compared and contrasted in this section and in the Configuration Changes section that follows it. This section focuses on defining DX2000 terminology in comparison with *DE 3.2* terminology. The next section points out where configuration of the two programs has stayed the same and where it has changed.

PARTITIONS AND EXTENDED DRIVES

DX2000 contains a conversion utility which converts *DE 3.2* partitions to DX2000 media folders on one or more DX2000 extended drives. A directory is created on the extended drive for each *DE 3.2* partition, while the directory structure and files for each partition remain intact.

Extended drives provide the directory structure seen by clients, but they are physical NTFS volumes. The directories on an extended drive are NOT virtual like partitions were in *DE 3.2*. The only virtual element of DX2000 lies in whether a file's data is actually on the extended drive or has been moved to media and purged from the drive. If the file is on media and the file data has been purged from the extended drive (usually done according to a purge rule you set), the file information in the

Windows Master File Table is altered to make the entire file *appear* to be on the extended drive.

CACHE SPACE AND EXTENDED DRIVES

In *DE 3.2*, files were kept in write cache until they could be written out to media and in read cache if they were frequently accessed. In DX2000, if the file has not yet been moved to media or is being kept online for rapid read access, the entire file is stored on the extended drive. When a file is moved out to media, it becomes eligible for purging from the extended drive. When the file qualifies for a purge rule, it is written to the purge list. When space is needed, DX2000 purges, or removes the file data for files listed on the purge list from the extended drive. A file tag containing the file information and location on media is sent back to the Windows Master File Table, which uses this information to make the file appear to still be resident on the drive, and thereby making it retrievable to clients accessing the extended drive.

MEDIA PATHS AND MEDIA FOLDERS

A media folder and a media path both contain the files from the media on which they are located. However, a media path was a logical construction that existed only in a database. In DX2000, you create an actual folder on the extended drive. Media is then added to the folder through DX and the information for the files on the media is restored to that folder in the Windows Master File Table. The media folder on the extended drive lists file information for all of the files and directories actually on any of the media in the folder.

MEDIA IN WRITE PATHS AND MEDIA IN MOVE GROUPS

In *DE 3.2* media was added to a write path to target movement of files from that write path to that media. In DX2000, media is grouped into move groups and move groups are used as target media for move rules. Move groups allow you to make subgroups of media within a folder. Media of the same type within the same media folder can be added to move groups.

WRITE PATHS AND MOVE RULES

Write paths “contained” media in *DE 3.2*. If you wrote files to a write path, the files would be moved to media in that write path. Move rules in DX2000 point to a target move group of media. Move rules define which files within the specified directory will be moved, when they will be moved and to what media (move group).

Move rules in DX2000 allow more control by providing complex time-based rule-making options. Whenever the extended drive is scanned, each file is checked against the configured move rules, and if it qualifies for move, is added to the move list.

DIRECT READ SETTINGS

In *DE 3.2*, direct read was configured through device settings, during media restore, in write cache rules and in the file list node. In DX2000, you can choose to set direct read for all files on a piece of media, set direct read for all files on an extended drive, set direct read for only certain files based on their qualification for a purge rule or even set direct read for individual files using the Explorer Add-ons functionality.

CACHE GARBAGE COLLECTION AND PURGE RULES

In *DE 3.2*, the files in read cache that were least frequently used were “garbage collected.” Purge rules in DX2000 allow more control by providing complex time-based rule-making options. Whenever the extended drive is scanned, and whenever a file is moved to media, each file is checked against the configured purge rules, and if it qualifies for purging, is added to the purge list by priority.

CACHE WATERMARKS AND PURGE WATERMARKS

In *DE 3.2*, cache watermarks would trigger file movement and garbage collection. Because there are no separate cache spaces in DX2000, two global purge watermarks are set in relation to the entire capacity of the extended drive. These purge watermarks control processing of the purge list. When a file has been moved to media and becomes eligible for purge according to the purge rules you have set, it is added to a purge list for the extended drive. A purge start watermark causes DX2000 to start processing the purge list when the specified percentage of the extended drive disk space is used. A purge stop watermark stops purging when the disk space used drops below the percentage specified.

FORCED MIGRATION WATERMARK AND FORCE MOVES WHEN NOTHING TO PURGE

If you have enabled the option to move files when there is nothing left to purge, as long as a purge condition is still in effect, DX will move files to media, even if the Move files to media schedule is not active, once the purge list has been depleted. This is because DX cannot purge files until they have been moved to media. Once they have been moved, they may qualify for purging, at which point they are processed in order to make space on the extended drive.

SHARES AND WINDOWS SECURITY

Since the “Virtual File System” was actually maintained in a database in *DE 3.2*, shares were managed in the Shares node of the Administrator module. Security for drives extended by DX2000 is managed through Windows NT/2000.

DATABASE AND KERNEL-LEVEL INTEGRATION

DX2000 tracks files through the Windows Master File Table, rather than relying on a database for file information storage. This enables DX to use native NT/2000 functionality (such as long filenames) and prepares it to take full advantage of functionality in future versions of Windows NT/2000.

DATABASE MAINTENANCE

DX2000 does not use a database to track files and directories. Therefore, database maintenance is no longer needed.

CONFIGURATION CHANGES

Because of the substantial changes in system architecture from *DiskExtender 3.2* to DISKXTENDER 2000, hardware and system configuration will not be retained when converting. However, file locations on media are preserved and transferred through the *DE 3.2* Conversion Utility.

Once the *DE 3.2* database has been converted and devices have been relocated to the DX2000 system, you can use the MEDIASTOR Administrator to add hardware to the DX system, and the DX Administrator to configure system settings and extended drive properties. The Administrator in both programs is the interface through which configurations are set and maintained.

Security and network connectivity between the end user and the extended drive for DX2000 is managed through Windows NT/2000.

DATABASE CONFIGURATION

DiskExtender 3.2 used a database to track file, directory, security, and network configuration information. DISKXTENDER 2000 no longer needs a separate database to track file locations. Windows NT/2000 maintains file, directory, security, and network configuration information for the files in a DX system.

Information for each file in the DX system is copied into the Windows Master File Table (MFT) whenever a file is written or restored to an extended drive. When a file is moved out to media and purged, the file data is removed, leaving a file “tag” on the extended drive. The file tag is a set of extended attributes stored in the Windows Master File Table that contains a pointer to the location of the file on media.

DX2000 can make a file that has been moved and purged appear to be present on the extended drive by substituting into the MFT the actual file size of the file on media (in place of the zero byte size of the file actually on the drive). Windows then displays the file information for the file on media in Windows Explorer, rather than the file information for the file actually on the drive. To the client connecting to the extended drive, the full file appears to always be on the drive, even if the file data is

actually only out on media. For each extended drive, you can control whether purged files display their true size (0 bytes) or the actual size of the file on media.

HARDWARE CONFIGURATION

In *DiskExtender 3.20*, hardware management was done through the Console. In a DISKXTENDER 2000 system, hardware is listed under a Hardware Tree in the MEDIASTOR Administrator. The tree structure allows you to easily view all devices attached to the MEDIASTOR computer and the drives in each device. You can access device management functions with a single mouse click, using commands on the device and drive shortcut menus. A new Manage Library Media function lets you view, insert, move, and eject library media from within the Administrator.

Despite the new interface, hardware configuration in DX2000 remains essentially the same as in *DE 3.2*. Aside from the starting point for adding new devices, the sequence used to add and configure devices has not changed from the *DE 3.2* procedures. Library drives, for example, still need to be configured in the proper order, and DISKXTENDER still retains the Auto Config and Test Config functions to assist you in configuring library drives.

CACHE CONFIGURATION

In *DiskExtender 3.2*, *DE* files were separated into write, compact, and read cache. You set the total amount of the cache and configured watermarks controlling the percentage of the cache drive that would be used for each type of cache. If the percentage of the drive allocated for write cache was reached, files could no longer be written to DX. If the percentage of compact cache was exceeded, the compaction would be paused and files from the media being compacted would be moved out to media automatically. Normally, files were moved to media according to a move schedule; however, if the Force migration watermark was reached, files were automatically moved out to media. Free space in cache was used for read file caching, and garbage collection of the least-recently-used read files occurred automatically as space was needed.

In DX2000, the size of an extended drive is determined by the size of the NTFS volume that is extended. A file is moved to media and then purged depending on the move rules and purge rules that apply to that file. Move rules add eligible files to a move list; purge rules add eligible files to the purge list. Instead of automatic garbage collection of read files, there is a purge watermark that triggers processing of the purge list when free space on the drive goes below a set level. The move list is processed according to a move schedule. If after processing of the entire purge list, the extended drive free space is still less than the amount set for the purge stop watermark, and if the Force moves when nothing to purge option is enabled, processing of the move list will begin regardless of the move schedule. Since files cannot be purged until they have been moved, processing of the move list may make more files eligible for purging, thereby making it possible for the purge stop watermark to be reached.

NETWORK CONFIGURATION

In *DiskExtender 3.20*, shares, users, and network connectivity was configured on the Network Configuration dialog box. DX2000 lets you manage share-, file-, and user-level security through Windows NT/2000. Windows also handles network connectivity between the end user and the extended drive.

Since the hardware and file migration responsibilities have been separated to be handled by MEDIASTOR and DISKXTENDER, the two programs must be able to access one another through the network. If both programs are installed on the same machine, this connectivity is not an issue. It becomes a concern, however, if the programs are installed on separate machines, or if you have multiple DISKXTENDER and MEDIASTOR machines. In these cases, you must be sure that access between DX and MEDIASTOR is enabled through network topology and through network security.

SYSTEM CONFIGURATION

Some of the settings configurable through the System Configuration dialog box in *DiskExtender 3.2* can be configured from the Hardware tree in MEDIASTOR. Despite some wording changes, the functionality of these system settings remains essentially consistent between the two versions. Drive saver settings for spinning down inactive standalone drives and dismounting inactive library drives are still available. Each drive saver setting is enabled by default, with 15 idle minutes before processing. In addition, the compaction function is now managed by DISKXTENDER separately from the MEDIASTOR hardware management. This means that you no longer need to schedule idle minutes before compaction begins because compaction is now a media task and can be scheduled for specific times.

The options on the Options tab in the System Configuration dialog box are now accessible using the Event Settings option in the Service menu of both the DX and the MEDIASTOR Administrators. These include logging options for writing errors and warnings to Windows Application logs, and debugging messages during service initialization.

CONVERTING TO DISKXTENDER 2000 – THE BASIC STEPS

There are three basic steps you need to complete in order to convert your *DE 3.2* system to a DX2000 System. Each of those tasks is listed below, with corresponding tasks for completion.

Step 1: Preparing the MEDIASTOR computer for conversion

- 1 Install MEDIASTOR on the planned machine(s). This may be the same machine as the one where DISKXTENDER will be installed. This must be a different machine than the one where *DE 3.2* is currently installed. Do not move hardware from the *DE 3.2* server and add to MEDIASTOR until conversion is completed.

Step 2: Preparing the DX2000 computer for conversion

- 1 Determine hardware/extended drive requirements for the DX2000 system. Information on this planning can be found in the *Planning Your DX System* chapter beginning on page 21.
- 2 Install DISKXTENDER on the planned machine(s). For more information, see *Installing DiskXtender* on page 34.
- 3 Configure the OTG MediaStor media service for the DX2000 service, and create at least one extended drive on the DX2000 service. However, **do not** create any media folders on the DX2000 service at this time. For more information, see *Creating the Media Service and Extended Drive(s)* on page 170.

Step 3: Preparing the DE 3.2 server for conversion

- 1 If necessary, determine the upgrade path for your existing DE system, and upgrade to DiskExtender version 3.20.90. For more information, see *DiskExtender Version* on page 166.
- 2 If you are using SQL Server, be sure you are using at least version 6.5. If you are using an earlier version, upgrade to 6.5 before running the conversion.
- 3 Run Server Reports. For more information, see *Server Reports* on page 166.
- 4 Prepare DE 3.2 Server for database conversion – back up server, rebuild indexes, run SQL Server optimization scripts, remove read and write access to database, and migrate all files to media. For more information, see *MS SQL Server* on page 167.
- 5 Install the DISKXTENDER 3.2 Conversion Utility on the DE 3.2 Server. For more information, see *Installing DX Version 3.2 Conversion Utility* on page 176
- 6 Determine database conversion time based on number of files in DE 3.2. For more information, see *Estimated Conversion Times* on page 162.
- 7 Decide on and set access restrictions during conversion.

After you have completed these steps, you are now ready to:

- ☞ Run DE 3.2 Conversion Utility to convert DE 3.2 database. See *Converting a Database Using the DX 3.2 Conversion Utility* on page 181
- ☞ Verify success of conversion in DX2000 Administrator. See *Verifying the Conversion* on page 186.
- ☞ Move hardware devices to the MEDIASTOR computer and add those devices to MEDIASTOR through the Administrator interface. The conversion adds the media to the extended drive, but the media remains offline until the device containing the media is added to MEDIASTOR and set online. See the Managing Hardware chapter of the MEDIASTOR System Guide for more information.
- ☞ Configure move groups and move rules in DX2000 to allow movement of new files to media. See the Setting Up File Migration chapter of the DX2000 Data Management Guide for more information.

- ↗ Configure purge rules and purge watermarks to cause garbage collection of moved files and maintain adequate free space on the extended drive. See the Space Management chapter of the DX2000 Data Management Guide for more information.
- ↗ Remove the *DE 3.2 Conversion Utility*. For more information, see *Removing the Conversion Utility* on page 186.
- ↗ Remove DiskExtender 3.2. For more information, see *Removing DiskExtender 3.2* on page 190.

PLANNING THE CONVERSION FOR YOUR DX SYSTEM

Before converting from *DiskExtender 3.2*, it may be advantageous to plan the steps that will be taken in the upgrade in order to anticipate any preparation needed for upgrading to DX2000. You need to consider the following issues:

What version of *DE* do you have installed now?

How long will it take to convert the *DE 3.2* database to a DX2000 system?

What hardware/extended drive space will DISKXTENDER 2000 require?

Do you need to provide read and write access during the conversion?

SYSTEM REQUIREMENTS

DISKXTENDER 2000 has a service component that provides file migration services for NTFS volumes extended by DX, and manages communication with one or more media services (like MEDIASTOR). Those media services, in turn, manage the mass storage devices and the media contained therein. To determine hardware requirements, you will need to decide whether DX and MEDIASTOR will be installed on the same machine, or whether there will be a DX machine and a separate MEDIASTOR machine.

System requirements and recommendations for DISKXTENDER 2000 can be found in the *Planning Your DX System* chapter beginning on page 21 of this guide. System requirements and recommendations for MEDIASTOR can be found in the *Getting Started* chapter of the MEDIASTOR System Guide. Both chapters contain basic minimum system requirements and recommended upgrades for optimization of your DX system. In addition, the *Planning* chapter in this guide provides sizing worksheets to allow you to accurately determine how large your extended drive will need to be in order to function most effectively.

NOTE

We recommend that when calculating estimated extended drive space requirements, that you determine how much space you will need for the conversion, determine how much space you expect to need going forward and add those figures together in order to gain a more accurate estimate of your extended drive hardware needs.

The drives extended by DX must be located on the DX computer, and must be NTFS volumes. The extended drive should be separate from the volume where the system files are stored.

Both DISKXTENDER and MEDIASTOR require the Windows NT 4.0 (Service Pack 6a or greater) or Windows 2000 operating system on the DX and MEDIASTOR computer(s). Systems running on Windows NT 3.51 or Windows NT 4.0 without Service Pack 6a or greater must upgrade to Windows NT 4.0 and apply Service Pack 6a or greater *before* upgrading.

NOTE

For information on the latest Window NT service packs and hot fixes certified for use with DX, please contact your technical support representative. For information on operating system issues that may affect performance on your DX system, please consult the DX Knowledge Base, which can be accessed opening the Start menu and selecting Programs > OTG DISKXTENDER > Help > DISKXTENDER Knowledge Base.

ACCESS RESTRICTIONS DURING CONVERSION

Prohibiting users from writing to or reading from the targeted DX2000 extended drive is required while running the *DE* 3.2 database conversion.

Removing read and write access to the *DE* 3.2 system is also required during the conversion process. You must be sure that access to partitions is not re-enabled after the conversion is complete; this could result in data being stored to the wrong location and ultimately cause potential data loss.

NOTE

Before converting the final piece of media in *DE* 3.2, make sure that all files in write cache have been moved to media.

ESTIMATED CONVERSION TIMES

Using benchmarks obtained through testing, we have developed estimated database conversion times.

There are three conversion scenarios benchmarked for these examples: single processor with DISKXTENDER and MEDIASTOR on the same machine, single

processor with DISKXTENDER and MEDIASTOR on separate machines, and dual processor with DISKXTENDER and MEDIASTOR on the same machine.

These estimates assume configurations similar to those tested and therefore results may vary with different hardware configurations.

The tables below summarize the results of benchmarking tests for conversion from *DiskExtender 3.2* to DISKXTENDER 2000 under the three scenarios.

NOTE

Be advised that the times listed here are rounded benchmarks specifically for the configurations shown. The actual time of your system conversion may vary.

Table 19: Single Processor – DX2000 and MEDIASTOR On The Same Machine

NUMBER OF FILES	CONVERSION TIME	TESTED CONFIGURATION
1,000,000	2 Hours 56 Minutes	550-MHz Pentium III Processor 20 GB IDE drive to 20 GB IDE drive 256 MB of Ram No other programs running No read or write access during conversion
5,000,000	13 Hours 20 Minutes	550-MHz Pentium III Processor 20 GB IDE drive to 20 GB IDE drive 256 MB of Ram No other programs running No read or write access during conversion
10,000,000	29 Hours 37 Minutes	550-MHz Pentium III Processor 20 GB IDE drive to 20 GB IDE drive 256 MB of Ram No other programs running No read or write access during conversion

Table 20: Single Processor – DX2000 and MEDIASTOR On Separate Machines

NUMBER OF FILES	CONVERSION TIME	TESTED CONFIGURATION
1,000,000	2 Hours 24 Minutes	550-MHz Pentium III Processor 20 GB IDE drive to 20 GB IDE drive 256 MB of Ram No other programs running

NUMBER OF FILES	CONVERSION TIME	TESTED CONFIGURATION
5,000,000	12 Hours 37 Minutes	No read or write access during conversion 550-MHz Pentium III Processor 20 GB IDE drive to 20 GB IDE drive 256 MB of Ram No other programs running No read or write access during conversion
10,000,000	25 Hours 49 Minutes	550-MHz Pentium III Processor 20 GB IDE drive to 20 GB IDE drive 256 MB of Ram No other programs running No read or write access during conversion

Table 21: Dual Processor – DX2000 and MEDIASTOR On The Same Machine

NUMBER OF FILES	CONVERSION TIME	TESTED CONFIGURATION
1,000,000	2 Hours 25 Minutes	600-MHz Pentium III Dual Processor 30 GB IDE drive to 30 GB IDE drive 512 MB of Ram No other programs running No read or write access during conversion
5,000,000	12 Hours 20 Minutes	600-MHz Pentium III Dual Processor 30 GB IDE drive to 30 GB IDE drive 512 MB of Ram No other programs running No read or write access during conversion
10,000,000	25 Hours 28 Minutes	600-MHz Pentium III Dual Processor 30 GB IDE drive to 30 GB IDE drive 512 MB of Ram No other programs running No read or write access during conversion

TIME ESTIMATES

Estimated times, based on the benchmarks above, are provided in the following tables. Both single processor and dual processor times are provided.

Figure 127: Single Processor Conversion Times

NUMBER OF FILES	ESTIMATED CONVERSION TIME
1,000,000	3 hours
5,000,000	15 hours
10,000,000	30 hours

IN:	YOU CAN CONVERT A DATABASE WITH APPROXIMATELY:
24 hours	8,000,000 files
48 hours	16,000,000 files
72 hours	32,000,000 files

Table 22: Dual Processor Conversion Times

NUMBER OF FILES	ESTIMATED CONVERSION TIME
1,000,000	2.5 hours
5,000,000	12.5 hours
10,000,000	25 hours

IN:	YOU CAN CONVERT A DATABASE WITH APPROXIMATELY:
24 hours	9,500,000 files
48 hours	19,000,000 files
72 hours	29,000,000 files

BEFORE YOU CONVERT

All applications other than *DiskExtender* 3.2 should be shut down before the conversion is performed. In addition, the following conditions must be met prior to conversion. If you have any questions or concerns about the conversion, or about

any of the following issues, please contact Technical Support *before* beginning the conversion process.

SERVER REPORTS

In order to have an accurate record of your *DE* 3.2 system configuration prior to beginning the database conversion process, you should run the following reports using the Report Wizard in the *DE* 3.2 Administrator:

- ↵ Partition report
- ↵ Media report
- ↵ Write Path report
- ↵ Share report
- ↵ System report
- ↵ Registry report

During the database conversion, and when configuring the DX2000 system after conversion, you can consult the reports for configuration information from the *DE* 3.2 system.

DISKEXTENDER VERSION

DiskExtender 3.20.90 must be the version installed on the machine. The conversion process will not upgrade any earlier of *DE* earlier than 3.20.90. If upgrading from a previous version, please follow the listed recommended upgrade paths.

The following table provides the recommended upgrade paths for moving from a previous version of *DE* 3.x to DISKXTENDER 2000. Please note that to install the 3.2 Conversion Utility, you must be running Windows NT 4.0 operating system with Service Pack 6a applied. If your *DE* 3.x computer's operating system requires upgrade, please upgrade Windows NT after *DiskExtender* has been successfully upgraded to 3.20.90 (if necessary). For detailed information on upgrading to interim versions of *DiskExtender*, please consult the documentation shipped with those versions.

Table 23: Recommended Upgrade Paths for Conversion

CURRENT VERSION	UPGRADE PATH
3.00.xx	3.00.xx → 3.10.90 → 3.20.90 → 5.2
3.10.xx	3.10.xx → 3.10.90 → 3.20.90 → 5.2
3.20.xx	3.20.xx → 3.20.90 → 5.2

NOTE

You must successfully initialize *DiskExtender* for each version upgrade before proceeding to the next.

MS SQL SERVER

Microsoft SQL Server 6.5 must be installed on the *DE* 3.2 machine. If the machine is running SQL Server Version 6.0 or earlier, the *DiskExtender* 3.2 database conversion will not run.

Multi-processors

If you are using a computer with multiple processors, set the affinity mask for multi-processors to 254 in SQL Configuration.

DE 3.2 Optimization

SQL Server configuration should be optimized for faster performance. SQL scripts for optimizing configuration settings can be downloaded from the Download Area of the Technical Support page at <http://www.otg.com>. Go to the Download Software page and select SQL Server Scripts/Utilities.

DBCC Full

You should run a Database Consistency Check (DBCC Full) on your database through *DE* 3.2 prior to running the conversion.

Update Statistics

You should update statistics on your database through *DE* 3.2 prior to running the conversion.

Rebuild Indexes

Before upgrading *DiskExtender* 3.2, you can rebuild indexes on the *DE* database to make the conversion process more efficient.

Database Backup

Before converting, perform a database backup. The *DiskExtender* database MUST be backed up before proceeding. SQL Server Backup is recommended, rather than NT Backup. If NT Backup is used, the reliability of the results is not guaranteed.

WINDOWS NT/2000 VERSION

The machine(s) where DISKXTENDER 2000 and MEDIASTOR is/are installed must have Windows NT 4.0 (with Service Pack 6a or greater) or Windows 2000 installed as the operating system. DX2000 will not install unless the operating system meets these requirements.

CACHE

The DX 3.2 Conversion Utility allows you to keep data in read cache during the conversion process. However, before the database conversion process is started, write cache should be emptied to insure that all files in write cache are moved to media. If write cache has not been flushed, data in cache will not be moved to the new DX2000 system. All files should be migrated to storage media (no pending file migration).

You can enable an option to copy cached files to the extended drive during partition conversion. This will allow you to copy files in read cache over to the extended drive. For systems that use forms of media with slower fetch rates, this copy feature can be used to eliminate time-consuming retrieval of files from media for files that were recently accessed.

EXTENDED DRIVE SPACE

You must be sure that the targeted extended drive has sufficient space, both for the conversion and for files written in the future. You can use the extended drive sizing guidelines provided in the *Planning Your DX System* chapter beginning on page 21.

THE CONVERSION PROCESS

In order to ensure a successful conversion, the following conditions must be met:

- ↗ All applications should be shut down.
- ↗ *DiskExtender* 3.20.90 must be installed on the machine; the conversion process will not upgrade any earlier version of *DE*.
- ↗ Microsoft SQL Server 6.5 must be installed on the machine; *DE* 3.20 will not convert using any earlier version of SQL Server.

- ☞ SQL Server configuration should be optimized for faster performance. SQL scripts for optimizing configuration settings can be downloaded from the Support page at www.otg.com. SQL processor usage adjustments should be made on multi-processor systems.
- ☞ Before the last media are converted, cache must be empty, and files migrated to storage media (no pending migration).
- ☞ The *DiskExtender* database MUST be backed up; SQL Server Backup is recommended.
- ☞ The target extended drive must be created and should have enough free space for at least the number of files to be converted. Additional space for system expansion is *highly* recommended. Do **not** create any media folders on the DX2000 system at this time.

The conversion process consists of two phases: DX2000 installation and DE 3.2 database conversion. If the procedure is aborted during database conversion, it will be necessary to call Technical Support in order to run the conversion a second time. Although database conversion does not alter the *DE 3.2* database in any way, stopping the conversion in process and restarting it may result in data not being correctly copied to the target extended drive.

INSTALLING/SETTING UP DX2000 AND MEDIASTOR FOR CONVERSION

Installation of the DX2000 and MEDIASTOR programs can be done at any time because the programs must be installed on a separate machine from the DE 3.2 program. Detailed instructions and procedures for installing the DISKXTENDER 2000 program can be found in the *DISKXTENDER Installation* chapter beginning on page 33. Detailed instructions and procedures for installing the MEDIASTOR program can be found in the Getting Started chapter of the MEDIASTOR system guide.

MEDIASTOR requires no other configuration aside from installation on a computer accessible to the DX computer. (This connectivity is not an issue if the programs are installed on the same machine.) Do **not** add any hardware to the MEDIASTOR configuration prior to the DE 3.2 conversion.

DISKXTENDER 2000 requires configuration of the OTG MEDIASTOR (OTGMS) media service and creation of at least one extended drive in order to run the conversion successfully. If you have installed MEDIASTOR on multiple computers, and plan to use multiple OTGMS services with a single DX computer, you must configure a separate OTGMS media service on the DX service for each MEDIASTOR computer.

Below you will find an abbreviated listing of the necessary steps and procedures for configuring the OTGMS media service and creating the extended drive(s). You can find detailed information for configuration and later editing of the OTGMS media service in the *Configuring an OTG MEDIASTOR Media Service* section of this guide, beginning on page 106. Detailed information on creation and configuration of

properties for your extended drive can be found in the Extended Drive Administration chapter of the DX2000 System Guide.

CREATING THE MEDIA SERVICE AND EXTENDED DRIVE(S)

DX2000, after installation, contains a function that will prompt you with messages to configure a media service, create an extended drive, and add a media folder to the new extended drive. Use these prompts to help you set up DX2000 for conversion.

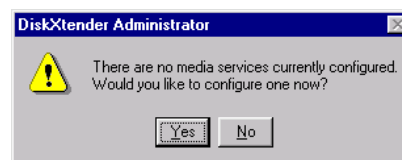
NOTE

To successfully set up an OTGMS media service in DX2000, you must have already installed MEDIASTOR on a computer accessible to the DX2000 computer.

To open and configure the administrator:

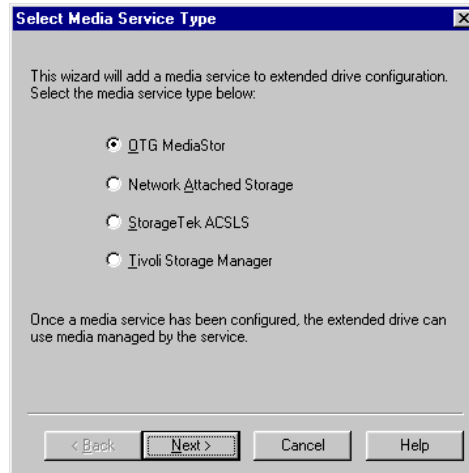
- 1 You have two options for starting the Administrator:
 - ✦ Immediately after DX installation, when the Installation Complete message appears, asking if you would like to start DISKXTENDER, click Start.
 - ✦ From the Windows Start menu, select Programs, then OTG DISKXTENDER. From the DISKXTENDER menu, select Administrator.
- 2 The Administrator window opens and a message appears asking if you would like to configure a media service.

Figure 128: DX Administrator: Configure Media Service?



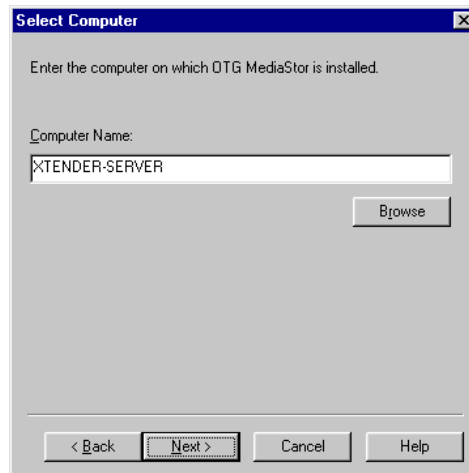
- 3 Click Yes. The media service wizard appears, starting with the Select Media Service Type page.

Figure 129: Select Media Service Type Page



- 4 Select the OTG MEDIASTOR option and click Next. The Select Computer page appears with the local computer listed by default.

Figure 130: Select Computer Page

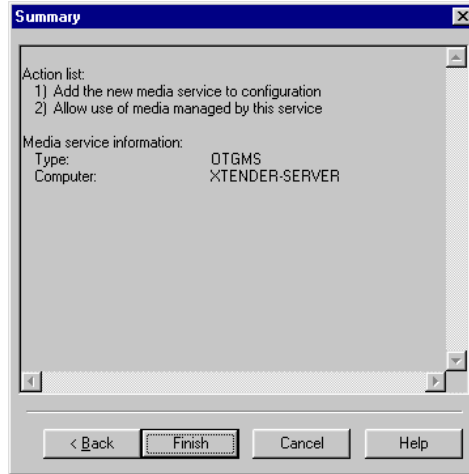


The Select Computer page allows you to specify the computer on which MEDIASOR has been installed and to which you want to connect.

- 5 In the Computer Name text box, if it is not already there, enter the computer name of the OTGMS computer you want to use. You can type in the path to the computer or you can browse for the computer on the network by clicking Browse.

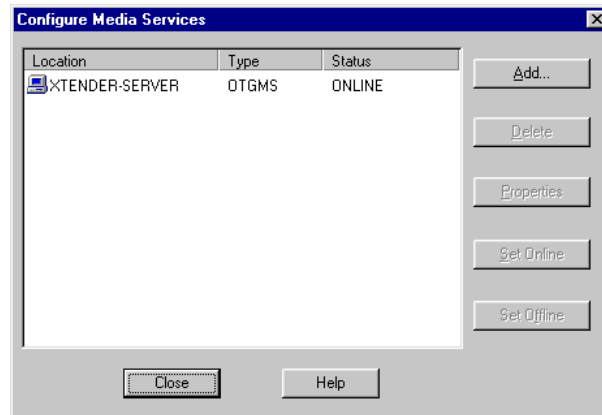
- 6 When the computer name where MEDIASSTOR is installed appears in the Computer Name text box, click Next. The Summary page appears.

Figure 131: Summary Page



- 7 On the Summary page, review the information you have provided through the media service wizard.
- 8 If the information is correct, click Finish. A progress message appears. Once the media service is created, the Configure Media Services dialog box appears, listing the OTGMS media service you just configured.

Figure 132: Configure Media Services Dialog Box

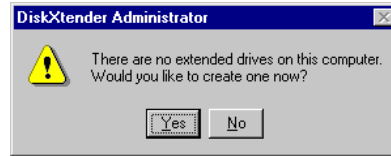


NOTE 

If you plan to use multiple MEDIASSTOR services with a single DX computer, select Add from the Configure Media Services dialog box and proceed from step 4 above. Repeat for each MEDIASSTOR computer/service you want the DX service to use.

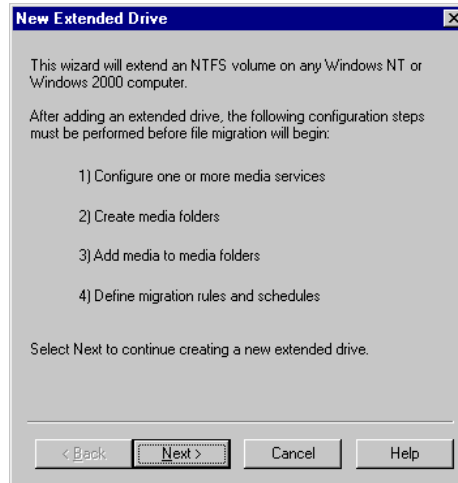
- 9 Click Close to close the Configure Media Services dialog box and return to the DX Administrator. A message appears asking whether you want to create an extended drive.

Figure 133: Create Extended Drive Pop-up Message



Click Yes. The Extended Drive wizard appears starting with the New Extended Drive page.

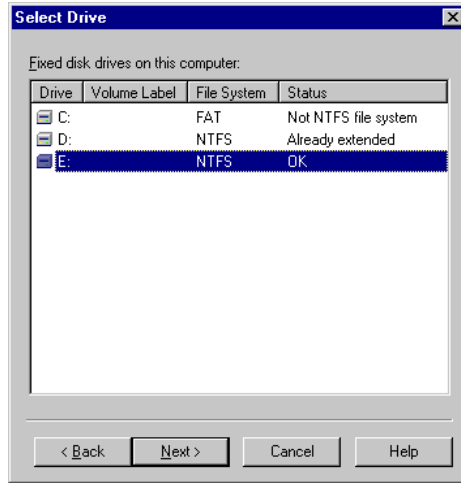
Figure 134: New Extended Drive Page



The New Extended Drive page lists the steps that must be performed after an extended drive has been created in order to begin file migration

- 10 Click Next. The Select Drive page appears.

Figure 135: Select Drive Page



The Select Drive page lists all partitioned drives on the DX computer, along with the File System and Status of each drive. Only drives listed with a status of OK can be extended.

- 11 From the Select Drive page, select the NTFS volume you want to extend and click Next. The Settings page appears.

NOTE 

If you are using SANXTENDER with your DX system, be sure to select a mapped fibre RAID drive as your extended drive.

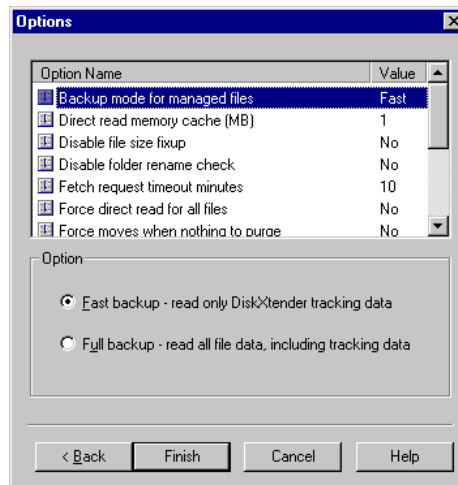
Figure 136: Extended Drive Settings Page



The Settings page contains three buttons: Schedule, Drive Scan and Backup. You can configure these settings later.

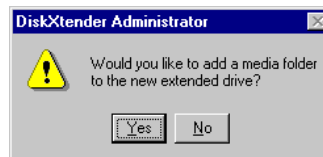
- 12 Accept the defaults and click Next. The extended drive Options page appears. You can configure these settings later.

Figure 137: Extended Drive Options Page



- 13 Accept the defaults and click Finish. The extended drive is created and now appears in the Administrator tree view.
- 14 When you have completed adding your extended drive(s), a message appears asking if you would like to add a media folder to the new extended drive.

Figure 138: DX Administrator: Add Media Folder To Extended Drive?



- 15 Click **No**. You must *not* create any media folders prior to the conversion.

After clearing the media folders message, the Administrator appears and should contain an extended drive in the tree view.

If you are using more than one extended drive on a single computer for the conversion process (you are using multiple DX2000 extended drives on one DX computer to convert multiple DE 3.2 partitions), select the New Extended Drive command from the Service menu to create an additional extended drive, and continue beginning with step 10. You may create as many extended drives as you want.

If you are using extended drives resident on more than one DX2000 computer for the conversion, repeat the instructions for configuring the media service and creating the extended drive(s) on each DX computer.

INSTALLING DX VERSION 3.2 CONVERSION UTILITY

The conversion utility must be installed on the machine where *DE* 3.2 is running in order to perform the database conversion. The Convert Utility installation sets up this module on the *DE* 3.2 computer. The Conversion Utility can be run on a Windows NT server or workstation.

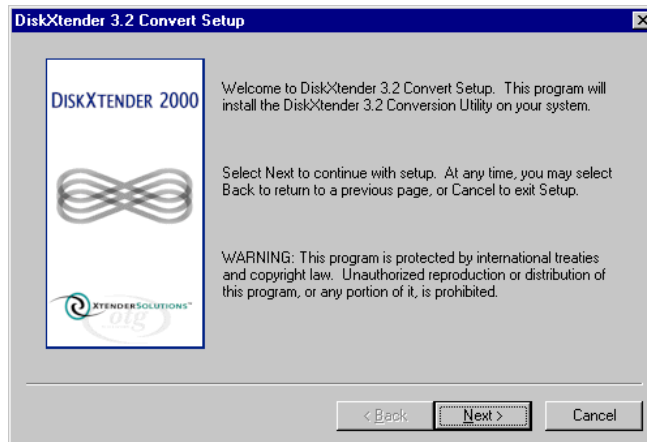
NOTE

Before running Setup, exit all applications. Setup may not be able to write to all necessary files if other software is running.

To install the DISKXTENDER 3.2 conversion utility:

- 1 Insert the DISKXTENDER setup CD-ROM into the drive. From the Windows Start menu, select Run. The Run dialog box appears.
- 2 You can either browse to the file or type the path in the Open text box:
D: \DX2000 .XXX\DXCONVERT32\SETUP . EXE
(In this path, D represents the drive holding the setup CD-ROM and XXX represents the DX2000 version number.)
- 3 Once the file/path appears in the Open text box, click OK. The convert utility setup is initiated (which may take up to two minutes), and the Setup wizard appears, starting with the DISKXTENDER 3.2 Convert Setup page.

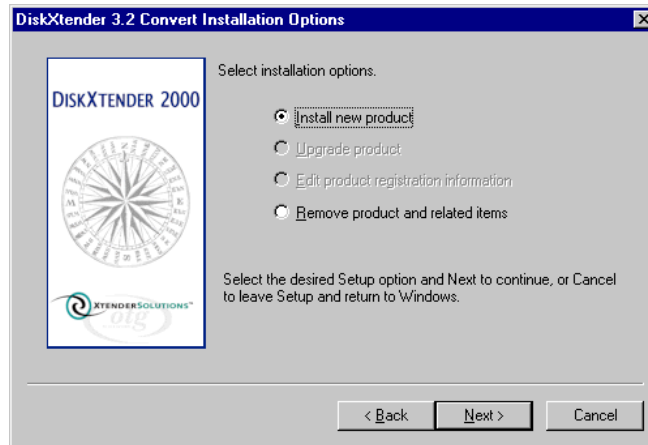
Figure 139 – DISKXTENDER 3.2 Convert Setup Page



The DISKXTENDER 3.2 Convert Setup page briefly describes the installation process.

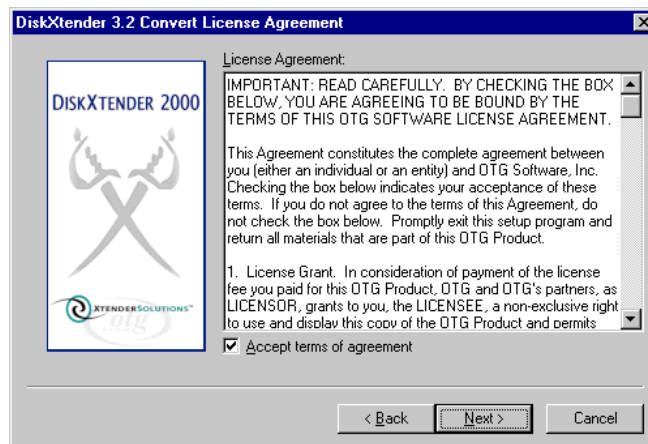
- 4 Click Next. The DISKXTENDER 3.2 Convert Installation Options page appears.

Figure 140: DISKXTENDER 3.2 Convert Installation Options Page



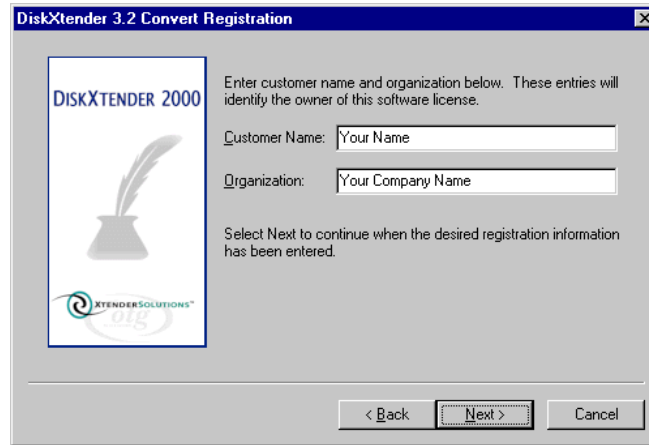
- 5 Select Install new product. Click Next. The DISKXTENDER 3.2 Convert License Agreement page appears.

Figure 141: DISKXTENDER 3.2 Convert License Agreement Page



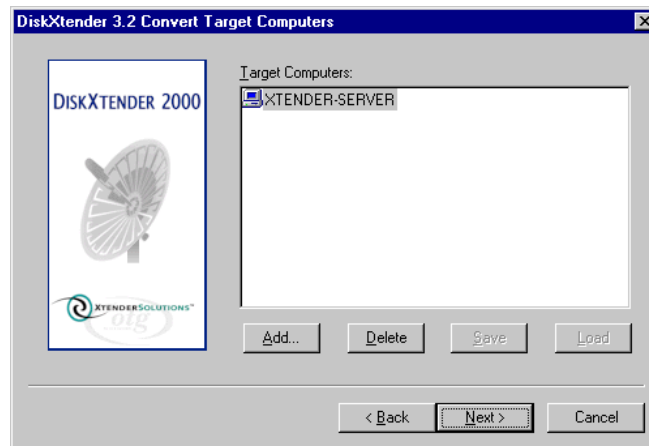
- 6 You must accept the terms of the license agreement before you can proceed with the installation. Click the checkbox next to Accept terms of agreement. Click Next. The DISKXTENDER 3.2 Convert Registration page appears.

Figure 142: DISKXTENDER 3.2 Convert Registration Page



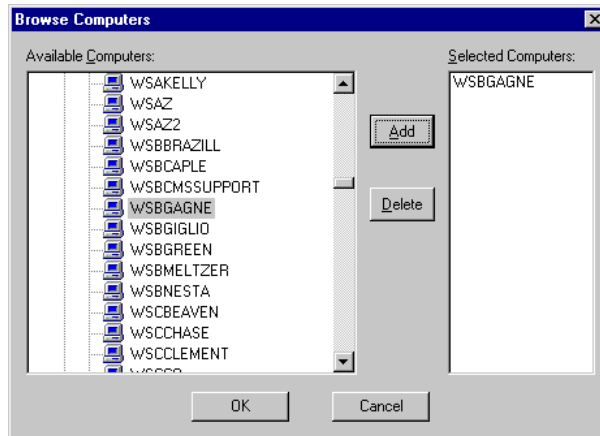
Enter your customer name and organization name. Click Next. The Convert Target Computers page appears.

Figure 143: Convert Target Computers Page



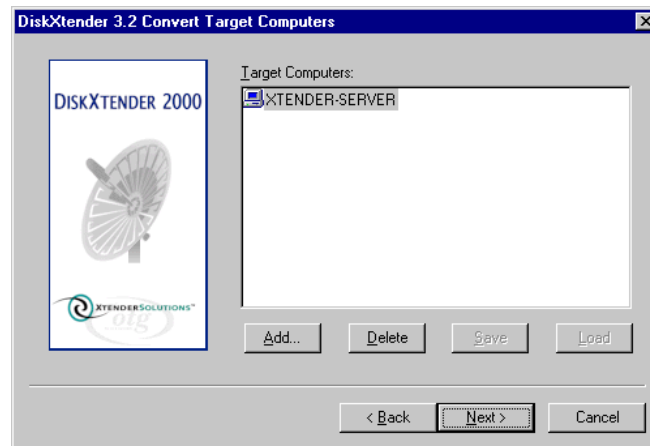
- 7 If you want to install the DX 3.2 conversion utility on more than the local computer, click Add. The Browse Computers dialog box appears.

Figure 144: Browse Computers Dialog Box



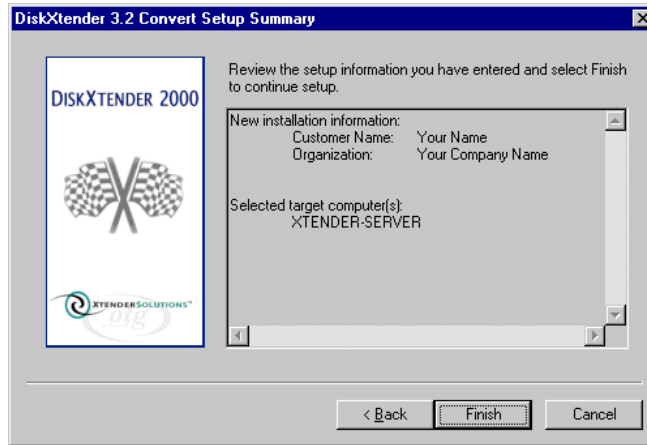
- 8 Under Available Computers, navigate to and select the computer on which you want to install the conversion utility. Click Add. The computer you have selected is listed under Selected Computers. Repeat this step for each additional computer on which you want to install the utility.
- 9 Click OK. You are returned to the Convert Target Computers page.

Figure 145: Convert Target Computers Page



- 10 When the Target Computers list is complete, click Next. The DISKXTENDER 3.2 Convert Setup Summary page appears. This page shows the customer name and organization and lists the target computers for the conversion utility installation.

Figure 146: DISKXTENDER 3.2 Convert Setup Summary Page



- 11 Verify the accuracy of the information. If all information is correct, click Finish.

NOTE 

If necessary, you can cancel the setup procedure at anytime by clicking Cancel.

- 12 When setup is complete, a dialog box appears, informing you whether or not the installation of the conversion utility was successful. Click Exit to close this dialog box.

Figure 147: DISKXTENDER 3.2 Convert Setup Complete Dialog Box



The DISKXTENDER 3.2 Convert Utility program group is installed, with the necessary commands available through the created program group in the start menu. The utility can now be used for database conversion.

DATABASE CONVERSION

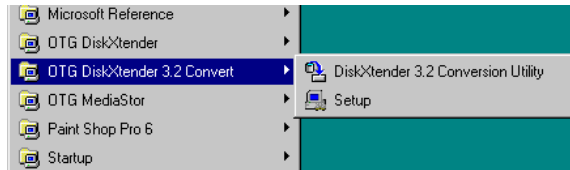
Once you have installed DX2000 and the DX 3.2 Conversion Utility, prepared your *DE* 3.2 database for conversion, checked for extended characters, and created an extended drive in DX2000, you can convert the *DE* 3.2 database. Converting the database moves the media information stored in the database into the Windows

Master File Table on the extended drive. Once the database has been converted, the converted media will be listed under the Media node in the Extended Drive tree in the DX2000 Administrator.

To open the DX 3.2 Conversion Utility:

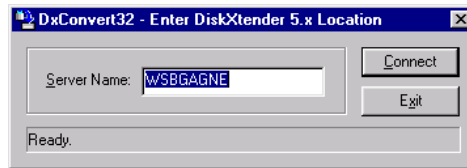
- 1 Choose OTG DISKXTENDER 3.2 Convert from the Start/Programs menu and select DISKXTENDER 3.2 Conversion Utility.

Figure 148: DISKXTENDER Conversion Utility Programs Menu



- 2 The Enter DISKXTENDER 5.x Location dialog box appears.

Figure 149: Enter DISKXTENDER 5.x Location Dialog Box



The Server Name text box contains the local server name by default. Replace the Server Name with the name of the computer on which DX2000 is installed.

- 3 When the appropriate server name appears in the text box, click Connect to connect the existing DE3.2 Server to the DX2000 computer.

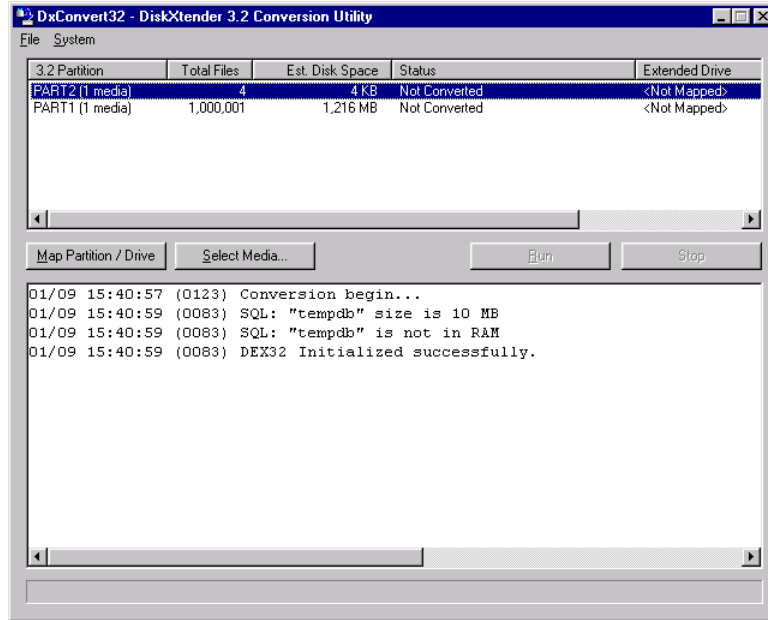
CONVERTING A DATABASE USING THE DX 3.2 CONVERSION UTILITY

The DISKXTENDER 3.2 Database Conversion window lets you select partitions to be converted, designate the target extended drive for the conversion, select media to be converted, and view conversion progress.

To run the conversion utility:

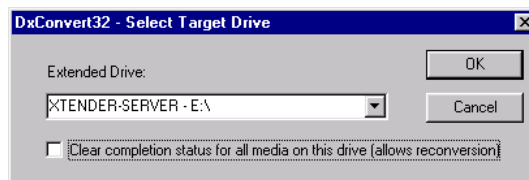
- 1 After connecting the DE 3.2 Server to the DX2000 computer, the DISKXTENDER 3.2 Database Conversion window appears showing the available 3.2 partitions for database conversion.

Figure 150 - DISKXTENDER 3.2 Conversion Utility Window



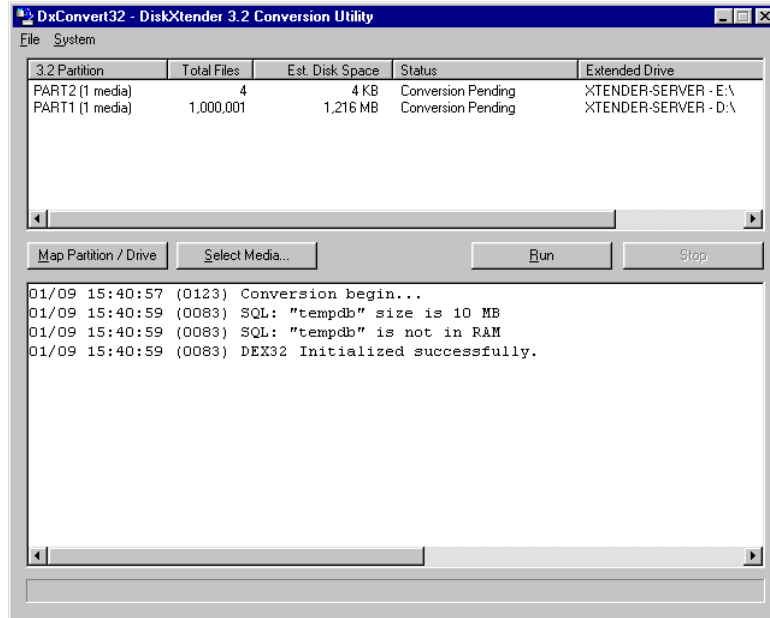
- 2 Highlight a partition name and click Map Partition/Drive to configure the location of the target extended drive.
- 3 The Select Target Drive dialog box appears.

Figure 151: Select Target Drive Dialog Box



- Select the destination extended drive for the conversion from the Extended Drive drop-down list. If the database is to be converted again later, enable the Clear completion status for all media on this drive (allows reconversion).
- 4 Click OK. You are returned to the Conversion Utility window, with the targeted extended drive selected appearing to the right of the partition.
 - 5 Repeat this process until each partition has a targeted extended drive.

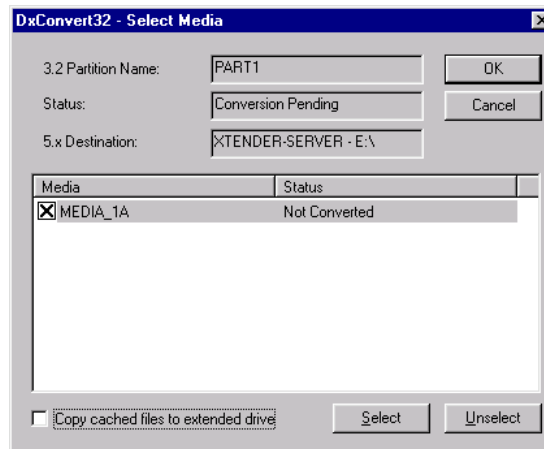
Figure 152 - DISKXTENDER 3.2 Conversion Utility Window



The Conversion Utility window will display a status of “conversion pending” for each partition after a target extended drive is selected.

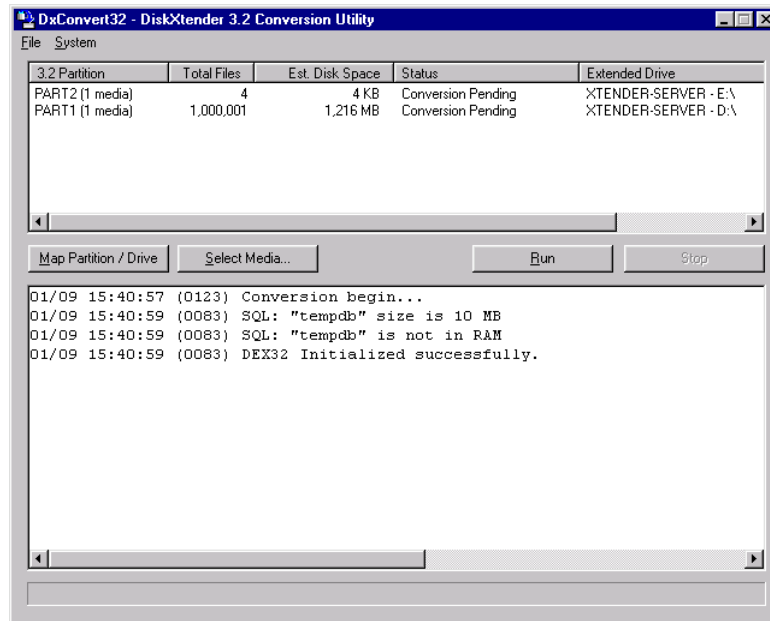
- 6 You can convert all or some of the media in a database. To select media in the partition to be converted, highlight a partition and click Select Media. The Select Media dialog box appears showing the available media in the partition.

Figure 153: Select Media Dialog Box



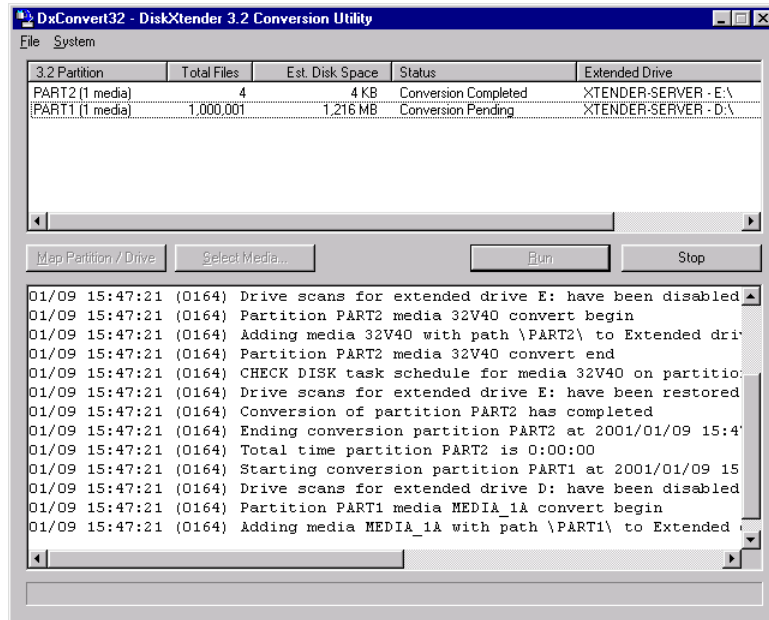
- 7 Highlight a piece (or pieces) of media and use the Select or Unselect buttons to enable which media to use for conversion. If the box next to a piece of media contains an “X”, that media is selected and will be converted.
- 8 If appropriate, enable the Copy cached files to extended drive option. This will ensure that any files currently in the read cache will be copied to the targeted extended drive. This option is intended for systems with large amounts of cached data and slow media retrieval times.
- 9 Click OK to accept the selected media for conversion. You are returned to the Conversion Utility window.

Figure 154 - DISKXTENDER 3.2 Conversion Utility Window



- 10 When all media conversion settings have been configured and all partitions have been assigned a target extended drive, click Run. The Conversion process begins.

Figure 155 - DISKXTENDER 3.2 Conversion Utility Window



System progress messages appear in the bottom pane of the window, accompanied by date and time of the message. In addition, the Stop button becomes active in the event you need to stop the conversion process once it has begun.

As partitions are converted, their status changes from Conversion Pending to Conversion Completed. Upon conversion completion of each partition, the log file in the bottom pane of the window will show the total time for partition conversion.

VIEWING THE CONVERSIONS LOG

You can view a log of the conversion process in DXPAD. Select View Convert Log from the system menu to open the log.

Using DXPAD

The Conversion Log displays in DXPAD. You can view the conversion logs at any time to see the progress of the database conversion. Logs from DXPAD can be saved or printed, or you can send a copy of the log by email. Using DXPAD, you can also easily find and view database conversion errors.

VERIFYING THE CONVERSION

Once the database conversion is complete, open DISKXTENDER 2000 and verify that the media in the *DiskExtender 3.2* system was successfully moved to the MEDIASTOR system and allocated to the DX2000 extended drive. Using the server reports you ran prior to conversion, you can check that all media have been moved. Because the DX 3.2 Conversion Utility does not make any alterations to the *DE 3.2* database, you can run reports after the conversion and they will still be accurate.

Once you are certain that all media information was transferred to MEDIASTOR and DX2000 correctly, you can remove your hardware device from the *DE 3.2* system, add it to the MEDIASTOR computer, and configure it to the MEDIASTOR service.

You will then need to configure the DX2000 system:

- ✎ Create new media folders, if needed;
- ✎ Create move groups within the new media folders and/or the media folders created by the conversion process (each partition is now a media folder);
- ✎ Add media to the move groups so files can be written to the media;
- ✎ Create move rules for any files that should be moved to media and point those move rules to the appropriate move groups.

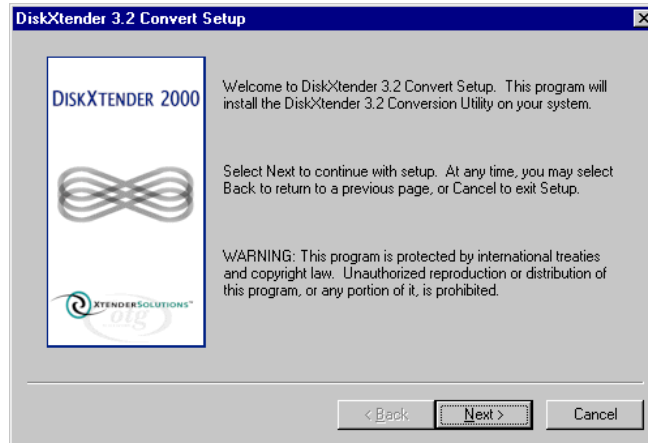
Detailed information about creating and configuring these objects in DX can be found in the Setting Up File Migration chapter of the DX2000 Data Management Guide.

REMOVING THE CONVERSION UTILITY

Once the database conversion process is complete and you have verified that the media and files have been successfully transferred to the DX2000 system, you can remove the DX 3.2 Conversion Utility.

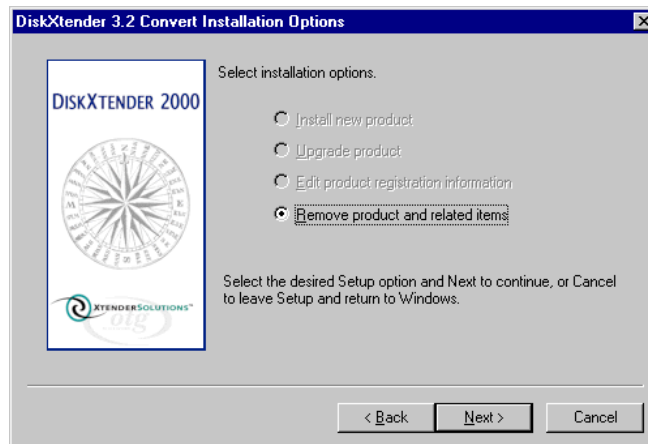
- 1 From the Programs option in the Start menu, select OTG DISKXTENDER 3.2 Conversion Utility, then select Setup. The DISKXTENDER 3.2 Convert Setup page appears.

Figure 156 - DISKXTENDER 3.2 Convert Setup Page



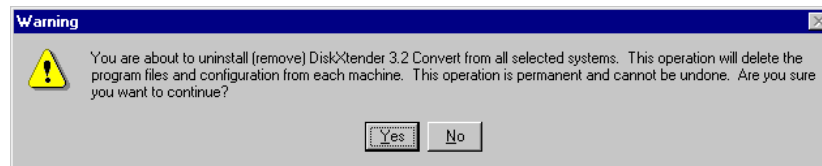
- 2 Click Next to continue with the uninstall. The Installation Options page appears.

Figure 157 - DISKXTENDER 3.2 Convert Installation Options



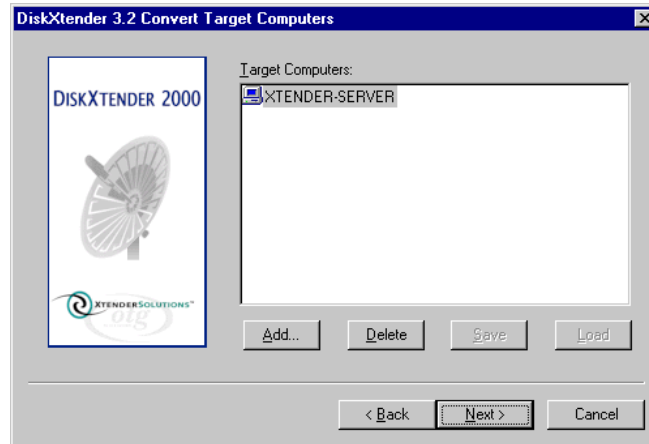
- 3 The only option that should be available is to Remove product and related items. Select that option and click Next. A warning message appears.

Figure 158 – Uninstall Warning Message



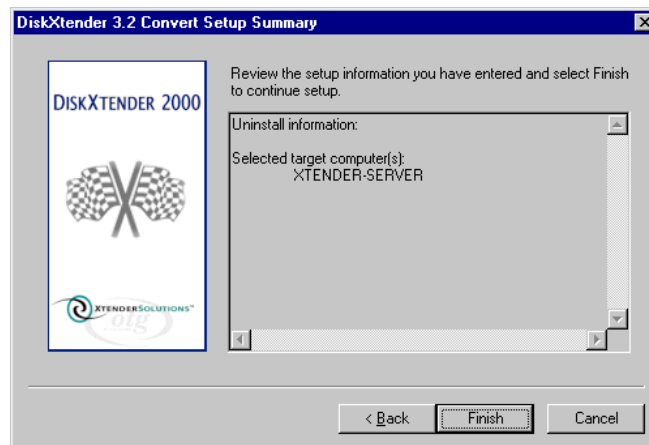
- 4 Click Yes to continue with the uninstall. The Target Computers page appears.

Figure 159 – Target Computers Page



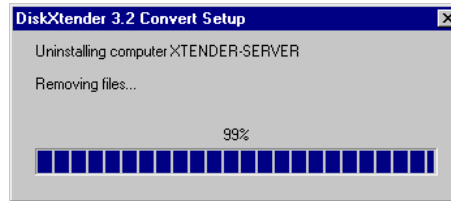
- 5 The local computer appears by default. You can select to uninstall the utility from multiple computers at once (if you have completed the conversion from all of those computers). To select additional computers, click Add, then select the computers from the Browse Computers dialog box that appears.
- 6 When all the computers from which you want to uninstall the utility appear in the Target Computers list, click Next. The Summary dialog box appears.

Figure 160 – Target Computers Page



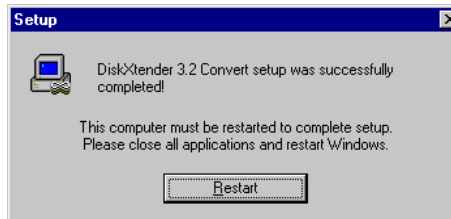
- 7 Review the information in the summary. If it is correct, click Finish. A progress bar appears showing the removal of related files and programs.

Figure 161: Uninstall Progress Bar



- 8 Once Uninstall is finished, a message appears stating that the DX 3.2 Conversion Utility has been removed from the system, and that you must restart the computer to complete the uninstall process.

Figure 162: Uninstall Complete – Restart Computer Dialog Box



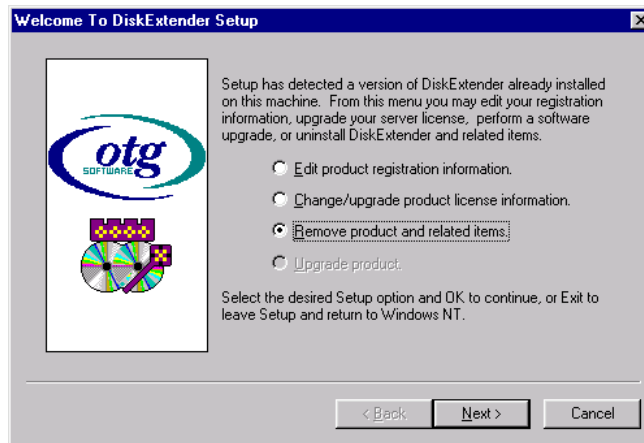
REMOVING DISKEXTENDER 3.2

Once the database conversion is complete, *DiskExtender 3.2* can be removed. When DX is removed, all configuration settings and system files are deleted. When reinstalled, new settings must be configured. Caution should be taken when removing the product, as all settings are permanently lost.

To uninstall DiskExtender 3.2:

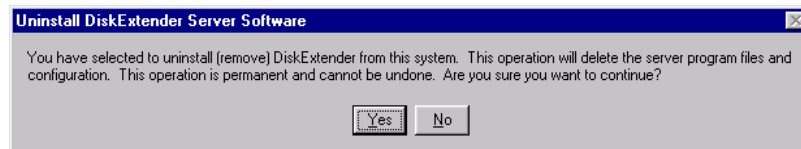
- 1 Select Setup from the *DiskExtender* program group. The Setup page appears.

Figure 163: Setup Dialog Box



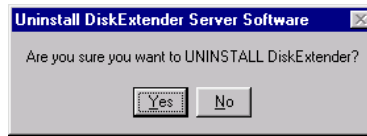
- 2 Select the Remove product and related items option and click Next. A message appears, prompting you to verify removing *DE*. Select Yes to continue; select No to abort.

Figure 164: Uninstall Verification Message



- 3 If Yes is selected, another message is displayed for further verification. Select Yes to continue.

Figure 165: Uninstall Verification Message



- 4 The *DE* database, all program files in the specified installation path, and the *DiskExtender* program group/folder are removed. A dialog box appears showing the status of the operation.

NOTE 

During uninstall, any files/directories that were not deleted are listed. These must be deleted manually through Windows.

SETTING UP YOUR NEW DX2000 SYSTEM

You have now successfully upgraded to DISKXTENDER 2000. Please keep in mind that default settings have been implemented. Extended drives, media folders, move groups, move rules, purge rules and delete rules can be created and/or changed through the Administrator. Following is a checklist that you should refer to once your upgrade has been completed to insure that you identify the remaining configuration steps to get your DX2000 system up and running. See the DISKXTENDER System Guide and the DISKXTENDER Data Management guide for details on using the various components of DISKXTENDER 2000. See the MEDIASTOR System guide for details on using the MEDIASTOR system.

Do you need to add devices to the MEDIASTOR computer?

In order to use MEDIASTOR as a media service to manage the media to which DX will write files, you must add the device(s) containing the media to the MEDIASTOR computer.

Do you want to create additional media folders?

Each directory that contained media on the partition becomes a media folder on the extended drive. If media was located in the root of the partition, the directory that was created for the partition will be a media folder. If media was located in a media path that was a subdirectory of the partition, that media path (including the partition as the lowest directory) becomes a media folder. You can create additional media folders on the extended drive, and add media and configure move and purge rules as appropriate.

Do you want to reassign media among the existing media folders?

When an upgrade is performed, media is assigned to media folders according to which media was associated with which write paths in *DE* 3.20. If you want to add additional media to any media folder, or remove media from a media folder, this can

be done from the Media node under each media folder in the Extended Drive tree in the DX Administrator.

Have you grouped media within each media folder into move groups?

In order to create move rules and move files to media in DX2000, you must first create move groups, and add the media in the media folders to the move groups. You cannot write to a piece of media until the media is added to a move group. Move groups can be created from the Move Groups node under each media folder in the Extended Drive tree in the DX Administrator.

Have you created move rules to specify which files should be moved to which move groups?

Once you have created move groups, you then create move rules to specify which files should be moved, and to which move group. You can move files according to their file extension, attributes, size, and age. You can create as many move rules as are necessary to set up the file migration pattern you want. When the extended drive is scanned, each move rule is checked for each file on the drive. Any files eligible for move under any move rule are added to a move list, which is processed during the times scheduled for file movement to media. The less move rules and move groups created, the simpler the DX system. More move rules and move groups will allow greater flexibility but will also make the system more complex. Move rules can be created from the Move Rules node under each media folder in the Extended Drive tree in the DX Administrator.

Have you created purge rules to specify which moved files should be purged of file data on the extended drive?

Purge rules are used to control which files are purged from the extended drive after they have been moved to media. When the extended drive is scanned, each purge rule is checked for each file on the drive. Any files eligible for purge under any purge rule are added to a purge list, which is processed whenever extended drive usage exceeds the Start watermark for purging. You can purge files according to their file extension, attributes, size, and age. You can create as many purge rules as are necessary to set up the garbage collection scheme that you want. The less purge rules created, the simpler the DX garbage collection system. More purge rules will allow greater flexibility but will also make the system more complex. Purge rules can be created from the Purge Rules node under each media folder in the Extended Drive tree in the DX Administrator.

Have you created delete rules to specify which moved files should be automatically deleted on the extended drive and from media?

Delete rules can be used to automatically clean unused files from the extended drive and from media. Please note that files deleted using delete rules are permanently deleted and cannot be retrieved from the extended drive or from media. When the extended drive is scanned, each delete rule is checked for each file on the drive. Any files eligible for delete under any delete rule are immediately deleted. You can delete files according to their file extension, attributes, size, and age. You can create as many delete rules as are necessary to set up the storage management scheme that

you want. Delete rules can be created from the Delete Rules node under each media folder in the Extended Drive tree in the DX Administrator.

Do you want to adjust default watermarks?

Purge watermarks in DX2000 control when the purge list for the extended drive is processed. The defaults set in DX2000 are configured so that purging will start when free space on the extended drive falls below 5 percent of the drive and stop once 10 percent of the space on the drive is free. You can set the Start and Stop watermarks to the levels that you want. Start and Stop watermarks can be set on the Options tab of the Extended Drive Properties dialog box, which can be accessed by right-clicking on the Extended Drive in the DX Administrator.

Do you want to change the default schedule for drive scans for your extended drive(s)?

The answer to this question is a resounding “Yes,” because extended drive scans are disabled by default. The purpose of an extended drive scan is to scan the contents of the extended drive, checking each file against all move and purge rules. When a file is eligible, it is added to the move list and/or purge list as appropriate. Only files listed on the move list will be moved to media, and only files listed on the purge list can be purged from the extended drive.

If you configure any move rules or purge rules to have age-delays, you *must* perform regular extended drive scans to update the move and purge lists. Files that qualify against move or purge rules with no age delay are typically written to the lists as soon as they are saved to the extended drive.

However, file-sharing issues or sharing violations can prevent files from being added to the move list when appropriate. DX must have full access to a file in order to obtain information required for the move list. If the file is open or is otherwise being accessed by a program or user, DX cannot add it to the move list.

For this reason, regular drive scans are required to be sure that all appropriate files are written to the move list when they qualify, and as such, are being written out to storage media (in coordination with your Move files to media schedule). Because drive scans for very large extended drives can be time consuming, and to make sure files due to be added to the move list are not currently being accessed, you may want to schedule your drive scans to occur during times of low extended drive and system traffic.

You can set a drive scan schedule from the Settings tab of the Extended Drive Properties dialog box, which can be accessed by right-clicking on the Extended Drive in the DX Administrator. More details can be found in the Extended Drive Administration chapter of the DX2000 System Guide.

Do you want to change the media activity schedule times?

Each extended drive in the DX system has its own separate media activity schedule. Moving files to media, updating media copies, processing media tasks in the media task queue, and allowing fetches from media are all media activities scheduled in the Schedule Properties dialog box. By default, the first three activities listed are scheduled from 8 p.m. to 8 a.m., while the Allow fetches from media schedule is

always active (24 hours/7 days a week) by default. You can change these schedules at any time through the Extended Drive Properties dialog box, which can be accessed by right-clicking on the Extended Drive in the DX Administrator.

Do you want to set up regular extended drive backups?

DX contains an Extended Drive Backup utility that is specifically engineered to allow you to reliably back up all of the data on your extended drives while you are using DX. During an extended drive backup, DX inventories *all* of the files on an extended drive and sees that the appropriate information (file data for non DX-managed files, file metadata for DX-managed files, to include file tags) is saved. DX then creates a data set file containing all of the information obtained from the inventory. The Extended Drive Backup utility allows you to set a network path for the backup data set file, set your backup schedule, and choose to run both incremental and/or full backups. You can then back up that file to another location using a standard backup program.

The Extended Drive Backup Utility can be found on the Settings tab of the extended drive Properties.

Do you want to set up prefetch schedules?

DISKXTENDER has a prefetch utility that allows you to schedule file retrieval of purged file data. You can designate which files should be fetched to the NTFS volume and schedule when the file retrieval will occur. Any files that you know will be needed can be marked for prefetch so that they will already be present on the NTFS volume when they are requested.

You can schedule a prefetch request to occur once at a set time, to reoccur at set times, or to be processed immediately. Prefetching files at low traffic times frees system resources and speeds read request response during high traffic times. When a file is retrieved in response to a configured, scheduled prefetch request, this process is referred to as a “prefetch.”

The Prefetch Request Manager, in the Tools menu in the Administrator, can be used to schedule, configure and manage prefetch requests.

CHAPTER EIGHT

CONVERTING TO DX2000 FROM DISKXTENDER 4.2

The conversion process for upgrading from DISKXTENDER 4.2 to DISKXTENDER 2000 has been designed to accommodate the needs of users with existing 4.2 systems. Because the architecture and functionality between DX 4.2 and DX2000 is very similar, the conversion process is simple and should take very little time, depending on the number of DX servers and agents you need to convert.

The conversion process runs in three stages or phases. The first phase of the conversion stops the DX 4.2 service and removes it from your system. The second phase of the conversion utility installs the DISKXTENDER 2000 and the MEDIASTOR programs for you, and then converts the media and hardware from the 4.2 system to the DX2000 system, to include assigning media to each extended drive. Phase 3 assigns media to move groups and media folders.

The functionality of the DX system remains basically the same, with some added features and options. Files are still saved to media folders on extended drive, those files are still migrated to media based on move rules, and purged based on purge rules, and media tasks and drive scans can still be scheduled for whenever fits your network traffic and file request needs. We recommend that after your conversion is complete, and you have verified the conversion, that you take some time to review the DX2000 System Guide, the DX2000 Data Management Guide and the MEDIASTOR System guide to familiarize yourself with the added functions and new features of your DX2000 system.

DX 4.2 vs DX2000 ARCHITECTURE

The fundamental difference between DX 4.2 and DX2000 is the architecture of the system, and the separation of duties between components of the system. Instead of using a Server/Agent architecture, DX2000 has divided the hardware device management responsibilities from the file migration responsibilities.

DX2000 is a system where one program (MEDIASTOR) controls the hardware devices and makes the media in those devices available for read/write commands, and another program (DISKXTENDER) controls the file migration activities, to include media tasks, function scheduling, and extended drive and service management.

In addition, because the hardware device responsibilities have been separated out from the file migration function, DX2000 can interact with other programs that make storage available (like Tivoli Storage Manager or ACSLS for Unix). This architecture allows DX2000 to use NAS devices for storage as well.

Security and network connectivity between the end user and the extended drive for DX2000 is still managed through Windows NT/2000 as it was for DX 4.2. In addition, service management functions can still be accessed either through the DX interface or through the Services option in the Control Panel (Windows NT) or Administrative Tools (Windows 2000).

CONFIGURATION CHANGES

Because of the similarity in basic system setup between DISKXTENDER 4.2 and DX2000, hardware and system configuration is retained when upgrading. Extended drive settings, and move groups and move, purge and delete rules should also remain intact through the conversion process.

HARDWARE CONFIGURATION

In DISKXTENDER 4.2, hardware management was done through the DX Server, and each device was listed under a Hardware Tree in the DX Administrator. In DX2000, hardware management is done through MEDIASTOR, but the Administrator setup and access to devices through a hardware tree remains the same. As with DX 4.2, the tree structure allows you to easily view all devices attached to the MEDIASTOR computer (formerly the DX Server) and the drives in each device. You can access device management functions with a single mouse click, using commands on the device and drive shortcut menus.

NETWORK CONFIGURATION

DX2000, like DX 4.2, lets you manage share-, file-, and user-level security through Windows. Windows NT/2000 also handles network connectivity between the end user and the extended drive.

Since the hardware and file migration responsibilities have been separated to be handled by MEDIASTOR and DISKXTENDER respectively, the two programs must be able to access one another through the network. If both programs are installed on the same machine, this connectivity is not an issue. It becomes a concern, however, if the programs are installed on separate machines, or if you have multiple DISKXTENDER and MEDIASTOR machines (replacing multiple DX Servers and DX Agents). In these cases, you must be sure that access between DX and MEDIASTOR is enabled through network topology and through network security.

SYSTEM CONFIGURATION

Despite some wording changes and some “placement” changes, the functionality of system settings remains essentially consistent between the two versions. For example, the compaction function in DX2000 works identically as it did in DX 4.2. However, this function, previously managed as a hardware function by the DX Server, is now managed by DISKXTENDER (formerly the DX Agent) as a data management function. In addition, many functions are now “extended drive-based” meaning that they must be configured separately for each extended drive, rather than system-wide. For example, the media task scheduler must be set up for each extended drive as opposed to being able to use the NT scheduler to set task schedules for the entire DX Server.

CONVERTING TO DISKXTENDER 2000 – THE BASIC STEPS

Listed here are the basic steps for converting your DX 4.2 system to DX2000. Use these steps as a guideline as you proceed through the conversion process. Where applicable, cross-references to related sections in this or other DX guides are provided.

- 1 Determine upgrade path for existing DX 4.x system to upgrade to DX 4.2. See *DiskXtender Version* on page 200 for more information.
- 2 Determine if additional hardware requirements exist for what will be your DX2000 system. See the *Planning Your DX System* chapter beginning on page 21.
- 3 Determine and set access restrictions during conversion. See *Access Restrictions during Conversion* on page 199 for more information.
- 4 Run 4.2 server reports. See *DX 4.2 System Reports* on page 199 for more information.
- 5 Backup the 4.2 server.
- 6 Install the OTG DISKXTENDER 4.2 Conversion Utility on each DX 4.2 Server. See *Installing DX Version 4.2 Conversion Utility* on page 202 for more information.

- 7 Run the OTG DISKXTENDER 4.2 Convert Utility to convert your DX Servers to MEDIASTOR computers, and your DX Agents to DISKXTENDER computers. See *DX 4.2 Conversion* on page 207 for more information.
- 8 Verify success of conversion in DX2000 Administrator. See *Verifying the Conversion* on page 213 for more information.
- 9 Check move groups and move, purge and delete rules in DX2000 and make any adjustments required.
- 10 Check DX and MEDIASTOR service properties, and make changes, as may be required based on new functionality.
- 11 Check DX extended drive properties and make changes, as may be required based on new functionality.
- 12 Run cleanup of DX 4.2 files either by selecting Yes at the prompt or by selecting the cleanup option in the conversion utility program group. See *Remove DiskXtender 4.2 Files and Settings* on page 214.
- 13 Remove OTG DISKXTENDER 4.2 Conversion Utility. See *Removing the Conversion Utility* on page 214 for more information.

SYSTEM REQUIREMENTS

System requirements and recommendations for the DX computer are listed in the *Planning Your DX System* chapter beginning on page 21. System requirements and recommendations for the MEDIASTOR computer can be found in the MEDIASTOR System Guide. As with DX 4.2, the extended drive should be separate from the volume where the system files are stored. An extended drive sizing guide is provided to help you determine the size of the extended drive you will need.

If you planned your DX 4.2 system using the guidelines provided with that version, you should not have any problems with DX2000 (unless you have current extended drive space issues). However, if you are upgrading your system from Windows NT to Windows 2000, you may want to recalculate your extended drive size requirements to accommodate file tag size differences between the two operating systems.

DISKXTENDER 4.2 required the Windows NT 4.0 (Service Pack 3 or greater) operating system on both the DX Server and the DX Agent computers. DX2000 requires either Windows NT 4.0 Service Pack 6a or greater, or the Windows 2000 operating system. Since your 4.2 system is replaced by programs that require a higher operating system, if your 4.2 Server and/or Agent computers are running on Windows NT 3.51 or Windows NT 4.0 with less than Service Pack 6a, you must upgrade those machines to Windows NT 4.0 with Service Pack 6a (or greater). If you ultimately will be running your DX2000 system on a Windows 2000 platform, we recommend waiting to upgrade to the Windows 2000 operating system until after the conversion to DX2000 is complete.

NOTE

For information on the latest Window service packs and hot fixes certified for use with DX, please contact your technical support representative. For information on operating system issues that may affect performance on your DX system, please consult the DX Knowledge Base, which can be accessed opening the Start menu and selecting OTG DISKXTENDER → Help → DISKXTENDER Knowledge Base.

ACCESS RESTRICTIONS DURING CONVERSION

Prohibiting access to the DX 4.2 Server and DX 4.2 Agents is required while running the conversion. This is necessary because of the need to reboot all servers and agents during the conversion process to load new services and drivers and to make appropriate changes to the registry settings for all computers being converted. In addition, prohibiting access to the extended drive(s) during conversion eliminates the possibility data loss due to new files being overwritten during conversion.




Access restrictions for the conversion to DX2000 from DX 4.2 should cause minimal disruption in that the conversion process is not designed to take an extraordinary amount of time. The time the conversion will take is entirely dependant on the number of DX Servers and DX Agents that will need to be converted.

BEFORE YOU CONVERT

Because your data and access to it is so important, we recommend the following processes be performed prior to conversion, in the event the conversion fails for some reason. Completing the precautionary steps outlined in this section will allow you to restore your DX system if there is a problem. If you have any questions or concerns about the conversion, or about any of the following issues, please contact your technical support representative before beginning the conversion process.

DX 4.2 SYSTEM REPORTS

In order to have an accurate record of your DX 4.2 system configuration prior to beginning the conversion process, you should run the following reports (selecting the Full detail option where applicable) using the Report Wizard in the DX 4.2 Administrator. Be sure to save each of the generated reports once they appear in DXPAD.

-  Agent Information – run a report for each agent in your DX system.
-  Extended Drive Information – run a report for each extended drive in your DX system.
-  Hardware Configuration – run a report from each DX server where hardware is configured

- ✦ Media Files – if possible, run a file report task on all media and a media files report to generate an accurate list of the files on the media. While this report is optional, it is highly recommended if time and resources permit.
- ✦ Media Properties – if possible, run a media properties report for all media in your system.
- ✦ Media Roster – run a report to gain summary information on the media if you cannot run a media properties report on all media in the system.
- ✦ Media Tasks – there should be no pending media tasks when the conversion is run. To be sure, you may want to run a media tasks report prior to conversion.
- ✦ Server Registry Information – run a report for each DX server in the system.
- ✦ System Settings – run a report for each DX server in the system.

After the conversion, to verify the configuration of your new DX2000 system, you can consult the reports for configuration information from the DX 4.2 system.

DISKXTENDER VERSION

DISKXTENDER 4.2.106 must be installed on the machine. The conversion process will not upgrade any earlier version of DX. If upgrading from a previous version, please follow the recommended upgrade paths.

The following table provides the recommended upgrade paths for moving from a previous version of DX 4.2 to DISKXTENDER 2000. Please note that prior to converting to DISKXTENDER 2000, you must be running Windows NT 4.0 with Service Pack 6a or higher installed. If your operating system requires upgrade, please upgrade Windows NT before the conversion process. For detailed information on upgrading to interim versions, please consult the documentation shipped with those versions.

Table 24: Recommended Upgrade Paths for Conversion

CURRENT VERSION	UPGRADE PATH
4.00.xx	4.00.xx → 4.20.106 → 5.2
4.10.xx	4.10.xx → 4.20.106 → 5.2
4.20.xx	4.20.xx → 4.20.106 → 5.2

NOTE

You must successfully initialize DX for each version upgrade before proceeding to the next.

WINDOWS NT VERSION

The machine where DISKXTENDER 4.20 is currently installed should be upgraded, if necessary, to Windows NT version 4.0 with Service Pack 6a or greater installed. DX2000 will not install unless Service Pack 6a or greater is installed.

EXTENDED DRIVE SPACE

You must be sure that the targeted extended drive has sufficient space, both for the conversion and for files written in the future. In addition, you may want to consider whether or not your operating system will be upgraded from NT to 2000. If so, you will want to recalculate your extended drive size requirements. You can use the extended drive sizing guidelines provided in the *Sizing Your Extended Drive* section beginning on page 28 of this guide.

VERIFYING HARDWARE CONNECTIONS

Before converting your DISKXTENDER system, you should confirm that the hardware is properly configured, specifically SCSI devices. For any SCSI device to work correctly (regardless of its use with DISKXTENDER), all devices and the SCSI adapter must be properly terminated. Problems could also arise if the SCSI cable exceeds the maximum cable length specified by the host adapter documentation. Additionally, all SCSI devices should be powered on before starting Windows NT.

NOTE

Keep in mind that SCSI cable length includes not only the external cable, but the internal cabling as well. For each drive, one foot of cable should be added to the total cable length. In addition, the size of a library adds to the amount of SCSI cable used.

THE CONVERSION PROCESS

The conversion consists of the following processes:

- ↻ Install the OTG Convert Utility on the DX 4.2 Server
- ↻ Run the conversion utility – Phase 1 of the conversion will:
 - ↻ Save the current DX 4.2 configuration
 - ↻ Stop the DX 4.2 Service
- ↻ Restart the Server and all Agent computers – Phase 2 of the conversion utility will auto-launch after restart
- ↻ Run Phase 2 of the conversion, which will:

Chapter Eight: Converting to DX2000 from DiskXtender 4.2

- ↖ Convert all DX 4.2 Agents to DX2000 Data Manager
- ↖ Convert the DX 4.2 Server to DX2000 MEDIASTOR
- ↖ Run hardware conversion
- ↖ Run media conversion (with media pool assignment)
- ↖ Restart the Server and all Agent computers – Phase 3 of the conversion utility will auto-launch after restart
- ↖ Complete the conversion wizard – Phase 3 of the conversion will:
 - ↖ Assign media to move groups and media folders
 - ↖ Finalize the conversion processConversion utility will return to windows (without reboot)
- ↖ Cleanup 4.2 files after confirming conversion. You may either select Yes at the cleanup prompt immediately following conversion, or select the cleanup command located in the conversion utility program group.
- ↖ Uninstall the conversion utility

If the procedure is cancelled at anytime during the conversion wizard, your 4.2 configuration will automatically be restored. If the conversion is aborted unintentionally during processing (system failure, power outage, etc) and the 4.2 system does not automatically restore, use the 4.2 restore utility located in the conversion utility program group. See *Recover Failed Conversion* on page 214.

INSTALLING DX VERSION 4.2 CONVERSION UTILITY

The conversion utility must be installed on the DX 4.2 Server machine in order to perform the conversion. The Convert Utility installation sets up this module on the DX 4.2 Server.

NOTE

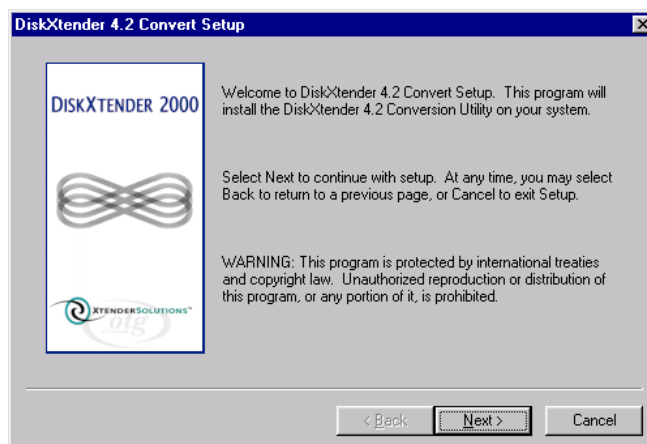
Before running Setup, exit all applications. Setup may not be able to write to all necessary files if other software is running.

To install the DX 4.2 conversion utility:

- 1 Insert the DISKXTENDER setup CD-ROM into the drive. From the Windows Start menu, select Run. The Run dialog box appears.
- 2 You can either browse to the file or type the path in the Open text box:
D : \DX2000 . XXX\DXCONVERT42\SETUP . EXE
(In this path, D represents the drive holding the setup CD-ROM and XXX represents the DX2000 version number.)

- 3 Once the file/path appears in the Open text box, click OK. The convert utility setup is initiated (which may take up to two minutes), and the Setup wizard appears, starting with the DiskXtender 4.2 Convert Setup page.

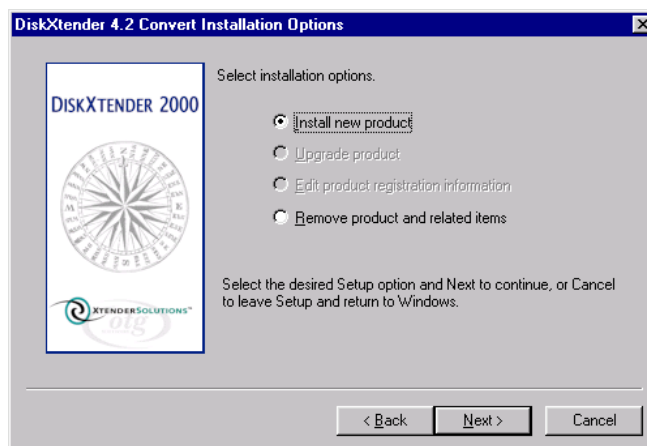
Figure 166 – DISKXTENDER 4.2 Convert Setup



The DX 4.2 Convert Setup page briefly describes the installation process.

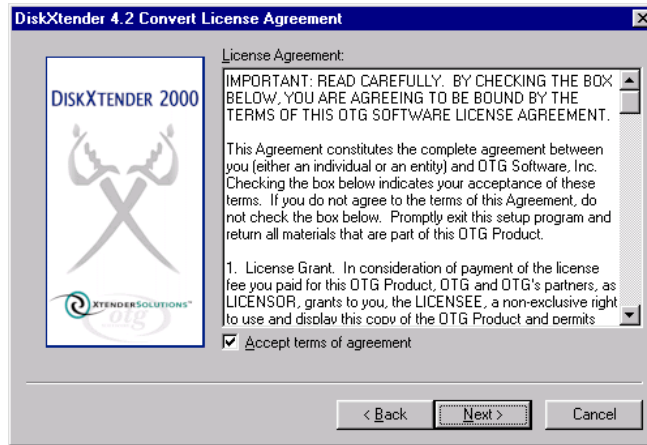
- 4 Click Next. The Convert Installation Options page appears.

Figure 167: DISKXTENDER 4.2 Convert Installation Options Page



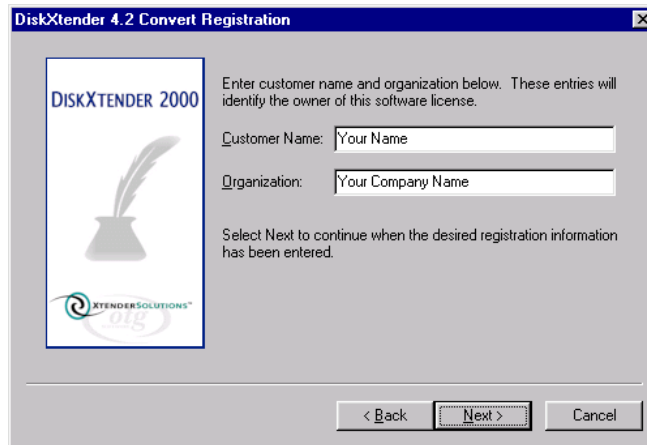
- 5 Select Install new product. Click Next. The DISKXTENDER 4.2 Convert License Agreement page appears.

Figure 168: DISKXTENDER 3.2 Convert License Agreement Page



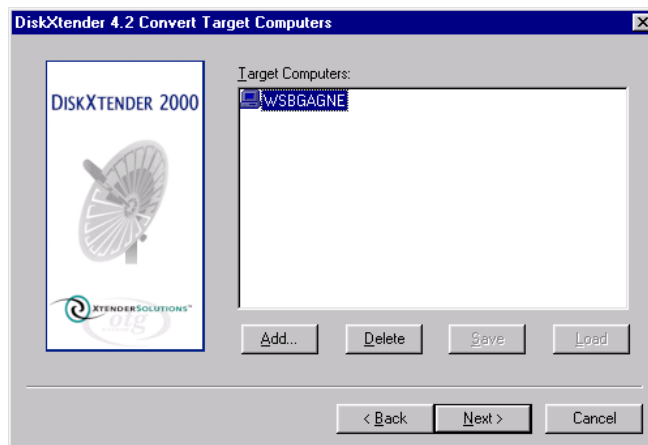
- 6 You must accept the terms of the license agreement before you can proceed with the installation. Click the checkbox next to Accept terms of agreement. Click Next. The DISKXTENDER 4.2 Convert Registration page appears.

Figure 169: DISKXTENDER 4.2 Convert Registration Page



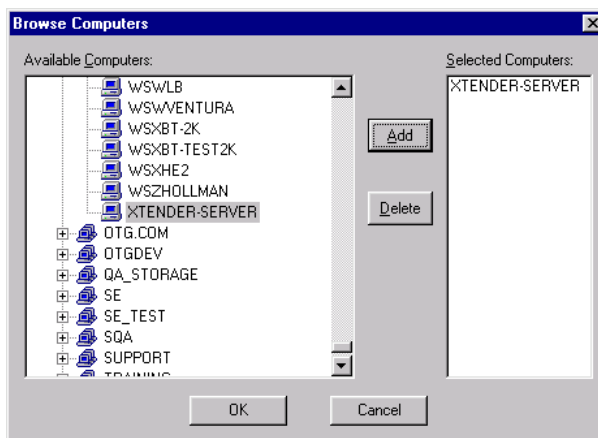
- 7 Enter the customer name and organization name. Click Next. The Select Target Computers page appears.

Figure 170: Select Convert Target Computers Page



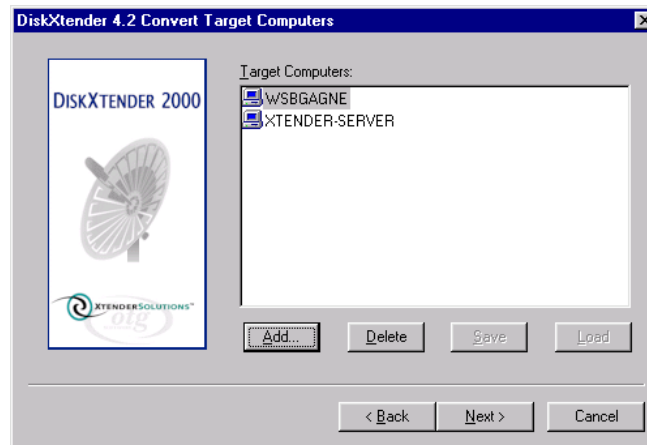
- 8 If you want to install the DX 4.2 conversion utility on more than the local DX 4.2 Server, click Add. The Browse Computers dialog box appears.

Figure 171: Browse Computers Dialog Box



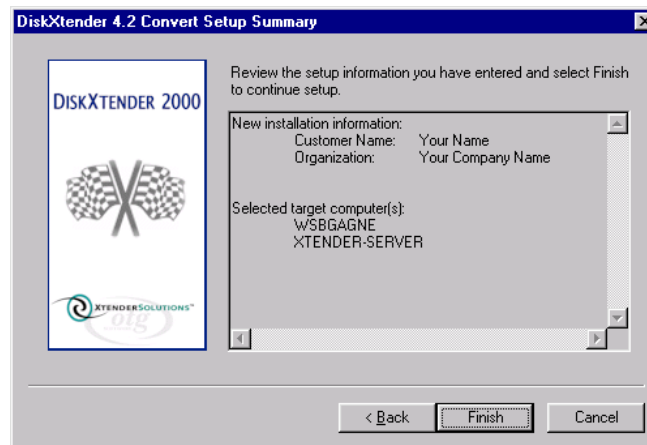
- 9 Under Available Computers, navigate to and select the computer on which you want to install the conversion utility. Click Add. The computer you have selected is listed under Selected Computers. Repeat this step for each additional DX Server on which you want to install the utility.
- 10 Click OK. You are returned to the Convert Target Computers page.

Figure 172: Convert Target Computers Page



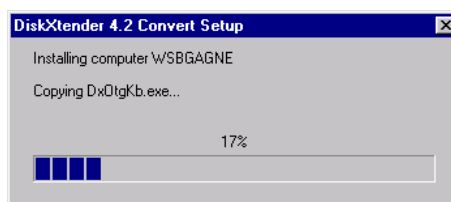
- 11 When the Target Computers list is complete, click Next. The DISKXTENDER 4.2 Convert Setup Summary page appears. This page shows the customer name and organization and lists the target computers for the conversion utility installation.

Figure 173: DISKXTENDER 4.2 Convert Setup Summary Page



- 12 Verify the accuracy of the information. If all information is correct, click Finish. A Progress Bar appears, showing the status of the installation.

Figure 174: DISKXTENDER 4.2 Convert Setup Progress Bar



NOTE 

If necessary, you can cancel the setup procedure at anytime by clicking Cancel.

- 13 If you are installing the conversion utility on more than one computer, a Setup Results dialog box may appear, listing the installation results for each computer you specified. Take note of any computers where a Reboot is required (or computers on which the upgrade failed). Click OK.
- 14 If you are installing the conversion utility on the local computer, a message appears, indicating that the installation has been successfully completed.

Figure 175: DISKXTENDER 4.2 Convert Setup Complete Dialog Box



You have the following choices:

- Click Start to close the Setup wizard and start the conversion utility.
- Click Exit to close the Setup wizard without starting the conversion utility.

The DISKXTENDER 4.2 Convert Utility program group is installed, with the necessary commands available through the created program group in the start menu. The utility can now be used for conversion.

DX 4.2 CONVERSION

Once you have installed the DX 4.2 conversion utility and run the necessary reports and registry backup files, you can convert your DX 4.2 system to DX2000. The conversion process essentially runs an upgrade of your system from DX 4.2 to DX2000 and installs the programs necessary (DX2000 Data Manager and DX2000

MEDIASTOR hardware manager) to make that happen. The conversion process also transfers all configuration information to the new programs and automatically loads all necessary services and drivers for the DX2000 system.

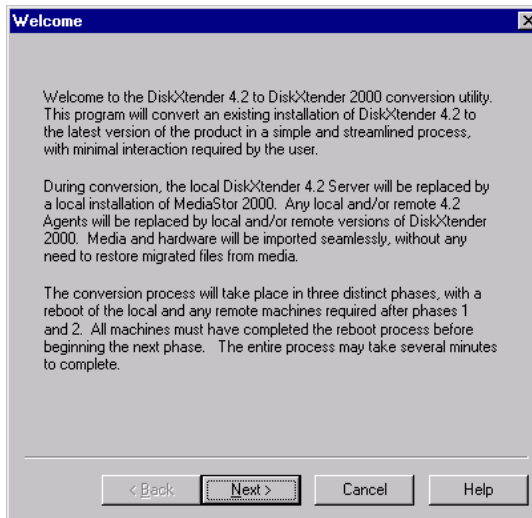
The conversion process runs in three phases. The first phase backs up your existing 4.2 registry configuration and removes the DX 4.2 service. At the end of the first phase, you will be prompted to restart the server computer. Upon restarting, the second phase automatically runs. The second phase replaces the DX 4.2 Agent software with the DX2000 program, and the DX 4.2 Server software with the MEDIASTOR program. At the end of the second phase, you will be prompted to restart the server and all agent computers. Upon restarting, the third phase automatically runs. The third phase finalizes the conversion process by assigning media to the appropriate move groups and media folders within your DISKXTENDER configuration.

The DX 4.2 Conversion utility functions as a wizard, leading you through the necessary steps for converting your 4.2 system to DX2000. The Next button continues to the following step, the Back button (when active) returns to the preceding step. The Cancel button exits Setup, canceling the process.

To run the DX 4.2 conversion utility:

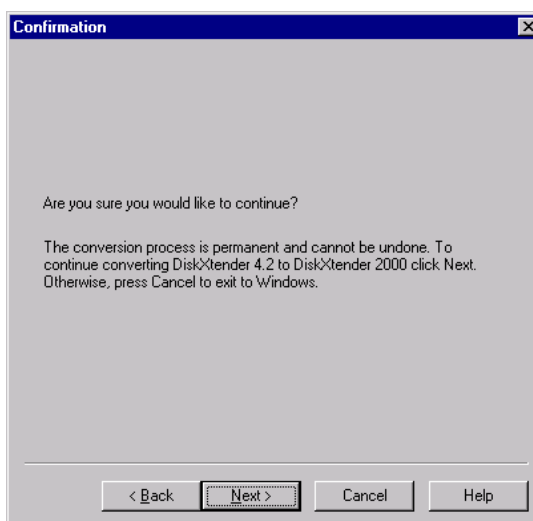
- 1 Choose OTG DISKXTENDER 4.2 Convert from the Start/Programs menu and select the DISKXTENDER 4.2 Conversion Utility option. The Welcome page appears.

Figure 176: DX 4.2 Conversion Utility Welcome Page



- 2 Click Next to continue. The Confirmation page appears.

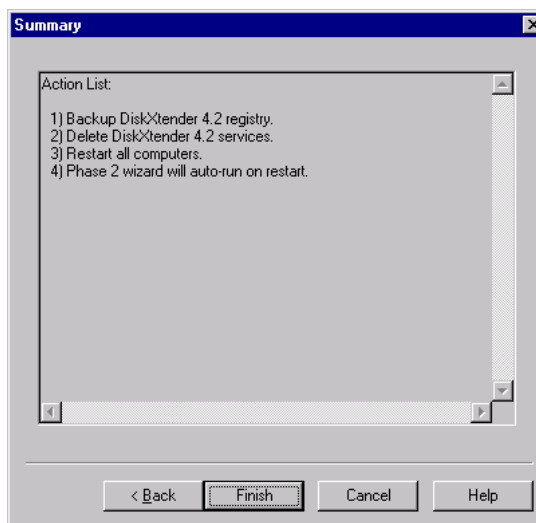
Figure 177: DX 4.2 Conversion Utility Confirmation Page



The Confirmation page provides a reminder that the conversion process is permanent and cannot be undone.

- 3 Click Next to continue. The Summary page appears.

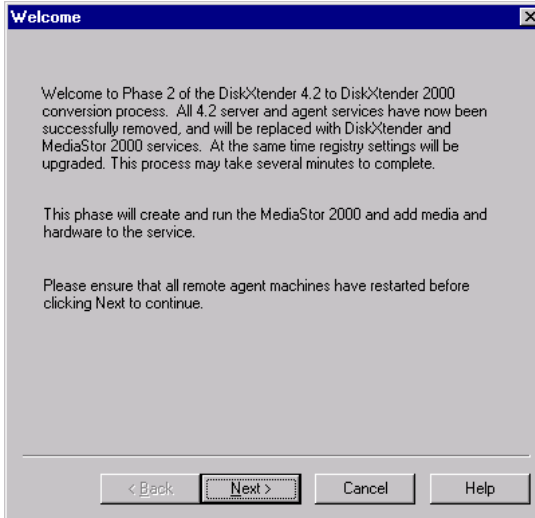
Figure 178: DX 4.2 Conversion Utility Summary Page



- 4 Click Finish. The conversion utility backs up the current 4.2 registry, stops the DX 4.2 service and removes the service from the computer. When complete, the wizard automatically restarts all computers.

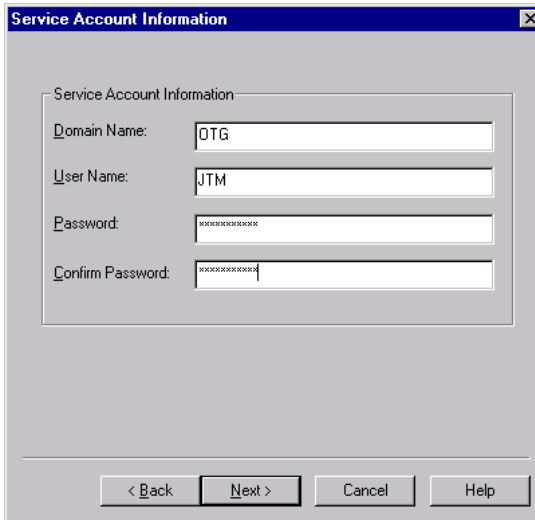
- 5 After restarting, Phase 2 begins automatically, and the Phase 2 Welcome page appears.

Figure 179: Phase 2 Welcome Page



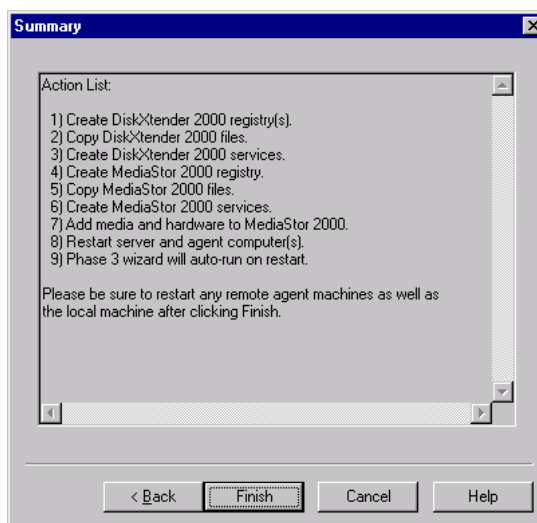
- 6 Click Next to continue. The Service Account Information page appears.

Figure 180: Service Account Information Page



- 7 Enter the account information for the account you want to use as the DX Service Account. Click Next. The Summary page appears.

Figure 181: Phase 2 Summary Page



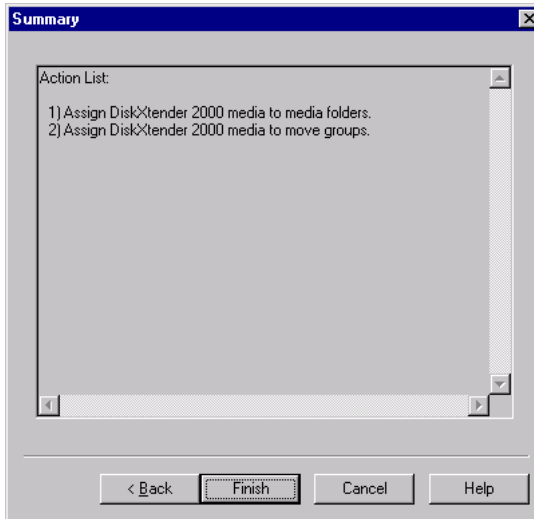
- 8 Click Finish to continue with the conversion. A progress bar appears while the DX2000 and the MEDIASTOR program files are copied onto the agent and server computers. After installation of the programs, conversion of the media and hardware takes place. This process may take several minutes.
- 9 When complete, the wizard automatically restarts all computers. After restarting, Phase 3 begins automatically, and the Phase 3 Welcome page appears.

Figure 182: Phase 3 Welcome Page



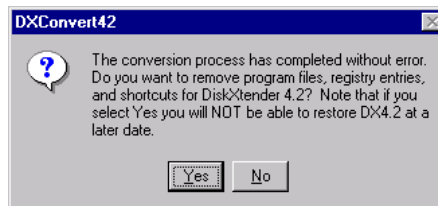
- 10 Click Next to continue. The Summary page appears.

Figure 183: Phase 3 Summary Page



- 11 Click Finish to complete the conversion. When completed, a dialog box appears informing you that the conversion has completed without error and asking you if you want to remove DX 4.2 program elements.

Figure 184: Remove DX 4.2 Elements Dialog Box

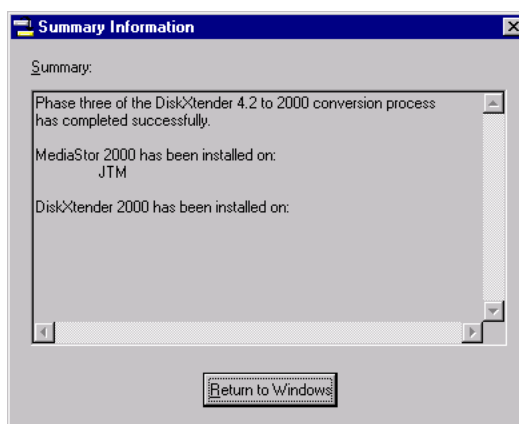


- 12 If you want to remove these elements, click Yes. Otherwise, click No.

NOTE 

Selecting No leaves the 4.2 settings in place, and allows you to restore your 4.2 system in the event there was a problem with the conversion. You may clean up these files later by using the Remove DISKXTENDER 4.2 Files and Settings option located in the DISKXTENDER 4.2 Conversion Utility Program Group.

Figure 185: DX 4.2 Conversion Summary Information



- 13 In the Summary Information dialog box, click Return to Windows to exit the conversion utility.

After completing the conversion, be advised that media will not come online until associated libraries complete the inventorying process. Depending on the size and number of libraries used, this process may take some time.

VERIFYING THE CONVERSION

Once the conversion is complete, open the MEDIAS_TOR Administrator (now located on the DX Server) and verify that the media and hardware devices in the DISKX_TENDER 4.2 system were successfully moved to the MEDIAS_TOR hardware configuration. Then open the DX2000 Administrator and verify that your media folders, move groups and move, purge and delete rules were all transferred over to DX2000 during the conversion process.

Since the report generation function in DX2000 is very similar to the one in DX 4.2, you may want to run reports in DISKX_TENDER 2000 and MEDIAS_TOR and compare the information in them to the DX 4.2 reports you ran prior to the conversion.

Once you are certain that all media and configuration information was transferred to DX2000 correctly, you can remove the conversion utility from all DX Servers where it was installed.

The conversion process installs an evaluation copy of DX2000 and MEDIAS_TOR. After conversion is complete, you will need to install the License Server and license your DX and MEDIAS_TOR software. See the License Server System Guide for information on installing and configuring the License Server. Contact Technical Support to obtain the necessary DX2000 and MEDIAS_TOR licenses.

ADDITIONAL CONVERSION UTILITY FUNCTIONS

Located in the OTG DISKXTENDER 4.2 Convert program group are two functions in addition to the conversion utility and the setup utility. You may or may not need to access either of these functions, depending on whether your conversion was successful, and whether you selected to remove remaining DX 4.2 files immediately following the conversion as part of the conversion wizard.

However, these functions will remain available to you, until the conversion utility is removed from your system.

RECOVER FAILED CONVERSION

The Recover Failed Conversion utility, located in the OTG DISKXTENDER 4.2 Convert program group, allows you to restore your DX 4.2 system to the state it was in prior to the conversion. This utility is specifically designed for use in the event a conversion failed, or for some reason the conversion was inaccurate or incomplete.

Selecting this option will remove the DX2000 program and setup and restore your DX 4.2 configuration.

REMOVE DISKXTENDER 4.2 FILES AND SETTINGS

The Remove DISKXTENDER 4.2 Files and Settings utility, located in the OTG DISKXTENDER 4.2 Convert program group, allows you to clean up and remove all remaining DX 4.2 files from your system after a successful conversion. The utility is specifically designed to allow you to retain all 4.2 settings and files until you have determined that the conversion to DX2000 was successful.

Selecting this option will remove all DX 4.2 settings and files. Once the files are removed, you will not be able to restore your 4.2 system. We recommend that you thoroughly verify that the conversion to DX2000 was successful before running this utility.

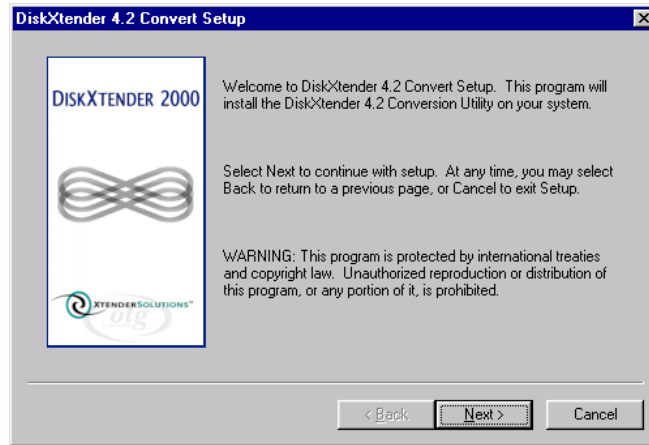
REMOVING THE CONVERSION UTILITY

Like installation, removing the conversion utility runs as a wizard that leads you through the necessary steps for uninstalling the 4.2 conversion utility. The Next button continues to the following step, the Back button (when active) returns to the preceding step. The Cancel button exits Setup, canceling the process.

To remove the DISKXTENDER 4.2 conversion utility:

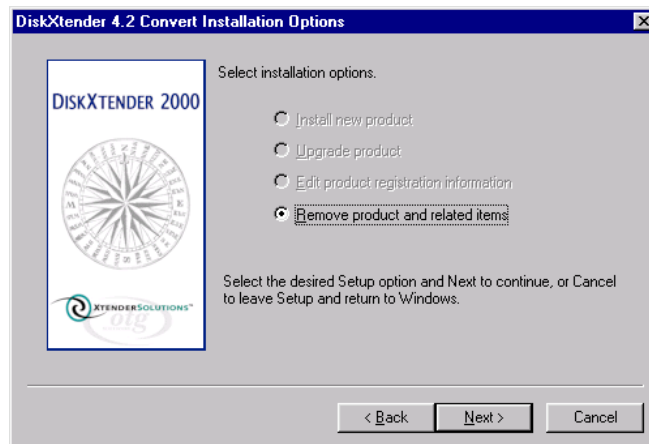
- 1 From the Programs option in the Start menu, select OTG DISKXTENDER 4.2 Conversion Utility, then select Setup. The DISKXTENDER 4.2 Convert Setup page appears.

Figure 186 - DISKXTENDER 4.2 Convert Setup Page



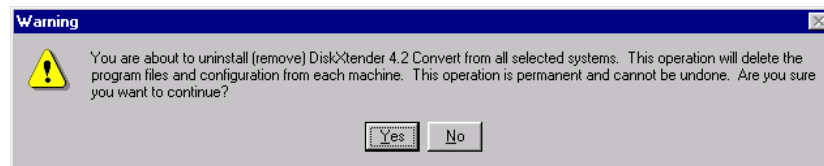
- 2 Click Next to continue with the uninstall. The Installation Options page appears.

Figure 187 - DISKXTENDER 4.2 Convert Installation Options



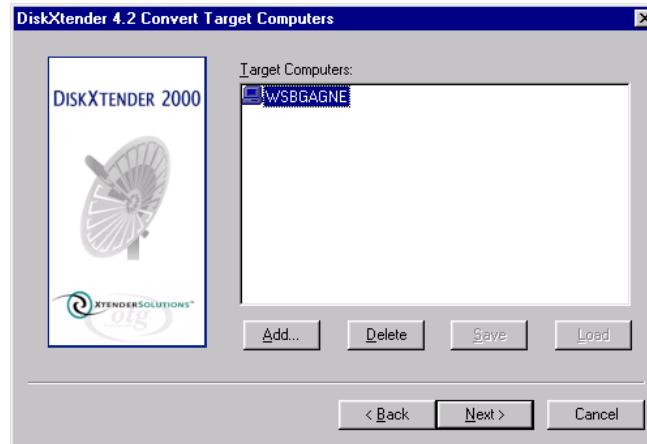
- 3 The only option that should be available is to Remove product and related items. Select that option and click Next. A warning message appears.

Figure 188 – Uninstall Warning Message



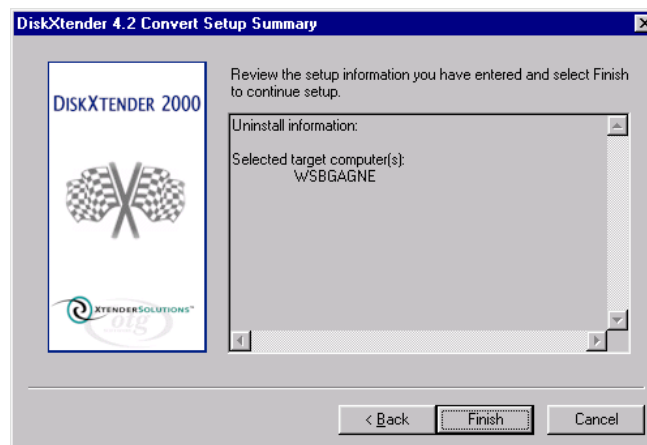
- 4 Click Yes to continue with the uninstall. The Target Computers page appears.

Figure 189 – Target Computers Page



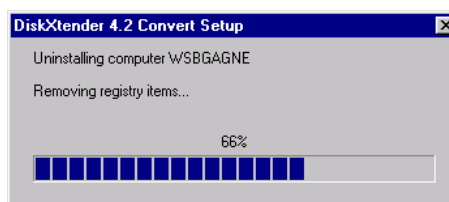
- 5 The local computer appears by default. You can select to uninstall the utility from multiple computers at once (if you have completed and verified the conversion for all of those DX 4.2 Servers). To select additional computers, click Add, then select the computers from the Browse Computers dialog box that appears.
- 6 When all the computers from which you want to uninstall the utility appear in the Target Computers list, click Next. The Summary dialog box appears.

Figure 190 – DISKXTENDER 4.2 Convert Setup Summary Page



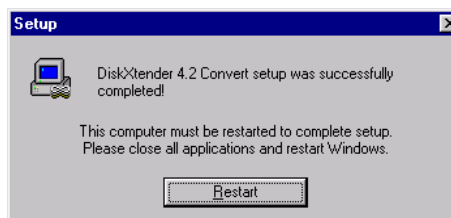
- 7 Review the information in the summary. If it is correct, click Finish. A progress bar appears showing the removal of related files and programs.

Figure 191: Uninstall Progress Bar



- 8 Once Uninstall is finished, a message is appears stating that the DX 4.2 Conversion Utility has been removed from the system, and that you must restart the computer to complete the uninstall process.

Figure 192: Uninstall Complete – Restart Computer Dialog Box



You have now successfully upgraded to DISKXTENDER 2000. Please keep in mind that default settings for the added functionality from DX 4.2 have been implemented for your DX service and extended drive. We recommend that you check all settings and refer to the DX Computer Administration and Extended Drive Administration chapters of the DX2000 System Guide specifically for information on these settings and the system defaults. We also recommend that you refer to the DX2000 MEDIASTOR System Guide to become familiar with the MEDIASTOR hardware manager interface.

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