



**Application Storage Manager™
Windows NT®/2000 Edition**

Data Management Guide

**ASM for Windows
Version 5.20**

P/N: 313445802

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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 on any extended NTFS volume.

With DX, many terabytes of data storage can be made 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, enhancing 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 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 data management guide explains how to setup and configure the components necessary for file migration in the DX system. In addition, the Storage Media Tasks chapter provides information and instructions for scheduling media tasks, allowing you to more effectively utilize downtime for accessing network resources.

CHAPTER SUMMARY

The following table summarizes each chapter of this document:

Table 1: Chapter Summary

CHAPTER:	DESCRIPTION:
<i>Chapter One: Introduction</i> on page 1	This chapter provides a brief overview of the system, including its concepts and components.
<i>Chapter Two: Setting Up File Migration</i> on page 31	This chapter details the steps for extending an NTFS volume. Instructions are provided on creating extended drives, creating media folders, assigning media to media folders, grouping media into move groups, and creating move rules for the files on the extended drive.
<i>Chapter Three: Managing File Migration</i> on page 83	This chapter provides information on administrative activities for file migration components. Details on removing and modifying move groups and move rules are contained in this chapter.
<i>Chapter Four: Space Management</i> on page 137	This chapter discusses the components necessary to manage space on the extended drive. Instructions are provided for creating and managing purge and delete rules.

CHAPTER:	DESCRIPTION:
<i>Chapter Five: Managing Storage Media</i> on page 177	This chapter provides details on accessing and executing media commands and media manager functions. Procedures for viewing media properties are also documented here. In addition, use of the Media Task Manager, Copy Media Manager and Media Prepare Manager are discussed.
<i>Chapter Six: Storage Media Tasks</i> on page 225	This chapter describes and provides instructions for assignment of each of the media tasks that can be performed in DX: format, label, label copy, file report, compact, restore, prefetch, check disk, add to extended drive, remove from extended drive, add to move group, and remove from move group.

RELATED DOCUMENTATION

Refer to the following additional documentation:

- ↗ DISKXTENDER System Guide
- ↗ DISKXTENDER Getting Started Guide
- ↗ MEDIASTOR System Guide if using OTGMS as a media service
- ↗ 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 the *DISKXTENDER Data Management Guide* 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 set up purge rules that purge file data that has already been moved to media in order to maintain available space on the extended drive. You can also choose which folders on the

extended drive will contain DX files and what media will be used to store files moved under a particular move rule.

Before designing a storage strategy, you should be comfortable with DISKXTENDER terminology and concepts. In addition, many of the issues discussed in this 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 DX architecture in this chapter, here are brief descriptions of key terms used in the DX Concepts section and throughout this guide. You can either read this glossary first or refer to it as needed while you read about DX.

Table 3: DISKXTENDER Glossary

TERM:	DEFINITION:
ACSL	ACSL is a device management software product that runs on a UNIX platform. DX can use an ACSL installation as a media service. ACSL has the ability to manage retrieval of media in some StorageTek tape libraries.
Compaction	Compaction is the process of reclaiming used storage media in the DX system by eliminating wasted space taken up by outdated copies of files or files marked for deletion. Compacting media copies all active (non-deleted and current versions of) files from media back to the extended drive, and then removes the media from the media folder, so that it can be reformatted and used again. The files that were copied to the extended drive will ultimately be moved back to media based on the move rules for the media folder.
Drive	A drive is a hardware device through which media can be read or written to.

TERM:	DEFINITION:
Extended Drives	An extended drive is an NTFS volume (hard drive) from which DISKXTENDER provides file migration services by moving files to media and fetching files from media according to the parameters you set.
File Data	File data is defined as the contents of a file. For example, in a word processing file, the File Data is the actual information or content in the file, as opposed to the metadata that the operating system, software program, or DX uses to identify and manipulate the 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. This is sometimes referred to as “metadata,” though true metadata includes other information in addition to the file tag.
File Migration	File migration is the process of moving files between an extended drive (NTFS volume resident on the DX computer) and external storage media. Moving files from the extended drive to storage media is called a “move,” and retrieving files from storage media back to the extended drive is called a “fetch.”
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 computer hardware that holds and spins a magnetic or optical disk, and reads and writes information to the disk. Often, large hard drives are partitioned into multiple drives or “volumes.” These multiple volumes are also sometimes referred to as “hard drives” or just “drives.”
Hardware Device	A hardware device is a device that contains one or more drives through which media can be accessed.
Jukebox/ Library	<p>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.</p> <p>The terms “jukebox” and “library” are interchangeable. In most instances in this manual, the term “library” is used to refer to libraries or jukeboxes.</p>

TERM:	DEFINITION:
Logical Media	<p>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.</p> <p>For example, a network share that shares a single folder to the network could be treated as a piece of logical media in DX. In contrast, a RAID device, which has multiple drives, could also be treated as a single piece of logical media if the entire device was shared as a single network share.</p>
Managed Files	<p>A file is not considered “managed” by DISKXTENDER until DX has moved the file’s data to media. Even if a file is saved to a DX media folder on an extended drive, DX does not recognize responsibility for management of the file data until DX has moved the file’s data to external storage media.</p>
Media	<p>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.</p> <p>In most instances in this manual, the term “media” refers to the storage media to which DISKXTENDER files are migrated.</p>
Media Pool	<p>A media pool is a reserve of pieces of media available for use with a particular extended drive.</p>
Media Service	<p>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 drive) when requested to do so.</p>
Media Type	<p>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 Erasable Optical (Magneto-Optical) media, CD-ROM media, DVD-RAM media, and tape media.</p>
Network Attached Storage (NAS)	<p>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 piece of Network Attached Storage media.</p>

TERM:	DEFINITION:
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 or MEDIASTOR)	OTG'S MEDIASTOR 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 of media 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 8
- ↪ *Media Services* – see page 9
- ↪ *Extended Drives* – see page 10
- ↪ *Media Tasks* – see page 19
- ↪ *Media Management Tools* – see page 25

- ↗ *Event Scheduling* – see page 26
- ↗ *Client Connectivity* – see page 29

DISKXTENDER COMPONENTS

DISKXTENDER is comprised of several components, or modules and each have specific functionality within the system. Several of these modules are discussed briefly in the sections that follow.

DISKXTENDER Data Manager Service

The DISKXTENDER Data Manager Service is a Windows NT/2000 service that runs on the computer where DISKXTENDER is installed. All media, schedule, and extended drive management is coordinated by the DX Data Manager. The DX Data Manager service uses two auxiliary drivers; the DxSpy driver and the DxSpyRec driver, to monitor and report file activity on the extended drive. These drivers watch for changes in the folders designated for DX file migration services, intercept requests for migrated files, and track the addition, modification, or deletion of files. The DX Data Manager moves, purges, and deletes files on the extended drives according to the file move, purge, and delete rules that have been set for the extended drives. The DX Data Manager communicates with computers offering media services (hardware device management) in order to retrieve files that need to be fetched from media, and to send files that need to be migrated to media.

DX Data Manager functionality can be managed through the DX Administrator, either on the DX Data Manager machine or from any remote installation of the DX Administrator.

DX Administrator

The Administrator allows you to view and configure the underlying structure of the DX system. The Administrator provides you with 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:

- ↗ Media services connectivity (connectivity to storage media and to the device management software that manages the storage hardware devices containing 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)

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

All aspects of extended drive functionality can be configured through the Administrator. You can assign pieces of media to an extended drive and to media folders, 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 workstation 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

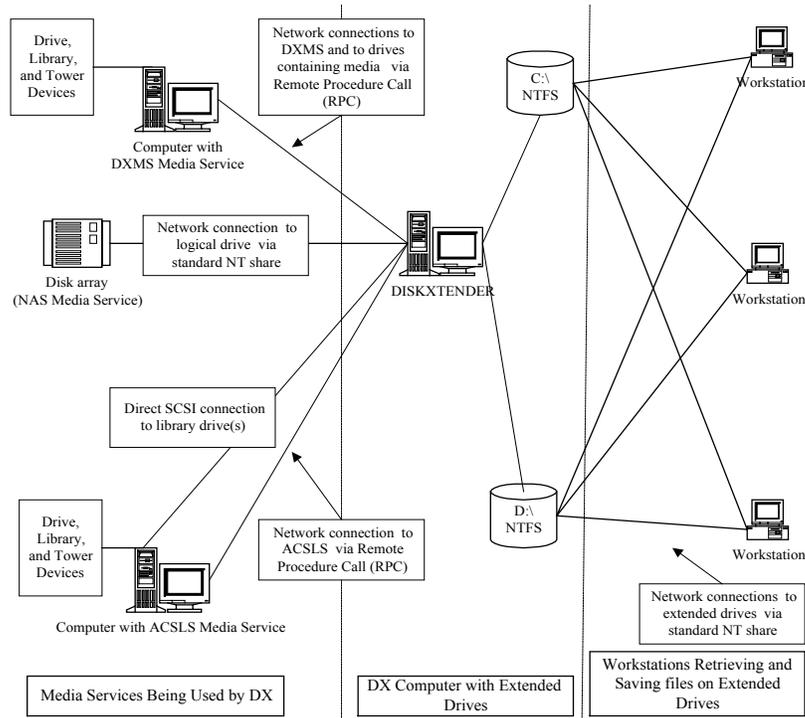
DX contains context-sensitive help links that provide instructional help and examples. The Online Help is automatically installed with DX and with the DX Remote Administrator). Press the <F1> key at any time to get help on the currently displayed dialog box, window or wizard page. You can also access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

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) media services. 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 drives 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. The media service then 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 extended 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 and is being managed 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.

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) that will access the media.

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 MEDIASTOR is being used to manage an optical library, MEDIASTOR 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 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 the media.

EXTENDED DRIVES

An extended drive is an NTFS volume (hard drive) from which DISKXTENDER provides file migration services, 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 use 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 appear to be present on the NTFS volume, whether the file data is actually present on the extended NTFS volume or only on the storage media. According to move and purge rules that you configure, DX moves files to storage 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 the extended drive is viewed through Windows Explorer, the entire file appears to still be stored on the hard disk of the extended drive, even if its file data has actually been purged.

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

ENABLING FILE MIGRATION FOR AN EXTENDED DRIVE

Once a drive or NTFS volume has been extended, certain steps must be taken before DX can migrate files from the extended drive to storage media.

Add media to the media folder(s)

Adding media defines the media folder(s) in which the media will be placed on the extended drive. A media folder is an actual directory on the extended drive whose contents represent the directory structure on the media that is “in” that folder. If media added contains existing files and directories, those files and directories can be added (restored) to the media folder on the extended drive so that they are available to client applications.

Create move groups

Move groups allow you to create sets of media within a particular media folder. Each set or group contains the media to which each move rule will migrate files.

Create move rules

This process defines a list of rules that determine what new/modified files will be moved to storage media. Each move rule points to a move group, which determines to what media the qualifying files will be moved.

Create purge rules

You create purge rules to automatically remove file data for files that have been moved to media. Purging a file only removes the file data, leaving behind a file tag that holds file information to be displayed in Windows Explorer and marks the location of the file on the media. These file tags are what make the file appear to still be resident on the extended drive.

Create delete rules

You can also set up rules that will automatically delete files from the extended drive when the files meet specified criteria. When files are deleted using a delete rule, they are deleted from both the extended drive and the media where they are stored. Once deleted, DX has no way to track files, and cannot retrieve them.

Set up a Drive Scan schedule for extended drive

Any files that qualify for move or purge under rules that include age exclusions cannot be added to the move or purge lists unless the extended drive is scanned to find those files. If you configure any time delays when you create your move and purge rules, you *must* periodically perform drive scans to update the move and purge lists.

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 the 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. Setting a drive scan schedule makes it easy to be sure extended drive scans are run regularly, and allows you to run them during low system-traffic times.

Set up Move Files to Media schedule for extended drive

Once you have configured the rules that determine which files will be moved, purged, or deleted on the extended drive, you need to make sure that there is an active move schedule to allow movement of files from the move list to media. You can set up a specific schedule for the extended drive. It is recommended that you set your Move Files to Media schedule for times when traffic on the network is low.

You can create multiple extended drives and/or multiple-media folders to make the file hierarchy more specific and detailed, or choose a more simple structure. Basic configurations have one type of media, one extended drive containing all media, one media folder, a single move group that fills media sequentially and a move rule that moves all files a certain number of days after creation. Configurations that are more complex can be defined (multiple extended drives, media types, move groups, move and purge rules, etc.) depending on organizational and migration requirements.

FILE MIGRATION

All files that are migrated by DISKXTENDER are initially saved to the NTFS volume. New/modified files are then moved to storage media and purged from the NTFS volume as specified in the move and purge rules that apply to the files. Files are also retrieved from media and stored on the NTFS volume automatically by DISKXTENDER. This movement of files to and from media is referred to as file migration.

One of DISKXTENDER's main performance advantages lies in the ability of the system to be configured so that frequently used files are maintained on the faster access, fixed media (hard drive) whenever possible. You should carefully plan extended drive size, and move and purge rules around application needs, anticipated volume, and available time/hardware for migration processing.

Scheduled file moves and scheduled prefetches prevent system bottlenecks resulting from read and write contention on the same DX computer. With a large enough extended NTFS volume, the DX computer can process all client read requests at full speed, processing moves for new/modified files and scheduled prefetches at a later, less active time.

Different aspects of file migration are controlled in different ways in DISKXTENDER:

- ↳ Fetch requests are automatically processed as quickly as possible (as long as the Allow fetches from media schedule is active).
- ↳ Prefetch requests are configured for each extended drive by selecting specific files to be prefetched. Prefetch requests are then processed according to the Prefetch schedule.

- ↳ Deferred fetch requests are queued requests that are created during inactive fetch schedule times. When the fetch schedule becomes active, the deferred fetch requests are processed and retrieved at that time.
- ↳ Regular extended drive scans can be scheduled in order to write all appropriate files to move and purge lists as they qualify against configured move and purge rules. In addition, regular drive scans ensure complete file synchronization for the move and purge lists, by capturing any files that may have had sharing violations when DX originally tried to add those files to the list.
- ↳ Move rules control which files are moved to media, or more accurately, which files are written to the move list for migration to media. The move list is processed when a Move files to media activity schedule is active. Media Activity schedules can be configured so that time and system resource consuming activities take place during reduced traffic times.

Fetch Files from Media

DISKXTENDER provides virtually limitless background mass storage services by creating the illusion that all files on an extended drive are actually on the NTFS volume to which clients are connected. In reality, some files on the volume have been moved to media and purged from the NTFS volume. When a file has been moved to media and then purged, DX leaves behind a file “tag” which contains only the file details (size, creation date, etc.) and the location of the file on DX media. When viewed through the Windows Explorer, all proper file details (i.e., correct size, date, etc.) appear.

When a read request is issued for a file, the file data may or may not be present on the NTFS volume. If the file is present, DX allows Windows to handle the file request. If only the file tag is present on the NTFS volume (i.e., file data has been moved to storage media and purged from the volume), DX retrieves the file and completes the request. When a file is retrieved, this process is referred to as a “fetch.” Fetches are one of the media activities that can be controlled by the media activity schedule. The Allow fetches from media activity is always active by default, but can be set to be active for only specified blocks of time, if necessary. If a file is requested when the fetch schedule is inactive, and the extended drive option to defer fetch requests is enabled, those requests are queued and the files are retrieved when the schedule becomes active.

Prefetch Files from Media

DISKXTENDER has a prefetch utility that allows you to schedule file retrieval. You can designate which files should be fetched to the extended drive 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 extended drive when they are requested. You may select specific files to be prefetched, or you can assign a prefetch task to a particular piece of media (which fetches all files from that media to the extended drive).

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.

Deferred Fetch Requests

If a client attempts to retrieve a file from media when the Allow fetches from media schedule is inactive, DX cannot fetch the file at that time. DISKXTENDER contains an extended drive option that allows you to queue file requests when the Allow fetches from media schedule is inactive. This option, Defer fetch requests if fetch is disabled, is available through the Options tab on the extended drive Properties dialog box, and is disabled by default. If enabled, DX will queue all file requests made during an inactive fetch schedule as deferred fetches. DX then processes all deferred fetches when the Allow fetches from media schedule becomes active.

MEDIA FOLDER

The media folder is the folder on the extended drive where media is added and grouped through DX. When files in a particular media folder are migrated by DX, they are moved to a piece (or group) of media in the media folder where the file is located.

Media is added to different media folders depending on desired data organization. File name conflicts can be resolved using media folders. If two files on different media have the same file name, it may not be desirable to add these media to the same media folder. DX’s media folders allow you to plan exact organization of directory trees and file locations on the extended drive, regardless of individual media content.

MOVE GROUPS

In order to move files to media that have been added to an extended drive, you must create move groups. Move groups allow you to separate media in a media folder into groups. You can then choose a move group (i.e., a group of media) to designate target media when creating a move rule.

Move groups can be used to group media within a folder for specific uses. If, for example, you wanted to store .gif files and .bmp files to different media in a particular folder, you could divide the media into a GIF move group and a BMP move group. You could then designate the GIF move group as the target media for the .gif files and the BMP move group as the target media for the .bmp files. Division of the media into separate move groups helps you control data migration by ensuring that only files of a particular type are written to a particular piece or type of media.

A move group can only contain media from a single media folder, and is limited to a single media type. If of one type, all of the media in a media folder can be grouped as a single move group, or you can subdivide the media within a folder into multiple groups.

Automated Move Groups

You can configure DX to automatically manage media for a move group based on media usage. Two of the main administrative activities related to move group maintenance could be set to automatically occur - automatic media labeling and automatic media compaction.

The automatic label and automatic compaction features can be used together to create intelligent move groups that allocate new media and perform compaction as space is needed. This allows the system administrator to simply load and format media, and then let other media maintenance activity be triggered by internal DX events. Auto Label and Auto Compact eliminate a time consuming requirement of system administration – the need to manage move groups and the available space within them, by allocating/compacting media, where necessary.

Automatic Media Labeling

The Auto Label option for move groups can be used to configure automatic addition of available blank media to a move group. You can enable or disable the Auto Label feature for each individual move group, either during move group creation or later through the move group properties. When enabled, a media prefix and watermark must be defined for use by automatic labeling. For example, the move group named PAYROLL MEDIA might be configured with a media prefix of 'PAYROLL' and a watermark of 200MB. This means that when the free space available in the move group falls below 200MB, blank media will be automatically labeled with a PAYROLL prefix and added to the move group.

DX also contains a batch formatting and labeling utility. This utility is called the Media Prepare Manager and formats media, and prepares blank media for automatic labeling. Only media in library devices can be used for automatic labeling.

Automatic Media Compaction

The Auto Compact option for move groups can be used to configure automatic compaction of media. You can enable or disable the Auto Compact feature for each individual move group. When enabled, you define a wasted space watermark for use by automatic compaction that tells DX when to compact the media. Let's say, for example, that the PAYROLL move group has a wasted space watermark of 50%. This means when the amount of wasted space on the move group media (due to deleted files) exceeds 50%, the media is compacted.

MOVE FILES TO MEDIA

New or modified files remain on the extended drive until they have been moved to storage media and purged. You control the timing of file moves through move rules and schedules. When an extended drive scan is run, DX checks the files in each media folder and attempts to qualify them against the move rules configured for that folder. If a file is eligible, DX adds it to a move list. Whenever a Move Files to Media schedule is active, DX processes the move list, writing each file on the list out to media. When a file is written to media, this process is referred to as a "move."

Move Rules

Once you have set up a move group, you can create move rules to move files to the media in the group. A move rule is a set of qualifications used by DISKXTENDER to move files from a specified directory. The move rule indicates to DX which new/modified files in a directory (and optionally, its subdirectories) should be moved to storage media, to which media, and when.

At least one move rule must exist before any files can be written to storage media. Your move rule strategy can be simple (one rule for all files in a media folder) or complex (many move rules, each qualifying different types of files or files in different sub-folders). The flexibility of move rules allows you to very specifically control data migration, and to achieve any level of data segregation.

SPACE MANAGEMENT

Part of managing an extended drive involves managing space on the extended drive. Ideally, files that will be retrieved frequently should remain on the extended drive, whereas files that will not be retrieved often can be purged once they are moved to media, leaving more space for frequently accessed files. In order to manage more files than would actually be able to fit on the extended drive, you need to configure space management rules.

Space management rules allow you to control what files are kept immediately available on the extended drive and what files are purged. Using DISKXTENDER as your data management system allows you to automate not only the movement of files to storage media, but also the purging and deletion of migrated files from the extended drive.

Purge Rules and Delete Rules enable automation of file data truncation and file data deletion based on specific aspects of files, which you determine and configure.

- ↳ Purge rules control when files are truncated on (or purged from) the extended drive. Files are either purged when moved to media (as a setting of a move rule), or whenever extended drive capacity is within the range set by the purge watermarks.
- ↳ Delete rules control when files are deleted from the extended drive and from any storage media to which they have been moved.

PURGE FILES

The term 'purge' is used to describe the process of truncating file data on the extended drive for files that have been moved to media. When a file is purged, it is

replaced with a file tag that references the file's location on media. Purging occurs either as part of the processing of a move (if the purge after move setting is enabled), or whenever the extended drive reaches a particular capacity, depending on how you choose to configure your purge rules. In the properties for each extended drive, you can set the watermarks that determine when purging based on drive capacity begins and ends. Purge rules are configured to control which files are purged on drive scan or moved to the purge list (during drive scans). The purge list is processed when the purge start watermark is reached.

You can purge files based on file age. Purge rules can be used to dictate file purge based on create time, last access time, or last modification time. This process is performed automatically by DX in the background, transparent to client applications.

Purge Rules

Purge rules allow you to reclaim space on the extended drive by truncating files on an extended drive once the files are moved to media. The parameters used to select files for a purge rule are similar to those configured for a move rule. File age, file size, file extension, and file attributes can be used to specify a set of files to be purged. You can also configure the processing priority for a purge rule. Priorities can be used to ensure that certain files, such as larger files, are purged first, optimizing the purge process.

DISKXTENDER will only purge files that have been moved out to media, so non-DX files are not affected by purge rules. It is recommended, however, that you create corresponding purge rules when you create move rules, to insure that disk space is reclaimed as needed. In addition, like with move rules, a regular drive scan is required to write files that qualify against purge rules to the purge list.

DELETE FILES

Delete rules allow the system administrator to remove files from storage using similar parameters as used in move rules and purge rules. However, delete rules actually delete files from the extended drive *and* from media. When a file is deleted on the extended drive, the file tag is deleted from the extended NTFS volume and the file data on the media is marked for deletion. This means that the file data will either be deleted immediately from media, or (for optical or tape media formatted with OTG file system) will not be transferred to a new piece of media when the media is compacted. (You can also configure secure file delete as an extended drive property option, which will overwrite any deleted files on tape and optical media, making them completely unrecoverable even before compaction.)

These rules can be used, for example, to help manage archival of particular files kept in order to comply with legal requirements. You could create a delete rule that deletes all files in a particular directory that you are not legally required to keep. As long as the files fit the legal criteria, they are backed up to media by DX and remain in the directory. Once the files no longer meet the required criteria (e.g., the files reach a certain age), however, DX can automatically delete them in accordance with a delete rule.

Delete Rules

In certain situations, you may not want to keep files after a certain period of time, even on storage media. You can use delete rules to automatically delete older files from both the extended drive and from storage media. When a file becomes eligible for deletion under a delete rule, it is deleted from the extended drive by DX. The file may still exist on the storage media, but it becomes an “orphaned” file; DX marks the file as deleted on the media and removes any references to the location of the file. Removing the location reference makes it impossible for DX to find or retrieve that file. When the storage media to which the file was moved is compacted, DX will not copy deleted files to the extended drive (a part of the compaction process). When the media is reformatted, the deleted files are permanently lost.

It is important to note that when a file is removed using a delete rule, it is removed permanently. Once the file has been deleted on the extended drive, DX will no longer keep a pointer to the file anywhere in the DX system. To simply clear space on the extended drive, but retain file data on storage media, use purge rules rather than delete rules. To actually remove files permanently, use delete rules.

MEDIA TASKS

A media task is defined as a media function that is assigned to a specific piece of media. Available media tasks include compaction, file reporting, formatting, labeling, labeling of copy media, check disk, add media to media folder, add media to move group, remove media from media folder, remove media from move group, prefetch, and file restore. Tasks can be managed through the Media Task Queue, either at the DX computer level (includes all assigned tasks for media) or at the media level (includes scheduled tasks for that media only.)

Media tasks can be processed immediately (at the time they are assigned) or when the Process scheduled media tasks schedule is active. Be advised, however, that since media tasks are assigned to specific media, *all* tasks assigned to a piece of media must be run together – either ASAP or during the media activity schedule.

FORMAT

All media must be formatted for use with DISKXTENDER. Formatting verifies the integrity of the media, and makes it available for use with system hardware. It prepares the media for file writes by creating the specified file system on the media. DISKXTENDER allows you to format media in a standalone drive, one piece of media at a time, or in a library, on multiple drives at one time.

NOTE

DISKXTENDER does not support formatting of CD-ROM, WORM or NAS media.

It is important to examine system needs before deciding upon a file system. OTG file system media is easily recognized by DX, and provides faster performance. However, if the media will need to be read by another file system or software program, it may be necessary to use a Windows Native file system.

A format can be performed on unformatted media, or media that have previously been formatted for the same or another file system. Both media that have never been formatted and media formatted in a file system other than the one configured for the drive will appear as either “unformatted” or “foreign” media to DISKXTENDER. Media that has been formatted but not labeled will be listed as Blank media.

NOTE

Formatting double-sided optical media in a standalone drive formats only one side of the media. Always format both sides of double-sided media at one time, to avoid confusion.

Force Low-level SCSI Format

By default, when NTFS media is formatted, a quick format is performed. Quick format clears the file table of all pointers to files on the media, but not the actual information on the media. A quick format is sufficient if the media is pre-formatted or has been previously low-level formatted in the drive type being used.

A low-level format is necessary when media has been formatted in a different drive type than the one being used, or if the media has repeatedly failed due to media errors. Select this option to perform a low-level SCSI format and prepare the media for the current drive type.

NOTE 

If a format fails, it is usually an indication that a low-level SCSI format is necessary to prepare the media for the current drive type.

Reformatting Media

If erasable optical or tape media has already been formatted, and is not currently assigned to a media folder, it can be reformatted from the Available Media pool. To reformat, assign the Format task for that piece of media. The formatting process erases existing data and recreates the file system on the media.

LABEL

When media is inserted in a device, DX inventories the media to determine if it recognizes the file system format, and reads the media label as well. If the media is formatted but has not been labeled, DX will identify the media as blank media and add it to the list under the Blank media node. Once media has been labeled from the Blank media list, the media appears with the new label in the Original media node. Media listed in the Original media node can be assigned to a media folder.

Labeling assigns a name and serial number to a piece of media, so that it can be tracked by DISKXTENDER. No two pieces of original media should have the same label, because the media label is what allows you to identify the media in the DX administrator. For ease of use, then, the media label should uniquely identify the media.

Automatic Media Labeling

Assigning a media task to a single piece of media is one way to cause a piece of media to be labeled. You can also use the automatic labeling feature in your move groups to label a blank piece of media and add it to the media folder and then to the move group whenever new media is needed for the move group.

Media Naming Conventions

Media label names may be alphanumeric (a-z or 0-9) characters. Media names may also include the following special characters: \$! - _ ?.

The recommended approach to naming media is to use a prefix and a sequence number. The prefix should represent the extended drive name, application name, etc.

that is writing to the media (i.e., CAD, IMAGES, DOCS). The sequence number represents the order of the media in the group and optionally should reflect the side of media (i.e., 1,2,3 or 1A, 1B, 2A, 2B, 3A, 3B). Combined, they give an orderly system for naming media (i.e., CAD1A, CAD1B, CAD2A, CAD2B, etc.).

Depending upon data organization, all media could be given the same prefix, with the only difference being the number following the prefix. Alternatively, different prefixes could be given to media depending upon file type or location, for example. When labeling media in a standalone drive, one side should be labeled LABEL1A, while the other side should be labeled LABEL1B, where LABEL is the media name.

LABEL COPY

The Label Copy task allows you to label a piece of blank media to be used as a copy of a piece of original media. Label Copy can only be performed on blank media. Blank media available for use as copy media are all blank media of the same type, format and size as the original media.

Copy media has the same label as the original it corresponds to, but has a unique serial number. When assigning a Label Copy task, you must select the piece of original media to be copied. DX assigns the same label to the copy and places the copy in the Copy media node of the Available media tree. Copy media is updated when the Update copy media activity schedule is active.

FILE RESTORE

File Restore makes files on media available for client access by placing file tags in the media folder on the extended drive that point to the files on the media. Whenever media is added to a media folder, the files on that media must be restored (so that the media's files are made available to clients), but file restore can be done at any time.

When assigning a File Restore task, you can enable or disable the Log Duplicates option. This option allows you to keep a count of duplicate files when restoring. If there are duplicate files, the newest file is restored and older versions are always replaced. You can also set the direct read attribute for a piece of media when you restore it. Setting direct read causes files to be fetched directly from media rather than fetched to the extended drive.

NOTE

File tags are information about the file including: name, location, attributes, size and create time.

COMPACT

Media compaction allows you to reclaim deleted file space on media by relocating active (or non-deleted) files from one or more pieces of media to other storage media. Compaction also allows you to migrate files from one type of media to another (e.g., CD-ROM to optical or optical to tape).

Compaction takes place by copying (fetching) the files from the media back to the media folder. Compaction also deletes the attribute identifying the file as a DX file for each of the files from the media. The compacted files remain in the media folder until transferred back to storage media based on the move rules established for that folder. Once a piece of media has been compacted, it can be reformatted for reuse or removed from the system (depending upon the type of media). Media selected for compaction is automatically removed from its media folder.

NOTE

For the best compaction results, you should have the equivalent of one side of the media available as free space on the extended drive.

Automatic Media Compaction

Assigning a media task to a single piece of media is one way to cause a piece of media to be compacted. You can also use the automatic compaction feature within your move groups to compact media in the group whenever the amount of wasted space on a piece of media exceeds a specified watermark.

PREFETCH

This task prefetches all files from the specified piece of media. If this task is performed, clients can access any of that media's files without the media being mounted to a drive. You can coordinate prefetch with file migration and purge to make sure that file data for necessary files is always present on the extended drive when it is needed. This task is particularly useful if you know a specific piece or pieces of media will not be available for file retrieval for an extended period of time. The prefetch task is also a valuable feature to have during disaster recovery.

NOTE

The Prefetch media task prefetches all files on the specified piece of media. This media task does not allow you to prefetch specific files. To prefetch specific files, use the Prefetch Request Manager.

FILE REPORT

The File Report task obtains file information from the specified piece of media so that you can run a Media Files report using the Report Generator from the Tools menu in the Administrator. You must run this task before running a Media Files report to have current media information in the report. You can choose whether to obtain a complete listing of files on the piece of media, or a summary of file totals on the media.

CHECK DISK

The Check Disk task is used to run NT's CHKDSK.EXE on DX media formatted with the NTFS or FAT file system. For OTG rewriteable media, DX will perform a scan of DX file tags.

ADD MEDIA TO MEDIA FOLDER

You can assign this task to automatically add a piece of media to a media folder. This allows you to add media after other tasks are completed without any need for manual intervention. This task can be scheduled for any piece of media located in the Original node of the Available Media tree, or media that has the format and/or label tasks assigned to it. The Add Media to Media Folder task can be used in conjunction with the Add to Move Group task to automatically add media to a media folder, then to a move group, all within a single process.

REMOVE MEDIA FROM MEDIA FOLDER

You can assign this task to automatically remove media from a media folder. Any piece of media in a media folder can be scheduled for removal, but all other pending tasks must have been carried out for the media before the media is removed.

When media is removed from a media folder, all files and file tags in the media folder on the extended drive that correspond to files saved on the media, are also removed. The files on the media will only exist on the media and no longer on the extended drive. Removing media from a media folder requires an extended drive scan to remove these files from the extended drive.

ADD MEDIA TO MOVE GROUP

This task adds a piece of media to an existing move group. Any piece of media assigned to the media folder or for which an Add Media To Media Folder task is pending can be assigned the Add Media To Move Group task.

You can also add one or more pieces of media to a move group when you create the move group, or through the move group properties dialog box. In addition, you can use the automatic labeling feature for your move groups to label a blank piece of media, add it to the media folder and then to the move group whenever new media is needed for the move group.

REMOVE MEDIA FROM MOVE GROUP

This task removes a piece of media from a move group. Unless specified by scheduling a subsequent Remove from media folder task, the piece of media remains in the media folder, though no longer part of the move group.

Media removed from a move group will no longer have files migrated to it.

MEDIA MANAGEMENT TOOLS

DISKXTENDER provides several tools that simplify the management of DX media.

COPY MEDIA MANAGER

DISKXTENDER has a Copy Media Manager that allows you to view and manage copy media tasks. You can assign the label copy task to blank media and view the status of existing copies. You can also promote a piece of copy media to original status. You can access the Copy Media Manager by selecting the Copy Media Manager option from the Tools menu in the Administrator.

MEDIA PREPARE MANAGER

DISKXTENDER has a Media Prepare Manager that allows you to assign the format and label media tasks to several pieces of media at once. You can select pieces of media in the system and assign either or both of these tasks to them from one centralized interface. You can access the Media Prepare Manager by selecting the Media Prepare Manager option from the Tools menu in the Administrator.

MEDIA TASK QUEUE MANAGER

DISKXTENDER has a Media Task Queue Manager that allows you to view and manage pending and processing media tasks. Tasks can be removed, added, promoted, or demoted using the Media Task Queue. All tasks assigned to media in the DX system can be managed from the queue. You can access the Media Task Queue Manager by selecting the Media Task Queue Manager option from the Tools menu in the Administrator.

PREFETCH REQUEST MANAGER

DISKXTENDER has a Prefetch Request Manager that allows you to schedule prefetch requests and to manage scheduled requests. Requests can be created, modified, or deleted using the Prefetch Request Manager. All prefetch requests in the DX system can be managed from the Request Manager. You can access the Prefetch Request Manager by selecting the Prefetch Request Manager option from the Tools menu in the Administrator.

EVENT SCHEDULING

DISKXTENDER provides scheduling for many system events, such as moving files to media, media copy updates, scheduled media task processing, prefetching files, and drive scans. This allows time-consuming processes to occur at convenient times such as nights and weekends, thus providing more efficient use of system processing during active times. Scheduling system events during inactive times ensures that the events do not compete with network clients for system, drive or library resources. Schedules can be defined, modified, and deleted through the Administrator.

MEDIA ACTIVITIES

A media activities schedule can be created for DX. Separate schedules can be set up for each extended drive. Schedules are configured in the Schedule Properties dialog box, which can be accessed from the Properties dialog box for the extended drive.

Move Files to Media

This schedule controls when the move list for an extended drive is processed, which writes files from the list out to media.

Process Media Task Queue

This schedule controls when media tasks that were given a “scheduled” value are processed. All tasks for a piece of media are processed, and then tasks for the next piece of media are processed. Media are processed in the order they are listed in the Media Task Queue Manager.

Update Media Copies

When this schedule is active, copies of original media in the DX system are automatically updated to match the original media. Copy media is created by assigning a label copy task for a blank piece of media.

Allow Fetches From Media

When this schedule is active, user requests for files no longer resident on the extended drive can be carried out. By default, this schedule is always active. Some enterprises, however, require that fetch access to purged files be restricted at certain times of the day. This media activity schedule option allows you to configure that kind of time-based restriction, if necessary. In addition, if you have time-based restrictions configured, you may want to enable the Defer fetch requests if schedule is inactive option for your extended drive. If the extended drive option to defer fetch requests is enabled, those requests are queued and the files are retrieved when the schedule becomes active.

Prefetch Requests

Prefetch requests are scheduled separately from other media activities, during prefetch request configuration. Flexible scheduling options are available for scheduling prefetch requests. Prefetch requests are scheduled in the Prefetch Request Manager.

Any files that you know will be needed can be marked for prefetch so that they will already be present on the extended drive when they are requested. You can schedule a prefetch request to occur once at a set time or to reoccur at set times or you can configure the request 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.”

NOTE 

Prefetches will fetch all requested files to the extended drive, to include files marked for direct read.

EXTENDED DRIVE SCAN

Extended drive scans inventory the contents of the extended drive and determine what files are to be written to the move and purge lists. Files will not be moved or purged, even if the extended drive reaches capacity or the Move files to media activity reaches a scheduled time, unless they are listed on the move list or purge list. 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.

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. If any of your move and purge rules use a file age exception to delay move and/or purge of files, you should set a regular drive scan schedule to make sure that all appropriate files are written to the move and purge lists.

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.

In addition, when you remove a piece of media from the extended drive, you must run a drive scan to complete removal of the media and remove the files on the media from the drive.

Forced Drive Scans

An option is available on the extended drive shortcut menu that allows you to force an immediate drive scan of the extended drive. A drive scan started using the Force Drive Scan command is started immediately, independently of any drive scan schedule you may have in place. You can use this command to run a drive scan if you remove a piece of media and would like to refresh the extended drive contents immediately.

Scheduled Drive Scans

You can also schedule drive scans to occur automatically. Drive scans are scheduled separately from other events (in each extended drive's Properties dialog box in the Administrator). 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.

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

SETTING UP FILE MIGRATION

The DISKXTENDER program uses a file migration system to allow you to manage large stores of data and files. The term ‘file migration’ refers to the function of moving files from a local hard drive to one or more pieces of storage media, and retrieving those files for use when requested. In essence, you move files from an extended drive with limited storage space to media pools with more extended storage space.

DISKXTENDER automates the migration of files to media using a rule-based system. Rather than just migrating all files to media without distinction between files, you can select which files should be moved to what types and pieces of media. DX tracks each file and each piece of media so that when a client requests file data that has been moved to media, DX can find the file and retrieve it for the client.

Besides determining what types of files are moved to what media, you can also configure a time delay for files that will delay movement of the files until some number of days after creation or last access or last edit. In addition, DX provides a prefetch function, which allows you to retrieve the most commonly used files during times of reduced system traffic.

One of the main reasons to use a file migration system to manage your data and files is to manage data storage space. After file data is moved to storage media, that data can be removed from the local storage space, freeing up that space for additional files. The key is to maintain as much local storage space as possible while still making files easily available. Ultimately, your data management system is also a space management system.

Besides the storage media being written to, DISKXTENDER uses six key components to automate file and space management. Those components are:

- ↗ Extended Drive – an NTFS volume (hard drive) on the computer where DX is installed
- ↗ Media Folder – folder created on the extended drive, through DISKXTENDER, where clients store (and access) files
- ↗ Move Group – group of storage media to which files, stored in a particular media folder, will be migrated
- ↗ Move Rule – rule outlining the attributes of files that determines which files stored in a particular media folder, will be moved
- ↗ Purge Rule – rule outlining the attributes of files that determines which files stored in a particular media folder, once moved to media, will have their file data removed from the extended drive (a file tag will remain, identifying the file for later retrieval)
- ↗ Delete Rule – rule outlining the attributes of files that determines which files stored in a particular media folder, will be deleted entirely from the DX system (permanently deleted from the extended drive and the storage media)

The extended drive, media folders, move groups and move rules, their creation, and their management are what enable and automate your file migration and data management system. The purge rules and delete rules are what enable and automate space management within your data management system.

In order to set up DISKXTENDER to start migrating files from the extended drive to media, you need to create and configure several of the file management components. Executing the following steps, in order, is the quickest way to begin:

To configure DX for the migration of files to media:

- 1 Configure one or more media services. Information and procedures related to media services can be found in the DISKXTENDER Getting Started Guide.
- 2 Create and configure an extended drive. For instructions, see *Extended Drives* on page 34.
- 3 Create a media folder. For instructions, see *Media Folders* on page 46.
- 4 Configure/Add media to the Available Media Pool for the extended drive. For instructions, see *Assigning Media to Extended Drives* on page 44.
- 5 Add media to the media folder. For instructions, see *Adding Media to a Media Folder* on page 54.

- 6 Create a move group. For instructions, see *Move Groups* on page 60.
- 7 Add media to the move group. For instructions, see *Move Groups* on page 60.
- 8 Create one or more move rules. For instructions, see *Move Rules* on page 68.
- 9 Set up a regular Drive Scan schedule. For instructions, see the *Extended Drive Administration* chapter in the DX System Guide.
- 10 Set up the Move files to media activity schedule. For instructions, see *Scheduling Movement of Files* on page 80.

Completing the above steps tells DX what files it is supposed to move, when it is supposed to move them, and to what media. In addition, scheduling regular drive scans ensures that all files that are supposed to be moved are written to the move list when they qualify, and that complete file synchronization for the move list is maintained by regularly checking the extended drive for files that should be moved to media.

The sections that follow in this chapter provide instructions to setting up all of the necessary components for migrating files to media. In addition, at the end of this chapter you will find instructions on how to configure DX to move files to media at times you specify using the extended drive scheduler.

Because many users prefer to stay with the default settings through the setup process, the instructions included in this chapter for creating your extended drives, media folders, move groups, and move rules do not cover configuration options in detail. This chapter provides enough information to enable you to get your DX system up and running, and start moving files to media. In addition, this chapter lists descriptions of the default settings for each of the DX file migration components.

However, if you would like to change default settings to customize your system during the setup process, you can do so. For information on configuring and changing the default properties and options for your move groups and your move rules, see *Chapter Three: Managing File Migration* on page 83. Because of the extensive nature and importance of properly configured extended drive settings, information on changing and managing extended drive properties occupies its own chapter. Please refer to the Extended Drive Administration chapter of your DX2000 System guide for detailed information and procedures.

For detailed discussion of purge rules and delete rules see *Chapter Four: Space Management* on page 137.

EXTENDED DRIVES

An extended drive is an NTFS volume whose storage capacity is “extended” by DISKXTENDER’s file migration services. DISKXTENDER allows you to “extend” an NTFS-formatted hard drive on a DX computer by moving files to other storage media while making the files appear to remain on the hard drive.

The first step in enabling file migration to media by DX is creating an extended drive. Once DX software is installed on a computer, any NTFS-formatted hard drives on that computer can be extended by DISKXTENDER. The extended drive must reside on the same computer where DX is installed.

NOTE

If your DX system is installed on a SAN and you are using SANXTENDER, your extended drive *must* be a shared fibre RAID drive mapped to the DX computer. For more information about how SANXTENDER works with DX, see the SANXTENDER System Guide.

DX and the media services it uses can be located on the same computer or on separate computers, as long as the computer’s specifications are acceptable for use with DX. For space requirements, minimum computer configurations, and system recommendations for the DX computer and the extended drive, please refer to the Planning Your DX System chapter of the DISKXTENDER Getting Started Guide.

To use DISKXTENDER to the greatest advantage for your organization, you should plan the organization of data in your DX system prior to creating your extended drives. For example, you should determine if all files will be saved in a single folder on one extended drive, or if you want to save different types of files to different folders, or even to different drives.

You can create multiple extended drives to make your file hierarchy more specific and detailed, or choose a more simple structure. Basic configurations have one type of media, one extended drive with a single media folder, one move group, containing all available media, move rules to fill media sequentially, and a purge rule for all files moved to media. More complex configurations can be defined using multiple extended drives, multiple media folders, move groups, move rules, purge rules etc., depending on organizational and migration requirements.

To store files, media is assigned to a media folder and then to a move group. To configure migration of files from the extended drive to the media, you must create a move rule that selects the files to be migrated and targets the media in the move group.

CREATING AN EXTENDED DRIVE

Since each component necessary for file migration is associated with an extended drive, you have to create an extended drive before you can create any of the other components. Before an extended drive is created, the DX Administrator is empty because there is not much to administer. Even if you have already added your media services, that media is not available for file migration until it is assigned to an extended drive through the media service.

As with most components in DISKXTENDER, there is a wizard function to help you create your extended drive. The Extended Drive wizard takes you step-by-step through all the necessary steps to create a new extended drive.

Within any DX wizard, 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.

When the extended drive is created, DX creates a new tree in the Administrator with the name of that drive. If you expand the extended drive tree, you will see nodes representing the other data management components.

Unless you make changes to the options when creating your extended drive, the defaults for each extended drive configuration are as follows:

Table 4: Extended Drive Settings Page Defaults

OPTION:	DEFAULT SETTING:
Schedule	Contains four Media Activities for scheduling: Move files to media, Process scheduled media tasks, Update copy media and Allow fetches from media. Default schedules for the first three run every day from 8 p.m. to 9 a.m. The Allow fetches from media schedule is active 24/7 by default.
Drive Scan	Sets extended drive scan schedule. Drive scans are disabled by default. Regular Drive Scans are required to write files to the move list for migration and to ensure complete synchronization of all files due to be moved to media. Scheduling drive scans for “off-hours” times makes running them regularly more convenient, and decreases the likelihood of a file not being written to the move list due to a file-sharing violation because a user or other program has the file open.
Backup	Sets specifications and scheduling for incremental and full extended drive backups. Backup schedule is disabled by default. We strongly recommend setting a regular Backup schedule in order to ensure that your DX files are saved regularly to backup.

Table 5: Extended Drive Options Page Defaults

OPTION:	DEFAULT SETTING:
Backup mode for managed files	Sets whether to backup only DX file tags or all file data for DX managed files when running a system backup. (This setting is not related to the DX Extended Drive Backup function.)
Direct read memory cache	Sets amount of extended drive memory to be used for direct read of files. Default is 1 MB.
Disable file size fixup	Selects the way purged DX files appear in Explorer (0 bytes or actual size). Shows actual file size by default.

OPTION:	DEFAULT SETTING:
Disable folder rename check	Manages whether or not users can rename media folders on the extended drive if not supported by the associated storage media. Renaming prevented (for applicable media) by default.
Fetch request timeout minutes	Configures the number of minutes DX will wait after a fetch request has been made before canceling the request.
Force direct read for all files	Allows setting direct read for <i>all</i> files moved to media. Direct read for only files marked is default.
Force moves when nothing to purge	Activates processing of move list when used space on extended drive exceeds purge start watermark and no files are written to purge list. Forced moves are disabled by default.
Prevent file delete	Prevents deletion of files when files cannot be deleted from associated storage media (write-once media). File deletion not prevented by default.
Prevent file modification	Prevents modification of files when files cannot be modified on associated storage media (write-once media). File modification not prevented by default.
Purge start watermark (drive percent full)	Sets the percentage of space on the extended drive that must be filled (used) before processing the purge list. Default is 95 percent full.
Purge stop watermark (drive percent full)	Sets the percentage of space on the extended drive that must be filled (used) before purge list processing stops. Default is 90 percent full.
Warn when free space is getting low (MB)	Allows DX to warn you when extended drive free space is getting low. Warning is disabled by default.
Defer fetch requests if fetch is disabled	Allows DX to defer rather than reject requests for files made when the Allow fetches from media schedule is inactive. Fetch requests are rejected by default.

Because management of the extended drive is critical to optimal performance of your DX system, we have devoted an entire chapter exclusively to configuration of the options available and other administrative tasks for the extended drive. For detailed information and procedures, see the Extended Drive Administration chapter of the DX2000 System Guide.

After the extended drive is created you can assign specific media to the extended drive through the media service(s). Adding media to the Available Media Pool for an extended drive is discussed in this section.

Starting the Extended Drive Wizard

To create a new extended drive:

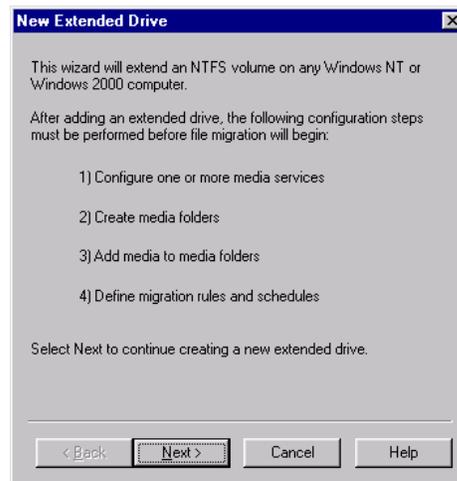
- 1 You have two options:
 - ↵ From the DX Administrator's Service menu, select New Extended Drive.
 - ↵ Click the New Extended Drive button on the toolbar.

Figure 2: New Extended Drive Toolbar Button



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

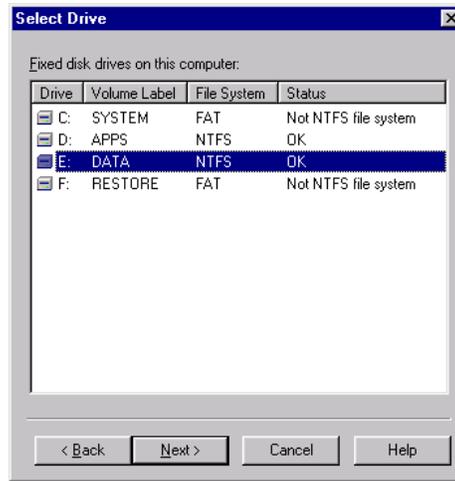
Figure 3: New Extended Drive Page



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

- 2 Click Next. The Select Drive page appears.

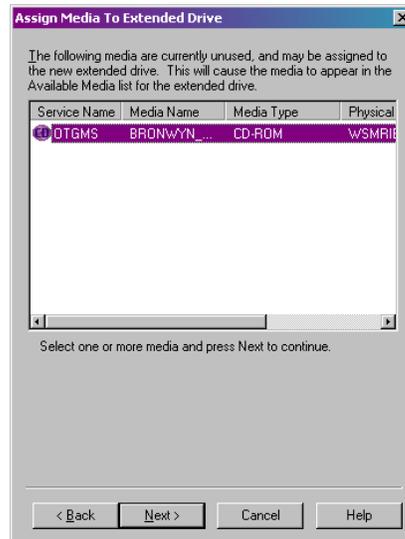
Figure 4: Select Drive Page



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.

- 3 From the Select Drive page, select the NTFS volume you want to extend and click Next.
- 4 If you have assigned media to a storage hardware management system, the Assign Media To Extended Drive page appears.

Figure 5: Assign Media To Extended Drive Page



The Assign Media To Extended Drive page lists all available media and allows you to assign that media to the extended drive being created. It includes the following information for each piece of available media:

- ↖ The type of media service controlling the media (OTGMS, NAS, TSM)
- ↖ The name of the media
- ↖ The type of media (optical, CD-ROM)
- ↖ The location of the media

- 5 Select the media you want to assign to the extended drive. If you do not want to assign media at this time, do not highlight any media.
- 6 Click Next. The Settings page appears.

The Settings page contains three buttons: Schedule, Drive Scan and Backup.

- ↖ Clicking Schedule takes you to the media activity scheduler, which allows you to configure a schedule for four media activities: Move files to media, Update copy media, Process scheduled media tasks, and Allow fetches from media.
- ↖ Clicking Drive Scan takes you to the drive scan scheduler, which allows you to configure regular drive scans for your extended drive. Regular Drive scans are *required* to migrate files with time delay attributes to move lists,

to remove files from media folders when media is removed from the media folders, and to ensure complete synchronization of the move list for all files due to be moved to media.

- ↪ Clicking Backup takes you to the extended drive backup scheduler, which allows you to set the location, frequency and timing for full and incremental backups of all data located on the extended drive. These backups can be used to restore extended drive data in the event of a system failure.

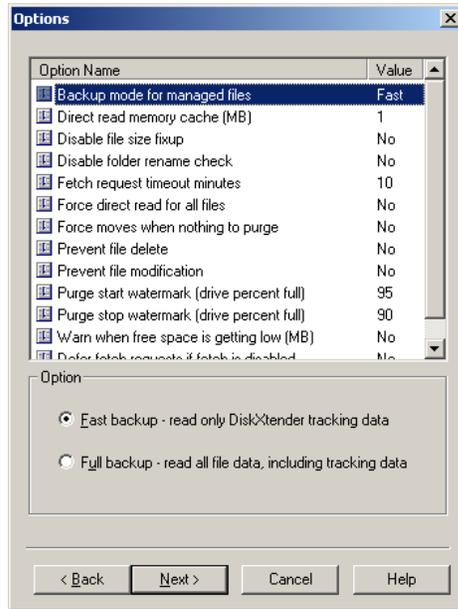
Figure 6: Extended Drive Settings Page



You may configure these schedules now or configure them later using the Properties option for the extended drive. For more detail on configuring extended drive settings, see the Extended Drive Administration chapter of the DX2000 System Guide.

- 7 Click Next. The extended drive Options page appears.

Figure 7: Extended Drive Options Page

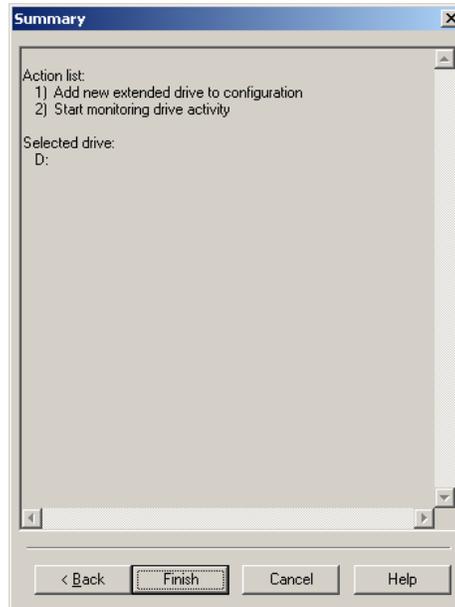


The extended drive Options page allows you to configure various file migration options for the files on your extended drive. The defaults for these options are listed in Table 4 on page 36. You may configure these options now or configure them later using the Properties option for the extended drive.

Proper configuration of these options is critical for optimal performance of your DX system. For a detailed discussion of each of these options, see the Extended Drive Administration chapter of the DX2000 System Guide.

- 8 Click Next. The Summary page appears.

Figure 8: Extended Drive Summary Page



The Summary page lists the settings you provided through the wizard.

- 9 Review the information in the Summary page. If you need to make changes, click Back. If the information is correct, click Finish.

After you have created your extended drive, DX displays a message prompting you to create a media folder for the extended drive.

Figure 9: Create Media Folder Message



You may create the media folder at this time or create the media folder later. Click Yes to start the create media folder wizard. For instructions, see *Creating Media Folders* on page 49.

ASSIGNING MEDIA TO EXTENDED DRIVES

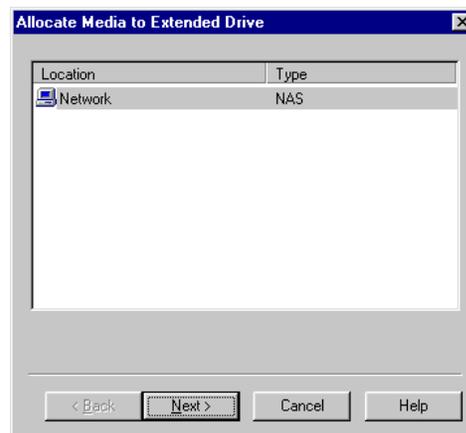
If you configured your media services after creating your extended drive, or if you did not assign media through the Extended Drive wizard, you must now assign the media in the media service to the Available Media pool for the extended drive to make it available for use.

To allocate media from the extended drive tree:

- 1 You have the following choices:
 - ✎ From the tree of the extended drive to which you want to allocate media, select the Available Media node. From the Edit menu, select Allocate media.
 - ✎ In the tree of the extended drive to which you want to allocate media, right-click the Available Media node. From the shortcut menu, select Allocate media.

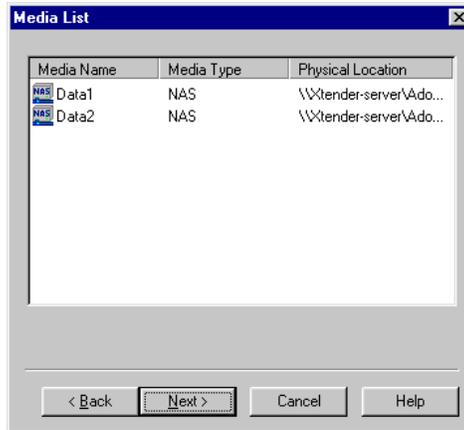
The media allocation wizard appears, starting with the Allocate Media to Extended Drive page.

Figure 10: Allocate Media to Extended Drive Page



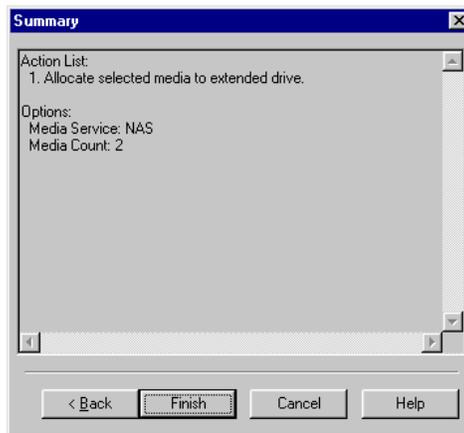
- 2 From the list of media services, select the media service containing the media that you want to allocate. Click Next. The Media List page appears.

Figure 11: Media List Page



- From the list of media, select the media that you want to allocate to the extended drive. (You can use a standard Windows <Shift> or <Ctrl> technique to select more than one piece of media.) Click Next. The Summary page appears.

Figure 12: Summary Page



- Review the information that you have provided to the wizard. If the information is correct, click Finish. A progress message appears.

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

drive tree can be assigned to media folders. For information, see the *Media Folders* section below.

MEDIA FOLDERS

After an extended drive has been created and media has been added to the extended drive, you can create media folders to organize files on the drive. On the computer on which DX is installed, the DX extended drive is an actual physical volume on the computer. Media folders created in DX are actual physical folders on that drive. Through Windows Explorer, each media folder created through DX looks like a normal folder you might create through Explorer. The media folder appears as part of the drive's directory structure.

Media folders are called such because within DISKXTENDER you assign media to a folder so that files saved in the folder on the extended drive can be moved to that media. What you are doing when you create a media folder is creating an association between the real folder on the hard drive volume and the pieces of storage media you add to the folder in DX.

You can create a media folder in DX using a folder that already exists on the extended drive, or create a new folder on the extended drive. You can also assign media to the media folders when you create them or create media folders and add media to the folders later.

Once a media folder has been created, it appears in both DISKXTENDER and in Windows Explorer. In Explorer, it appears as a folder on the drive. In DX, the media folder appears as a node under the extended drive. Under the media folder in DX you will see additional nodes representing the DX components that can be created for each media folder to enable file migration and space management.

Media must be added to the media folder in DX before files in that folder can be written to media. Once added to a media folder, a piece of media is reserved for that media folder's files. No two media folders can share the same piece of media. Original media, which appears in the Available Media list, can be added to any folder in an extended drive.

MEDIA FOLDER CREATION CONCEPTS

Before creating your media folders you may want to decide how you want your extended drive directories structured, particularly if you plan to have multiple media folders on your extended drive, and especially if you plan to have multiple levels of media folders (directories with one or more sub-directories).

If you plan to use multi-level directory structures for your DX files, you will also have to determine if you want to migrate the files for each folder and subfolder separately to different pieces and/or types of media, or if you will move all of a given directory's files and subfolders using the same criteria.

Establishing how you will want directories, files and subfolders migrated to media will tell you how many media folders you will need to create, and how you will ultimately set up your media, move groups, and move rules for those media folders.

Planning Extended Drive Directory Structure for File Migration

If you want to create rules that only apply to media in folders farther down the directory tree than the root, you will need to create additional media folders. This allows you to create move, purge, and delete rules separately for those specific folders.

Any rules created for the root media folder can apply either to only the files within that directory or to the files within that directory and all subfolders of that directory. For example, viewing your extended drive through Windows Explorer, you have a /REPORTS/ folder that is a DX media folder and within that folder you have subfolders for each month (/JAN/, /FEB/, etc). You could set up DISKXTENDER to migrate only files saved in the /REPORTS/ root to storage media or you could set up DISKXTENDER to migrate all files and all subdirectories in the /REPORTS/ folder to storage media.

You could not, however, create a move rule in the /REPORTS/ folder that would move files saved in the /REPORTS/ root and files only in the /MAR/ folder. You would need to create a media folder in DX using the existing /MAR/ folder and then create a separate move rule in that folder. To keep non-DX files separate from DX files, you may wish to create separate folders on the extended drive to hold files you do not want managed by DISKXTENDER.

Files can all be stored in one media folder, or they can be divided into multiple media folders if segregation of data is necessary. The number of files or directories that can be placed in an extended drive depends on the size of the NTFS volume. Although it is possible, it is not recommended to exceed 16,000 files per directory.

As with any file system, doing so will impede system performance, placing greater demands on memory and processors, and yielding a slower response time to the client. As the number of files increases in a single directory, the potential for a workstation error when connecting or browsing directories on the extended drive increases.

Planning Media Directory Structure for File Migration

When creating the directory structure on the extended drive, it is important to consider both the file structure being created on the extended drive, and the directory structure that will be created on the piece of media.

The directory structure that will appear on the media when files are migrated is identical to the structure that appears on the extended drive except that the root media folder will not appear on the media.

For example, you create a media folder /REPORTS/ on the extended drive. Within that media folder, there are subfolders (that are not specifically configured as DX media folders) for each month (/JAN/, /FEB/, /MAR/, etc.). The move rule you have established for the /REPORTS/ media folder migrates all files and subfolders to media. On the extended drive, your directory structure and files would look like this:

```
↵ E:\REPORTS\YEAREND.DOC
↵ E:\REPORTS\JAN\ACCOUNTS.DOC
↵ E:\REPORTS\FEB\ACCOUNTS.DOC
↵ E:\REPORTS\MAR\ACCOUNTS.DOC
```

However, on the media, the directory structure and files would look like this:

```
↵ YEAREND.DOC
↵ \JAN\ACCOUNTS.DOC
↵ \FEB\ACCOUNTS.DOC
↵ \MAR\ACCOUNTS.DOC
```

Notice that the root media folder name is not migrated with the media. It is for this reason that a given piece of media can only be assigned to one instead of multiple media folders. It is also for this reason that we recommend you label your media in such a way that corresponds with the media folder to which it is or will be assigned.

Keeping track of what folder's files have been migrated to what media is particularly important if media is removed then re-added to media folders. When media is added to a media folder, any existing files on that media are restored to the media folder on the extended drive (making those files available if necessary). If the media contains files with names that duplicate the names of files already resident in the media folder, the resident files are overwritten if the duplicate files on the media are newer. This is why organizing the directory structure for both your extended drive and your media is important to consider before creating the media folders and adding media to them.

CREATING MEDIA FOLDERS

Creating a media folder in DISKXTENDER creates an association between a physical directory on the extended drive, and the media to which the files saved in that directory should be moved. In addition, in the DISKXTENDER interface, creating a media folder activates the options for creating the media folder components (move groups, move rules) that will ultimately allow migration of files from the folder to storage media.

You have the option of creating media folders and adding media to them separately, or you may create media folders while adding media to the media folder. To choose the second option, you must have at least one piece of media in the Original node of the extended drive.

To create a media folder without media:

1 You have the following options:

- ↳ In the tree view, select an extended drive. From the Edit menu, select Create Media Folder.
- ↳ Right-click an extended drive. A shortcut menu appears. From the shortcut menu, select Create Media folder.

The Create Media Folder dialog box appears.

Figure 13: Create Media Folder Dialog Box

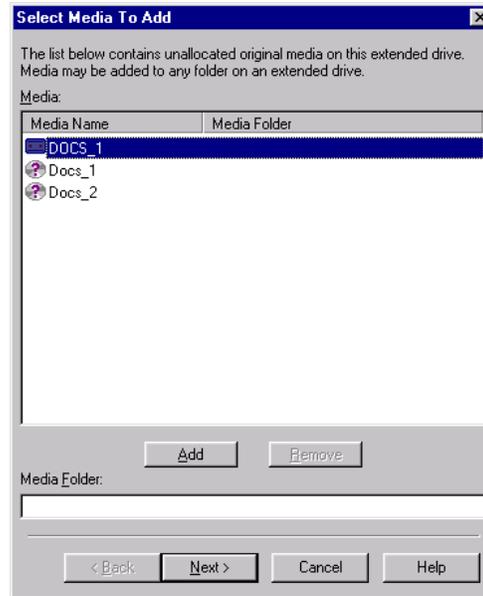


- 2 You have the following choices:
 - ↳ To create a new folder on the extended drive, type the media folder name in the Enter Folder Name text box.
 - ↳ To use a folder that already exists on the extended drive as a media folder, click Browse. The Select Folder page appears. Select the folder and click OK. The folder name appears in the Enter Folder Name text box.
- 3 Click OK. The media folder is added to the Extended Drive tree under the extended drive.

To create a media folder with media:

- 1 You have the following choices:
 - ↳ In the tree view, select an extended drive and select Add Media to Media Folders from the Edit menu.
 - ↳ Right-click an extended drive and select Add Media to Media Folders from the shortcut menu.The Select Media To Add page appears.

Figure 14: Select Media To Add Page

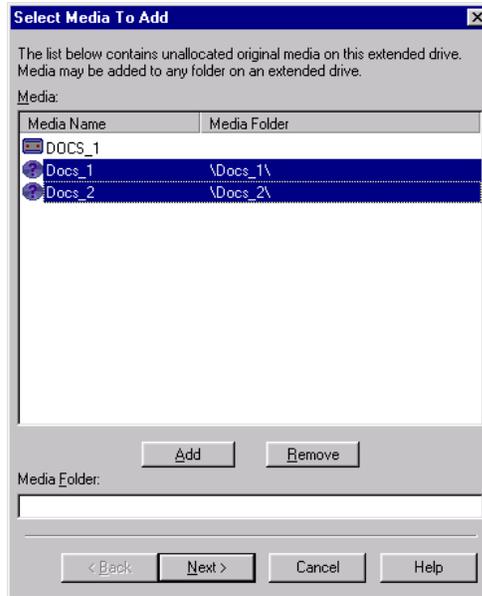


The Select Media To Add page lists all Original media available for assignment to media folders. This box also allows you to select multiple pieces of media, which creates multiple media folders (each named after the piece of media used to create them).

2 You have three choices:

- ↪ To create a media folder (or folders) with the same name as the media, select the media and click Add. The media folder name appears to the right of the media.
- ↪ To create a media folder with a different name than the media, type the name of the folder in the Media Folder text box, select the media you want added to that folder and click Add. The media folder name appears to the right of the media.
- ↪ To add the media to an existing folder, type the name of the folder in the Media Folder text box, select the media you want added to that folder and click Add. The media folder name appears to the right of the media.

Figure 15: Select Media to Add Page

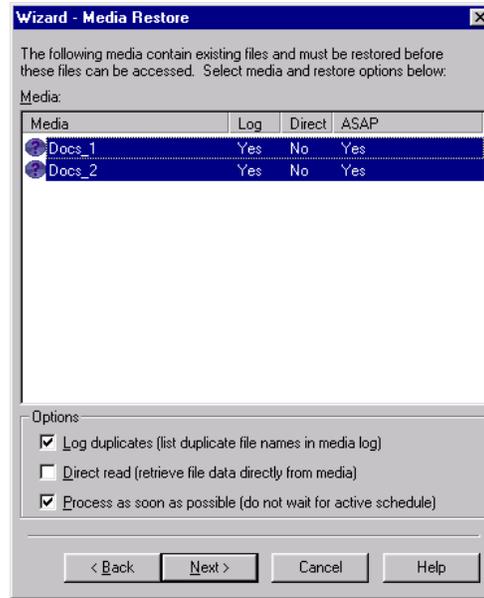


NOTE 

If you select two pieces of media that have the same name (regardless of capitalization), only one media folder, with that name, will be created and both pieces of media will be assigned to that folder.

- 3 Click Next to continue. The Media Restore page appears.

Figure 16: Media Restore Page



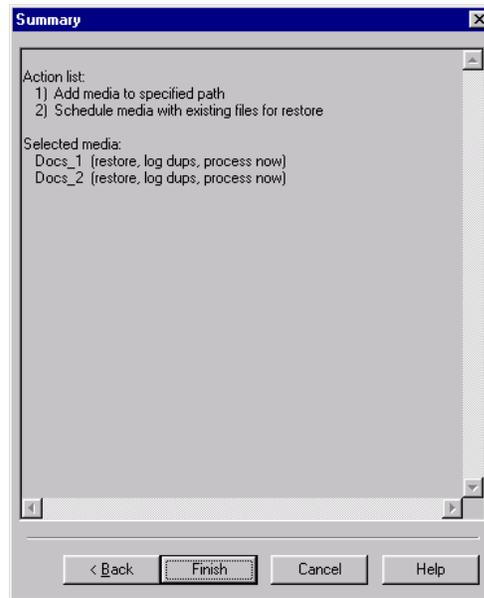
The Media Restore page options are only active if the media you are adding to media folders contain files that must be restored to the extended drive. Those options are as follows:

Table 6: Wizard - Media Restore Page Options

OPTION:	DESCRIPTION:
Log Duplicates	Enable this option to keep a count of files on the media that duplicate files already on the extended drive when restoring.
Direct Read	Enable this option to apply the direct read attribute to all restored files. Direct read means that when accessed by a client, the file will be read directly from media rather than fetched to the extended drive and read from there.
Process ASAP	Enable this option to restore the media immediately, rather than as a scheduled Media Restore task (according to the Process scheduled media tasks media activity schedule).

- 4 If available, configure the restore options for restoring files to the media folder on the extended drive and click Next. The Summary page appears.

Figure 17: Summary Page



- 5 Review the information in the Summary page and click Finish.

When new folders are created, these folders appear in the extended drive tree in the Administrator and through Explorer on the extended drive. In DX, the media selected in the wizard appears in the Media node underneath the media folder in the Administrator.

ADDING MEDIA TO A MEDIA FOLDER

Adding media to a media folder makes that media available for addition to move groups in that folder and ultimately for storage of files saved to that folder on the extended drive. You can add both previously unused media and media with existing files to a media folder. When media with existing files is added to a media folder those files must be restored in order to make them accessible to clients. For more information, see *File Restore* below.

File Restore

When media is added to a media folder in DX, file tags for any files already existing on the media are copied to that folder on the extended drive. This is called File Restore.

File restore makes files on media available for access through DISKXTENDER by placing tags on the extended drive that point to the files on the media. File tags contain information about the file including name, file size, age and other attributes that define the file. The file tag allows the file to appear as if the file is resident on the extended drive, but the file data remains on the media.

When files and directories are restored to the extended drive, file tags and directory structures are created in the media folder on the extended drive. File data is moved to the hard drive when a client requests the file, unless the Direct Read option is selected. If the restored files are marked for Direct Read, upon request from a client, the file data is read directly from the media rather than fetched to the extended drive.

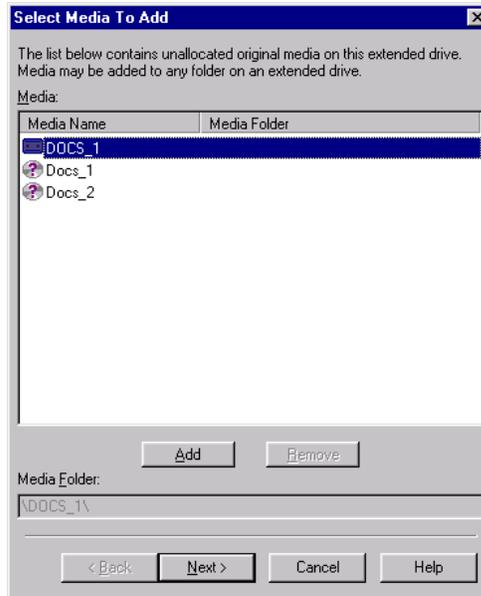
Adding Media to Existing Media Folders

Adding media to media folders is done through a wizard. The Add Media wizard allows you to add media to an existing media folder or create a media folder and add the media simultaneously. For instructions on creating media folders and adding media simultaneously, see *Creating Media Folders* on page 49.

To add media to existing media folders:

- 1 You have the following choices:
 - ↳ Drag the media from the Original node under the extended drive's Available Media node to a media folder (or to the Media node under the media folder). A message appears, prompting you to confirm the addition of the media to the media folder. Click Yes. Since you have already selected the media to add, the Add Media wizard appears, starting with the Media Restore page. Skip to step [REF_Ref484573243](#) to continue.
 - ↳ Right-click the Media node under a media folder and select Add Media from the shortcut menu. The Add Media wizard appears, starting with the Select Media to Add page.

Figure 18: Select Media To Add Page

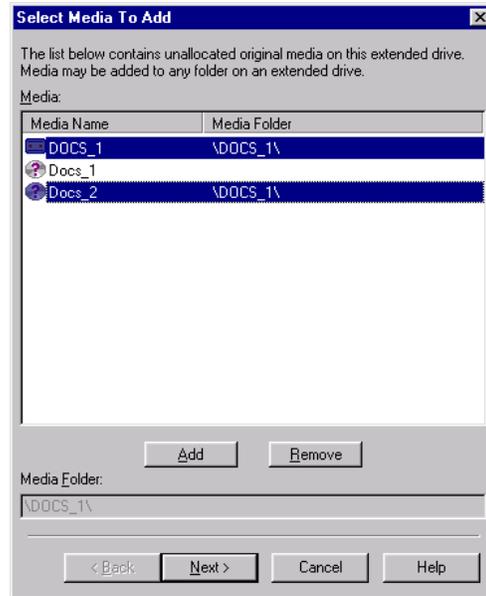


The Select Media to Add page lists all available media that can be assigned. Notice that the Media Folder text box at the bottom is grayed out but contains the media folder you selected in the Administrator for adding media.

- 2 You have the following choices:
 - ↵ Double-click a piece of media.
 - ↵ Select one or more pieces of media and click Add.

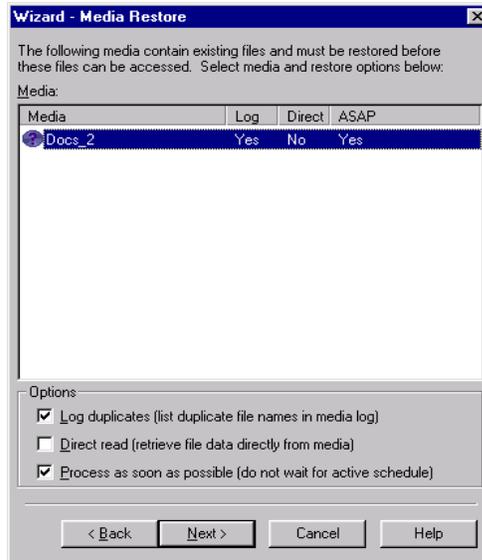
The media folder appears to the right of the selected media in the Media list.

Figure 19: Select Media To Add Page



- 3 When the media folder appears to the right of every piece of media you want to add to the media folder, click Next. The Media Restore page appears.

Figure 20: Media Restore Page



Media restore options are only active if the media you are adding to the media folder contains files. For details on what the media restore function does, see *File Restore* on page 55.

- 4 Set the appropriate restore options for any media that currently contains files. Those options are as follows:

Table 7: Wizard - Media Restore Page Options

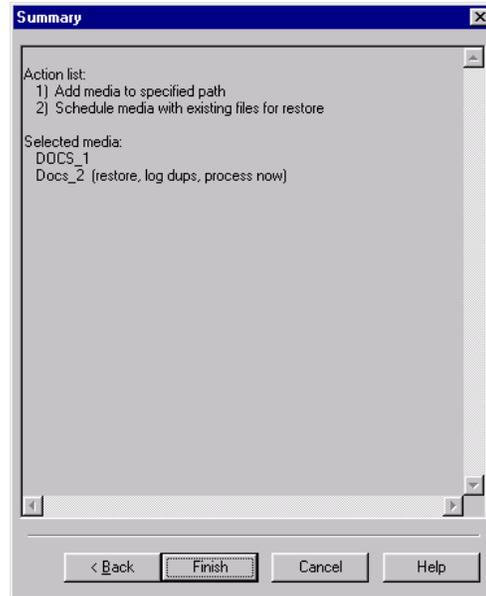
OPTION:	DESCRIPTION:
Log Duplicates	Enable this option to keep a count of files on the media that duplicate files already on the extended drive when restoring.
Direct Read	Enable this option to apply the direct read attribute to all restored files. Direct read means that when accessed by a client, the file will be read directly from media rather than fetched to the extended drive and read from there.
Process ASAP	Enable this option to restore the media immediately, rather than as a scheduled File Restore media task (according to the Process scheduled media tasks media activity schedule).

NOTE 

The Process scheduled media tasks schedule is accessed through the Extended Drive properties. For more information on configuring this schedule, see the *Media Activity Scheduler* section on page 219.

- 5 Once restore options have been set, click Next. The Summary page appears.

Figure 21: Summary Page



The Summary page displays the media that will be added to the media folder and the media restore options selected, if applicable.

- 6 Review the information in the Summary page. If the Summary Page information is correct click Finish. The media is added to the media folder.

Once you have created your media folders and added media to them, you can create move groups to subdivide the media in the media folders. For instructions, see *Creating Move Groups* on page 61.

MOVE GROUPS

Move groups are specific groupings of media within a media folder. When you set up a move rule for a set of files, you point to the move group that contains the media to which you want to move those files.

To use media assigned to a media folder for file migration, that media must be assigned to a move group within that media folder. Assigning media to different move groups in a media folder allows you to subdivide media within a media folder for separate uses.

By assigning media to move groups, you can control to which set of media files will be written and to where. This can be useful if segregation of data is necessary. For example, if you wish to separate files from different months onto different pieces of media within a media folder, you can create a move group for each month. Separate media can be assigned to each move group so files for different months are not stored on the same media.

For example, there might be a media folder, `\ACCOUNTS\`, with several pieces of media in the folder. One set of the media could be assigned to a move group called January, and another set of the media could be assigned to a move group called February. By targeting different move groups, you could create move rules that move the file `\ACCOUNTS\JAN\REPORT.DAT` to one set of media and write the file `\ACCOUNTS\FEB\REPORT.DAT` to another set. A move rule for `\ACCOUNTS\JAN*.*` could target the January move group, and one for `\ACCOUNTS\FEB*.*` could target the February move group.

Because media is first assigned to a media folder, the only media available when assigning media to a move group are media in that media folder. For example, if you create a media folder `\JAN\` and assign media to it, that media can only be used by a move group in the `\JAN\` media folder.

NOTE

Move groups can contain only writable media. CD-ROM media, for example, is not available to be assigned to a move group because it is read-only.

CREATING MOVE GROUPS

DISKXTENDER has a wizard to lead you step-by-step through the move group creation process. Several pages of the Wizard lead you through the Move Group Properties windows. This allows you to configure your move group properties at the time you create the move group. You can also access and change these configurations later. Unless you make changes to the options when creating your move group, the defaults for each option are as follows:

Table 8: Move Group Options Defaults

OPTION:	DEFAULT SETTING:
Library mount – minimum free space on media	Sets the minimum amount of free space that must be on a piece of media in order to be mounted for file migration. Default is 32 KB.
Library mount – minimum number of files	Sets the minimum number of files due to be migrated before library media will be mounted. Default is 1.
Library mount – maximum number of media	Sets the maximum number of that group’s media that will be mounted at one time for migration of files. Default is 1. Default should not be changed if Sequential fill method option is selected.
Maximum write errors before media writes disabled	Allows for disabling media writes if a specified number of write errors occurs for a piece of media. Default does not disable media.
Media fill method	Sets media fill method to random (first available media is written to) or sequential (media is written to in the order in which it appears in the move group). Default is sequential fill.
Remove media when free space falls below __ MB	Allows a piece of media to be removed from a move group when the amount of free space on the media falls below a specified number of megabytes. Default does not remove media.
Warn when group space falls below __ MB	Instructs DX to enable a warning when the amount of free space for all media in the move group falls below a specified number of megabytes. Default does not send a warning. System warnings are transformed into alerts using the Alerts tab in the Service Properties dialog box.

For detailed information on managing the properties and options for your move groups see *Chapter Three: Managing File Migration* on page 83.

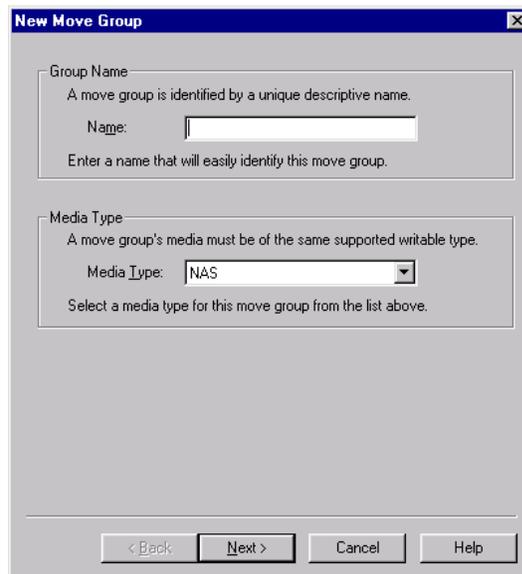
Starting the Move Group Wizard

This section describes how to start the move group wizard and briefly describes how to configure the New Move Group page.

To start the move group wizard:

- 1 Right-click on the Move Groups node under the appropriate media folder and select New from the shortcut menu. The Move Group wizard appears, starting with the New Move Group page.

Figure 22: New Move Group Page



The screenshot shows a dialog box titled "New Move Group" with a close button (X) in the top right corner. The dialog is divided into two main sections. The first section is titled "Group Name" and contains the text "A move group is identified by a unique descriptive name." Below this is a label "Name:" followed by an empty text input field. Underneath the input field is the instruction "Enter a name that will easily identify this move group." The second section is titled "Media Type" and contains the text "A move group's media must be of the same supported writable type." Below this is a label "Media Type:" followed by a dropdown menu currently showing "NAS". Underneath the dropdown is the instruction "Select a media type for this move group from the list above." At the bottom of the dialog, there are four buttons: "< Back", "Next >", "Cancel", and "Help".

- 2 In the Name text box, enter a name for your move group. Try to use a name that will identify what media the move group will be using, and if possible describe the kinds of files that will be moved to this move group's media.
- 3 From the Media Type drop-down list, select the type of media that will be assigned to the move group. Each move group can contain only one type of media.
- 4 Click Next. The Media page appears.

Configuring the Move Group Wizard Media Page

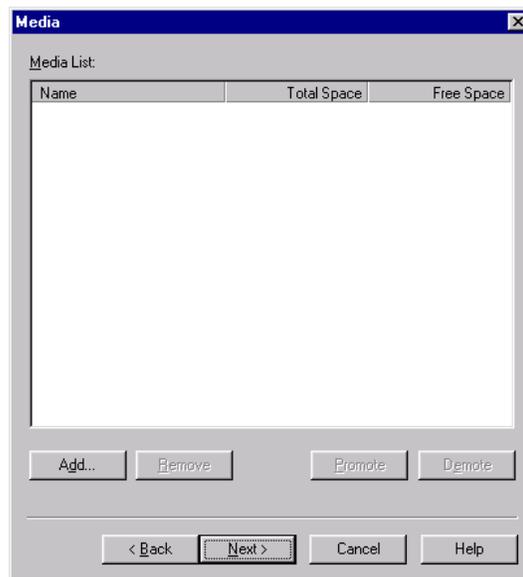
When the Media page appears, it is empty, because no media has been added to the move group. The Media page allows you to add media to the group, if you want to do so at this time.

If you are planning a basic file migration setup, we recommend you add all your available media (of the same type) to the move group at this time. You may remove it later if necessary.

NOTE

You may create the move group without media and add it later, however you will not be able to move files until media is added to your move group.

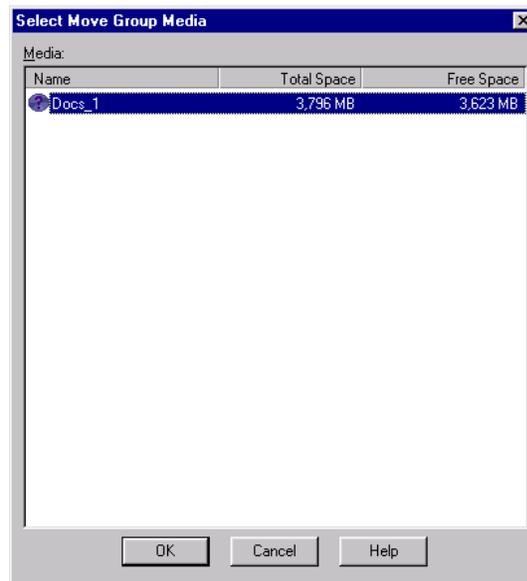
Figure 23: Move Group Media Page



To continue the move group wizard:

- 1 You have two choices:
 - ↪ If you do not want to add media to the move group at this time, click Next. A warning message appears informing you the move group will be created with no media. Click OK to continue. The move group Options page appears.
 - ↪ If you want to add media to the move group, click Add. The Select Move Group Media dialog box appears.

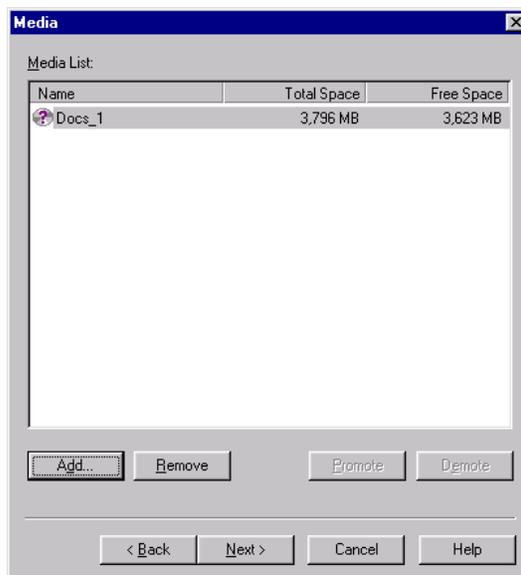
Figure 24: Select Move Group Media Dialog Box



The Select Move Group Media dialog box lists all media assigned to the media folder that corresponds to the media type selected in the New Move Group page of the wizard.

- 2 Select the media you want to add to the move group and click OK. (You can use a standard Windows <Shift> or <Ctrl> technique to select more than one piece of media.) The Media page reappears with the media listed.

Figure 25: Move Group Media Page

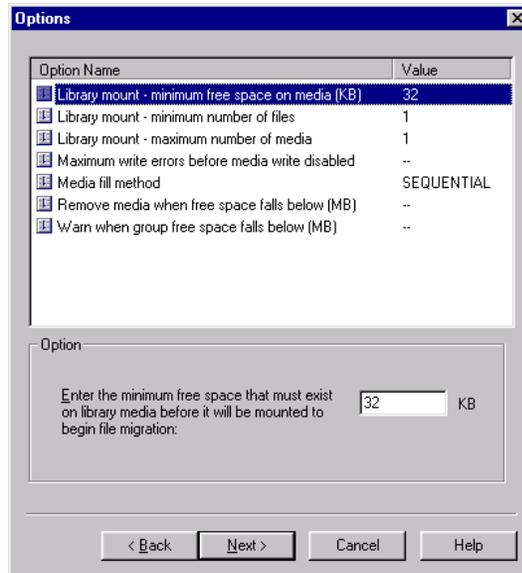


- 3 Click Next. The move group Options page appears.

Configuring the Move Group Wizard Options Page

The move group Options page allows you to configure various options for your move group and its media. For an overview of the available options, see Table 8 on page 61. A detailed explanation of the move group options can be found in the *Move Group Properties* section beginning on page 86.

Figure 26: Move Group Options Page



To continue the move group wizard:

- 1 Configure the options as appropriate (or leave the default settings). You may change these settings later, if necessary.
- 2 Click Next. The Automation page appears.

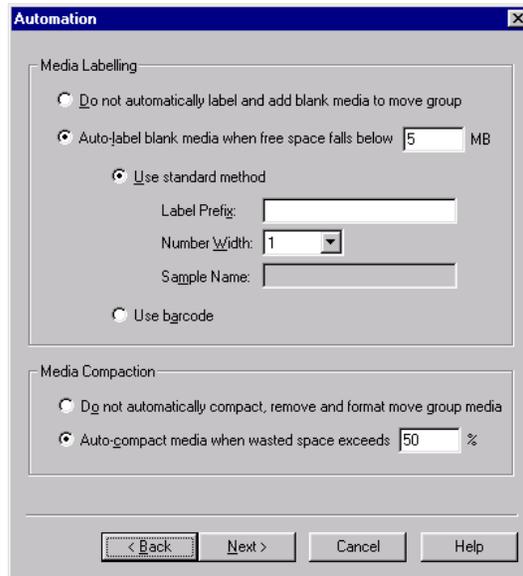
Configuring the Move Group wizard Automation page:

The Automation page allows you to configure automatic labeling and addition of blank media to the move group. You can also set automatic media compaction to occur.

NOTE 

If your move group media type does not allow automatic labeling of media (example: NAS) these options will be grayed out.

Figure 27: Move Group Automation Page

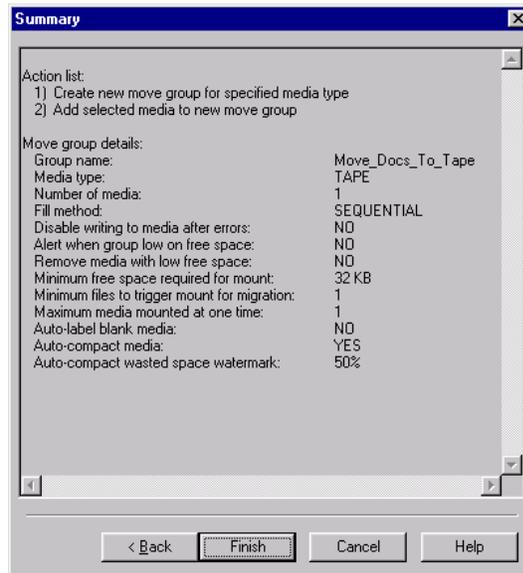


Detailed information about configuring automatic labeling and compaction for your move group can be found in the *Move Group Properties* section beginning on page 86.

To complete the Move Group wizard:

- 1 Configure the move group automation settings as appropriate and click Next. The Summary page appears.

Figure 28: Move Group Summary Page



The Summary page lists all the move group configuration information you provided through the wizard.

- 2 Review the information in the Summary page. If the information in the Summary page is correct, click Finish. The move group is created and appears in the Move Group node of the media folder.

Once you have created your move groups, you can create move rules. Move rules determine what files are written to the media in selected move groups. For instructions, see *Creating Move Rules* on page 71.

MOVE RULES

Move rules are designed to allow you to configure, very specifically, what files in a media folder will be moved to what media. You can configure file movement based

on file age, file extension, file attributes, and file size. At least one move rule must exist before files can be migrated to media.

The following options are available during creation (and later management) of your move rules:

Table 9: Move Rule Configuration Options

WIZARD PAGE/ PROPERTIES TAB:	OPTIONS:	DESCRIPTION:
File Name	Media Folder	Which folder contains the files to which you want to apply this move rule.
	Include Subfolders	Move only the files in the selected media folder or the files in all the subfolders in the media folder.
	File Name	Which files in the selected folder you want to move to media. (For example: all files: *.*; only bitmaps: *.BMP)
Size	Any Size	Move files of any size.
	Exclude files smaller than __	Do not move files smaller than the specified size.
	Exclude files larger than __	Do not move files larger than the specified size.
Attributes	Any	Move files regardless of attributes.
	Exclude files with selected attributes	Do not move files if they have the selected attributes. Useful for excluding system files from move. (Though if avoidable, you should <i>never</i> use a system drive as your DX extended drive.)
Age	Any	Move files regardless of age.
	Exclude files with an age less than __ days	Do not move files until the specified number of days has passed since the selected file action.
	Since: (file action)	The action from which the age of files is determined for exclusion – Create time, Last access time, Last write time.

WIZARD PAGE/ PROPERTIES TAB:	OPTIONS:	DESCRIPTION:
Settings	Move Group to Receive files	Which move group (group of media) will receive these files when moved.
	Set Direct Read	Mark these files to be read directly from media when requested by a client (after the file data is purged).
	Purge immediately after move	Purge these files (remove file data) from the extended drive as soon as they are moved to media.

There are a number of things you should consider when determining which of these options to set for your move rules.

For example, if you are using optical media, you may want to set up an age restriction from Last write time in your move rule because of the way files are written to optical media. This limits the number of times frequently changing files are written and rewritten to the media.

You can also configure specific move rules to target very large files for move and immediate purge, in order to efficiently clear space from the extended drive. In addition, if your move group contains NAS media, you may want to set the direct read option for those files, because file retrieval from NAS is faster than with other kinds of media. When a client requests one of these files in the future, the file is read directly from the media rather than being fetched to the extended drive first, helping you maintain extended drive space.

When files qualify for move based on the configurations you set in the move rule, they are added to the move list, either during a drive scan (if an age delay is set) or at the time the file is saved to the media folder on the extended drive. The move list for each extended drive is constructed based on the move rules you create.

The contents of the move list dictates what files are moved to media. The move list is processed and files are moved to media whenever the Move files to media activity schedule is active. For more information on scheduling the Move files to media activity, see *Scheduling Movement of Files* on page 80.

When a file is written to a media folder on the extended drive, DX checks the file against the criteria of the move rules for that folder. If the file matches the criteria under one of the move rules, DX attaches a DX file attribute to the file. The file

attribute indicates that the file qualifies for movement to media and, if applicable, the particular file age the file must reach before migration.

If the file qualifies for migration to media under a move rule that *does not* have a file age exclusion specified, DX immediately adds the file to the move list. If the file qualifies for migration to media under a move rule that *does* have a file age exclusion specified, DX adds the DX attribute to the file but does not add the file to the move list until the next extended drive scan.

When a drive scan is run, the existing move list is discarded and DX builds a new list based on the DX attributes it finds on the files saved in the media folders on the extended drive. Every file in a DX media folder is checked when an extended drive scan occurs. If you configure a time delay in your move rules, you *must* periodically scan the extended drive to be sure that files initially excluded from the move list because of age are added to the list after they reach the correct age for migration.

In addition, file-sharing issues or sharing violations can prevent files from being added to the move list when appropriate. DX must have full access to the 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.

It is for this reason that proper configuration of your Drive Scan schedule is a critical part of making sure files are moved to media when appropriate. If drive scans are permanently disabled, files that qualify for movement to media after a certain time delay, or those that had a sharing violation when they originally became eligible, will *never* be written to the move list and therefore never moved to media. Drive scans are required to capture these files and regenerate the move list for movement of files to media. For information on scheduling regular drive scans for your extended drive, see the Extended Drive Administration chapter of the DX2000 System Guide.

CREATING MOVE RULES

Once move groups have been created for an extended drive, you can establish move rules to regulate the movement of files to the media in those move groups. A move rule contains the instructions that DISKXTENDER will follow when choosing which files to move to a particular piece or group of media.

When you create a move rule, you specify a particular directory's files be moved, then further restrict the set of files by file extension, by file size and file attributes. File age can be used to determine when files are moved.

Each move rule points to a move group as the target location for file migration. Before you can create a move rule to move files from an extended drive to media, you must create a move group to establish a group of media to which to move the

files. You may create the move groups separately before creating the move rules, or you can create the move group from within the Move Rule Wizard.

The Move Rule Wizard leads you through the step-by-step process of creating and configuring a move rule. Several pages of the wizard lead you through the Move Rule Properties windows. This allows you to configure your move rule properties at the time you create the move rule. You can also access and change these configurations later, if necessary.

For clarity and speed, the following procedures for creating move rules do not cover these configurations in detail. For a discussion of each of the Move Rule Properties pages, see *Move Rule Properties* on page 108.

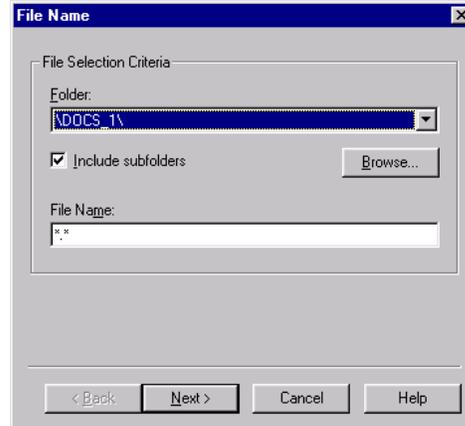
Starting the Move Rule Wizard

This section describes how to start the move rule wizard and briefly describes how to configure the File Name page.

To start the move rule wizard:

- 1 Right-click the Move Rules node under the appropriate media folder and select New from the shortcut menu. The Move Rule wizard appears, starting with the File Name page.

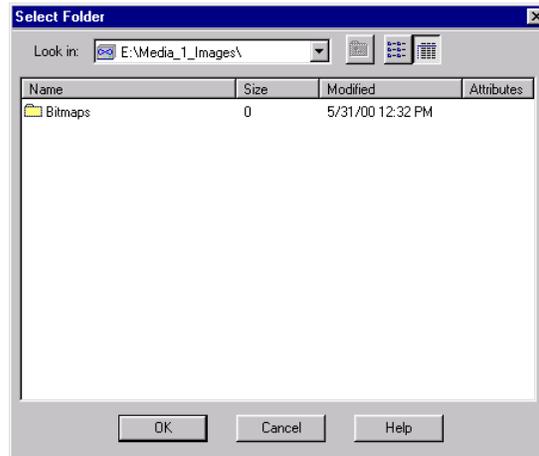
Figure 29: File Name Page



The File Name page allows you to define the location and extension for the files to be moved.

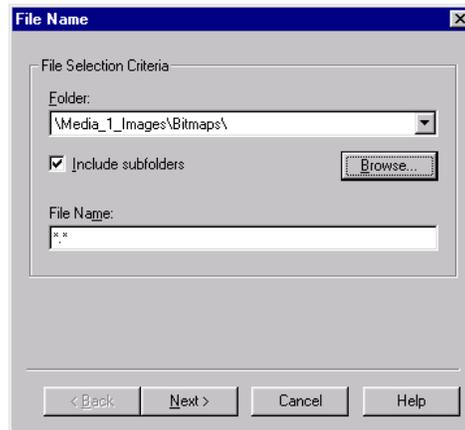
- 2 Select the Folder containing the files for which you want to configure this move rule. The active media folder is listed by default. To select a subfolder of the media folder, click Browse. The Select Folder dialog box appears.

Figure 30: Select Folder Dialog Box



- 3 Select the subfolder to use for the move group and click OK. The file path appears in the Folder box of the File Name page.

Figure 31: File Name Page



NOTE 

You cannot include more than one selected subfolder of the media folder in a single move rule. You can include either one or all subfolders only. To move files in a different subfolder, create a second move rule.

- 4 Enable or disable the option to include all subfolders in the folder listed in the Folder text box.
- 5 In the File Name text box, enter the file specification to determine which files are to be moved using this move rule. For example, entering * .DOC will apply this move rule to all files in the specified media folder with a DOC extension.

NOTE 

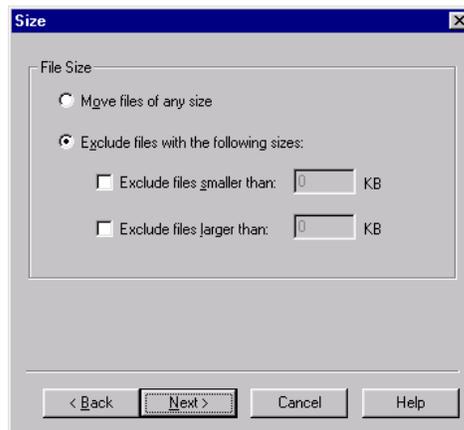
Only one specified file extension can be configured per move rule. To move files of a different specified extension in the same folder, create a second move rule. For more information on using wildcards to designate specific file names for move, see *The File Name Tab* section beginning on page 109.

- 6 Click Next. The Size Page appears.

Configuring the Move Rule Wizard Size Page

The Size page allows you to choose configure a specific size range for the files affected by the move rule, or to move qualifying files of any size.

Figure 32: Size Page



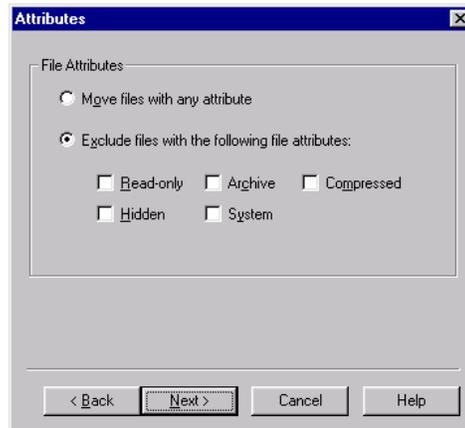
To continue the move rule wizard:

- 1 You have the following choices:
 - ↗ To move files of all sizes, select Move files of any size.
 - ↗ To configure a file size range for exclusion from the move rule, select the Exclude files with the following sizes option, enable the appropriate checkboxes, and enter the sizes as appropriate.
- 2 Click Next. The Attributes page appears.

Configuring the Move Rule Wizard Attributes Page

The Attributes page allows you to exclude movement of files with the specified attributes, or to move qualifying files with any attribute.

Figure 33: Attributes Page



To continue the move rule wizard:

- 1 You have the following choices:
 - ↗ To move files regardless of attributes, select Move files with any attribute.
 - ↗ To exclude files with particular attributes, select Exclude files with the following file attributes and then enable the options for the attributes for files that should *not* be moved.

WARNING

Attributes for existing files can be viewed through Windows Explorer. When extending a system drive, be sure to exclude files with the System attribute to prevent operating system file purge. Extending a system drive with DX is *not recommended* and may cause severe operating system damage.

- 2 Click Next. The Age page appears.

Configuring the Move Rule Wizard Age Page

The Age page allows you to move files of any age or exclude files of a particular age.

Figure 34: Age Page



To continue the move rule wizard:

- 1 You have the following choices:
 - ↗ To move files regardless of age, select Move files with any age.
 - ↗ To exclude files within a particular age range, enable the Exclude files with an age less than option, and then enter the number of days that must elapse before a file is moved. Set the date from which that file age is calculated by selecting one of the following options from the Since drop-down list: Create time, Last write time, Last access time.
- 2 Click Next. The Settings page appears.

Configuring the Move Rule Wizard Settings Page

The Settings page allows you to specify the move group (group of media) to which files will be moved. This window also allows you to enable the direct read and purge after move options.

Figure 35: Settings Page



To continue the move rule wizard:

- 1 From the Move Group To Receive Files dropdown list, select the name of the target move group to which you want files to be moved.

NOTE 

You may create a new move group to receive files for this move rule by clicking New. This opens the Move Group Wizard. For instructions on creating move groups using the wizard, see *Creating Move Groups* on page 61.

- 2 Enable or disable move options. The following table describes each option:

Table 10: Settings Page Move Options

OPTION:	DESCRIPTION:
Mark file for direct read after move	Enabling this option sets the direct read attribute to all files moved to media under this move rule. The direct read attribute means that when requested by a client, a file (whose data has been purged) is read directly from the media rather than being fetched to the extended drive first and read from there.
Purge files immediately after move	Enable this option to immediately purge file data for all files moved to media under this rule. Purging files removes file data from the extended drive while leaving behind a file tag containing the file attributes.

NOTE

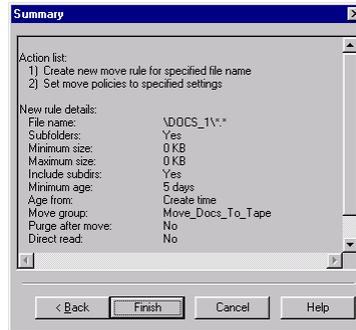
Purge rules for files can be configured separately if purging after move is not appropriate for all files that qualify for this move rule. For details on creating separate purge rules, see *Creating Purge Rules* on page 143.

- 3 Click Next. The Summary Page appears.

Completing the Move Rule Wizard

The Summary page allows you to review the information that you have provided through the wizard. If necessary, you can click Back to make changes on a previous page.

Figure 36: Summary Page



To complete the move rule wizard:

- Review the information in the Summary page. If the information in the summary is correct, click Finish. The move rule is created and appears in the Move Rule node after the media folder.

Please remember, if you have age delays configured in any of your move rules, you *must* run regular drive scans in order to write those qualifying files to the move list. In addition, DX cannot write files to the move list if doing so would cause a sharing violation (i.e., a user or program has a file open). Regular drive scans ensure that *all* appropriate files are written to the move list, and thereby moved to media when the Move files to media schedule is active. In order to be sure that regular drive scans are run, we highly recommend that you set a schedule for extended drive scans.

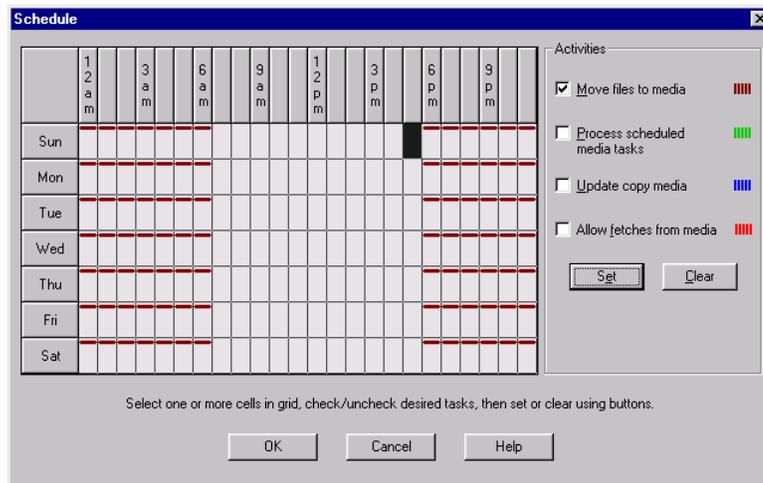
For information on setting up your extended drive scan schedule, see the Extended Drive Administration chapter in the DISKXTENDER System Guide.

SCHEDULING MOVEMENT OF FILES

Each DX extended drive has its own scheduling capability that allows you to set up specific processing schedules for media activities. This scheduling capability allows you to process the tasks for extended drive media at whatever time is most convenient for you.

When files qualify for movement under the configured move rules, they are written to the move list, either immediately upon being saved to the extended drive, or during a drive scan. The move list is not processed, however, until the Move files to media schedule is active. The Move files to media activity is scheduled through the extended drive scheduler.

Figure 37: Extended Drive Schedule Dialog Box



You can access the scheduler by opening the extended drive properties, clicking on the Settings tab then clicking the Schedule button. A dark red line represents the Move files to media activity. When that line appears across a box, during the corresponding time(s), the move list is processed and files on the list are moved to media.

The schedule grid contains columns for each hour of the day and rows for each day of the week, creating cells which each represent one hour. For example, the blacked out cell in Figure 37 above represents 5 p.m. to 6 p.m. on Sunday. DISKXTENDER'S scheduler allows you to set scheduled activities by selecting one or many cells in the grid. You can easily schedule all activities for a large block of time, or you can

schedule specific activities for smaller blocks of time. In Figure 37 above, the Move files to media activity is the only activity scheduled and will run from 6 p.m. to 6 a.m. every day of the week.

For details on how to use the extended drive scheduler to set up media activity schedules, see the *Media Activity Scheduler* section on page 219.

NOTE

If you have more than one extended drive configured for your DX system, you will have to configure each extended drive schedule separately.

CHAPTER THREE

MANAGING FILE MIGRATION

The DISKXTENDER program uses a file migration system to allow you to manage large stores of data and files. The term ‘file migration’ refers to the function of moving files from a local hard drive to one or more pieces of storage media, and retrieving those files for use when requested. Essentially what you are doing is moving files from an extended drive with limited storage space to media pools with more extended storage space.

DISKXTENDER automates the migration of files to media using a rule-based system. Rather than just migrating all files to media without distinction between files, you can select which files should be moved to what types and pieces of media. DX tracks each file and each piece of media so that when a client requests file data that has been moved to media, DX can find the file and retrieve it for the client.

Besides determining what types of files are moved to what media, you can also configure a time delay for files, that will delay movement of the files until some number of days after creation or last access or last edit. In addition, DX provides a prefetch function, which allows you to retrieve the most commonly used files during times of reduced system traffic.

The idea of using a file migration system to help you manage your data and files is also about helping you manage data storage space. After file data is moved to storage media, that data can be removed from the local storage space (extended drive), freeing up that space for additional files. The key is to maintain as much local storage space as possible while still making files easily available. Ultimately your data management system is also a space management system.

Chapter Three: Managing File Migration

Besides the storage media being written to, DISKXTENDER uses 6 key components to automate file and space management. Those components are:

- ↗ Extended Drive – an NTFS volume (hard drive) on the computer where DX is installed.
- ↗ Media Folder – folder created on the extended drive, through DISKXTENDER, where clients store (and access) files.
- ↗ Move Group – group of storage media to which files, stored in a particular media folder, will be migrated.
- ↗ Move Rule – rule outlining the attributes of files, stored in a particular media folder, that determines which files will be moved.
- ↗ Purge Rule – rule outlining the attributes of files, stored in a particular media folder, that determines which files, once moved to media, will have their file data removed from the extended drive (a file tag will remain, identifying the file for later retrieval).
- ↗ Delete Rule – rule outlining the attributes of files, stored in a particular media folder, that determines which files will be deleted entirely from the DX system (permanently deleted from the extended drive and the storage media).

The extended drive, media folders, move groups and move rules, their creation, and their management are what enable and automate your file migration and data management system. The Purge Rules and Delete Rules are what enable and automate space management within your data management system.

This chapter focuses on the management of your file migration components: media folders, move groups, and move rules. While you may have done some configuration of these components when you created them, you may have to make changes or updates to your file migration configuration in the future.

In addition, at the end of this chapter you will find a section on configuring Prefetch Requests. Prefetch requests allow you to retrieve the most commonly used files in advance, during low-traffic times. This ensures that when a client accesses a prefetched file, it is available directly from the extended drive and the client will not have to wait for the file to be retrieved from media.

For a detailed discussion of Purge Rules and Delete Rules, see *Chapter Four: Space Management* on page 137.

MANAGING MEDIA FOLDERS

When you create a media folder for an extended drive, you provide a specific folder location on the extended drive for files to be stored. When you create move groups and move, purge and delete rules for a media folder, you are creating a data management setup for the files saved in that folder. Creating multiple media folders for an extended drive allows you to subdivide and categorize your files in a way that makes it easier to apply separate migration strategies to different types of files. It also allows you to be very specific about what files are to be migrated to what pieces or types of media.

Media folders do not contain specific properties as many other components of DISKXTENDER do. Instead, managing media folders involves creating, modifying and deleting move groups and move, purge and delete rules, and applying them to the appropriate files in each of the media folders on the extended drive.

Media folders are listed under the extended drives for which they are configured. Each media folder has the move group(s) created for it and the media assigned to each move group, along with the move, purge and delete rules listed in a tree structure below the media folder.

Each of the following sections of this chapter provides information about move groups and move rules. For information and instructions on creating purge rules and delete rules, see *Chapter Four: Space Management* on page 137.

MOVE GROUPS

Move groups are specific groupings of media within a media folder. When you set up a move rule for a set of files, you point to the move group of media to which you want those files moved.

To use media assigned to a media folder for file migration, that media must be assigned to a move group within the media folder. Assigning media to different move groups in a media folder allows you to subdivide media within a media folder for separate uses.

By assigning media to move groups, you can control to which set of media files will be written, and to where. This can be useful if segregation of data is necessary. For example, if you wish to separate files from different months onto different pieces of media within a media folder, you can create a move group for each month. Separate media can be assigned to each move group so files for different months are not stored on the same media.

NOTE 

Move groups can contain only writable media. CD-ROM media, for example, is not available to be assigned to a move group because it is read-only.

MOVE GROUP PROPERTIES

The Move Group Properties dialog box contains five tabs: General, Media, Settings, Automation, and Statistics. All but the Statistics Tab correspond to pages in the Move Group Wizard, and contain move group properties configured when you created the move group.

Accessing the Move Group Properties and selecting each of the tabs allows you to view and change many of the settings established when the move group was created. You can change the group name, add and remove media from the group, configure different labeling options or set different media fill options. You can also promote and demote media fill order within the move group.

The following sections discuss each of the tabs and their available options.

To access the Move Group Properties:

- 1 Right-click the move group whose properties you want to view and select Properties from the shortcut menu. The Move Group Properties dialog box appears with the General Tab active by default.
- 2 As with most Properties functions in DISKXTENDER, after making changes you have three options:
 -  To save changes and close the Properties dialog box, click OK.
 -  To save changes and keep the Properties dialog box open, click Apply.
 -  To discard all changes made since the Properties dialog box was opened and close the Properties dialog box, click Cancel.

The General Tab

The General Tab is the tab that first appears when you open the Move Group Properties dialog box. The General Tab allows you to change the move group's name and the type of media that will be assigned to the move group.

NOTE 

You cannot add any media to a move group that is of a different type than what is specified for the group. This attribute must be changed before media of a different type can be added.

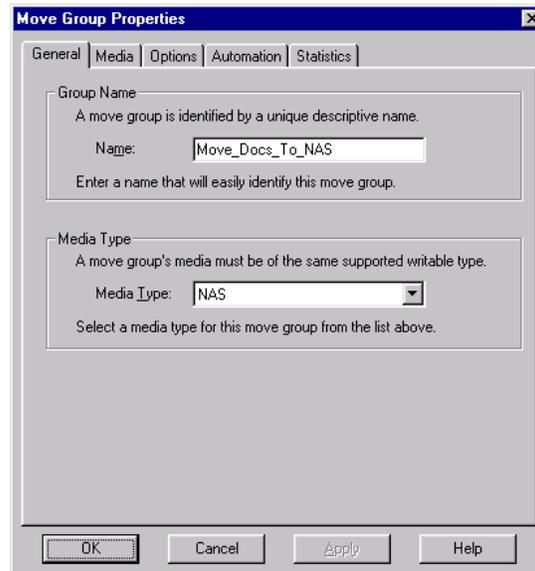
WARNING 

If you have media already assigned to the move group, and you attempt to change the media type, a warning box appears informing you that all media in that move group will be removed.

To view the General Tab:

- 1 Click the General tab in the Move Group Properties dialog box. The General Tab appears.

Figure 38: Move Group Properties: General Tab



- 2 You have the following choices:
 - ↳ To change the name of the Move Group, type the new name into the Name text box in the Group Name section of the tab.
 - ↳ To change the media type, select a different media type from the Media Type drop-down list in the Media Type section of the tab.

NOTE

If you change the media type for the move group, you may also want to change the move group name to reflect the new media type, if applicable.

The Media Tab

The Media Tab lists all media currently assigned to the Move Group and statistics on the Total Space and Free Space on that media. If you did not assign media to the group when you created the move group, you may use this tab to add media after the group is created. You can also use this tab to add additional media to the move group.

In order to add media to the move group, the media must already be assigned to the media folder. Each piece of media can only be assigned to one move group at a time.

The Media Tab allows you to add and remove media for the move group and allows you to promote and demote media. Promoting and demoting media changes the order of the media in the list and pertains specifically to the Fill Sequentially option for move groups. For more information on setting the filling media sequentially attribute, see the *Use Sequential Fill Method* discussion on page 97.

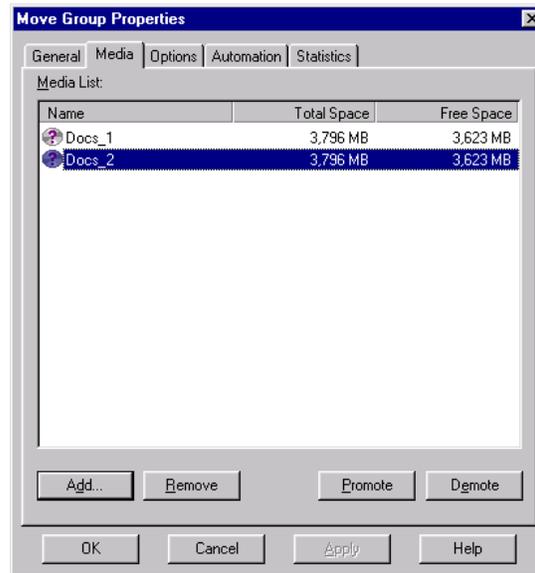
NOTE

You can also add and remove media for the move group by dragging media to and from the move group in the tree view of the administrator or by assigning the Add to Move Group or Remove From Move Group media tasks. For more information on assigning the tasks to media, see *Chapter Six: Storage Media Tasks* on page 225.

To view the Media Tab:

- ➔ Click the Media tab in the Move Group Properties dialog box. The Media Tab appears.

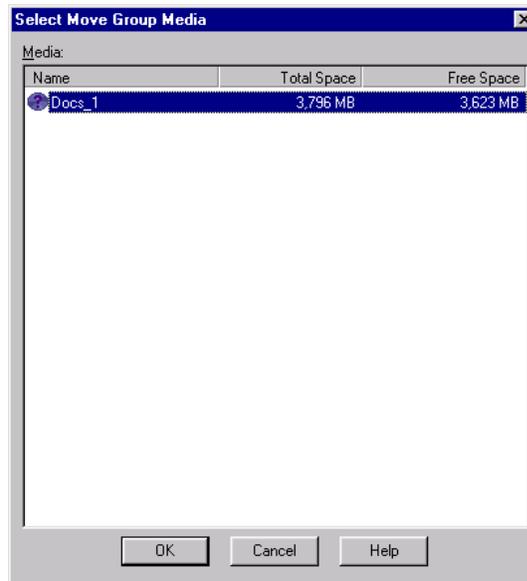
Figure 39: Move Group Properties: Media Tab



To add media to a move group:

- 1 In the Media Tab of the move group Properties, click Add. The Select Move Group Media dialog box appears, listing all media of the specified media type available in the media folder.

Figure 40: Select Move Group Media Dialog Box



- 2 From the Media list, select the media you want to add and click OK. The selected media appears in the Media Tab.

To remove media from the move group:

- In the Media Tab of the move group Properties, select the media you want to remove and click Remove. The selected media is removed from the move group, but remains assigned to the media folder.

Reordering Media in a Move Group

You can promote and demote media to set the media fill sequence. If Fill media in the move group sequentially is enabled for the move group, media is filled sequentially in the assigned list order. If more than one piece of media has been assigned to a move group, the media can be placed in a particular order so that files are written to media in the order listed. The piece of media listed first is the first piece of media to which files will be written; when this piece of media is full, files are written to the second piece of media, and so on. A piece of media can be “promoted” to a higher position in the list, or “demoted” to a lower position. (If sequential fill is disabled, the next available piece of media in the move group is used, regardless of the order set in this list.)

To promote or demote media in the move group:

- 1** In the Media tab, select the piece of media whose order in the list you want to change.
- 2** You have the following choices:
 - ↳ To move the media up in the list, click Promote. The media is moved up one position in the list.
 - ↳ To move the media down in the list, click Demote. The media is moved down one position in the list.

The Media now appears in the new order.

The order of media listed in the Media tab is relevant only if the Fill Sequentially attribute is configured for the move group. The Fill Method option can be found in the Settings Tab of the Move Group Properties dialog box. For more information on this attribute, see the *Use Sequential Fill Method* discussion on page 97.

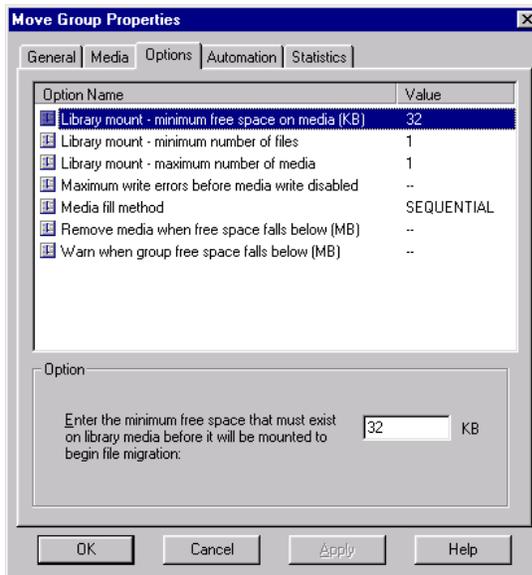
The Options Tab

The Options Tab lists all configurable options available for the move group. Each of these options is discussed below. The configuration options that appear in the lower part of the Options tab correspond to the option selected in the list in the upper part of the Options tab.

To view the Options Tab:

- Click the Options tab in the Move Group Properties dialog box. The Options Tab appears.

Figure 41: Move Group Properties: Options Tab

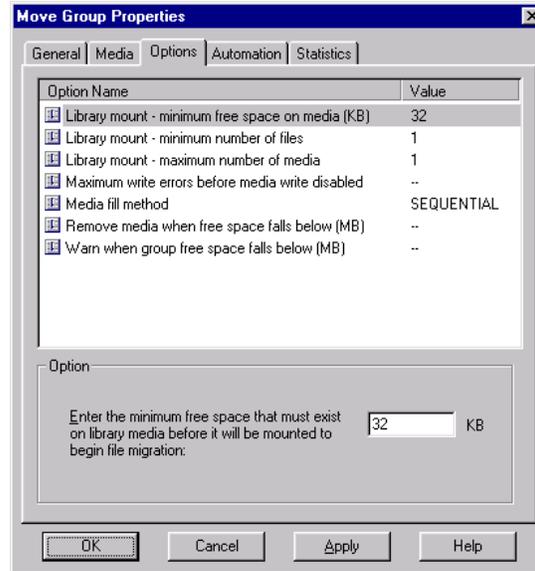


The following sections discuss each of the move group options available for configuration, in the order in which they appear in the Options tab.

Library mount - minimum free space on media (KB)

Use this option to configure DX to only mount media that has more than the specified number of kilobytes of free space available on the media. This setting only controls whether or not DX will *mount* the media specifically for media writes. If the media is already mounted when the file moves are activated, DX will attempt to write to the media regardless of the amount of free space on the media.

Figure 42: Library mount – minimum free space on media (KB) option

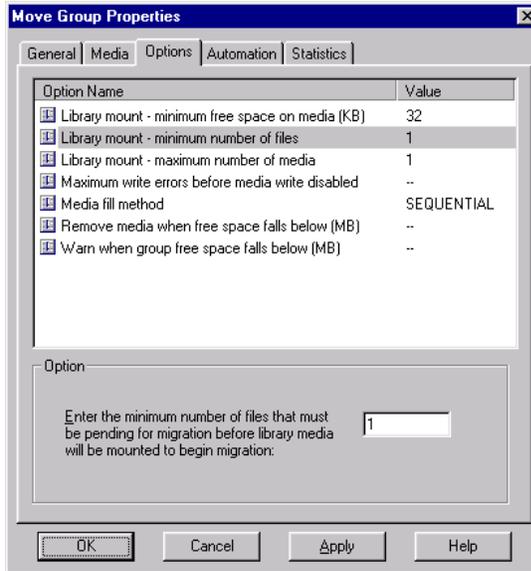


In the text box, type in the number of kilobytes (KB) of free space that must be available on the media for the media to be mounted to the device drive for file writes. If media in the move group has less free space than the entered number of kilobytes, the media will not be mounted for file moves to media. The default is 32.

Library mount - minimum number of files

Use this option to configure DX to only mount media in the move group if at least the specified number of files will be moved to the media in that move group. This setting only controls whether or not DX will mount the media specifically for media writes. If the media is already mounted when the file moves are activated, DX will attempt to write to the media, regardless of the number of files to be written.

Figure 43: Library mount – minimum number of files option

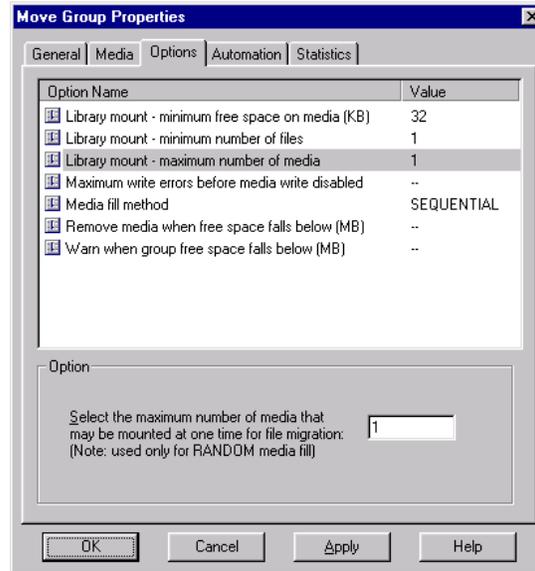


In the text box, enter the number of files that must be on the move list before the media in this move group will be mounted for file writes. The default is 1.

Library mount -maximum number of media

Use this option to configure the maximum number of media from this move group that can be mounted for file writes at one time.

Figure 44: Library mount – maximum number of media option



In the text box, enter the maximum number of media from this move group that can be mounted in device drives for file writes at one time. The default is 1.

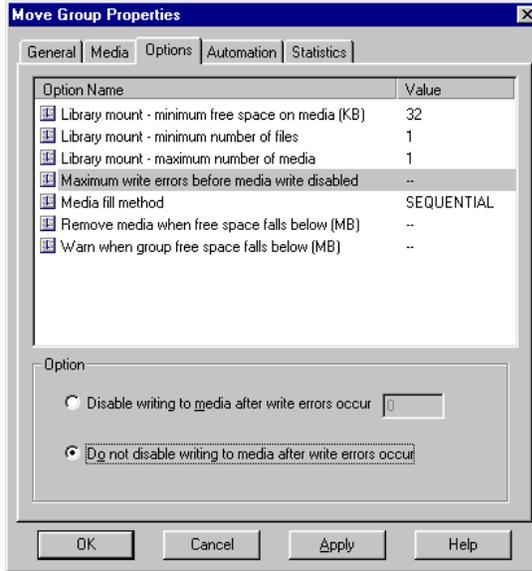
NOTE

If you have configured Sequential fill for the media in this move group the maximum number of media that can be mounted at one time will be 1, regardless of this setting.

Maximum write errors before media write disabled

Use this option to configure DX to stop writing to media if a specified number of write errors occur when migrating files to media.

Figure 45: Maximum write errors before media write disabled option



Disable writing to media after write errors occur __: select this to configure DX to stop writing to media if the specified number of write errors have occurred when attempting to write files to the media.

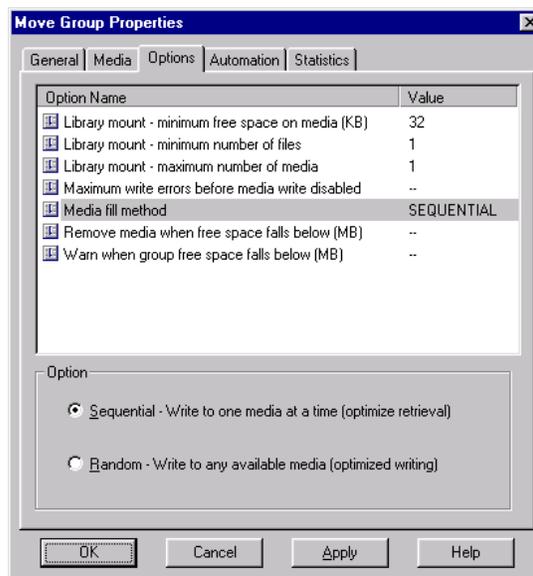
Do not disable writing to media after write errors occur: select this to allow DX to continue to attempt to migrate files to media, regardless of the number of write errors that have occurred on the media. This is the default.

Use Sequential Fill Method

The Media fill method option for move groups allows you to determine whether to fill media in the order in which they appear in the media list in the Media tab, or to fill media randomly, selecting media based on its availability. For information on setting media order, see *The Media Tab* on page 88.

If sequential fill is enabled, DX will wait until the next piece of media in the move group is available before proceeding to move files to that move group. If sequential fill is not enabled, DX will use the piece of media in the move group that can be accessed most quickly, regardless of media order in the move group.

Figure 46: Media fill method option



Sequential – Write to one media at a time (optimize retrieval): select this option to fill the media in the move group in the order in which they appear in the Media tab. This is the default.

Random – Write to any available media (optimized writing): select this option to fill media based on its availability at the time files are migrated.

NOTE 

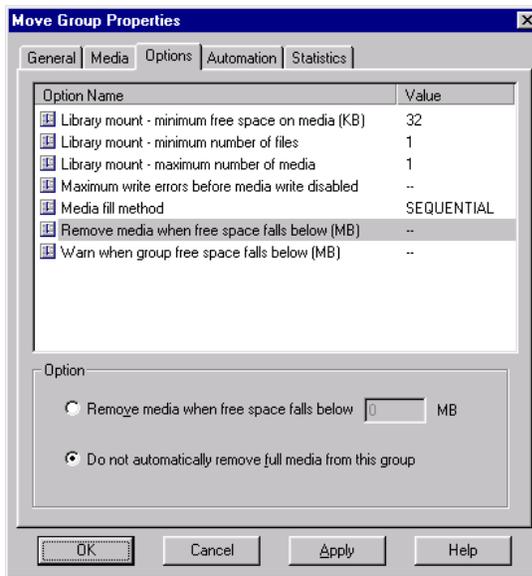
File retrieval can be less efficient when media is not filled in sequence. For example, several bitmaps could be moved to media according to a particular move rule while not being moved to sequential media. If all the bitmaps were retrieved at once, DX might have to mount several pieces of media, which would slow retrieval times.

Remove media when free space falls below (MB)

Use this option to automatically remove media from the move group when the free space on the piece of media falls below a specified number of megabytes. Removing the media from the move group means that files will no longer be migrated to that piece of media. Media removed from a move group remains in the media folder.

You should enable this option if your move group contains media that cannot be compacted.

Figure 47: Remove media when free space falls below (MB) option



Remove media when free space falls below __ MB: select this to automatically remove pieces of media when free space on that media falls below the entered number of megabytes.

Do not automatically remove full media from this group: select this to leave media in the move group regardless of its fill level. This is the default.

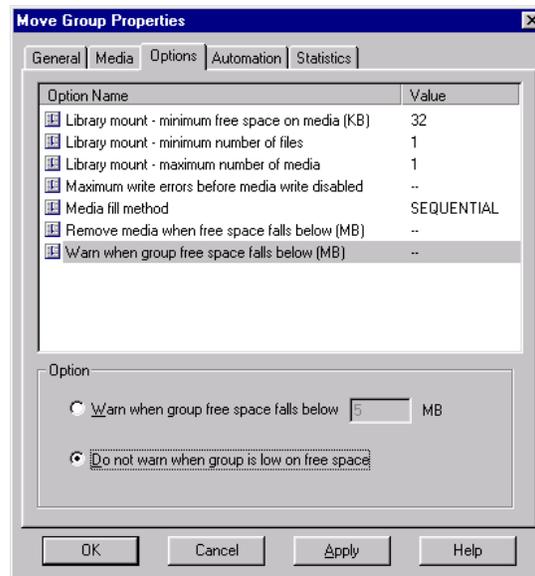
NOTE 

You may not want to enable this option if you use automated media compaction for the media in the move group (available from the Automation tab). Compacting media removes the media from the move group and the media folder automatically.

Warn when group free space falls below (MB)

Use this option to configure whether or not you want DX to warn you when the free space available on all media in the move group falls below a specified number of megabytes. Warnings can be configured into Alerts using the Alerts tab in the Service Properties dialog box.

Figure 48: Warn when group free space falls below (MB) option



Warn when group free space fall below __ MB: select this to configure DX to send you a warning when the amount of free space in the move group media falls below the entered number of megabytes.

Do not warn when group is low on free space: select this to disable any free space watermark warnings. This is the default.

NOTE

If you have enabled the automated labeling and automated compaction option (available through the Automation Tab of the move group properties), you do not need to configure a warning, as the media in the move group will automatically be added and compacted as space is required.

The Automation Tab

The Automation Tab of the Move Group Properties page allows you to set up automatic media labeling and addition of that labeled media to the move group when the free space on the media in the move group falls below a specified level.

The Automation Tab also contains an automatic Media Compaction option that allows you to set up automatic compaction of media in the move group when the amount of wasted space on each piece of media exceeds a specified percentage.

Compacting media reclaims lost space by writing all active files from the media (those not marked for deletion) back to the media folder on the extended drive, and removing the media from the move group and the media folder. After media has been compacted, it can be reformatted (if supported by the media type), allowing that media to be used again. The files written to the media folder are migrated back to move group media based on the move rules for the media folder. Automatic compaction automatically assigns the Format task to the media it has compacted. Once formatted, the media is added to the Blank media node, and is available to be re-added to the move group.

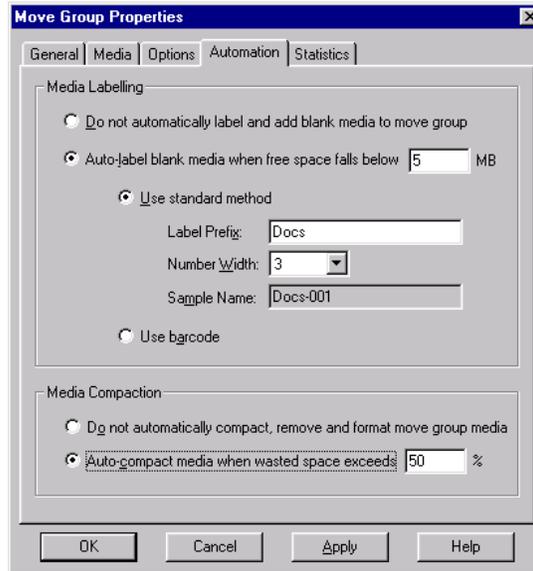
NOTE

If your move group contains a media type that does not support media labeling or media compaction and reformat (example: NAS), the Automation options will not be available.

To view the Automation Tab:

- ➔ Click the Automation tab in the Move Group Properties dialog box. The Automation Tab appears.

Figure 49: Move Group Properties: Automation Tab



Configuring Automated Media Labeling

You can configure whether to automatically label blank media and add it to the move group when move group media free space falls below a certain level. The labeling options available are as follows:

Table 11: Automated Media Labeling Options

OPTION:	DESCRIPTION:
Do not automatically label and add blank media to move group	<p>Select this option to prevent DX from automatically selecting blank media, labeling it, and adding it to a move group.</p> <p>If you select this option, you may want to activate the Warn when group free space falls below ___ MB option on the Options tab to alert you when move group free space falls below a particular level. This will signal you to manually label and add blank media to the group when needed.</p>
Auto-label blank media when free space falls below ___ MB	<p>Select this option to configure DX to automatically select blank media, label it, and add it to the move group when the total number of free megabytes on media in the move group falls below a specified number.</p> <p>↳ Select Use standard method to label media based on a label prefix and number width. In the Label Prefix text box, specify a prefix to be used for naming each added piece of media. From the Number Width drop-down list box, select the number of digits to be used to create the incremental numbering for the media label. DX adds the number to the prefix to create the name for each added piece of media.</p> <p>The Sample Name text box provides an example of what the media name will look like based on the prefix and number width criteria you set.</p> <p>↳ If barcodes are available on your system, and if you want DX to generate labels for media based on these barcodes, select Use barcode. To determine if the media device supports barcode labeling, refer to your device manual.</p>

NOTE

If your move group contains a media type that does not support media labeling, the automated Media Labeling options will not be available.

Configuring Automated Media Compaction

You can configure whether to automatically compact media when the wasted space on the media exceeds a certain percentage. Media compaction reclaims wasted space by writing all active (non-deleted) files on the media back to the media folder on the extended drive. The media is then automatically removed from the move group and media folder.

Files written to the extended drive are re-migrated back to media based on the move rules for that media folder. The options for automated media compaction are as follows:

Table 12: Automated Media Compaction Options

OPTION:	DESCRIPTION:
Do not automatically compact, remove and format move group media	Select this option to prevent DX from automatically compacting media.
Auto-compact media when wasted space exceeds ____ %	Select this option to configure DX to automatically compact media when wasted space on the media exceeds the specified percentage.

NOTE 

If your move group contains a media type that does not support media formatting, the automated Media Compaction options will not be available.

The Statistics Tab

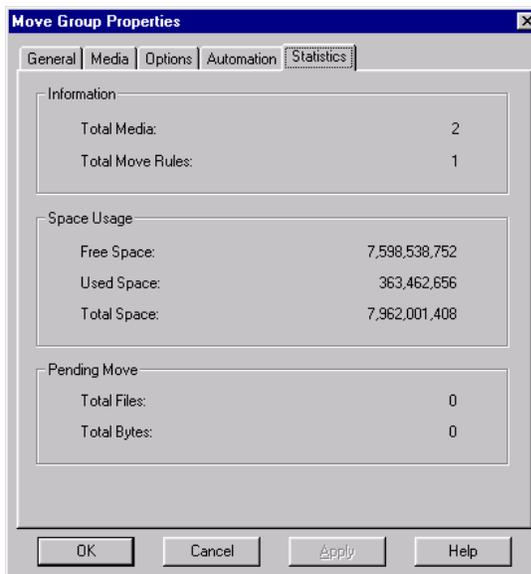
The Statistics Tab of the Move Group properties contains statistical information about the media in the move group, including the total number of media, the total number of move rules, total space usage, and pending move details.

You may only view the statistical information. There are no configurable options in this tab.

To view the Statistics Tab:

- Click the Statistics tab in the Move Group Properties dialog box. The Statistics Tab appears.

Figure 50: Move Group Properties: Statistics Tab



The information listed on the Statistics Tab is as follows:

Table 13: Move Group Properties: Statistics Tab Information

GROUP:	ITEM:	DESCRIPTION:
Information	Total Media	The number of media currently in the move group.
	Total Move Rules	The number of move rules currently configured to write to the move group.
Space Usage	Free Space	The number of free bytes (total) on move group media.
	Used Space	The number of used bytes (total) on move group media.
	Total Space	The number of total bytes on move group media.
Pending Move	Total Files	The number of files pending move.
	Total Bytes	The sum of all bytes in files pending move.

DELETING A MOVE GROUP

A move group can easily be deleted. When a move group is deleted, all configurations for that move group, including any move rules currently configured to write to the move group, are also deleted. The media in the deleted move group remains assigned to the media folder and the files on the media remain listed in the media folder on the extended drive. The media from the deleted move group is then available to be added to another move group in the media folder.

If you want to delete a move group without deleting the associated move rule(s), create a move group and assign it to the affected move rule(s) in place of the group you want to delete.

To delete a move group:

- 1 Right-click the move group you want to delete and select Delete from the shortcut menu. A verification message appears.
- 2 Click Yes to delete the move group. If there are any move rules configured to write to the move group, a warning message appears informing you that the move rule will be deleted as well.
- 3 Click OK to continue with the deletion.

The move group and all associated configurations and move rules are deleted.

MOVE RULES

Move rules control what files in the media folder(s) on the extended drive are moved to media. The path where the files are located is specified, as well as file parameters delimiting which files within the path are affected by the rule. You can set file parameters to select only certain files using the file extension, file attributes, and file size. You can also configure a time delay for files, excluding them from movement until after a certain specified time period has elapsed since file creation, last file access, or last file write.

In the Extended Drives tree, each move rule is listed under the Move Rules node of each media folder, and is represented by a truck icon. Each move rule points to a target move group of media for migration.

There are a number of things you should consider when determining what option settings to use for your move rules.

For example, if you are using optical media, because of the way files are written to optical media, you may want to set up an age restriction from Last write time in your move rule. This limits the number of times frequently changing files are written and rewritten to the media.

You can also configure specific move rules to target very large files for movement and immediate purge to efficiently clear space from the extended drive. If your move group contains NAS media, you may want to set the direct read option for those files because file retrieval from NAS is faster than with other kinds of media. When a client requests one of these files in the future, the file is read directly from the media rather than being fetched to the extended drive first, helping you maintain extended drive space.

When files qualify for move based on the configurations you set in the move rule, they are added to the move list, either during a drive scan or at the time the file is

saved to the media folder on the extended drive. The move list for each extended drive is constructed based on the move rules you create.

The contents of the move list dictates what files are moved to media. The move list is processed and files are moved to media whenever the Move Files to Media activity schedule is active. For more information on scheduling the Move files to media activity, see *Scheduling Movement of Files* on page 80.

When a file is written to a media folder on the extended drive, DX checks the file against the criteria of the move rules for that folder. If the file matches the criteria under one of the move rules, DX attaches a DX file attribute to the file. The file attribute indicates that the file qualifies for movement to media and, if applicable, the particular file age the file must reach before migration.

If the file qualifies for migration to media under a move rule that *does not* have a file age exclusion specified, DX immediately adds the file to the move list. If the file qualifies for migration to media under a move rule that *does* have a file age exclusion specified, DX adds the DX attribute to the file but does not add the file to the move list until the next extended drive scan.

When a drive scan is run, the existing move list is discarded and DX builds a new list based on the DX attributes it finds on the files saved in the media folders on the extended drive. Every file in a DX media folder is checked when an extended drive scan occurs. If you configure a time delay in your move rules, you *must* periodically scan the extended drive to be sure that files initially excluded from the move list because of age are added to the list after they reach the correct age for migration.

In addition, 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 the 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.

It is for this reason that proper configuration of your Drive Scan schedule is a critical part of making sure files are moved to media when appropriate. If drive scans are permanently disabled, files that qualify for movement to media after a certain time delay, or those that had a sharing violation when they originally became eligible, will *never* be written to the move list and therefore never moved to media. Drive scans are required to capture these files and regenerate the move list for movement of files to media. For information on scheduling regular drive scans for your extended drive, see the Extended Drive Administration chapter of the DX2000 System Guide.

NOTE 

Forced drive scans also write time-delayed files to the move list, and you may force an extended drive scan whenever necessary. However, to ensure that all qualified files are moved to media when appropriate, we recommend you set up a regular drive scan schedule for each extended drive.

MOVE RULE PROPERTIES

The Move Rule Properties dialog box contains six tabs: File Name, Size, Attributes, Age, Settings and Statistics. All but the Statistics tab correspond to pages in the Move Rule Wizard and contain the move rule properties configured when you created the move rule.

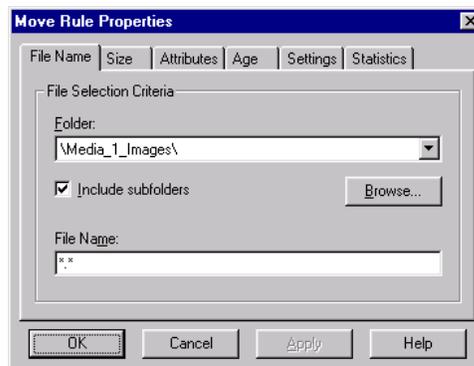
Accessing the Move Rule Properties and selecting each of the tabs allows you to view and change the settings established when the move rule was created. You can change what files are affected by the move rule by changing or disabling the file size specifications, changing or disabling the exclusion of files based on file attributes, and changing or disabling the age (time delay) specifications for moving files. You can also change which move group's media is to receive the files, and enable or disable the direct read and purge after move options.

The following sections discuss each of the tabs and their available options.

To access the Move Rule Properties:

- 1 Right-click the move rule whose properties you want to view and select Properties from the shortcut menu. The Move Rule Properties dialog box appears with the File Name Tab active by default.

Figure 51: Move Rule Properties Dialog Box



- 2 As with most Properties functions in DISKXTENDER, after making changes you have three options:
 - ↵ To save changes and close the Properties dialog box, click OK.
 - ↵ To save changes and keep the Properties dialog box open, click Apply.
 - ↵ To discard all changes made since the Properties dialog box was opened and close the Properties dialog box, click Cancel.

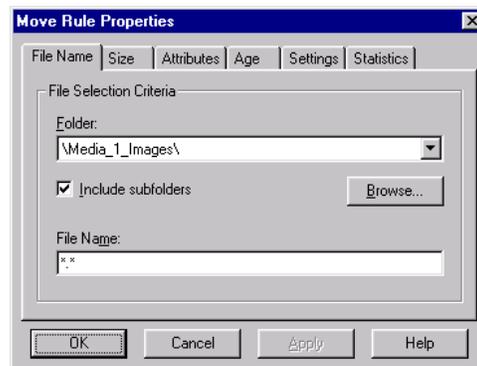
The File Name Tab

The File Name tab is the tab that first appears when you open the Move Rule Properties dialog box. The File Name tab allows you to view and change the folder and file name specifications for the move rule.

To view the File Name tab:

- ➔ Click the File Name tab in the Move Rule Properties dialog box. The File Name tab appears.

Figure 52: Move Rule Properties: File Name Tab



The Folder text box allows you to change the location of files to which the move rule will be applied. You have the following choices:

- ↗ To apply the move rule to files in a different folder, select the folder/path from the Folder drop-down list. To select a specific subfolder within the active media folder, click Browse.
- ↗ Enable or disable the Include subfolders option. If enabled, all files in the specified folder and all subfolders and their files will be subject to the move rule. If disabled, only the files in the specified directory will be subject to the move rule.

NOTE

You cannot include more than one select subfolder of the media folder in a single move rule. You can include either one or all subfolders only. To move files in a different subfolder, create a second move rule.

In order to change which files in the specified location the move rule applies to, you can use the standard Windows asterisk (*) wildcard to select only files with specific extensions or naming conventions for move. The asterisk represents one or more characters in the name or extension part of the file name. For example:

- ↗ To apply the move rule to all files in the directory, type * . * in the File Name text box.
- ↗ To apply the move rule to only files of a particular type, type in an asterisk before the period and the appropriate file extension after the period. For example, to move only bitmaps type * .BMP in the File Name text box.
- ↗ To apply the move rule to files with a certain naming convention use the asterisk as part of the file name. For example, to move only files indicated as reports, type *REPORT . * or *REPORT* . * in the file name text box.
- ↗ To use the wildcard to specify only files of a certain type with a specific naming convention, use the asterisk in the name part of the file name while specifying the file extension. For example, to move only text files indicated as reports, type *REPORT* . TXT in the file name text box.

NOTE

Only one file name specification can be configured per move rule. To move files of a different specification in the same folder, create a second move rule.

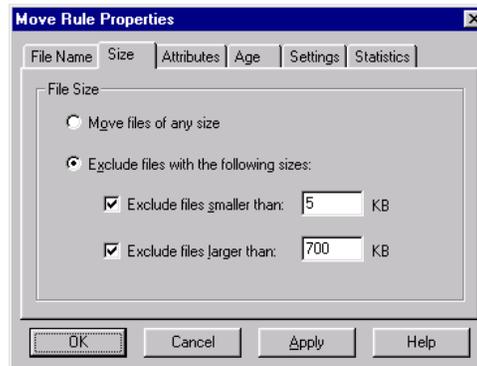
The Size Tab

The Size tab allows you to view and change the file size qualifications for the move rule.

To view the Size tab:

- Click the Size tab in the Move Rule Properties dialog box. The Size tab appears.

Figure 53: Move Rule Properties: Size Tab



To move files of all sizes, select Move files of any size. This is the default.

To only move files of a specified size range, select the Exclude files with the following sizes. You have the following options:

- Enable the Exclude files smaller than __ KB. In the text box, type in the number of kilobytes (KB) that a file must match or exceed in order to be moved to media.
- Enable the Exclude files larger than __ KB. In the text box, type in the number of kilobytes (KB) that a file must be equal to or smaller than in order to be moved to media.

If both options are enabled, only files whose size falls in between the kilobyte specifications will be subjected to the move rule. Files whose size falls outside of the range set by both options will never qualify for movement to media under this move rule.

The Attributes Tab

The Attributes tab allows you to view and change the specific file attribute qualifications for the move rule.

To view the Attributes tab:

- 1 Click the Attributes tab in the Move Rule Properties dialog box. The Attributes tab appears.

Figure 54: Move Rule Properties: Attributes Tab



- 2 You have the following choices:
 - ↳ To move files with any attributes, select Move files with any attribute. This is the default.
 - ↳ To exclude files with certain attributes from being moved to media, select Exclude files with the following attributes. Then click a check the boxes corresponding to the attributes that will disqualify a file from being moved to media.

WARNING

Attributes for existing files can be viewed through Windows Explorer. When extending a system drive, be sure to exclude files with the System attribute to prevent operating system file purge. Extending a system drive with DX is not recommended and may cause severe operating system damage.

The Age Tab

The Age Tab allows you to configure a time delay for the movement of files to media.

If there is no age specification configured for the move rule, all files that otherwise qualify for movement to media under this move rule will be written to the move list immediately upon being saved to the media folder on the extended drive.

If an age specification is configured for the move rule, all files that otherwise qualify for movement to media under this move rule will be written to the move list when the entered days have elapsed since the selected file action *and* the next drive scan is run. For information on Drive Scans, see the Extended Drive Administration chapter of the DX2000 System Guide.

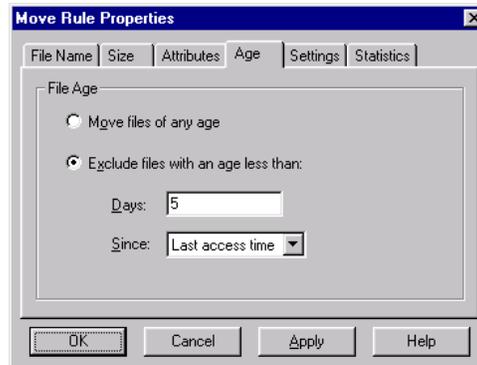
NOTE 

Files written to the move list are moved to media when the Move files to media schedule is active. For information on scheduling the Move files to media activity, see *Scheduling Movement of Files* on page 80.

To view the Age tab:

- ➔ Click the Age tab in the Move Rule Properties dialog box. The Age tab appears.

Figure 55: Move Rule Properties: Age Tab



If you want to move files regardless of age, select Move files with any age. This is the default.

To exclude files from movement to media until a certain number of days have passed since a specific file action, enable the Exclude files with an age less than option. Then configure the following:

- ✎ Type in the number of days you want to elapse from the file action trigger before the file is written to media in the Days text box.
- ✎ Select the appropriate file action trigger from the Since drop-down box: Create time, Last access time, or Last write time.

The Settings Tab

The Settings tab allows you choose a different move group to receive the files being selected for move by the move rule. You can also enable or disable the direct read and purge files after move options.

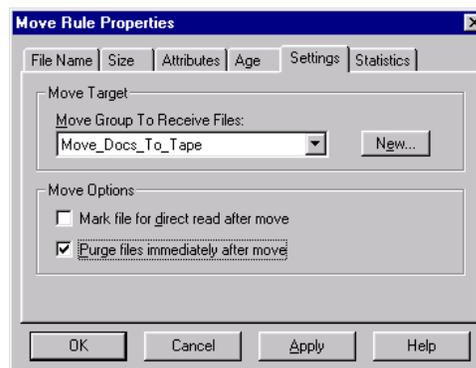
NOTE

If you disabled certain time periods on the Allow fetches from media schedule to create a time-based restriction of access to purged files, you may want to take that into consideration when determining whether to purge files immediately after move, or to mark files for direct read.

To view the Settings tab:

- 1 Click the Settings tab in the Move Rule Properties dialog box. The Settings tab appears.

Figure 56: Move Rule Properties: Settings Tab



Changing the targeted move group for your move rule changes the media to which the files moved by this move rule are written.

2 You have the following options:

- ✎ To choose a different existing move group to receive the files being selected for migration by the move rule, select the new move group from the Move Group To Receive Files drop-down box.
- ✎ To create a new move group to receive migrating files, click New. This opens the Move Group Wizard and leads you through the creation of a new move group. Once the wizard completes, you are returned to the Settings tab of the Move Rule Properties dialog box and the new move group appears in the Move Group To Receive Files text box.

You may also enable or disable the options in the Move Options section of the Settings Tab. The options are as follows:

Table 14: Settings Tab: Move Options

OPTION:	DESCRIPTION:
Mark file for direct read after move	Enabling this option sets the direct read attribute to all files moved to media under this move rule. The direct read attribute means that when requested by a client, a file is read directly from the media rather than being fetched to the extended drive first and read from there.
Purge files immediately after move	Enable this option to immediately purge file data for all files moved to media under this rule. Purging files removes file data from the extended drive while leaving behind a file tag containing the file attributes.

NOTE ✎

Purge rules for files can be configured separately if purging after move is not appropriate for all files that qualify for this move rule. For details on creating separate purge rules, see *Creating Purge Rules* on page 143.

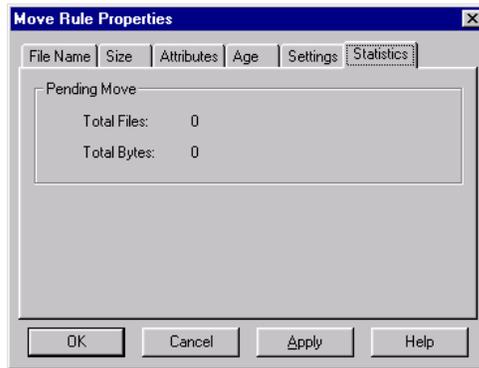
The Statistics Tab

The Statistics tab provides pending file migration statistics from the most recent drive scan. The statistics shown pertain only to the files selected for migration by qualifying for this move rule and are valid only until the next extended drive scan.

To view the Statistics tab:

- Click the Statistics tab in the Move Rule Properties dialog box. The Statistics tab appears.

Figure 57: Move Rule Properties: Statistics Tab



The items shown on the Statistics tab are as follows:

Table 15: Statistics Tab: Pending Move Information

ITEM:	DESCRIPTION:
Total Files	The number of files that at the time of the last drive scan qualified for migration to media using this move rule.
Total Bytes	The total size, in bytes, of all files that at the time of the last drive scan qualified for migration to media using this move rule.

DELETING A MOVE RULE

A move rule can easily be deleted from the media folder. Deleting a move rule deletes all configured options for that move rule. Remember, however, that you must have at least one move rule configured in order to migrate files to media.

To delete a move rule:

- 1 Right-click the move rule that you want to delete and select Delete from the shortcut menu.
- 2 A message appears, prompting you to verify the deletion. Click Yes.

The move rule is deleted and no longer appears in the Move Rule node for that media folder in the extended drive tree.

PREFETCH REQUESTS

If you configure your move rules to purge files from the extended drive after they are moved to media, the data from the files is removed from the extended drive, leaving behind a file tag that identifies the purged file and its attributes.

When a client requests a purged file, depending on the type of media the file has been migrated to, it may take some time to retrieve the file. In addition, multiple client requests for purged files may put a critical strain your system resources and cause media mounting conflicts in your media device.

DISKXTENDER contains a prefetch capability, which allows you to retrieve frequently used files from storage media in advance of their being requested by a client. This allows you to reduce read requests during high traffic times by anticipating file retrieval needs. In addition, if you disable certain time periods of the Allow fetches from media schedule to create a time-based restriction of access to purged files, you will want to be sure to have all necessary files prefetched to the extended drive, in order to maintain access to those files during the times when fetches are prohibited.

NOTE

The Allow fetches from media schedule only pertains to individual client requests for purged DX files from media. It does not apply to and will not affect any DX prefetch requests created through the Prefetch Request Manager.

During a prefetch, DISKXTENDER goes out to media to retrieve specified files from storage media and writes the file data to the extended drive. Prefetches will fetch all requested files to the extended drive, to include files marked for direct read.

Frequently used files can be prefetched during off-peak hours, enabling faster access to files during high traffic times. Prefetch requests and schedules are created in the Prefetch Request Manager available from the Tools menu.

There are two kinds of prefetch requests: Direct and Indirect. Both function identically with respect to retrieving a list of files from media to the extended drive. Direct prefetch requires you to manually create the list of files to be retrieved. Indirect prefetch allows you to use a previously saved list of files for Prefetching. For more information on Direct and Indirect Prefetch Requests, see *Direct Prefetch Request* below and *Indirect Prefetch Request* on page 119.

NOTE

Prefetch is a memory-intensive procedure. When planning to prefetch a large number of files, for optimal performance, we recommend you create several smaller prefetch request lists instead of one large list. You also may want to create separate lists (if possible) for files fetched from separate pieces of media. This reduces the potential for drive and media competition within a library, also called “thrashing.”

NOTE

The Prefetch functions discussed here do not include the Prefetch media task. The Prefetch media task can be assigned to a particular piece of media and will prefetch all files on that media to the extended drive. For more information on the Prefetch media task, see *Prefetching Files from Media* on page 237.

DIRECT PREFETCH REQUEST

A direct prefetch request is a request where you build a prefetch file list by selecting files as a step in the wizard. You can select files and folders for prefetch by browsing for them, or you can add files to the file list by selecting a text file that lists specific files.

The direct prefetch option is intended for manually creating prefetch requests for specific files. Direct prefetch requires manual selection of the files to be prefetched. When a direct prefetch request is made, DX registers the name of each file requested, even if a list is loaded from a file. If the request is resubmitted, the list of files added when the request was created will be prefetched. If the contents of a file list loaded for a direct request changes, DX will not register those changes for resubmission. For this reason, direct requests should not be used for recurring prefetches where file lists are being regenerated each time. Instead, save the recurring file list for use later in an indirect prefetch request. For more information on saving file lists, see *Saving a Prefetch File List to a File* on page 132.

INDIRECT PREFETCH REQUEST

An indirect prefetch request is a request where you load an existing file list. This option is intended for re-occurring batch prefetches where the list of files being prefetched may change. You can designate a file where DX can read a file list, and then rebuild that list as needed. With an indirect request, DX registers only the name of the file that contains the list of files to be prefetched. As long as that list is saved under the specified filename, the contents of the list can change as often as required.

Indirect Prefetch File Format

The file for use in the indirect prefetch request should be created before you run the prefetch wizard to create the request. In the wizard, you can browse for the file or type it in the file text box. Prefetch request files should be saved with an extension of .DXP.

If you have an existing list of files, you can load that list into the file list once you have formatted it correctly. For the list import to be successful, the file must contain a complete, correct directory path for each file to be added, such as:

```
\ACCOUNTS\OCTOBER\EXPENSES.XLS
```

The file should have a single file listing per line (i.e., file listings are separated by hard returns). Comments can be inserted in the file, but each comment line should be preceded by a semi-colon (;).

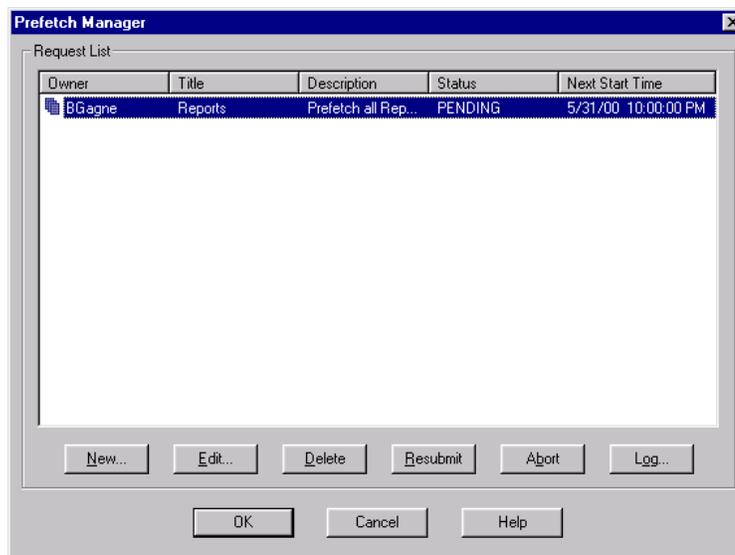
USING THE PREFETCH MANAGER

The Prefetch Manager lists pending requests and provides access to prefetch management functions. This design allows you to manage prefetch requests from a central location for each extended drive. From the Prefetch Manager you can create new prefetch requests, and edit, delete, stop, and resubmit existing requests, and view the Prefetch log.

To open the Prefetch Manager:

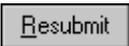
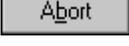
- From the Tools menu in the Administrator, select the Prefetch Request Manager. The Prefetch Manager dialog box appears.

Figure 58: Prefetch Manager Dialog Box



All prefetch management functions are available through the Prefetch Manager dialog box. The buttons in the Prefetch Manager perform the following functions:

Table 16: Prefetch Manager Buttons

BUTTON:	FUNCTION:
	Opens Prefetch wizard to create a new prefetch request.
	Opens Prefetch wizard to edit selected prefetch request.
	Deletes selected prefetch request.
	Resubmits selected prefetch request. This button allows you to reuse a request after it is completed, reducing your prefetch configuration time.
	Stops the selected prefetch request if it is currently processing.
	Provides access to the prefetch log.

The Prefetch Wizard

The Prefetch wizard leads you step-by-step through configuring either direct or indirect prefetch requests. Once the requests have been configured, they are added to the list in the Prefetch Manager and will be processed based on the schedule you set for each prefetch request.

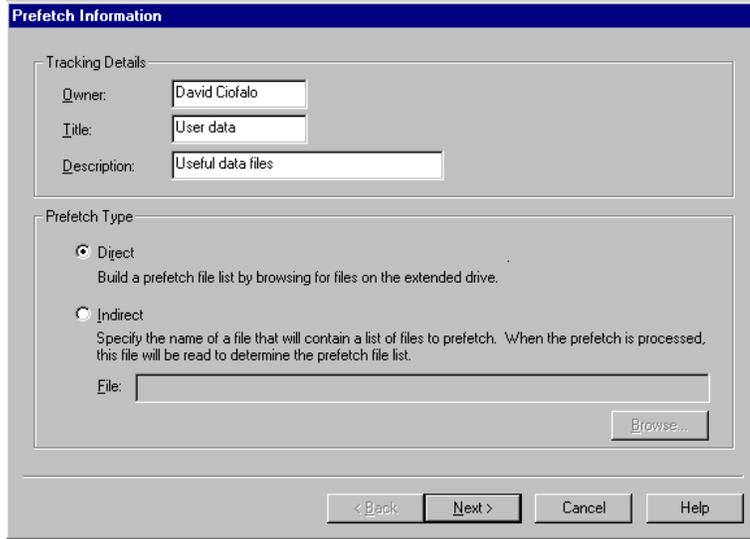
To start the Prefetch Wizard:

- ➔ In the Prefetch Manager page, click Add. The Prefetch Wizard opens with the Prefetch Information page.

Configuring Prefetch Information

The Prefetch Information page allows you to configure settings for the prefetch request.

Figure 59: Prefetch Wizard: Prefetch Information Page



To configure prefetch information:

- 1 In the Tracking Details section of the Prefetch Information Page, enter the identifying information for the request. This information appears in the Prefetch Properties page once the request is complete.

Table 17: Prefetch Information Page: Request Details

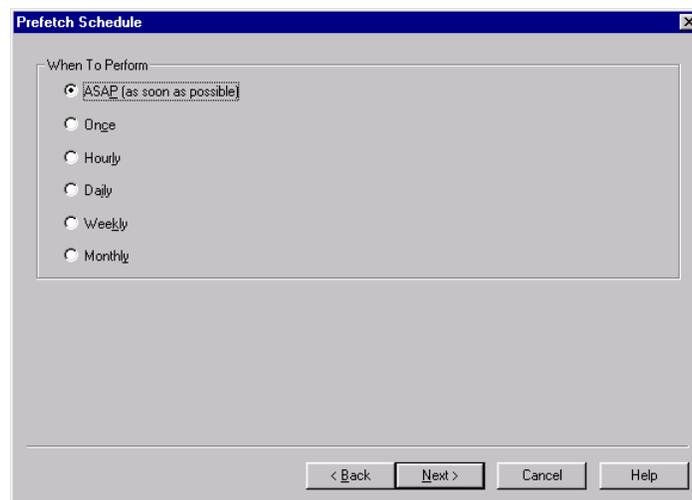
ITEM:	DESCRIPTION:
Owner	The name of the person initiating the prefetch request.
Title	The name of the prefetch job.
Description	A description of the request, which can be up to 255 characters in length.

- 2 Select either Direct or Indirect prefetch type. If you select Indirect, you must enter or Browse to the name of the file containing the list of files to be prefetched.
- 3 Click Next. The Prefetch Schedule page appears.

Scheduling the Prefetch Request

The Prefetch Schedule page defines how frequently the prefetch will occur. Prefetches can be scheduled to occur ASAP, once, hourly, daily, weekly, and monthly.

Figure 60: Prefetch Wizard: Prefetch Schedule Page



NOTE

The Prefetch scheduler functions independently of the Allow fetches from media activity schedule, and will run when scheduled through the wizard, regardless of whether the Allow fetches from media schedule is active at that time or not.

To perform an immediate prefetch:

- 1 Select the ASAP (default) option to configure the prefetch to occur immediately after you finish configuring the prefetch in the wizard.

- 2 You have one of two options:
 - ↪ If you are configuring an Indirect prefetch, click Finish to complete configuration of your prefetch. (For further instructions, see *Completing Request Configuration* on page 135.)
 - ↪ If you are configuring a Direct prefetch, click Next. The Prefetch File List page appears. (For further instructions, see *The Prefetch File List Page* on page 129.)

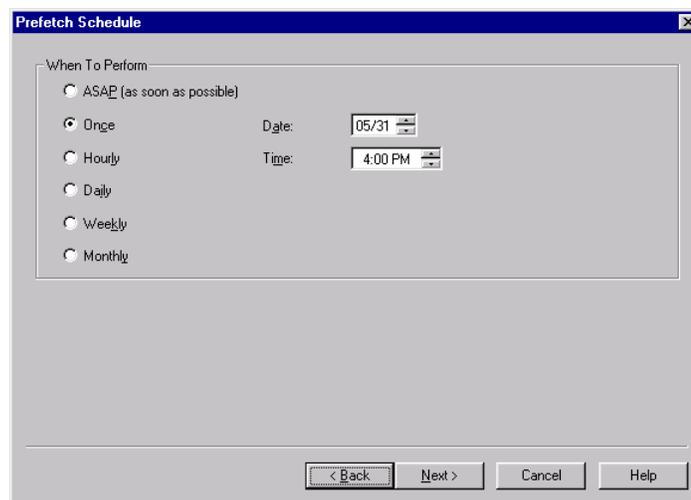
NOTE

To schedule a one-time prefetch for a time other than now, use the Once option.

To perform a one-time prefetch:

- 1 Click Once on the Prefetch Schedule page. The Date and Time spin-boxes appear.

Figure 61: Once Prefetch Option



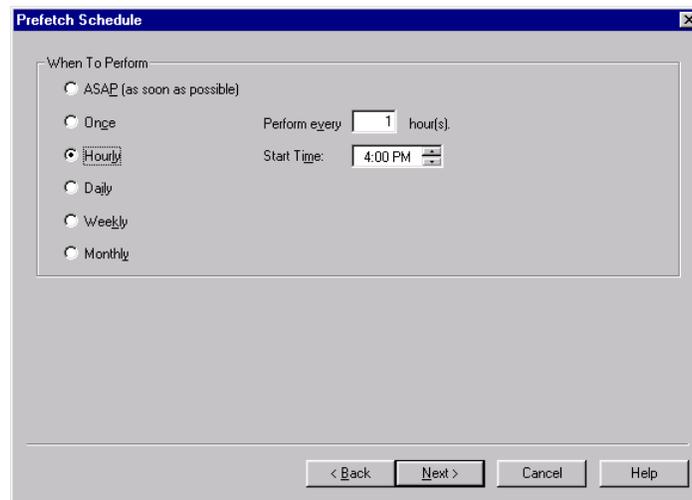
- 2 In the Date spin-box, specify the date you want the prefetch to occur.
- 3 In the Time spin-box, specify the time you want the prefetch to occur.

- 4 You have one of two options:
 - ↪ If you are configuring an Indirect prefetch, click Finish to complete configuration of your prefetch. (For further instructions, see *Completing Request Configuration* on page 135.)
 - ↪ If you are configuring a Direct prefetch, click Next. The Prefetch File List page appears. (For further instructions, see *The Prefetch File List Page* on page 129.)

To configure the prefetch to occur on an hourly basis:

- 1 Click Hourly on the Prefetch Schedule page. The Perform every ____ hour(s) text box and Start Time spin-box appears.

Figure 62: Hourly Prefetch Option



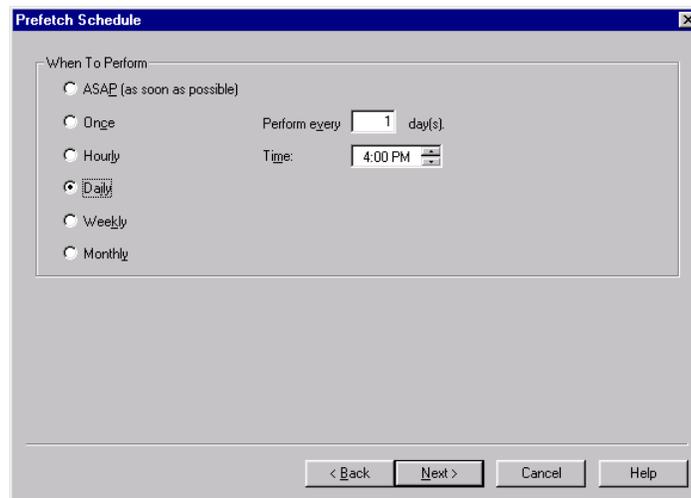
- 2 In the Perform every ____ hour(s) text box, specify the hourly rate at which you want the prefetch to occur. You can enter a number from 1 to 24.
- 3 In the Time spin-box, specify the time you want the *first* prefetch to occur.

- 4 You have one of two options:
 - ↪ If you are configuring an Indirect prefetch, click Finish to complete configuration of your prefetch. (For further instructions, see *Completing Request Configuration* on page 135.)
 - ↪ If you are configuring a Direct prefetch, click Next. The Prefetch File List page appears. (For further instructions, see *The Prefetch File List Page* on page 129.)

To configure the prefetch to occur on a daily basis:

- 1 Click Daily on the Prefetch Schedule page. The Perform every ____ day(s) text box and Time spin-box appears.

Figure 63: Daily Prefetch Option



- 2 In the Perform every ____ day(s) text box, specify the daily rate for the prefetch. You can enter a number anywhere from 1 to 365.
- 3 In the Time spin-box, specify the time you want the prefetch to occur.

- 4 You have one of two options:
 - ↪ If you are configuring an Indirect prefetch, click Finish to complete configuration of your prefetch. (For further instructions, see *Completing Request Configuration* on page 135.)
 - ↪ If you are configuring a Direct prefetch, click Next. The Prefetch File List page appears. (For further instructions, see *The Prefetch File List Page* on page 129.)

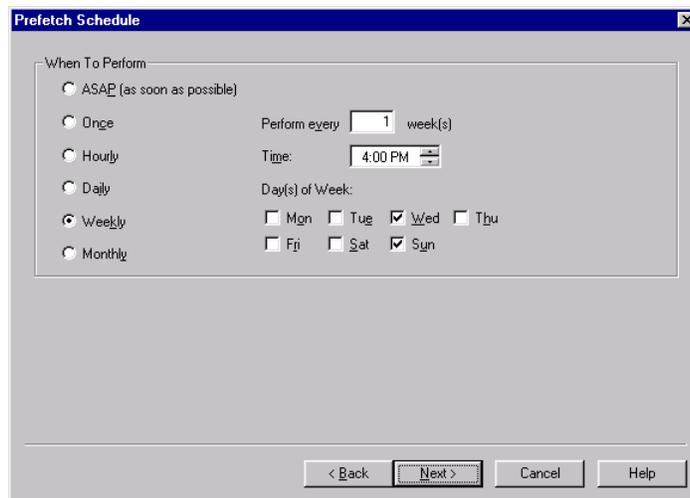
NOTE 

You can configure prefetch requests on particular days of the week using the *Weekly* option.

To configure the prefetch to occur on a weekly basis:

- 1 Click Weekly on the Prefetch Schedule page. The Perform every ____ week(s) text box, the Time spin-box, and the Days of Week checkboxes appear.

Figure 64: Weekly Prefetch Option



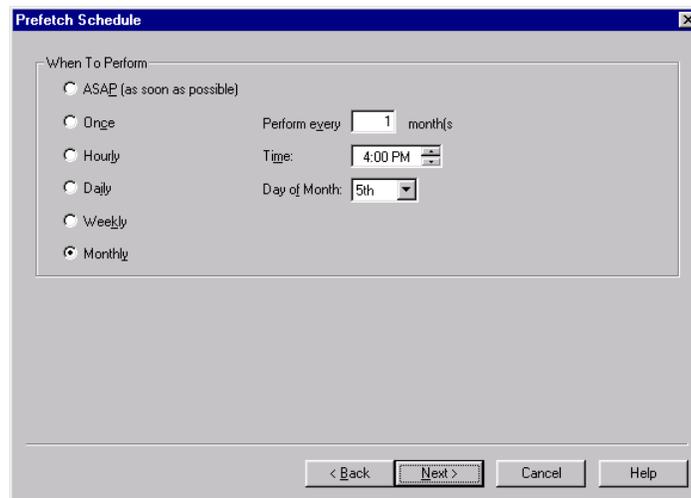
- 2 In the Perform every ____ week(s) text box, specify the weekly rate for the prefetch. You can enter a number anywhere from 1 to 52.
- 3 In the Time spin-box, specify the time you want the prefetch to occur.
- 4 Under Day(s) of Week, specify which day(s) of the week you want the prefetch to occur.

- 5 You have one of two options:
 - ↪ If you are configuring an Indirect prefetch, click Finish to complete configuration of your prefetch. (For further instructions, see *Completing Request Configuration* on page 135.)
 - ↪ If you are configuring a Direct prefetch, click Next. The Prefetch File List page appears. (For further instructions, see *The Prefetch File List Page* on page 129.)

To configure the prefetch to occur on a monthly basis:

- 1 Click Monthly on the Prefetch Schedule page. The Perform every ____ month(s) text box, the Time spin box, and the Day of Month drop-down list box appear.

Figure 65: Monthly Prefetch Option



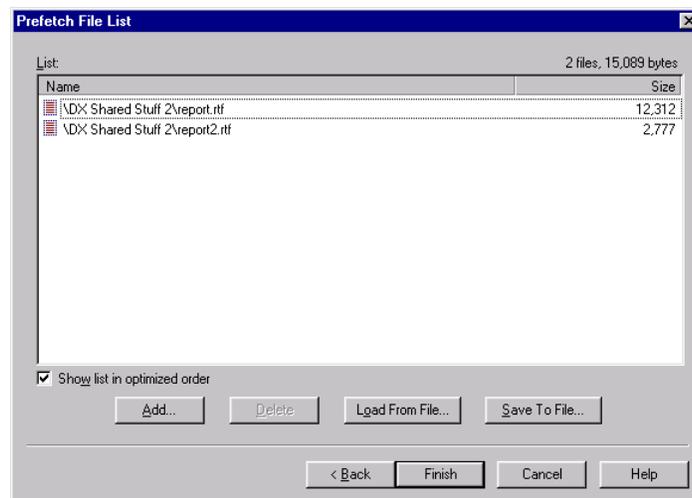
- 2 In the Perform every ____ month(s) text box, specify the monthly rate for the prefetch. You can enter a number from 1 to 12.
- 3 In the Time spin-box, specify the time you want the prefetch to occur.
- 4 In the Day of Month drop-down list box, specify the date for the prefetch to occur.

- 5 You have one of two options:
- ↗ If you are configuring an Indirect prefetch, click Finish to complete configuration of your prefetch. (For further instructions, see *Completing Request Configuration* on page 135.)
 - ↗ If you are configuring a Direct prefetch, click Next. The Prefetch File List page appears. (For further instructions, see *The Prefetch File List Page*, below.)

The Prefetch File List Page

For a new request, the Prefetch File List page will initially be blank because no files have been selected for prefetch. You can add files to the list by browsing for them or by loading a file with a list of files in it. Once files have been added, you can delete files from the list. You can also save the list to a file if you would like to use the list again later. You can sort the list of added files by media ID and file location by checking Show list in optimized order.

Figure 66: Prefetch Wizard: Prefetch File List Page



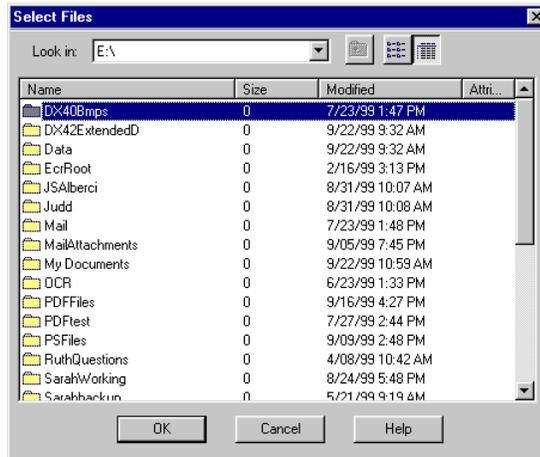
NOTE ↗

Saving this list to a file creates a properly formatted file for an indirect prefetch.

To add files to the Prefetch File List:

- 1 Click Add. The Select Files dialog box appears.

Figure 67: Select Files Dialog Box



The Select Files page lists files available on the extended drive on the DX computer. You can select a new drive from the Look in drop-down list, or use the Up button to move up one directory level at a time on the current drive.

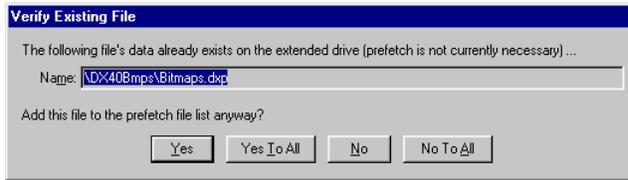
- 2 Select the files that you would like to add to the prefetch request and click OK. If you choose to add an entire folder, a message appears, verifying addition of subfolders.

Figure 68: Include Subfolder Verification Message



- 3 Click Yes to include files in subfolders. If a file you are adding is already present on the extended drive, a message appears, verifying addition to the list.

Figure 69: Verify Existing File Dialog Box

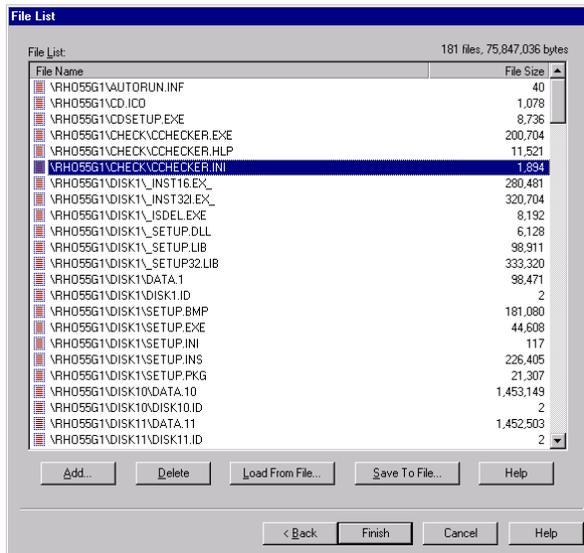


4 You have the following choices:

- ☞ Click Yes to verify adding the specified file.
- ☞ Click Yes To All to verify adding all files that are already fetched (resident on the extended drive) without verifying them individually.
- ☞ Click No to not add the specified file.
- ☞ Click No To All to not add any of the files that are currently fetched (resident on the extended drive).

Files are added to the list in the Prefetch File List page in accordance with your selections.

Figure 70: Prefetch Wizard: File List Page



Saving a Prefetch File List to a File

You can save the currently displayed file list to a file. The saved file can be used or edited later for an indirect prefetch request.

To save a prefetch file list to a file:

- 1 Click the Save As button. The Save As dialog box appears.

Figure 71: Save As Dialog Box



Prefetch files are saved by default to the root of the extended drive. The file list is saved as a prefetch file (.DXP) by default. You can change the directory by selecting a different location in the Save As dialog box, and change file type by using the Save as type drop-down list.

- 2 Enter the file name for the list you are saving and click Save to return to the File List page.

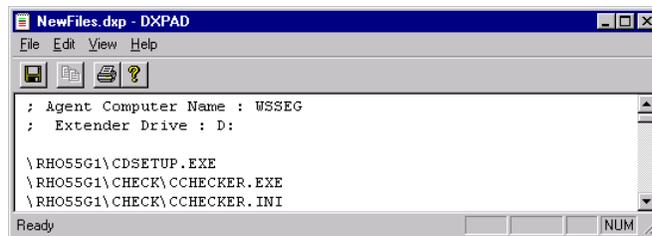
Loading Files to the Prefetch File List From a File

If you have an existing list of files, you can load those files into the file list by selecting the list file once you have formatted it correctly. For the list import to be successful, the file must contain a complete, correct directory path for each file to be added, such as:

```
\ACCOUNTS\OCTOBER\EXPENSES.XLS
```

The file should have a single file listing per line (i.e., file listings are separated by hard returns). Comments can be inserted in the file, but each comment line should be preceded by a semi-colon (;).

Figure 72: Example of File for List Creation



To load files to the Prefetch File List from a file:

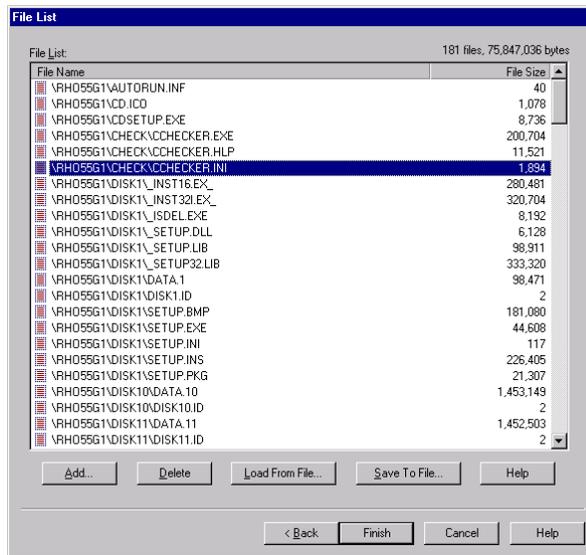
- 1 Click the Load From File button. The Open dialog box appears. By default, only prefetch (.DXP) files are listed.

Figure 73: Browse for a Prefetch File List



2. Navigate to the file that you want to add and click Open. If you successfully open a file list, the files from the list appear in the File List page.

Figure 74: Prefetch Wizard: File List Page



Deleting Files from the Prefetch File List

You can delete files from the file list after you have added them.

To delete files from the Prefetch File List:

- 1 Select the files that you want to delete.
- 2 Click the Delete button in the File List page. A message appears, prompting you to confirm deletion of the files.

Figure 75: Delete Items Verification Message

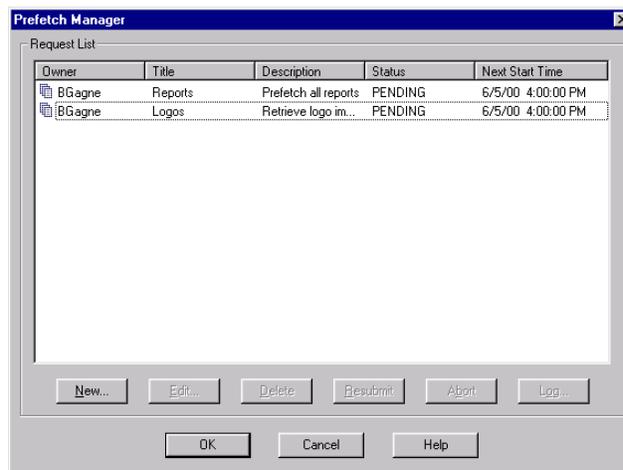
- 3 Click Yes. The selected files are deleted from the list.

Completing Request Configuration

After adding the correct files to the Prefetch File List page of the Prefetch wizard, you can complete the request configuration.

To complete the request configuration:

- Click Finish. The request appears in the Request List in the Prefetch Manager dialog box.

Figure 76: Prefetch Manager Dialog Box

Once a prefetch request appears in the Prefetch Manager request list, and until it is processed, that request can be edited (using the wizard), deleted, resubmitted, and aborted using the appropriate buttons in this dialog box. You can also add new prefetch requests to the request(s) listed in the Prefetch Manager.

NOTE

Prefetch is a memory intensive procedure. To optimize performance, create several prefetch requests with smaller file lists instead of one request with a large file list.

CHAPTER FOUR

SPACE MANAGEMENT

The idea of using a file migration system to help you manage your data and files is to also help you manage data storage space. After file data is moved to storage media, that data can be removed from the local storage space, freeing up that space for additional files. The key is to maintain as much local storage space as possible while still making files easily available. So that ultimately your data management system is also a space management system.

Space management refers to management of the available space on your extended drive. An extended drive is called such because its storage capacity is “extended” for use by DISKXTENDER’s file migration services. DISKXTENDER allows you to “extend” an NTFS-formatted hard drive on a DX computer by moving files to media for storage while making the files appear to remain on the hard drive.

Those files appear to remain on the hard drive because DX uses a “file tag” to identify the file after the file data is removed. Removing file data while leaving the file tag behind is called a purge. The file is still accessible, and to a client workstation, appears to be saved on the extended drive volume. When the client requests the file, DX goes to the media where the file is stored and retrieves the file data, displaying it for the client.

In some instances, you may also want to delete files completely when they are no longer of use. DISKXTENDER allows you to set up delete rules for files that set specific criteria for what files are to be deleted from both the extended drive and the storage media.

The extended drive, media folders, move groups and move rules, their creation and management are what enable and automate file migration in your data management system. The purge rules (and the purge after move setting in move rules), and delete rules are what enable and automate space management within your data management system. This chapter, devoted to a discussion on managing the space on your extended drive, discusses creation, configuration, and management of purge rules and delete rules in DX.

For details on the creation of extended drives and media folders, and creation and management of move groups and move rules, see *Chapter Two: Setting Up File Migration* on page 31.

We recommend that you periodically back up your extended drives in order to preserve any data that has not yet been migrated to media, and in the event files deleted from your DX system in error need to be recovered. See the Extended Drive Administration chapter of the DX2000 System Guide for more information on scheduling regular extended drive backups.

PURGING DISKXTENDER FILES

Once files have been moved to media, they can be purged from the extended drive, creating more space for new files. When files are purged, the data in the file is removed from the extended drive and a “file tag” is left behind. The “file tag” contains information about the file including name, size, age and other attributes. It is this tag that allows purged files to appear to remain on the extended drive volume, making them accessible to clients.

When a client requests a purged file, DX goes to the media where the file is stored, and retrieves the file data, displaying it for the client. Depending on the type of storage media you are using, this retrieval (called a fetch) could take up to several minutes, particularly if there are several other fetches processing, and available media drives are already in use.

Because space and file retrieval requirements vary, DISKXTENDER provides several different ways to purge files from the extended drive. In addition, DX allows you to be very specific as to when files are purged from the extended drive; either as files qualify for purging, or only when used extended drive space reaches a specified level or “watermark.”

PURGE LIST

The Purge List is a listing of files on the extended drive, which based on configured purge rules, are due to be purged. It is this list that tells DISKXTENDER what files need to be purged.

Files are written to the purge list in two ways:

- ↪ As soon as a file is moved to media, DX checks to see if it qualifies for a configured purge rule. If it does, the file is written to the purge list.
- ↪ During an extended drive scan, DX checks all extended drive files (that have previously been moved to media) to see which ones qualify for configured purge rules. This captures all files that qualify for a purge rule with an age specification (also called time-delay or age-delay). When a file qualifies for a purge rule after a specified time-delay, the file is written to the purge list during the next drive scan.

When the purge list is processed, the files written to it are purged from the extended drive. By default, the purge list will begin to be processed when the purge start watermark is reached. The purge start watermark is simply an identification of how much space on the extended drive must be filled (in percentage) before files will be purged. The default is 95 percent.

The processing of the purge list (purging of files) will continue until the purge stop watermark is reached. The purge stop watermark is simply an identification of how much space on the extended drive must be filled (in percentage) before processing of the purge list will stop. The default is 90 percent.

The percentage of extended drive space between the purge start and the purge stop watermarks is how much space must be reclaimed for use by purging files from the extended drive through processing the purge list.

The purge start and purge stop watermarks are configured through the extended drive Properties using the Options tab. For more information on configuring extended drive options, see the Extended Drive Administration chapter of the DX2000 System Guide.

WHEN TO PURGE FILES

Files cannot be purged from the extended drive until they are moved to media. However, once a file is moved to media, you can choose whether to purge that file from the extended drive immediately, or wait until a specified period of time has passed, or purge the file when extended drive space is low, or choose not to purge the file at all, leaving the file data on the extended drive.

Which option you choose is likely determined by a number of factors, including the type of storage media you are using, how much space you have on your extended drive and how often files are normally accessed. For example, if you are using NAS as your storage media, you may want to purge all files as soon as they have been moved because file retrieval from NAS is much faster than with other types of media. Or, if you only want to remove infrequently used files, you may decide to purge files only after a certain number of days have passed since they were last accessed.

In addition, if you disabled certain time periods on the Allow fetches from media schedule to create a time-based restriction of access to purged files, you may want to take that into consideration when determining when to purge files. Purge rules can be used to purge files based on the age of the file. That capability, in combination with one or more of the purge options described below, allows you to maintain necessary extended drive space, while still allowing client access to needed files, regardless of media access restrictions.

Purge Immediately After Move (Move Rule Option)

The option to purge files immediately after they have been moved to media is configured in move rules as opposed to purge rules. This is because the attribute that qualifies the file to be purged is that it was moved to media with no other qualifier necessary.

When the Purge file immediately after move option is enabled in a move rule, the files that qualify for the move rule are moved to media and their data is immediately purged. They are never written to the purge list. Purging files in this way allows you to maintain a high volume of free space on your extended drive and is particularly useful if your storage media allows for fast retrieval of files upon client request.

Purging files immediately after they are moved to media and then setting up prefetch requests for frequently used files allows you to manage very specifically what file data is resident on the extended drive and when. Using these two options in conjunction with one another gives you a great deal of control over your extended drive space. For information on configuring the Purge files immediately after move

option for your move rules, and for instructions on using the Prefetch Manager, see *Using The Prefetch Manager* on page 120.

Purge During Drive Scans (Purge Rule Option)

Setting up purge rules allows you to specify what files will be purged from the extended drive and when. One of the options for your purge rules allows you to set up DX to purge files that qualify for the purge rule during the next drive scan rather than when the used extended drive space reaches the purge start watermark.

When a file is moved to media, DX checks to see if it qualifies for a purge rule. If it does, that file is written to the purge list. When the next extended drive scan is run (either scheduled or forced), all files qualifying for purge under a purge rule with the Purge files during extended drive scans option enabled are purged from the extended drive.

Using this option in conjunction with regularly scheduled extended drive scans helps maintain a high volume of free space on your extended drive. For information on configuring your extended drive scan schedule, see the Extended Drive Administration chapter of the DX2000 System Guide.

Purge As Disk Space Needed (Purge Rule Option)

Because setting up purge rules is designed to make sure there is always a useful amount of space on the extended drive for new files, the default setup for purging files is to do so only when the free space on the extended drive reaches a critical level.

When a file is moved to media, DX checks to see if it qualifies for a purge rule. If it does, that file is written to the purge list. Unless otherwise specified, the files written to the purge list are not purged from the extended drive until the drive's used space reaches the purge start watermark, as configured in the extended drive properties. In addition, the purge list is only processed (listed files purged) until the purge stop watermark is reached (also configured through the extended drive properties).

The Purge files matching as disk space is needed option for the purge rules also allows you to set up a priority system for purging qualified files. Purging files in this way assures that file data will remain on the extended drive until purging them to recover space on the extended drive is absolutely necessary. This method is recommended if you are using a type of storage media that does not allow for fast retrieval of files.

Move Without Purge (Files Never Purged)

It is not necessary to purge files from your extended drive. However, files moved to media remain resident on the extended drive if they are not purged. Files then use up twice as much space as is necessary, as the files are now saved on both the extended drive and the media. Filling up extended drive space to capacity could also cause problems if extended drive space is required to run a DX function such as compaction.

Setting up file migration without purging files may be useful if you are only using your DX system for file backup or extended drive mirroring. However, if you are using DX as a tool to manage files and file space, we recommend purging files at a point that makes the most sense for proper maintenance of your DX system.

PURGE RULES

DX allows you to configure purge rules to reclaim space on the extended drive by truncating DX files after those files have been moved to media.

Purge rules control when file data from moved files is purged from the hard drive. Purge rules are designed to allow you to configure, very specifically, what files in a media folder will have their file data removed from the extended drive. You can configure file purging based on file age, file extension, file attributes and file size.

When a file's data is purged by DISKXTENDER, it is removed from the extended drive and exists only on media. A file "tag" is left on the drive, which makes the file appear to be present on the drive and points to the file data on the media.

When a user opens a file tag, DX automatically retrieves the file data from media and either restores it to the extended drive (called a fetch) or reads the file data directly from media (called a direct read). To the user, the data retrieval from media is seamless, but may take slightly longer than it would if the file data was on the drive. You may want to keep the file data on the extended drive for files frequently accessed by clients, to speed file access. You could also schedule a prefetch to retrieve frequently used files after they have been purged. For instructions on scheduling prefetch requests, see *Using The Prefetch Manager* on page 120.

The purge list for each extended drive is constructed by DX based on the purge rules you create. The contents of the purge list dictates what files are truncated. When the purge watermarks for the extended drive are reached, the purge list is processed and files are truncated to free space on the drive and prevent the drive from overfilling.

If the file qualifies for purge under a purge rule that *does not* have a file age exclusion or time delay specified, DX immediately adds the file to the purge list after

the file is moved to media. If the file qualifies for purge under a purge rule that *does* have a file age exclusion or time delay specified, DX adds the file to the purge list during the first extended drive scan after the time delay has expired.

NOTE 

DX does not attempt to qualify files for purge until they have been moved to media. Therefore, only files that have been moved to media can be purged using purge rules.

NOTE 

Both forced and scheduled Drive Scans write time-delayed files to the purge list, and you may force an extended drive scan whenever necessary. However, to ensure that all qualified files are purged from the extended drive when appropriate, we recommend you set up a regular drive scan schedule for each extended drive.

CREATING PURGE RULES

Creating purge rules is done through a wizard. The Purge Rule Wizard leads you through the step-by-step process of creating and configuring a purge rule. Several pages of the wizard lead you through the purge rule properties. This allows you to configure your purge rule properties at the time you create the purge rule. You can also access and change these configurations later.

For clarity and speed, the following procedures for creating purge rules do not cover these configurations in detail. For a discussion of each of the Purge Rule Properties pages, see *Purge Rule Properties* on page 151. This section immediately follows the instructions for creating your purge rules.

NOTE 

Only files that have been moved to media can be purged from the extended drive. Files that qualify for the purge rule but that have not been migrated to media will not be purged.

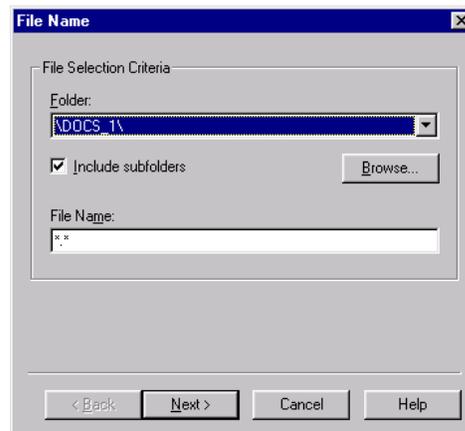
Starting the Purge Rule Wizard

This section describes how to start the purge rule wizard and briefly describes how to configure the File Name page.

To start the purge rule wizard:

- 1 Right-click the Purge Rules node under the appropriate media folder and select New from the shortcut menu. The purge rule wizard appears, starting with the File Name page.

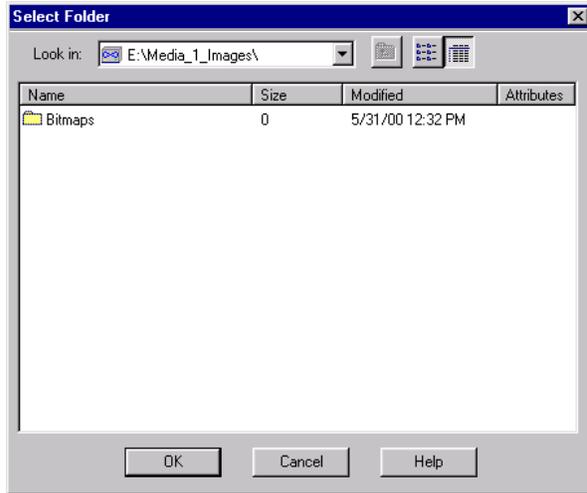
Figure 77: File Name Page



The File Name page allows you to define the location and extension for the files to be purged.

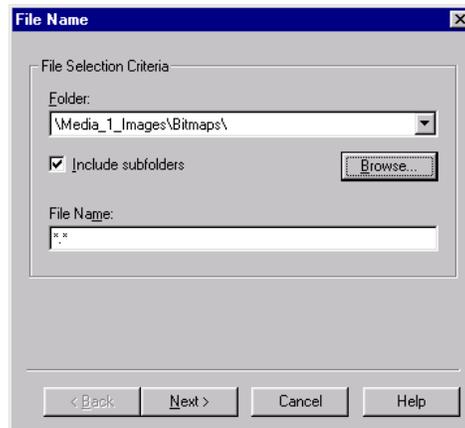
- 2 Select the Folder containing the files for which you want to configure this purge rule. The active media folder is listed by default. To select a subfolder of the media folder, click Browse. The Select Folder window appears.

Figure 78: Select Folder Window



- 3 Select the subfolder to use for the purge rule and click OK. The file path appears in the Folder box of the File Name page.

Figure 79: File Name Page



NOTE

You cannot include more than one subfolder of the media folder in a single purge rule. You can include either one or all subfolders only. To purge files in a different subfolder, create a second purge rule.

- 4 Enable or disable the option to include all subfolders in the folder listed in the Folder text box.
- 5 In the File Name text box, enter the file specification to determine which files are to be purged using this purge rule. For example, entering * .DOC will apply this purge rule to all files in the specified media folder with a DOC extension.

NOTE

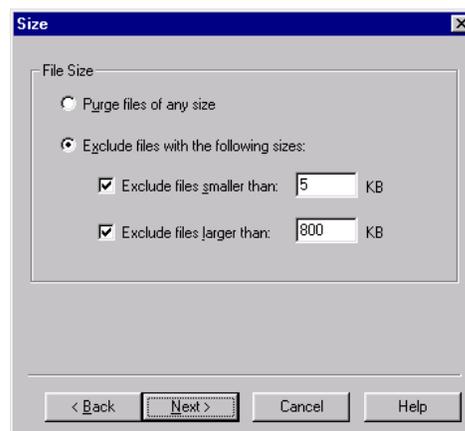
Only one specified file extension can be configured per purge rule. To purge files of different specified extensions in the same folder, create a second purge rule. For more information on using wildcards to designate specific file names for purge, see *The File Name Tab* on page 152.

- 6 Click Next. The Size Page appears.

Configuring the Purge Rule Wizard Size Page

The Size page allows you to choose to purge all files in the path or configure a specific size range for the files affected by the purge rule.

Figure 80: Size Page



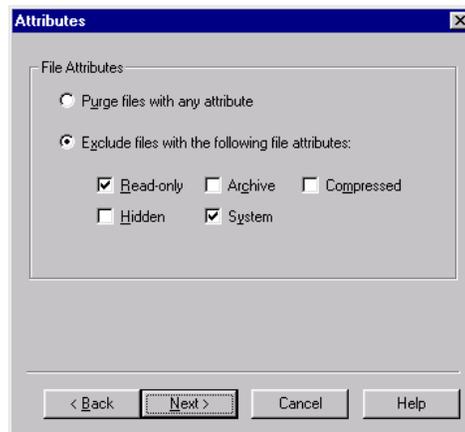
To continue the purge rule wizard:

- 1 You have the following choices:
 - ↳ To purge files of all sizes, select Purge files of any size.
 - ↳ To configure a file size range for exclusion from the purge rule, select the Exclude files with the following sizes option, enable the appropriate checkboxes, and enter the sizes as appropriate.
- 2 Click Next. The Attributes page appears.

Configuring the Purge Rule Wizard Attributes Page

The Attributes page allows you to select to only purge files with the specified attributes.

Figure 81: Attributes Page



To continue the purge rule wizard:

- 1 You have the following choices:
 - ↳ To purge files regardless of attribute, select Purge files with any attribute.
 - ↳ To exclude files with particular attributes, select Exclude files with the following file attributes and then enable the options for the attributes for files that should *not* be purged.

WARNING 

Attributes for existing files can be viewed through Windows Explorer. When extending a system drive, be sure to exclude files with the System attribute to prevent operating system file purge. Extending a system drive with DX is not recommended and may cause severe operating system damage.

- 2 Click Next. The Age page appears.

Configuring the Purge Rule Wizard Age Page

The Age page allows you to purge files of any age or exclude files of a particular age.

Figure 82: Age Page



To continue the purge rule wizard:

- 1 You have the following choices:
 - ↖ To purge files regardless of age, select Purge files with any age.
 - ↖ To exclude files within a particular age range, enable the Exclude files with an age less than option and then enter the number of days that must elapse before a file is purged. Set the date from which that file age is calculated by selecting one of the following options from the Since drop-down list: Create time, Last write time, Last access time.
- 2 Click Next. The Settings page appears.

Configuring the Purge Rule Wizard Settings Page

The Settings page allows you to specify parameters for when files are purged.

Figure 83: Settings Page



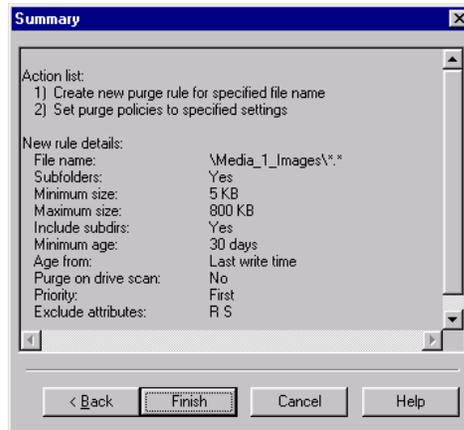
To continue the purge rule wizard:

- 1 You have the following choices:
 - ✎ To purge files only when space is needed, select Purge files matching this rule as disk space is needed and choose the priority for purge of the files covered by the rule.
 - ✎ To configure the rule to purge files as soon as DISKXTENDER finds them during a drive scan, select Purge files matching this rule during extended drive scans.
- 2 Click Next. The Summary Page appears.

Completing the Purge Rule Wizard

The Summary page allows you to review the information that you have provided. If necessary, you can click Back to make a change on a previous page.

Figure 84: Summary Page



To complete the purge rule wizard:

- Review the information you have provided through the Purge Rule wizard. If the information in the Summary is correct, click Finish. The purge rule is created and appears under the Purge Rules node of the media folder on the extended drives tree.

MANAGING PURGE RULES

You can open the properties for purge rules you have already configured and adjust those properties. Purge rules control what files on the extended drive get purged. The path where the files are located is specified, as well as file parameters delimiting which files within the path are affected by the rule. The file parameters available to select files for purging include file extension, file attributes, and file size. You can also control when files are added to the purge list.

NOTE

Only files that have been moved to media can be purged from the extended drive. Files that qualify for the purge rule but that have not been migrated to media will not be purged until the file is moved.

PURGE RULE PROPERTIES

The Purge Rule Properties dialog box contains six tabs: File Name, Size, Attributes, Age, Settings and Statistics. All but the Statistics tab correspond to pages in the Purge Rule Wizard and contain the purge rule properties configured when you created the purge rule.

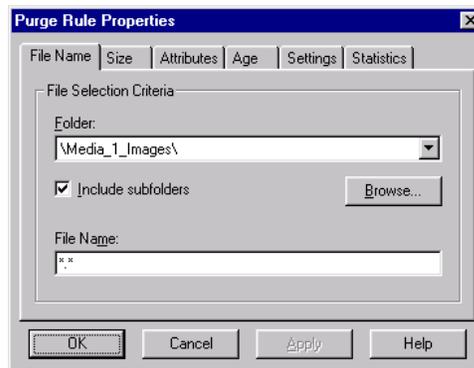
Accessing the Purge Rule Properties and selecting each of the tabs allows you to view and change the settings established when the purge rule was created. You can change the rule name, change or disable the file size specifications, change or disable the exclusion of files based on file attributes, change or disable the age (time delay) specifications for purging files and select whether to purge files when they qualify for purge or to purge qualifying files only when extended drive disk space is needed.

The following sections discuss each of the tabs and their available options.

To access the purge rule properties:

- Right-click the purge rule whose properties you want to view, and select Properties from the shortcut menu. The Purge Rule Properties dialog box appears with the File Name Tab active by default.

Figure 85: Purge Rule Properties Dialog Box



As with most Properties functions in DISKXTENDER, after making changes you have three options:

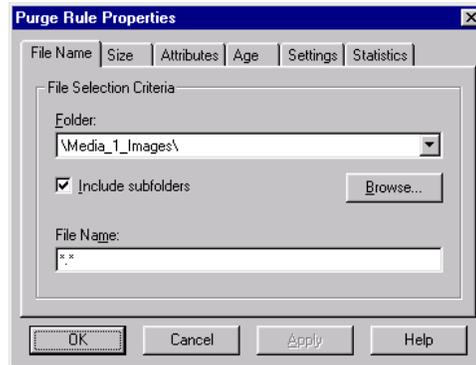
- ↵ To save changes and close the Properties dialog box, click OK.
- ↵ To save changes and keep the Properties dialog box open, click Apply.
- ↵ To discard all changes made since the Properties dialog box was opened and close the Properties dialog box, click Cancel.

The File Name Tab

The File Name tab is the tab that first appears when you open the Purge Rule Properties dialog box. The File Name tab allows you to view and change the folder and file name specifications for the purge rule.

To view the file name tab:

- Click the File Name tab in the Purge Rule Properties dialog box. The File Name tab appears.

Figure 86: Purge Rule Properties: File Name Tab

The Folder text box allows you to change the location of files to which the purge rule will be applied. You have the following choices:

- To apply the purge rule to files in a different folder, select the folder/path from the Folder drop-down list. To select a specific subfolder within the active media folder, click Browse.
- Enable or disable the Include subfolders option. If enabled, all files in the specified folder, and all subfolders and their files will be subject to the purge rule. If disabled, only the files in the specified directory will be subject to the purge rule.

NOTE

You cannot include more than one select subfolder of the media folder in a single purge rule. You can include either one or all subfolders only. To purge files in a different subfolder, create a second purge rule.

In order to change to which files in the specified location the purge rule will be applied, you can use the standard windows asterisk (*) wildcard to select only files with specific extensions or naming conventions for purging. The asterisk represents one or more characters in the name or extension part of the file name. For example:

- To apply the purge rule to all files in the directory, type *.* in the File Name text box.

- ✎ To apply the purge rule to only files of a particular type, type in an asterisk before the period and the appropriate file extension after the period. For example, to purge only bitmaps, type * .BMP in the File Name text box.
- ✎ To apply the purge rule to files with a certain naming convention use the asterisk as part of the file name. For example, to purge only files indicated as reports, type *REPORT . * or *REPORT* . * in the file name text box.
- ✎ To use the wildcard to specify only files of a certain type with a specific naming convention, use the asterisk in the name part of the file name while specifying the file extension. For example, to purge only text files indicated as reports, type *REPORT* . TXT in the file name text box.

NOTE

Only one file name specification can be configured per purge rule. To purge files of a different specification in the same folder, create a second purge rule.

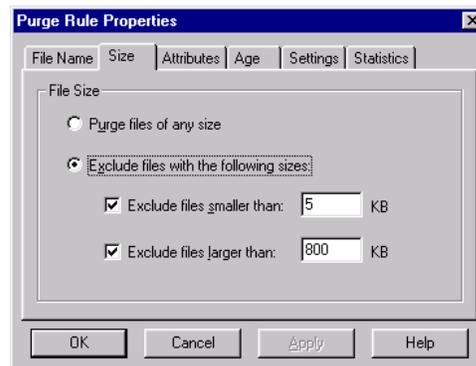
The Size Tab

The Size tab allows you to view and change the file size qualifications for the purge rule.

To view the size tab:

- ➔ Click the Size tab in the Purge Rule Properties dialog box. The Size tab appears.

Figure 87: Purge Rule Properties: Size Tab



To purge files of all sizes, select Purge files of any size. This is the default.

To only purge files of a specified size range, select the Exclude files with the following sizes. You have the following options:

- Enable the Exclude files smaller than __ KB. In the text box, type in the number of kilobytes (KB) that a file must match or exceed in order to be purged from the extended drive.
- Enable the Exclude files larger than __ KB. In the text box, type in the number of kilobytes (KB) that a file must be equal to or smaller than in order to be purged from the extended drive.

If both options are enabled, only files whose size falls in between the kilobyte specifications will be subjected to the purge rule. Files whose size falls outside of the range set by both options will never qualify for purging from the extended drive under this purge rule.

The Attributes Tab

The Attributes tab allows you to view and change the specific file attribute qualifications for the purge rule.

To view the attributes tab:

- 1 Click the Attributes tab in the Purge Rule Properties dialog box. The Attributes tab appears.

Figure 88: Purge Rule Properties: Attributes Tab



- 2 You have the following choices:
 - ↳ To purge files with any attributes, select Purge files with any attribute. This is the default.
 - ↳ To exclude files with certain attributes from being purged from the extended drive, select Exclude files with the following attributes. Then click a check in the boxes corresponding to the attributes that will disqualify a file from being purged from the extended drive.

WARNING

Attributes for existing files can be viewed through Windows Explorer. When extending a system drive, be sure to exclude files with the System attribute to prevent operating system file purge. Extending a system drive with DX is *not recommended* and may cause severe operating system damage.

The Age Tab

The Age Tab allows you to configure a time delay for the purging of files from the extended drive.

If there is no age specification configured for the purge rule, all files that have been moved to media and that otherwise qualify for purge under this purge rule will be written to the purge list.

If an age specification is configured for the purge rule, all files that have been moved to media and that otherwise qualify for purge under this purge rule will be written to the purge list when the entered number of days has elapsed since the selected file action, *and* the next drive scan is run.

To view the age tab:

- Click the Age tab in the Purge Rule Properties dialog box. The Age tab appears.

Figure 89: Purge Rule Properties: Age Tab

If you want to purge files regardless of age, select Purge files with any age. This is the default.

To exclude files from being purged from the extended drive until a certain number of days have passed since a specific file action, enable the Exclude files with an age less than option. Then configure the following options:

- ✎ In the Days text box type in the number of days you want to elapse from the file action trigger before the file is purged.
- ✎ Select the appropriate file action trigger from the Since drop-down box: Create time, Last access time or Last write time.

The Settings Tab

The Settings tab allows you to determine when the files qualifying for purge under this purge rule are actually purged from the extended drive. You can configure DX to purge these files immediately upon being added to the purge list during an extended drive scan, or you can select to purge these files only as disk space is needed on the extended drive.

To view the settings tab:

- 1 Click the Settings tab in the Purge Rule Properties dialog box. The Settings tab appears.

Figure 90: Purge Rule Properties: Settings Tab



2 You have two options:

- ↪ If you select the Purge files matching this rule as disk space is needed option, files that qualify for this purge rule will be written to the purge list when they qualify, but will not be purged from the extended drive until the extended drive used space watermark is reached. At that time, the purge list is processed and files are purged from the extended drive. This is the default.
- ↪ If you select the Purge files matching this rule during extended drive scans option, files written to the purge list during an extended drive scan by qualifying for this purge rule, are purged immediately.

Extended drive scans (both scheduled and forced) write qualifying files with an age-delay configured to the purge lists. In order to see that files are written to both move and purge lists as appropriate, we recommend setting a regular extended drive scan schedule. In addition, the watermark for determining when to process the purge file list to free up needed disk space is configured through the Extended Drive Properties dialog box, using the Options tab. For more information on extended drive options and extended drive scan scheduling, see the Extended Drive Administration chapter of the DX2000 System Guide.

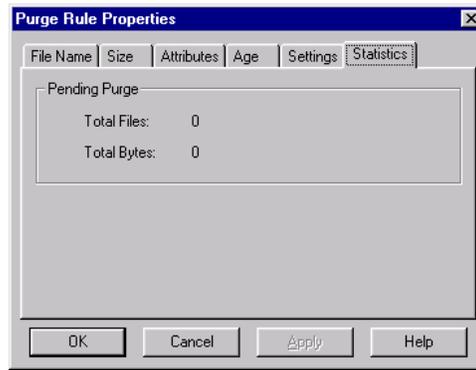
The Statistics Tab

The Statistics tab provides pending file purge statistics from the most recent drive scan. The statistics shown pertain only to the files selected for purge by qualifying for this purge rule, and are valid only until the next extended drive scan.

To view the statistics tab:

- Click the Statistics tab in the Purge Rule Properties dialog box. The Statistics tab appears.

Figure 91: Purge Rule Properties: Statistics Tab



The items shown on the Statistics tab are as follows:

Table 18: Statistics Tab: Pending Purge Information

ITEM:	DESCRIPTION:
Total Files	The number of files that at the time of the last drive scan qualified for purging from the extended drive using this purge rule.
Total Bytes	The total size, in bytes, of all files that at the time of the last drive scan qualified for purging from the extended drive using this purge rule.

DELETING A PURGE RULE

A purge rule can easily be deleted from the media folder. Deleting a purge rule deletes all configured options for that purge rule.

To delete a purge rule:

- 1 Right-click the purge rule that you want to delete and select Delete from the shortcut menu.
- 2 A message appears, prompting you to verify the deletion. Click Yes.

The purge rule is deleted and no longer appears in the Purge Rule node for that media folder in the extended drive tree.

DELETE RULES

In certain situations, you may not want to keep files after a certain period of time, even on storage media. You can use delete rules to automatically delete files from both the extended drive and from storage media. When a file becomes eligible for deletion under a delete rule, it is deleted from the extended drive by DX and marked for deletion on the media. The file may still exist on a piece of media, but it becomes an “orphaned” file and is no longer recognized or tracked by DX.

When the storage media that the file was moved to (and then deleted from) is compacted, DX does not copy deleted files from the original piece of media back to the extended drive. Files on compacted media are actually deleted when the compacted media is reformatted. While it may be possible to recover deleted files from storage media, we do not support this recovery and recommend you use extreme caution if using delete rules to delete files on a regular basis.

Since files qualifying for deletion are not deleted until the media is compacted and reformatted, you may wish to set up the secure file delete option for your extended drive. The Use secure file delete option can be found in the Extended Drive Properties dialog box on the Options tab. When a file is deleted and the Use secure file delete option is enabled, the file is actually overwritten with bogus data, so that the original file cannot be recovered, even if the media is never reformatted. For more information on setting up your extended drive properties, see the Extended Drive Administration chapter of the DX2000 System Guide.

WARNING 

It is important to note that DX does not keep copies of deleted files anywhere in the DX system. To simply clear space on the extended drive, but retain file data on storage media, use purge rules rather than delete rules.

CREATING DELETE RULES

Creating delete rules is done through a wizard. The Delete Rule Wizard leads you through the step-by-step process of creating and configuring a delete rule. Several pages of the wizard lead you through the delete rule properties. This allows you to configure your delete rule properties at the time you create the delete rule. You can also access and change these configurations later.

For clarity and speed, the following procedures for creating delete rules do not cover these configurations in detail. For a discussion of each of the Delete Rule Properties pages, see *Delete Rule Properties* on page 169. This section immediately follows the instructions for creating your delete rules.

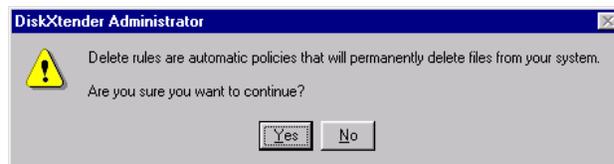
Starting the Delete Rule Wizard

This section describes how to start the delete rule wizard and briefly describes how to configure the File Name page.

To start the delete rule wizard:

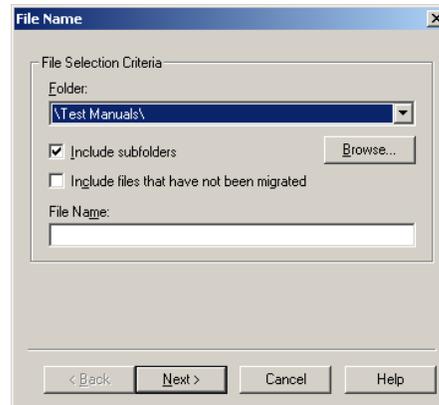
- 1 Right-click the Delete Rules node under the appropriate media folder and select New from the shortcut menu. A verification message appears.

Figure 92: Create Delete Rule Verification Message



- 2 Click Yes to continue. The Delete Rule Wizard opens, starting with the File Name page.

Figure 93: File Name Page



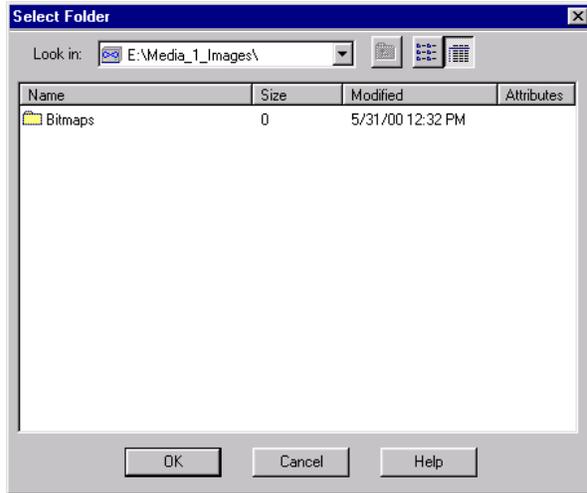
The File Name page allows you to define the location and extension for the files to be deleted. You can also select to Include subfolders and Include files that have not been migrated. Unlike the corresponding page in the move and purge rule wizards, the File Name textbox is empty and requires you to enter information before moving on with the wizard.

WARNING

If you check the Include files that have not been migrated option, DX will attempt to qualify *all* files in the media folder against the delete rule(s), *regardless* of whether the files have been moved to media or not.

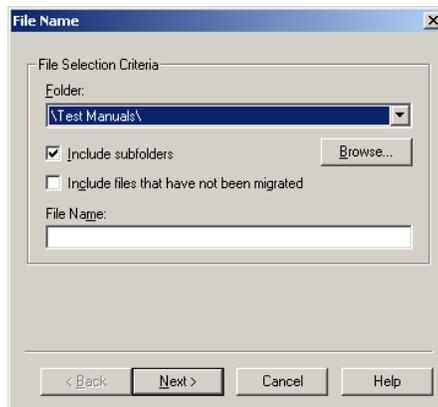
- 3 Select the Folder containing the files for which you want to configure this delete rule. The active media folder is listed by default. To select a subfolder of the media folder, click Browse. The Select Folder dialog box appears.

Figure 94: Select Folder Dialog Box



- 4 Select the subfolder to use for the delete rule and click OK. The file path appears in the Folder box of the File Name page.

Figure 95: File Name Page



NOTE

You cannot include more than one subfolder of the media folder in a single delete rule. You can include either one or all subfolders only. To delete files in a different subfolder, create a second delete rule.

- 5 Enable or disable the option to include all subfolders in the folder listed in the Folder text box.
- 6 Enable or disable the option to include files that have not been migrated for qualification against the delete rule.
- 7 In the File Name text box, enter the file specification to determine which files are to be deleted using this delete rule. For example, entering *.DOC will apply this delete rule to all files in the specified media folder with a DOC extension.

NOTE

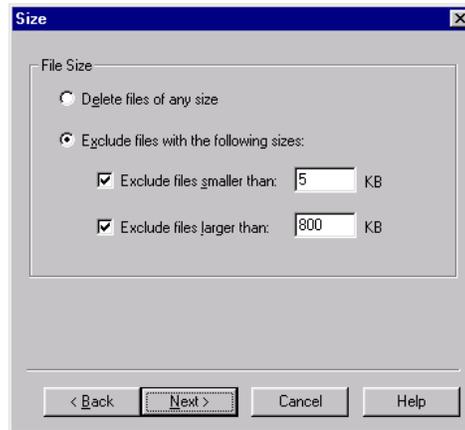
Only one specified file extension can be configured per delete rule. To delete files with a different specified extension in the same folder, create a second delete rule. For more information on using wildcards to designate specific file names for delete, see *The File Name Tab* on page 170.

- 8 Click Next. The Size Page appears.

Configuring the Delete Rule Wizard Size Page

The Size page allows you to choose to delete all files in the folder or configure a specific size range for the files affected by the delete rule.

Figure 96: Size Page



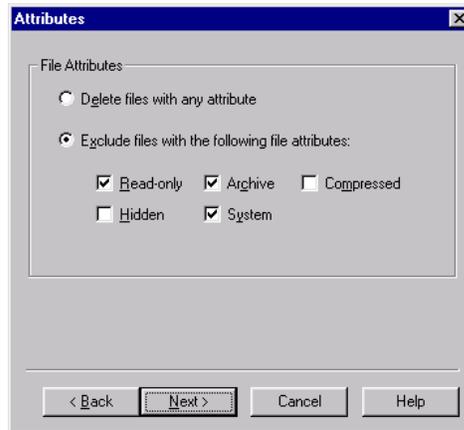
To continue the delete rule wizard:

- 1 You have the following choices:
 - ✎ To delete files of all sizes, select Delete files of any size.
 - ✎ To configure a file size range for exclusion from the delete rule, select the Exclude files with the following sizes option, enable the appropriate checkboxes, and enter the sizes as appropriate.
- 2 Click Next. The Attributes page appears.

Configuring the Delete Rule Wizard Attributes Page

The Attributes page allows you to select to only delete files with the specified attributes.

Figure 97: Attributes Page



To continue the delete rule wizard:

- 1 You have the following choices:
 - ↗ To delete files regardless of attributes, select Delete files with any attribute.
 - ↗ To exclude files with particular attributes, select Exclude files with the following file attributes, and then enable the options for the attributes for files that should *not* be deleted.

WARNING

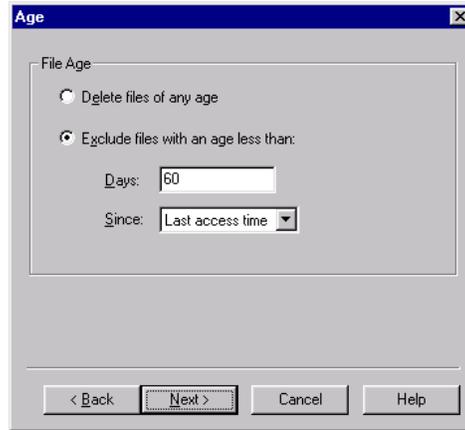
Attributes for existing files can be viewed through Windows Explorer. When extending a system drive, be sure to exclude files with the System attribute to prevent operating system file delete. Extending a system drive with DX is not recommended and may cause severe operating system damage.

- 2 Click Next. The Age page appears.

Configuring the Delete Rule Wizard Age Page

The Age page allows you to delete files of any age or exclude files of a particular age.

Figure 98: Age Page



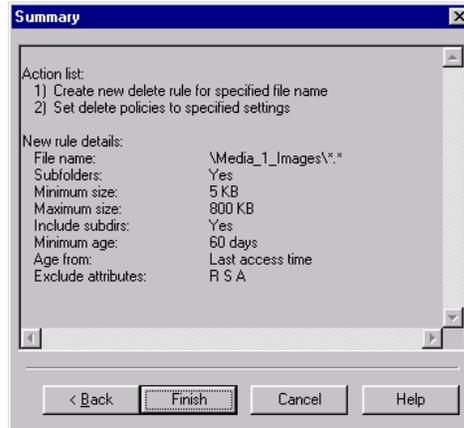
To continue the delete rule wizard:

- 1 You have the following choices:
 - ✎ To delete files regardless of age, select Delete files with any age.
 - ✎ To exclude files within a particular age range, enable the Exclude files with an age less than option and then enter the number of days that must elapse before a file is deleted. Set the date from which that file age is calculated by selecting one of the following options from the Since drop-down list: Create time, Last write time, Last access time.
- 2 Click Next. The Summary Page appears.

Completing the Delete Rule Wizard

The Summary page allows you to review the information that you have provided. If necessary, you can click Back to make a change on a previous page.

Figure 99: Summary Page



To continue the delete rule wizard:

- Review the information you have provided through the wizard. If the information in the Summary is correct, click Finish. The delete rule is created and appears under the Delete Rules node of the media folder in the extended drive tree.

MANAGING DELETE RULES

You can open the properties for an existing delete rule and modify the settings for that rule. Delete rules control what files in the media folder(s) on the extended drive are deleted. The path where the files are located is specified, as well as file parameters delimiting which files within the path are affected by the rule. You can set file parameters to select files including the file extension, file attributes, and file size. You can also configure a time delay for files, allowing them to be deleted only after a certain specified time period has elapsed since file creation, last file access, or last file write.

In the Extended Drives tree, each delete rule is listed under the Delete Rules node of each media folder and is represented by a skull and crossbones icon.

DELETE RULE PROPERTIES

The Delete Rule Properties dialog box contains four tabs: File Name, Size, Attributes, and Age. Each of the properties tabs corresponds to pages in the Delete Rule Wizard and contains the delete rule properties configured when you created the delete rule.

Accessing the Delete Rule Properties and selecting each of the tabs allows you to view and change the settings established when the delete rule was created. You can change the rule name, change or disable the file size specifications, change or disable the exclusion of files based on file attributes, and change or disable the age (time delay) specifications for deleting files.

The following sections discuss each of the tabs and their available options.

To access the delete rule properties:

- 1** Right-click the delete rule whose properties you want to view and select Properties from the shortcut menu. The Delete Rule Properties dialog box appears with the File Name Tab active by default.
- 2** As with most Properties functions in DISKXTENDER, after making changes you have three options:
 - ☞ To save changes and close the Properties dialog box, click OK.
 - ☞ To save changes and keep the Properties dialog box open, click Apply.
 - ☞ To discard all changes made since the Properties dialog box was opened and close the Properties dialog box, click Cancel.

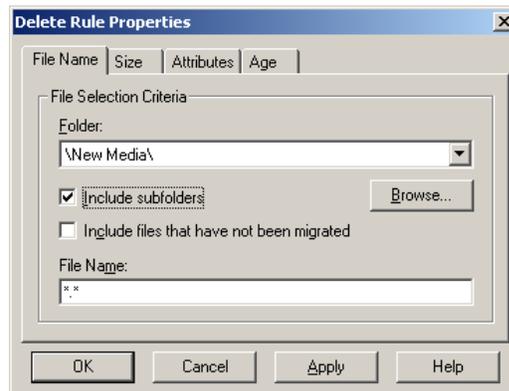
The File Name Tab

The File Name tab is the tab that first appears when you open the Delete Rule Properties dialog box. The File Name tab allows you to view and change the folder and file name specifications for the delete rule.

To view the file name tab:

- Click the File Name tab in the Delete Rule Properties dialog box. The File Name tab appears.

Figure 100: Delete Rule Properties: File Name Tab



The Folder text box allows you to change the location of files to which the delete group will be applied. You have the following choices:

- To apply the delete rule to files in a different folder, select the folder/path from the Folder drop-down list. To select a specific subfolder within the active media folder, click Browse.
- Enable or disable the Include subfolders option. If enabled, all files in the specified folder and all subfolders and their files will be subject to the delete rule. If disabled, only the files in the specified directory will be subject to the delete rule.
- Enable or disable the Include files that have not been migrated option. If enabled, **all** files in the specified folder will be subject to the delete rule. If disabled, only the files in the specified folder that have been migrated (moved to media) will be subject to the delete rule.

NOTE 

You cannot include more than one select subfolder of the media folder in a single delete rule. You can include either one or all subfolders only. To delete files in a different subfolder, create a second delete rule.

In order to change to which files in the specified location the delete rule will be applied, you can use the standard windows asterisk (*) wildcard to select only files with specific extensions or naming conventions for delete. The asterisk represents one or more characters in the name or extension part of the file name. For example:

- ↵ To apply the delete rule to all files in the directory, type * . * in the File Name text box.
- ↵ To apply the delete rule to only files of a particular type, type in an asterisk before the period and the appropriate file extension after the period. For example, to delete only bitmaps, type *.BMP in the File Name text box.
- ↵ To apply the delete rule to files with a certain naming convention use the asterisk as part of the file name. For example, to delete only files indicated as reports, type *REPORT . * or *REPORT* . * in the file name text box.
- ↵ To use the wildcard to specify only files of a certain type with a specific naming convention, use the asterisk in the name part of the file name while specifying the file extension. For example, to delete only text files indicated as reports, type *REPORT* . TXT in the file name text box.

NOTE 

Only one file name specification can be configured per delete rule. To delete files of a different specification in the same folder, create a second delete rule.

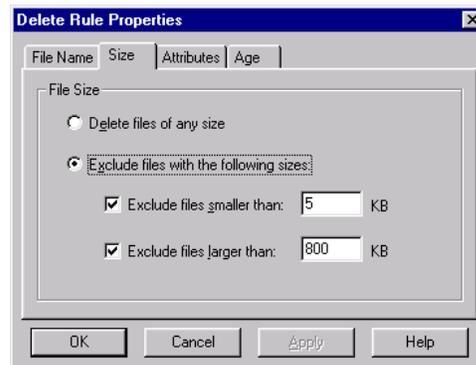
The Size Tab

The Size tab allows you to view and change the file size qualifications for the delete rule.

To view the size tab:

- Click the Size tab in the Delete Rule Properties dialog box. The Size tab appears.

Figure 101: Delete Rule Properties: Size Tab



To delete files of all sizes, select Delete files of any size. This is the default.

To only delete files of a specified size range, select the Exclude files with the following sizes. You have the following options:

- Enable the Exclude files smaller than __ KB. In the text box, type in the number of kilobytes (KB) that a file must match or exceed in order to be deleted.
- Enable the Exclude files larger than __ KB. In the text box, type in the number of kilobytes (KB) that a file must be equal to or smaller than in order to be deleted.

If both options are enabled, only files whose size falls in between the kilobyte specifications will be subject to the delete rule. Files whose size falls outside of the range set by both options will never qualify for deletion under this delete rule.

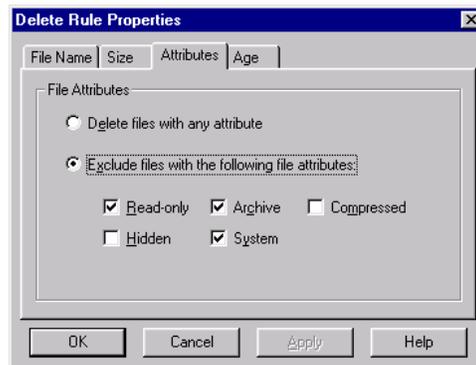
The Attributes Tab

The Attributes tab allows you to view and change the specific file attribute qualifications for the delete rule.

To view the attributes tab:

- Click the Attributes tab in the Delete Rule Properties dialog box. The Attributes tab appears.

Figure 102: Delete Rule Properties: Attributes Tab



You have the following choices:

- To delete files with any attributes, select Delete files with any attribute. This is the default.
- To exclude files with certain attributes from being deleted to media, select Exclude files with the following attributes. Then click a check in the boxes corresponding to the attributes that will disqualify a file from being deleted to media.

WARNING

Attributes for existing files can be viewed through Windows Explorer. When extending a system drive, be sure to exclude files with the System attribute to prevent operating system file delete. Extending a system drive with DX is not recommended and may cause severe operating system damage.

The Age Tab

The Age Tab allows you to configure a time delay for the deletion of files to media.

If an age specification is configured for the delete rule, all files that otherwise qualify for deletion under this delete rule will be deleted when the entered days have elapsed since the selected file action *and* the next drive scan is run.

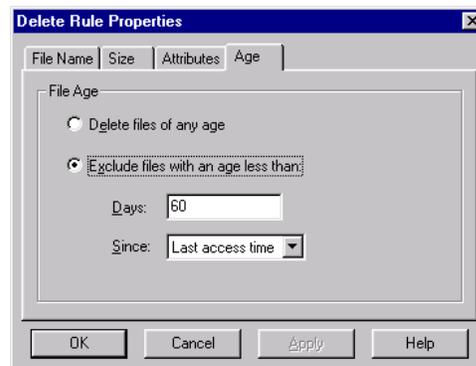
WARNING

If there is no age specification configured for the delete rule, all files that otherwise qualify for deletion under this delete rule, will be deleted immediately after the first drive scan.

To view the age tab:

- Click the Age tab in the Delete Rule Properties dialog box. The Age tab appears.

Figure 103: Delete Rule Properties: Age Tab



If you want to delete files regardless of age, select Delete files with any age. This is the default.

To exclude files from deletion until a certain number of days have passed since a specific file action, enable the Exclude files with an age less than option. Then configure the following options:

- In the Days text box type in the number of days you want to elapse from the file action trigger before the file is written to media.
- Select the appropriate file action trigger from the Since drop-down box: Create time, Last access time or Last write time.

DELETING A DELETE RULE

A delete rule can easily be deleted from the media folder. Deleting a delete rule deletes all configured options for that delete rule.

To delete a delete rule:

- 1 Right-click the delete rule that you want to delete and select Delete from the shortcut menu.
- 2 A message appears, prompting you to verify the deletion. Click Yes.

The delete rule is deleted and no longer appears in the Delete Rule node for that media folder in the extended drive tree.

CHAPTER FIVE

MANAGING STORAGE MEDIA

By adding media services for the DX computer, you create a supply of storage media that you can use to “extend” the NTFS volumes on DX computers. Media are listed in the DX system as soon as they are inserted in the device used by the media service, inventoried if necessary, and added to the media pool for an extended drive. For more information on configuring a media service to your DX computer, see the Media Services chapter of the DX2000 Getting Started Guide.

Media that have been allocated to the extended drive but are not yet in use by a media folder appear under the Available Media tree for each extended drive. Media that have been added to a media folder can be found under the Media node for the media folder.

When a piece of media is initially added to a media device, the system evaluates the media. After DX scans the piece of media, it is then placed in one of the six nodes in the media tree, depending on whether the media is formatted, labeled, or contains a recognized file system. Once media attributes are determined, the media can then be formatted, labeled, added to a media folder, or used to copy a piece of already existing media.

Although unassigned (Available) media are listed in a separate place from assigned (Media folder) media, the media management functionality is common to all DX media. For example, while different media tasks are available depending on the current use and status of the media, the interface for adding, editing, and deleting the tasks is the same.

A discussion of available media activities is provided here, as well as steps for accessing media commands and information via the shortcut menu. The commands available through the shortcut menu include the Edit Tasks function. Media Tasks are discussed only briefly in this chapter. For a detailed discussion on media tasks, see the *Storage Media Tasks* chapter beginning on page 225.

This chapter deals primarily with the general management of your storage media, regardless of its current use or status in the DX system. If you need detailed information on migrating files to storage media or recommendations on how to set up your extended drive to make use of your storage media, see *Chapter Two: Setting Up File Migration* on page 31.

THE AVAILABLE MEDIA TREE

The Available Media Tree contains all media allocated for an extended drive (through the media service(s)) not yet assigned to a media folder. There are seven nodes in the Media tree: Original, Copy, Duplicate, Blank, Foreign, Unknown and Unformatted Media.

ORIGINAL MEDIA

All media that have been prepared for use with DX 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:

- ↗ Assigned to the extended drive through the media service
- ↗ 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 being used as copies of Original media on the DX extended drive. 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 an original piece of media once the damaged media is removed from the extended drive.

DUPLICATE MEDIA

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

BLANK MEDIA

Blank media are media that have been formatted for use with DISKXTENDER but not labeled. Blank media can be labeled, reformatted, deleted, renamed, or labeled for use as a copy 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 with a file system not supported for that media type is considered by DX to be “foreign” media and is placed in the Foreign Media List. Media in this list can be formatted (if the media is of a type that DX supports), and its media properties viewed. Foreign media must be reformatted with the appropriate file system in order to be used for file migration.

UNKNOWN MEDIA

Unknown media encompasses any media in the hardware device that DISKXTENDER does not recognize. The problem could be an unsupported media type or an unsupported file system. For detailed information on what File Types and Media Types are supported by DX, see the Storage Media chapter of the Getting Started Guide.

UNFORMATTED MEDIA

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

MEDIA FUNCTIONS

When a piece of media is selected in the tree view or the contents view of the Administrator window, the Edit menu contains commands specific to the management of media on the extended drive. The commands available for media in the Edit menu are the same commands that appear in the shortcut menu when you right-click a piece of media in the tree view or the contents view.

Shortcut and Edit menu commands allow you to edit the media tasks assigned for that piece of media, stop a task in progress, and clear an error status for a piece of media. You can also view media activity logs or clear the media logs, and view the properties for the selected piece of media.

What menu commands are available to media is partially determined by the status of the media selected. For example, the Edit Tasks and Properties commands are always available, but the Abort Task in Progress command is only available when a task is processing.

ACCESSING THE MEDIA SHORTCUT MENU

For any piece of media, the shortcut menu allows you access to many common media functions and commands. The Shortcut menu is accessed by right-clicking a piece of media from the tree view or the contents view of the DX Administrator.

The commands available for media are the same whether accessed through the shortcut menu or through the Edit option on the main menu. Those commands are discussed in detail below.

Removing Media from a Media Folder

The Remove function removes media from its assigned media folder (and move group if applicable). Logically, the remove command is only available for media assigned to media folders.

WARNING

Removing media from a media folder removes all files (and file tags) on that media from the extended drive. To maintain immediate availability of those files, compact the media before removing it from the media folder.

To remove media from a media folder:

- 1 You have the following choices:
 - ✎ Right-click the media and select Remove from the shortcut menu.
 - ✎ Select the media and select Remove from the Edit menu.A verification message appears.
- 2 Click Yes. Another message appears stating that a drive scan must be run to complete removal of the media.
- 3 Click Yes to run the drive scan immediately. Click No to allow the next scheduled drive scan to complete removal of the media from the media folder.

Once a drive scan is run, the media is removed from the media folder and appears in the Original node of the Available Media tree for the extended drive.

Deallocating Media from the Extended Drive

For NAS, OTGMS, and TSM media, using the Deallocate command on the shortcut menu for media removes that piece of media from the extended drive and thereby from use by DISKXTENDER for file storage.

To deallocate NAS, OTGMS, or TSM media:

- 1 Remove the media from its media folder (if applicable). For instructions, see *Removing Media from a Media Folder* on page 180. The media should now appear in the Original node of the Available Media tree.
- 2 You have the following choices:
 - ✎ Right-click the media. A shortcut menu appears. From the shortcut menu, select Deallocate.
 - ✎ Select the media. From the Edit menu, select Deallocate.A verification message appears.
- 3 Click Yes. The media no longer appears in the Available Media tree.

For NAS, OTGMS, and TSM media, you can also use the Media Service Property dialog box to deallocate media from an extended drive. For instructions, see the following sections:

- ✎ *Deallocating NAS Media from an Extended Drive*, below
- ✎ *Deallocating OTGMS Media from an Extended Drive* on page 183
- ✎ *Deallocating Virtual TSM Media from an Extended Drive* on page 183

To deallocate ACSLS media, you must remove the media association with the DX extended drive through the UNIX interface. For instructions, see *Deallocating ACSLS Media from an Extended Drive (Assigning ACSLS media back to the system)* on page 184.

Deallocating NAS Media from an Extended Drive

The Media Service Property dialog box allows you to deallocate a piece of virtual NAS media from an extended drive.

NOTE

To deallocate NAS media, the NAS media service should be *online*. If you attempt to deallocate media while the media service is offline, the change may not take effect.

To deallocate a NAS media from an extended drive:

- 1 Remove the media from its media folder (if applicable). For instructions, see *Removing Media from a Media Folder* on page 180. The media should now appear in the Original node of the Available Media tree.
- 2 From the Service menu, select Configure Media Services. The Configure Media Services dialog box appears.
- 3 Select the NAS media service and click Properties (or double-click the media service). The Media Service Property dialog box appears.
- 4 Click the Media List tab.
- 5 You have the following choices:
 - ↳ Double-click the media you want to deallocate from the extended drive.
 - ↳ Select the media and click Deallocate. (You can use a standard Windows <Shift> or <Ctrl> technique to select more than one piece of media.)A progress message appears. The Media Service Property dialog box reappears, with the extended drive letter removed from the NAS media listing.

Deallocating OTGMS Media from an Extended Drive

The Media Service Property dialog box allows you to deallocate a piece of OTG MEDIASTOR media from an extended drive.

NOTE

To deallocate OTGMS media, the OTGMS media service should be *online*. If you attempt to deallocate media while the media service is offline, the changes may not take effect.

To deallocate an OTG MEDIASTOR media from an extended drive:

- 1 Remove the media from its media folder (if applicable). For instructions, see *Removing Media from a Media Folder* on page 180. The media should now appear in the Original node of the Available Media tree.
- 2 From the Service menu, select Configure Media Services. The Configure Media Services dialog box appears.
- 3 Select the OTGMS media service whose properties you want to edit and click Properties (or double-click the media service). The Media Service Property dialog box appears.
- 4 Click the Media List tab.
- 5 You have the following choices:
 -  Double-click the media that you want to deallocate from the extended drive.
 -  Select the media. (You can use a standard Windows <Shift> or <Ctrl> technique to select more than one piece of media.) Click Deallocate.A progress message appears. The Media Service Property dialog box reappears, listing the OTG MEDIASTOR media without the extended drive from which it was deallocated.

Deallocating Virtual TSM Media from an Extended Drive

The Media Service Property dialog box allows you to deallocate a piece of virtual TSM media from an extended drive.

NOTE

To deallocate TSM media, the TSM media service should be *online*. If you attempt to deallocate media while the media service is offline, the change may not take effect.

To deallocate virtual TSM media from an extended drive:

- 1 Remove the media from its media folder (if applicable). For instructions, see *Removing Media from a Media Folder* on page 180. The media should now appear in the Original node of the Available Media tree.
- 2 From the Service menu, select Configure Media Services. The Configure Media Services dialog box appears.
- 3 Select the TSM media service and click Properties. The Media Service Property dialog box appears.
- 4 Click the Media List tab.
- 5 You have the following choices:
 - ✎ Double-click the media that you want to deallocate from the extended drive.
 - ✎ Select the media. (You can use a standard Windows <Shift> or <Ctrl> technique to select more than one piece of media.) Click Deallocate.
- 6 A progress message appears. The Media Service Property dialog box reappears, listing the TSM media without the extended drive from which it was deallocated.

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 back to the system, effectively removing it from the DX extended drive (and the DX system altogether). All commands described in this procedure are entered on the Sun computer where ACSLS is installed.

To assign media to the system:

- 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 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 ACSSA 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 ACSSA Command Processor Window: "Set: set completed, Success."

Renaming Media

The Rename function allows you to rename media through the administrator without going through the format and label tasks. Renaming a piece of (writable) media changes the label identifier on that media. Renaming a piece of media does not affect the files or directories on the media.

The Rename command is only available for media that has already been formatted and labeled.

NOTE

While the Rename command is available for NAS media and non-rewritable media, the renaming is not permanent. The media reverts to its original label the next time the Administrator refreshes.

To rename a piece of media:

- 1 You have the following choices:
 -  Right-click the media and select Rename from the shortcut menu.
 -  Select the media and select Rename from the Edit menu.
 -  Select the media and click the Rename button on the toolbar.

Figure 104: Rename Toolbar Button



- 2 The media name appears highlighted in the tree view with a cursor. Retype the name as desired.
- 3 Press <ENTER> or click outside of the media name. The media is now listed with its new name.

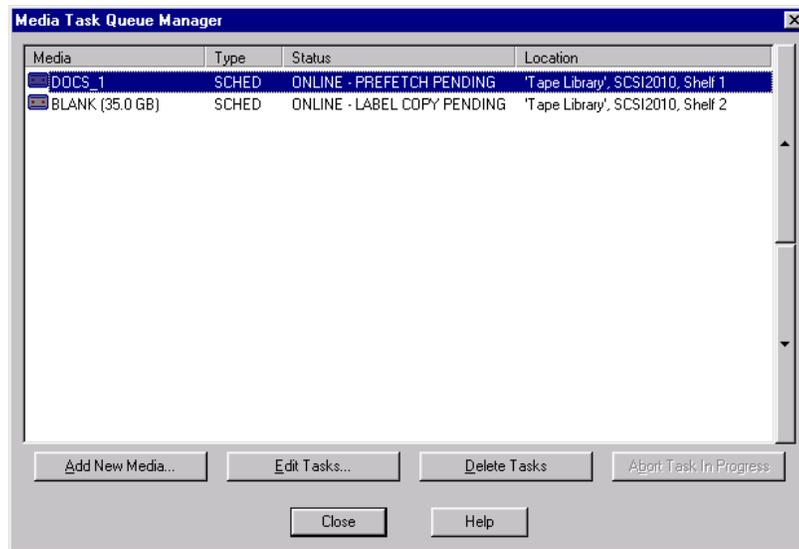
EDITING TASKS FOR INDIVIDUAL MEDIA

The Edit Task function opens the Media Tasks page. Through the Media Tasks page, you can add or remove tasks, or change option configurations for currently assigned tasks for the selected piece of media. The shortcut menu provides fast access to the Edit Tasks command.

Media Task Queue Manager

The Media Tasks page can also be opened through the Media Task Queue Manager, which is accessible from the Tools menu.

Figure 105: Media Task Queue Manager



The Media Task Queue Manager, in addition to providing access to editing media tasks, also allows you to delete all media tasks for a piece of media, to abort a task in progress, to add media and tasks to the queue and to change the order in which media is processed.

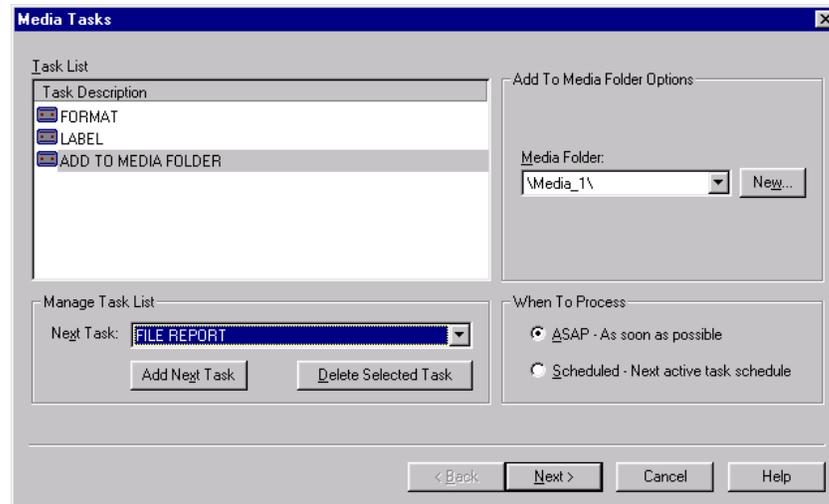
To edit tasks for media:

- 1 You have the following choices:

- ↖ Right-click the media and select Edit Tasks from the shortcut menu.
- ↖ Select the media and select Edit Tasks from the Edit menu.
- ↖ Select Media Task Manager from the Tools menu, select the media, and click Edit Tasks.

The Media Tasks page appears.

Figure 106: Media Tasks Page



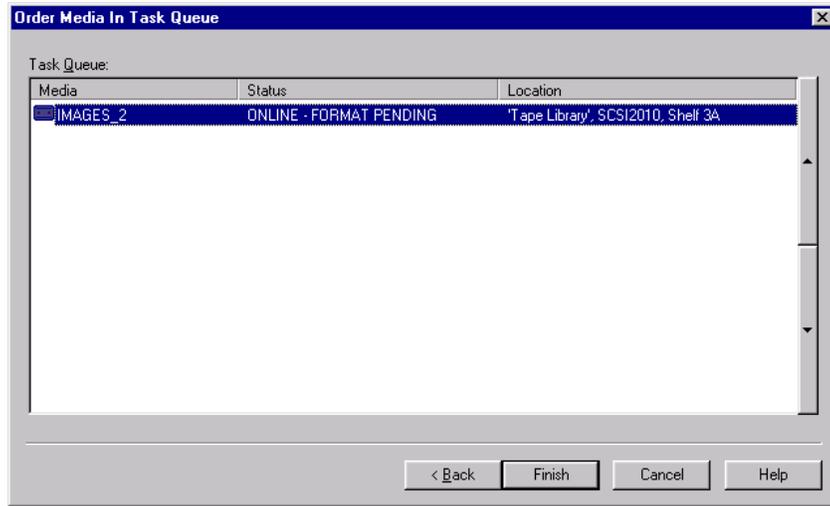
- 2 Add tasks, remove tasks or edit option configurations as needed. For more specific information on media tasks, see *Chapter Six: Storage Media Tasks* on page 225.
- 3 Click Next. The Media Task Queue Manager appears listing all media with currently assigned tasks.

NOTE

If you accessed the Edit Tasks function through the shortcut menu, the Order Media In Task Queue dialog box appears. This is so that you can see where the media you right-clicked to access the shortcut menu is in the queue, and adjust it appropriately.

- 4 From the Media Task Queue Manager (or the Order Media in Task Queue) page, you can alter the order in which media is processed by selecting the media in the Task Queue list and promoting it or demoting it using the arrows on the right side of the window.

Figure 107: Order In Media Task Queue Page



- 5 When you are done, click Finish or Close as appropriate. Changes to the tasks assigned for the selected media are saved.

STOPPING TASK EXECUTION FOR INDIVIDUAL MEDIA

You can stop a media task in progress for a particular piece of media by using the Abort Task in Progress command. When you stop a task in progress, one of two things will happen. Either the next pending task will begin processing or the aborted task will be left in the media task queue as a failed task. If the aborted task is left in the media task queue as a failed task, you must clear the error status on the media before the remaining tasks will be processed. For instructions, see *Clearing Task Error Status* on page 190.

NOTE

Once in progress, the Format task cannot be aborted.

To stop a task in progress:

- 1 You have the following choices:

- ✎ Right-click the media and select Abort Task in Progress from the shortcut menu.
 - ✎ Select the media and select Abort Task in Progress from the Edit menu.
 - ✎ Select the Media Task Manager from the Tools menu, select the media in the Media Task Queue and click Abort Task in Progress.
- 2 A verification message appears. Click Yes to stop the currently processing task.

The task that was in process is aborted. If the aborted task remains in the task queue as a “failed” task, you will have to clear the error status in order to process the remaining tasks (if any) for that piece of media. For instructions, see *Clearing Task Error Status* on page 190.

CLEARING TASK ERROR STATUS

If a pending task for a piece of media fails or an aborted task remains in the task queue as a failed task, you may need to clear the error status for the piece of media before any other activities for that media can take place.

To clear the error status:

- 1 You have the following choices:
- ✎ Right-click the media and select Clear Error Status from the shortcut menu.
 - ✎ Select the media and select Clear Error Status from the Edit menu.
- The Clear Media Error Status dialog box appears.

Figure 108: Clear Media Error Status Dialog Box



- 2 You have the following choices:
 - ✦ To cancel all pending tasks and clear the error status, select Delete all pending media tasks and clear media error status.
 - ✦ To clear the error status and continue processing assigned tasks, select Clear media error status and continue [retry pending tasks].
- 3 Select the appropriate option and click OK. The error status is cleared. If applicable, pending media tasks are processed.

VIEWING MEDIA LOGS

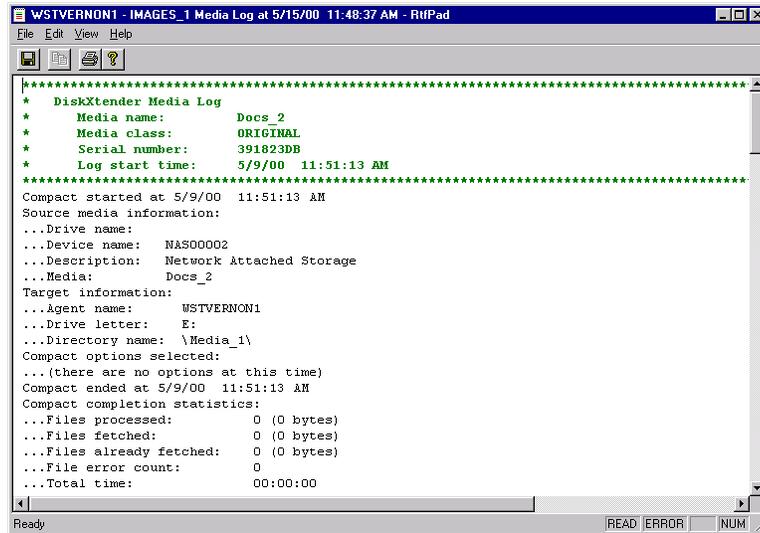
DX maintains a log of activity for each piece of media in the DX system. These logs are useful for viewing task processing information and error codes/status for failed tasks.

To open a media log:

- ➔ You have the following choices:
 - ✦ Right-click the media and select View Log from the shortcut menu.
 - ✦ Select the media and select View Log from the Edit menu.

The Media Log for the piece of media appears.

Figure 109: Media Log Window



CLEARING MEDIA LOGS

You can manually clear the information in a media log using a command from the shortcut menu for the piece of media. Media logs have a specific size limitation, after which the log is truncated from the beginning of the file. While the log size is regulated through automatic truncation, large logs are often cumbersome and difficult to navigate. Clearing media logs regularly makes it easier to find new information.

NOTE

You may want to save your log before clearing it. Display the log and then select Save from the File menu in the log window. (For instructions on displaying the log, see *Viewing Media Logs* above.)

To clear a media log:

- You have the following choices:
 - ↗ Right-click the media and select Clear Error Status from the shortcut menu.
 - ↗ Select the media and select Clear Error Status from the Edit menu.

A confirmation message appears. Click Yes to delete the data in the media log.

OPENING MEDIA PROPERTIES

The media Properties window consists of up to five tabs, including: General, Space, Location, Statistics and Progress. What tabs appear depends on the type of media and its status. For a discussion of the information and options available for each of these tabs, see *Media Properties* below.

MEDIA STATUS

You can configure the media items in the tree view of the DX Administrator to change color depending on their status. The following table lists each color and describes the status indicated by each color:

Table 19: Media Status Indicated by Color

MEDIA COLOR:	MEDIA STATUS:
Red	Error
Yellow	Offline
Green	Online and running a task
Black	Online, but not running a task

To configure the tree view to indicate media status by color:

- From the View menu, select Enable Color. A checkmark next to the Color option signifies that the option has been enabled. If this option is disabled, all media items are black, regardless of status.

MEDIA PROPERTIES

The Media Properties dialog box contains multiple tabs with information pertaining to the selected piece of media. The tabs that may appear for a piece of media are as follows:

- ↔ General
- ↔ Location
- ↔ Space
- ↔ Statistics
- ↔ Progress

Accessing the Media Properties and what information is provided in each of the tabs is described in the sections that follow.

OPENING MEDIA PROPERTIES

The Properties command is always available for every piece of media on an extended drive, regardless of the current use, assignment or status of the media. The Media Properties window consists of up to five tabs, including: General, Space, Location, Statistics and Progress. What tabs appear depends on the type of media and its status. For example, the Statistics tab does not appear for Blank media, and the Progress tab only appears for media with tasks that are currently processing.

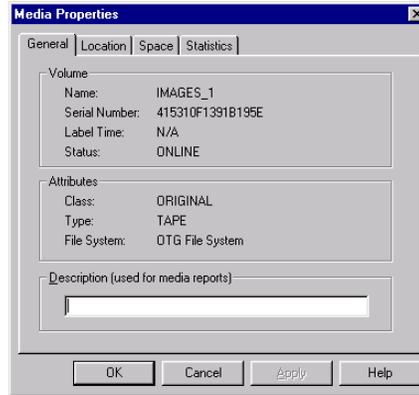
To open the media properties dialog box:

- 1 You have the following choices:
 - ↵ Right-click the media and select Properties from the shortcut menu.
 - ↵ Select the media and select Properties from the Edit menu.
 - ↵ Select the media and press <F2>.The Media Properties dialog box appears with the General tab active by default.
- 2 Activate a tab by clicking the tab title.
- 3 Make any necessary changes to the aspect of the Media Properties selected.
- 4 Once any changes have been made, you have the following choices:
 - ↵ Click OK to save changes and close the dialog box.
 - ↵ Click Apply to save changes to the active tab without closing the dialog box.
 - ↵ Click Cancel to discard all changes and close the dialog box.

The General Tab

The General tab provides identifying information for the media. For all except foreign media, you can use this tab to enter a brief Description, which is used for media reports.

Figure 110: Media Properties: General Tab



The information found in the General tab is as follows:

Table 20: Media Properties Dialog Box: General Tab Items

ITEM:	DESCRIPTION:
Name	Name assigned to the media when labeled.
Serial Number	Serial number of the media. For more information, see <i>Media Serial Numbers</i> on page 197.
Label Time	Date and time the media was labeled.
Status	Current status of media. Status settings include: <ul style="list-style-type: none"> ↳ offline ↳ online ↳ compact pending/ in progress/ failed/ paused ↳ format pending/ In progress/ failed ↳ label pending/ In progress/ failed ↳ restore pending/ in progress/ failed ↳ file report pending/ In progress/ failed ↳ library inventory pending/ in progress/ failed/ unknown

ITEM:	DESCRIPTION:
Class	There are seven valid classes to describe the media: <ul style="list-style-type: none">↳ original↳ copy↳ duplicate↳ blank↳ foreign↳ unknown↳ unformatted
Type	The type of storage media: NAS, CD-ROM, DVD-RAM, WORM, Erasable Optical, Tape
File System	The media's file system. There are 12 valid file systems: <ul style="list-style-type: none">↳ unknown↳ otg optical↳ otg tape↳ iso 9660 joliet↳ fat↳ ntfs↳ iso 9660↳ iso 9660 ms↳ hsg↳ hsg ms↳ audio↳ photocd
Description	An editable field where you can enter a media description to be used for media reports. The maximum number of characters that can be entered into the Description edit box is 64.

NOTE 

For Foreign media, the Information tab displays “N/A” for media name, serial number, and label time. The Description field is unavailable for editing.

Media Serial Numbers

Because media can be taken from one DX system and imported or placed in another, media name is not sufficient for tracking media. While not recommended, DX does allow more than one piece of media with the same name. Therefore DX must use the serial number of media to track it and the files migrated to it.

DX can support more than one piece of media with the same name on an extended drive, provided they have different serial numbers. If DX identifies two pieces of media with the same serial number, it will classify one as Duplicate and require that it be reformatted and given a new serial number before it can be used.

Media serial numbers provide a way to track all DX media uniquely, irrespective of the DX system in which they were formatted. The serial number is an eight-byte integer, represented as a hexadecimal string in the following format: `XXXXXXXXYYYYYYYY`. The serial number is broken down as follows:

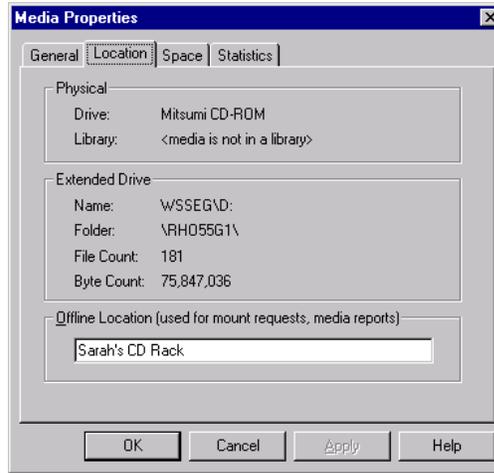
Table 21: Serial Number Interpretation

POSITION:	DESCRIPTION:
(XXXXXXXX)	The serial number from the Windows system boot drive (usually drive C:). Windows assigns this number when the hard drive is formatted. This number is unique for all hard disks.
(YYYYYYYY)	The encoded date/time that the media was labeled, expressed in seconds elapsed since Midnight, January 1, 1970.

The Location Tab

The Location tab provides information about the physical and logical location of the media. You can also enter an offline location for the media, which is used for mount requests and media reports.

Figure 111: Media Properties: Location Tab



The information found in the Location tab is as follows:

Table 22: Media Properties Dialog Box: Location Tab Items

ITEM:	DESCRIPTION:
Drive	Specifies the drive in which the media is mounted.
Library	Specifies the library in which the media is located, and its location in the library (drive and/or shelf number).
Name	Name of the computer and the extended drive to which the media is assigned.
Folder	Name of the media folder to which the media is assigned.
File Count	Number of files on the media.

ITEM:	DESCRIPTION:
Byte Count	Number of bytes used on the media.
Offline Location	Text field into which you can enter up to 32 characters to describe the physical location where offline media are stored (e.g., Second Floor Storage Room, Shelf 25D). This location is shown when a MEDIA NOT FOUND error appears.

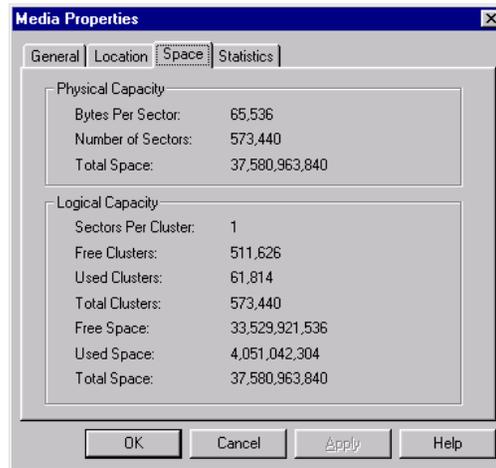
NOTE 

For foreign media, the Location tab displays “N/A” for Folder and the Offline Location field is unavailable for editing.

The Space Tab

The Space tab provides statistical information on the physical and logical capacity of the media.

Figure 112: Media Properties: Space Tab



The information found in the Space tab is as follows:

Table 23: Media Properties Dialog Box: Space Tab Items

ITEM:	DESCRIPTION:
Bytes per Sector	Number of bytes written to the media per sector (determined by media).
Number of Sectors	Total number of sectors on media.
Total Space	Total media space, in bytes.
Sectors per Cluster	Number of sectors per cluster.
Free Clusters	Number of free clusters on the piece of media.
Used Clusters	Number of used clusters on the piece of media.
Total Clusters	Total number of clusters on the piece of media.
Free Space	Free space in bytes on the piece of media.
Used Space	Written space in bytes on the piece of media.
Total Space	Total space in bytes on the piece of media.

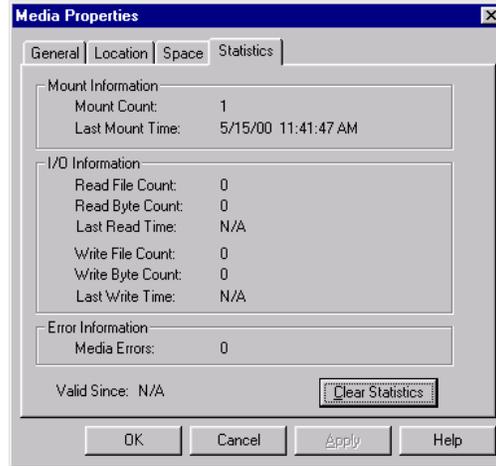
NOTE 

For foreign media, the Space tab displays “N/A” for all Logical Capacity information.

The Statistics Tab

The Statistics tab provides statistics relating to media mounts, file input and output, and media errors.

Figure 113: Media Properties: Statistics Tab



The information found in the Statistics tab is as follows:

Table 24: Media Properties Dialog Box: Statistics Tab Items

ITEM:	DESCRIPTION:
Mount Count	Number of mounts per current session.
Last Mount Time	Time the media was last mounted.
Read File Count	Number of read requests during current session.
Read Byte Count	Number of bytes of files read during current session.
Last Read Time	Time the media was last read.
Write File Count	Number of write requests during current session.
Write Byte Count	Number of bytes of files written during current session.
Last Write Time	Time the media was last written.
Media Errors	Number of errors encountered per current session.

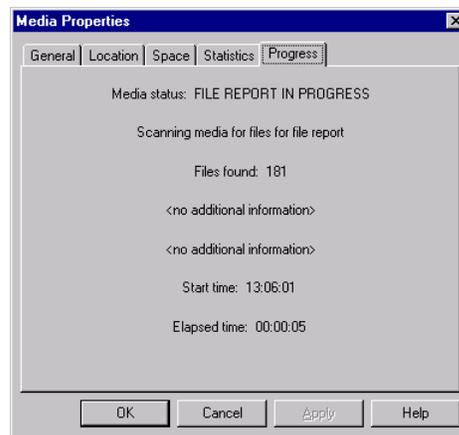
NOTE 

The Statistics tab does not appear for foreign media.

The Progress Tab

During certain system activities, the Media Properties dialog box contains an extra Progress tab, which displays the progress of a current activity. Once the activity has been completed, the Progress tab no longer appears.

Figure 114: Media Properties: Progress Tab



The following information appears, as well as descriptive information pertinent and specific to the activity in progress.

Table 25: Media Properties Dialog Box: Progress Tab Items

ITEM:	DESCRIPTION:
Media status	Current status of media.
Start time	Time the activity in progress began.
Elapsed time	Total amount of time that has passed since the activity began.

MANAGING COPY MEDIA

Copy media can be created for each piece of Original or assigned media on the extended drive. You can start a Label Copy media task from the Edit Tasks wizard, the Media Task Queue Manager, or the Copy Media Manager.

The Label Copy task assigned through the Edit Tasks function (either from the media shortcut menu or through the Media Task Queue Manager) is intended primarily to assign the task to individual pieces or sides of media and for circumstances such as:

- ✎ You need to label a copy for a single side of an original piece of media.
- ✎ You need to copy from a standalone drive to a library drive or vice versa, or between two stand-alone drives.
- ✎ You need to schedule a label copy in conjunction with another task, such as format.

The Label Copy feature in the Copy Media Manager is intended for the following circumstances:

- ✎ You need to label multiple pieces of media for use as copies.
- ✎ Both sides of the original media are original and both sides of the blank media are blank and will be used as copies.
- ✎ You are copying from a library to a library.

This section deals specifically with using the Copy Media Manager to create, maintain, and promote copy media. For more information on using the Label Copy media task to create media copies, see *Labeling Copy Media* on page 231.

Once a copy is created, whether through the Copy Media Manager or assigned as a separate media task, the Copy Media Manager allows you to view the update status of all copy media and when necessary, promote the copy to original, in the event a piece of original media becomes corrupted.

NOTE

DISKXTENDER supports remote media copying, meaning that copy media and selected blank media for copy do not have to be resident on the same MEDIASTOR server as their associated originals. This allows you to create and maintain off-site copies of original media for disaster recovery.

BLANK MEDIA FOR COPY

The blank media selected for copy must match the original. The following must be identical for the original and the copy media:

- ↵ Media type (i.e., tape must be used to copy tape, WORM must be used to copy WORM, etc.)
- ↵ File system (i.e., NTFS media must be copied to NTFS media)
- ↵ Block size/sector size
- ↵ Total media capacity
- ↵ Compression settings (i.e., both must be compressed or both must be uncompressed)

COPIES FROM DX 4.X

DISKXTENDER 4.x copy media was formatted using unique serial numbers. This is compatible with the DX2000 copy media format. Once DX2000 is installed and the media from the DX 4.2 system is added to the DX2000 system, these media will be added to the Copy list under the Available Media tree.

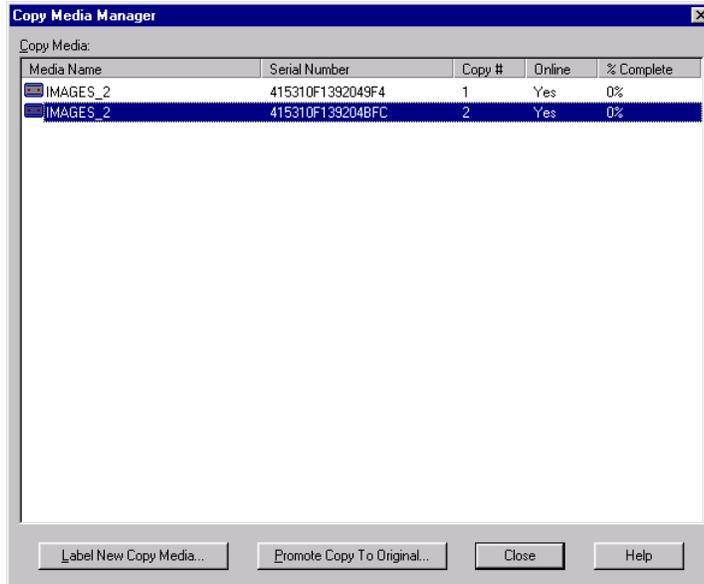
OPENING THE COPY MEDIA MANAGER

The Copy Media Manager lists all existing copy media, along with the update status, the copy number and the online/offline status of each. The Copy Media Manager window gives you easy access to copy functions, allowing you to label new copies, promote existing copies, and view the status of existing copies.

To open the copy media manager

- From the Tools menu, select Copy Media Manager. The Copy Media Manager dialog box appears.

Figure 115: Copy Media Manager Dialog Box



Within the Copy Media Manager, you can label a new piece of copy media or promote an existing piece of copy media to an original. You can also view the update status of existing copies. The information that can be viewed for each piece of media in the Copy Media Manager is summarized in the following table.

Table 26: Copy Media Manager Information

COLUMN:	DESCRIPTION:
Media Name	The media label for the piece of copy media (this is the same the media label for the original).
Serial Number	The unique serial number for the piece of copy media.
Copy Number	The number of that copy (i.e., if this was the first copy of an original created, it would be copy number one; if another copy already existed when it was created, it would be copy number two.)
Online	Whether or not the piece of copy media is currently online.
% Complete	The percentage at which the copy is currently synchronized to the original.

Creating a New Copy

You can create one or more copies of one or more original pieces of storage media from the Copy Media Manager using the Label New Copy Media option. The Label New Copy Media function allows you to assign the Label Copy media task to multiple pieces of media at once, and add those media to the Media Task Queue. For more information on the Label Copy task or the Media Task Queue, see *Chapter Six: Storage Media Tasks* on page 225.

NOTE

DISKXTENDER supports remote media copying, meaning that copy media and selected blank media for copy do not have to be resident on the same MEDIASTOR server as their associated originals. This allows you to create and maintain off-site copies of original media for disaster recovery.

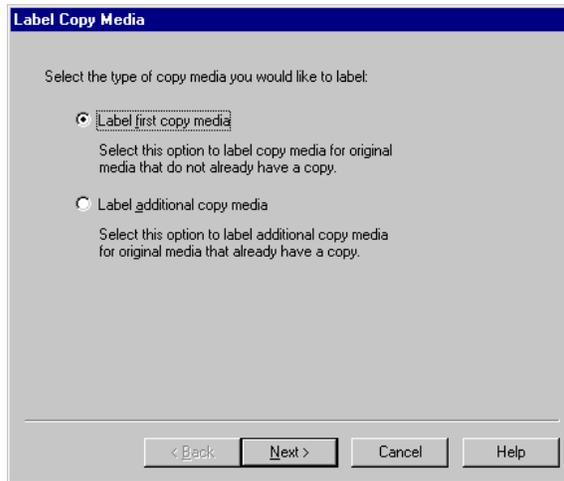
NOTE

When using the Copy Media Manager to Label Copy media, the task is set to automatically process ASAP – as soon as possible. To change the processing to Scheduled – Next active task schedule, you must change the status using the Edit Tasks function. For instructions, see *Editing Tasks for Individual Media* on page 187.

To create a new copy:

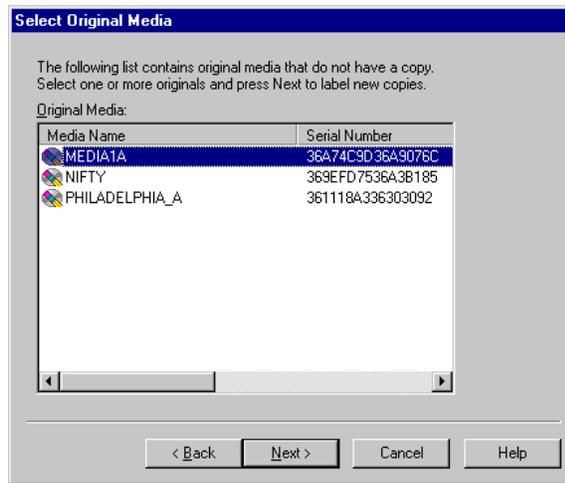
- 1 From the Copy Media Manager, click Label New Copy Media. The Label Copy Media page appears.

Figure 116: Label Copy Media Page



- 2 You have the following choices:
 - ↳ If you are creating a copy of an original piece of media that does not already have a copy on the extended drive, select Label first copy media.
 - ↳ If you are making additional copies of original media that already has a copy or copies on the extended drive, select Label additional copy media.
- 3 Click Next. The Select Original Media dialog box appears.

Figure 117: Select Original Media Page

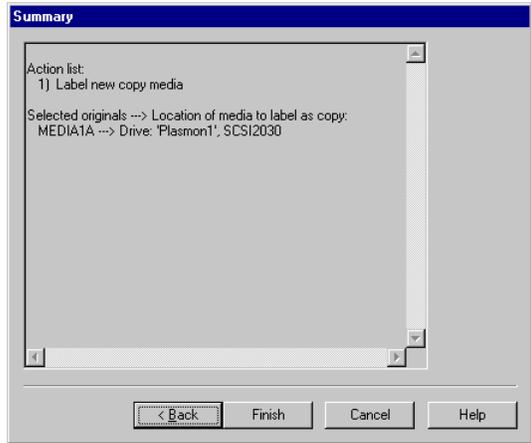


- 4 Select the piece (or pieces) of media that you would like to make copies of and click Next. The Summary page appears.

NOTE 

You must always select the front *and* back of two-sided media to copy the media in this wizard. To copy a single side of a piece of media, use the Edit Tasks function. For details on how to configure an individual Label Copy task, see *Labeling Copy Media* on page 231.

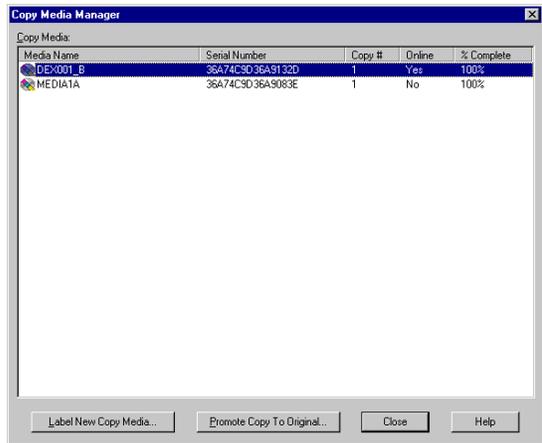
Figure 118: Summary Page



- 5 Click Finish to complete the copy media labeling process.

After completing the wizard, the selected blank media will be scheduled for the Label Copy task in the Media Task Manager. The Label Copy task will execute when the Process scheduled media tasks activity schedule is active. Once complete, the copy media appear in the Copy media list in the tree view of the Administrator.

Figure 119: Copy Media Manager



PROMOTING COPY MEDIA TO ORIGINAL MEDIA

Copy media is useful as a backup for original media. In the event the original piece of media is lost or damaged, it may become necessary to replace the original using the copy. In order to use copy media as original media, the original piece of media must be removed from the media folder and deleted from the extended drive. The copy may then be promoted to an original.

WARNING

If you promote a copy that is not 100% updated to an original, any changes not updated on the copy will be lost.

NOTE

Promoting copy media is intended for disaster recovery when an original is lost or damaged beyond repair. Demoting a copy promoted to original and re-inserting the original media will cause the copy to be inaccurate and is not supported. Once a copy has been promoted to original, it should remain as an original.

Deleting the Original from DISKXTENDER

The first step in promoting a copy to an original is to delete the original from DISKXTENDER.

To delete the original media from DX:

- 1 If this piece of media is currently assigned to media folder, remove it from the media folder using the Remove command in the media shortcut menu. A drive scan must be performed to remove files from the extended drive that reference the original media.
- 2 Once the media has been removed from the media folder, deallocate the media from the extended drive.
- 3 If applicable, remove the piece of media from the media service.

Once the original piece of media has been deleted from DISKXTENDER, the copy media can be used as an original.

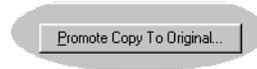
Promoting the Copy to an Original

Once the original has been deleted from DX, you can promote the copy to replace the original.

To promote the copy media to an original media:

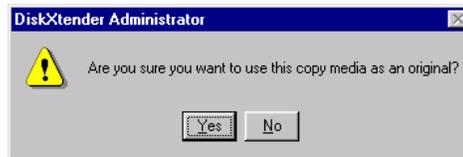
- 1 In the Copy Media Manager, select the piece of copy media to be used as an original.
- 2 Click Promote Copy to Original.

Figure 120: Promote Copy To Original Button



A verification message appears.

Figure 121: Message: Copy Treated As Original



- 3 Click Yes to promote the copy to original. A confirmation message appears letting you know that the copy has been promoted and will no longer be considered a copy.

Figure 122: Confirmation Message



This message alerts you that the process is complete. The media can now be added to a media folder, and files can be read from and written to it.

Once a piece of copy media has been changed to original media, DISKXTENDER no longer views the piece of media as a copy.

To undo the process, you must remove the piece of copy media that has now been promoted to original from the system (i.e., removed from the media folder and deleted from the extended drive media pool). Reinsert the previously original piece of media and then reinsert the copy (that had been promoted). DISKXTENDER will

now view the two pieces of media as it did before removal of the original and promotion of the copy took place.

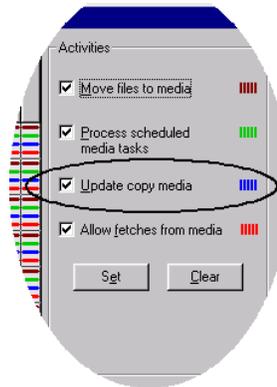
WARNING

Trying to “undo” the promotion of a copy to original creates the risk of losing all data newly written to the promoted original. For this reason, we do not recommend, under any circumstances, attempting to undo the promotion of a copy to original media.

Updating Media Copies

DX updates all copy media according to the schedule set for the Update Media Copies media activity.

Figure 123: Schedule Update Copy Media Activity Option



DX automatically updates all copies with a status of less than 100% updated during active copy schedule times. When a copy is performed, it is managed and tracked automatically by DISKXTENDER. DX searches for written data, and knows how much of the media it has left to copy.

Copy media is automatically updated to match the original whenever the Update copy media activity runs. For information on setting the extended drive schedule and the associated times to update copy media, see the *Media Activity Scheduler* section on page 219.

NOTE 

If the copy media is offline at the time the Update copy media schedule is active, the copy will not be updated.

MEDIA ACTIVITIES

DISKXTENDER provides scheduling for common media activities, including file migration. Although you can process many of these activities immediately, scheduling them during inactive times ensures the activities do not compete with network clients for system drive or library resources.

Activity scheduling is managed using the Settings tab in the Extended Drive Properties dialog box. Each schedulable option (drive scans, media activities, backups) only affects the media activities for that extended drive. For more information on extended drive properties and schedules, see the Extended Drive Administration chapter of the DX2000 System Guide.

DX ACTIVITY PRIORITIES

In addition to the scheduling mechanism, DX has a built-in precedence system that causes particular activities to always take precedence over others. Understanding the priority system will allow you to schedule activities in the most efficient way possible in order to avoid conflicts with system resources.

For example, retrieval of requested files from media always takes precedence over all other media activities. If a client requests a file that has to be retrieved from media, the media activity precedence rules observed by DX ensure that the client does not have to wait for other pending media activities to take place before the piece of media containing the needed file is mounted.

For this reason, we generally recommend that you schedule file migration, media tasks, and media copy updates at a time when client retrieval requests are at a minimum.

The following list outlines the order of precedence for DISKXTENDER activities.

- ↵ Fetch files from media (to include deferred fetches)
- ↵ Drive scan
- ↵ Move files to media
- ↵ Prefetch files from media
- ↵ Process Media Task Queue
- ↵ Flush media transactions (library drives only)

When schedules overlap, DISKXTENDER performs activities according to these priorities. For example, a drive scan will be performed before files are moved to media, if they conflict.

Move files to media and Flush media transactions are interruptible events; the others are not. This means, for example, if a file move is in progress and media restore is scheduled to begin, the file being moved at that time will finish, but no other files will be moved, allowing the media restore to begin. Conversely, if an extended drive scan is running, and the Move files to media schedule becomes active, the drive scan will finish before the movement of files will begin.

For a more detailed discussion of each of the activities listed above, except drive scans, see *Types of Storage Media Activities* below. Drive scans are an extended drive activity, as opposed to a storage media activity. For a more detailed discussion of drive scans, see the Extended Drive Administration chapter of the DX2000 System Guide.

NOTE ↵

The priority listing above only applies when activity processing happens to occur simultaneously, due to either overlapping schedules or other system requests.

TYPES OF STORAGE MEDIA ACTIVITIES

A media activity is an activity that requires a piece of media to be online and accessible to DX in order for the activity to take place. In the case of media services that store files to removable media, the piece of media has to be mounted in a drive.

Frequent mounting and dismounting of media can have a wear-and-tear effect on the library devices that move media to and from the drives where the media is mounted. Problems can also arise when there are requests pending to mount more pieces of media than there are drives available.

DX gives you control over media activities by allowing you to schedule four of the types of storage media activities: Move files to media, Process scheduled media tasks, Update media copies and Allow fetches from media. These activities are scheduled using the Schedule button accessible through the Settings tab in the extended drive Properties. In addition, you can schedule prefetch requests through the Prefetch Request Manager. Scheduling of these media activities lets you ensure efficient management of media mounts and dismounts within a device, and allows you to reduce competition for available drives during peak usage times.

Fetch Files From Media

DISKXTENDER provides virtually limitless background mass storage services by creating the illusion that all files on an extended drive are actually on the NTFS volume to which clients are connected. In reality, some files on the volume have been moved to media and truncated (purged) from the extended drive. When a file has been moved to media and then purged, DX leaves behind a file “tag” which contains only the file details (size, creation date, etc.) and the location of the file on storage media. When viewed through the Windows Explorer, all proper file details (i.e., correct size, date, etc.) appear.

When a client attempts to open a file on the extended drive, the file data may or may not be present on the extended drive. If the file is present, DX allows Windows to handle the file request. If only the file tag is present on the extended drive (file data has been moved to storage media and purged from the volume), DX retrieves the file from media, copies the file back to the extended drive, and completes the client request. When a file is retrieved, this process is referred to as a “fetch.”

A fetch is a media activity because it requires that media to be mounted, and may use network resources for the transfer of fetched files. Fetches can only occur when the Allow fetches from media schedule is active. However, because the retrieval of files is one of the most important DX activities, the Allow fetches from media schedule, by default, is always active. Unless the extended drive schedule is set to *not* allow fetches from media at specific times, and a purged file is requested during a time when the fetch schedule is inactive, fetch requests are carried out as soon as the request is issued. If you have time-based restrictions for file fetches set, and the Defer fetch requests if fetch is disabled extended drive option enabled, file requests made during an inactive fetch schedule will be processed as soon as the fetch schedule becomes active again.

NOTE

The Allow fetches from media schedule only pertain to individual client requests for purged DX files (to include files marked for direct read). It does not apply to and will not affect any DX prefetch requests created either as media tasks or through the Prefetch Request Manager.

Move files To Media

The Move files to media activity occurs only when the schedule for that activity is active. Files that have been added to the move lists are migrated to storage media. When a client writes a file to an extended NTFS volume managed by DISKXTENDER, the file is saved on the extended drive visible to the client. Files remain on the extended drive until eligible for migration, then, transparently to the client, DX moves them to storage media. You create the move rules that determine if and when a file becomes eligible for move.

When a file becomes eligible for move, the name of the file will be added to a list of files to be moved. Depending on the move rule settings, the file name is added either immediately or during the next drive scan. When a drive scan is run, every potentially eligible file on the drive will be checked and a move list created from the results.

During the time scheduled for the Move files to media activity, DX copies the files on the move list out to storage media and purges any moved files that have Purge files immediately after move configured. The Move files to media schedule applies to all files currently on the move list.

NOTE

When a file is eligible to be purged based on Purge rules, it is added to a purge list in the same way files are added to a Move list, either immediately or during the next drive scan. If the Purge files immediately after Move setting is in effect, however, the file is purged immediately. For more information on creating move rules and enabling a Purge after Move, see *Creating Move Rules* on page 71.

Prefetch Files From Media

When a file is retrieved in response to a configured, scheduled request, this process is referred to as a “prefetch.” DISKXTENDER has a prefetch utility that allows you to schedule this file retrieval. You can designate which files should be fetched to the extended drive 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 extended drive when they are requested. Prefetches will fetch all requested files to the extended drive, to include files marked for direct read.

You can schedule a prefetch request to occur once at a set time, to occur regularly 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.

A prefetch request is a media activity because it requires media to be mounted. Configuration and scheduling of prefetch requests is done through the Prefetch Request Manager. This allows you to control the scheduling of each individual prefetch request. The Prefetch Request Manager, in the Tools menu in the Administrator, can be used to schedule, configure and manage prefetch requests. For more information on prefetch requests, see *Prefetch Requests* on page 117.

NOTE 

DISKXTENDER has two types of Prefetch functionality: Prefetch Request Manager and the Prefetch Media Task. The prefetch activity discussed above and listed in the *Prefetch Requests* section on page 117 refers to prefetch requests configured through the Prefetch Request Manager. Prefetch Media Tasks are assigned and processed as part of the Media Task Queue. For more information, see *Process Media Task Queue* below.

Process Media Task Queue

Media tasks are activities that you can actively assign to specific pieces of media. Media tasks include prefetch (all files on a specified piece of media), compact, file report, format, label, label copy, file restore, add to move group, remove from move group, add to media folder, remove from media folder, and check disk.

When you assign media tasks to a piece of media, you can choose to process the tasks immediately or to schedule them to process later. When you select the immediate processing option, DX will start processing the task right away. When you choose to schedule a task, the activity will not occur until the Process scheduled media tasks activity in the extended drive scheduler activates.

During the times when the Process scheduled media tasks option is active in the extended drive schedule, DX will process all scheduled tasks for media listed in the Media Task Queue, in the order in which the media are listed. Once all scheduled tasks for a piece of media are complete, DX will remove the media from the queue and proceed to the next piece of media.

NOTE

For detailed information and instructions on assigning, editing, and scheduling media tasks, see *Chapter Six: Storage Media Tasks* on page 225.

Update Media Copies

DX automatically updates any piece of copy media that is less than 100% updated during active copy schedule times. When a copy is created, it is managed and tracked automatically by DISKXTENDER.

When the Update Media Copies schedule is active, DX checks each copy against its original to determine whether any updates should be made to the copy. DX searches for the number of sectors written, and knows how much of the media it has left to copy. If updates are required, DX will update the copy. Update status for individual pieces of copy media can be viewed through the Copy Media Manager, which is accessible from the Tools menu in the DX Administrator. For more information on creating and managing copies, see *Managing Copy Media* on page 203 or *Labeling Copy Media* on page 231.

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 file changes 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.

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 for move: Transactions will be flushed when nothing left to move (or the schedule is inactive).
- ↗ Media mounted for media task processing: Transactions will be flushed when no tasks are left (or the schedule is inactive).
- ↗ Media mounted for copy: Transactions will be flushed when no copies are left to update (or the schedule is inactive).

MEDIA ACTIVITY SCHEDULER

DISKXTENDER provides scheduling for many system events, including file movement to media and drive scans. This allows you to schedule time-consuming processes to occur at more convenient times, such as nights, weekends and holidays, providing more efficient and effective system functionality.

Scheduling these events during inactive times ensures the events do not compete with network clients for system, drive, or library resources. Schedules can be defined, modified, and deleted using DX Administrator. In addition, many schedules have corresponding event logs that track event completion and errors.

The scheduler also contains an option to restrict access to purged files during times when access to the media from which the files would be fetched is prohibited.

You should set event schedules based on the needs of the individual system. Issues to consider when setting up your schedule include the importance of specific media activities, the length of time required, and the available resources necessary to complete each activity.

There are four storage media activities that can be scheduled for each extended drive. Those activities are:

- ↗ Move files to media

Chapter Five: Managing Storage Media

- ↗ Process scheduled media tasks
- ↗ Update copy media
- ↗ Allow fetches from media

There are three additional system activities that have their own separate scheduling capabilities. Those activities are:

- ↗ Drive Scans
- ↗ Prefetch Requests
- ↗ Extended Drive Backups

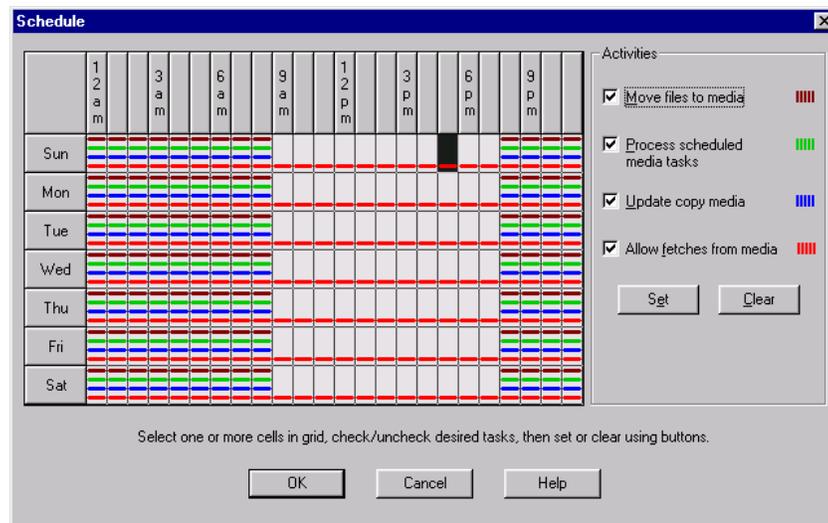
All of the media activities listed above are specific to the extended drive for which they are configured and must be scheduled and maintained separately for each extended drive in your DX system.

SCHEDULING STORAGE MEDIA ACTIVITIES

DISKXTENDER media activities are scheduled for a time range (e.g., 2am-4am). This range provides a “window of opportunity” for the activity(s) to occur. Any time within this range that an activity can begin, it will. If for any reason the activity does not begin during this time, it will not be performed until the next time the schedule is active. When these activity schedules overlap, they occur based on the priority system noted in the *DX Activity Priorities* on page 213.

The activity scheduler exists as a property of each extended drive, and can be accessed through the Settings tab of the Extended Drive Properties dialog box. These schedules are specific to and must be configured separately for each extended drive.

Figure 124: Extended Drive Schedule Dialog Box



Within the scheduler, colored lines represent each activity, allowing you to quickly see which activities are scheduled for what blocks of time. When the scheduler first appears, three of the four available activities are scheduled to occur from 8 p.m. to 9 a.m. every day of the week. The Allow fetches from media activity is scheduled to occur 24 hours a day, 7 days a week (always active). These are the defaults for each DX extended drive, and these schedules will remain set this way until changed.

The schedule grid contains columns for each hour of the day and rows for each day of the week, creating cells which each represent one hour. For example, the blacked out cell in Figure 124 above represents 5 p.m. to 6 p.m. on Sunday. DISKXTENDER'S scheduler allows you to set scheduled activities by selecting one or many cells in the

grid and by selecting one or more activities for those time period cells. You can easily schedule all activities for a large block of time, or you can schedule specific activities for smaller blocks of time.

When you select an area in the schedule grid and click the Set button, any activities checked will be scheduled for that time period. Any activities not checked will be cleared for the selected area, even if they were already scheduled for some or all of the time blocks.

NOTE

Any time the Allow fetches from media schedule is *not* active, client fetch requests for files whose data has been purged (to include files marked for direct read) *will not* be honored. Changing the schedule for this activity may prevent clients from having access to necessary files. We recommend that you retain the default setting for fetches (always active), unless your organization requires a time-based restriction of access to purged files. If you have a time-based restriction configured, you may want to set the Defer fetch requests if fetch is disabled extended drive Properties option.

To set up a media activity schedule:

- 1 From the Settings tab in the extended drive Properties dialog box, click Schedule. The Schedule dialog box appears.
- 2 To change schedule settings, select the area of the grid that corresponds to the time period during which you would like to schedule or clear an activity.
 - ✎ To set an activity for the selected blocks, check the appropriate option(s) in the Activities section of the Schedule dialog box.
 - ✎ To clear an activity for all selected blocks, uncheck the appropriate option(s) in the Activities section of the Schedule dialog box.Use the buttons described below to make and save changes as needed.

Table 27: Schedule Properties Dialog Box: Set/Clear Buttons

BUTTON:	ACTION:
	Sets the activities that are checked and clears the activities that are not checked in the highlighted area of the schedule grid.
	Clears all scheduled activities in the highlighted area of the schedule grid, regardless of which options are checked in the Activities section.

- 3 Once you have made changes to the schedule, you have the following choices:
- ↳ Click OK to save changes and close the dialog box.
 - ↳ Click Cancel to close the dialog box without saving changes.

NOTE 

You must save changes to the schedule using the Set and Clear buttons before selecting OK or Apply. Making changes and selecting OK without using the Set or Clear buttons will close the dialog box without saving your changes.

CHAPTER SIX

STORAGE MEDIA TASKS

Media tasks are media activities that you can actively assign to specific pieces of media. Media tasks include prefetch (all files on a specified piece of media), compact, file report, format, label, label copy, file restore, add to move group, remove from move group, add to media folder, remove from media folder, and check disk. In addition, you can assign media prepare functions (format and label) to media through the Media Prepare Manager or prepare and create copies of Original media through the Copy Media Manager.

When you assign media tasks to a piece of media, you can choose to process the tasks immediately or to schedule them to process later. When you choose to schedule a task, the media to which the task is assigned is added to the Media Task Queue. You can then control the order of media in the queue, thereby controlling when media with scheduled tasks are processed.

This chapter addresses each of these media activities in detail and discusses procedures for processing the tasks when they are assigned or scheduling them to occur at another time.

You can access media task information from two points in the DX system. The Edit Tasks option, accessible from the shortcut menu for each individual piece of media allows you to edit tasks for an individual piece of media. The Media Task Manager, accessible from the Tools menu allows you to edit media tasks and manage the processing order for media with pending tasks. Tasks assigned through the Media Prepare Manager and the Copy Media Manager can be viewed and edited through the Media Task Queue Manager.

TYPES OF MEDIA TASKS

This section contains a detailed description of each media task available in DISKXTENDER and the options available for each task when assigned to media. After that, you will find a section that describes how to use the Media Task Manager, including how to edit tasks and adjust the order of media in the Media Task Queue. At the end of this chapter, you will find information and procedures for managing the Scheduler that activates processing of the Media Task Queue.

Each media task described below can be scheduled to occur when the Process scheduled media tasks schedule is active, or to occur immediately, independent of the Process scheduled media tasks activity schedule.

FORMATTING MEDIA

All media must be formatted for use with DISKXTENDER. Formatting verifies the integrity of the media, and makes it available for use with system hardware. It prepares the media for file writes by creating the specified file system on the media. DISKXTENDER allows you to format media in a standalone drive one side at a time, or in a library on multiple drives at one time.

You can perform a format on unformatted media, or media that has previously been formatted for the same or another file system. Media that has never been formatted will appear in the Unformatted media node. Media formatted in a file system other than the one configured for the drive or device it is in will appear in the Foreign media node.

Media is formatted for a particular file system. Media formatting options differ depending on the file system configured for the hardware device being used as a media service. For example, if a device has been configured for OTG file systems, the format command automatically formats media for this file system; likewise with Windows Native file systems. Media formatted for Windows Native file systems cannot be mixed in a hardware device with media formatted for OTG file systems.

It is important to examine system needs before deciding on a file system. DX will read media from OTG, FAT or NTFS file systems. OTG media is only recognized by DX, and provides faster performance. However, if the media will need to be read by another file system or software program, it may be more appropriate to use a Windows Native file system.

NOTE 

For information on file system recommendations and the relationships between file systems and media types, see the Storage Media chapter of the Getting Started Guide.

Reformatting Media

Previously formatted media can be reformatted if necessary. The formatting process erases existing data and recreates the file system on the media. To reformat, assign the Format task for that piece of media.

If you want to reformat a piece of media currently assigned to a Media Folder, you should first assign the Compact task. (For instructions, see *Compacting Media* on page 235.) Compaction places all of the files currently on the media onto the extended drive and removes the media from the media folder. After assigning the Compact task, you can assign the Format task to reformat the media. The media is formatted, and if you do not select to label it after reformat, it is placed in the Blank media node in the Available Media list.

Force Low-level SCSI Format

By default, when NTFS media is formatted, a quick format is performed. Quick format erases the pointers to all files on media, but not the actual information. A quick format is sufficient if the media is pre-formatted or has been previously low-level formatted for the file system being used.

A low-level SCSI format is necessary when media has been formatted in a different file system than the one to be used for the current drive, or if the media has repeatedly failed due to media errors. Select this option to perform a low-level SCSI format, prepare the media for the current file system, and drive type.

NOTE 

If a format fails initially, it is usually an indication that a low-level SCSI format is necessary to prepare the media for the current file system and drive type.

Enable Compression for the media

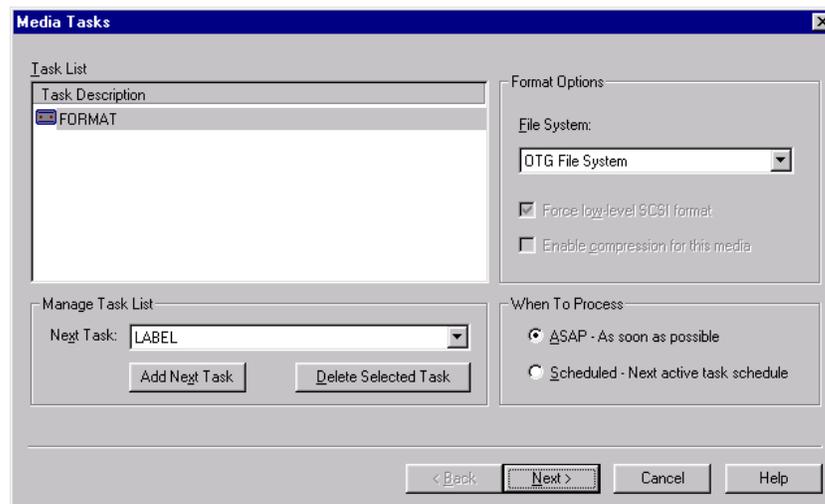
If compression is enabled for a piece of media, files are compressed when they are written to the media, allowing you to in some cases conserve storage media space. Whether or not the Enable compression option is available for the format task is

determined by which file system is being used and whether the device in which the media resides supports file compression.

To assign a format task:

- 1 There are two ways to open the Media Tasks page:
 - ↖ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ↖ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Format from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 125: Format Media Task



- 3 In the Format Options section, select a file system from the File System drop-down list, and use the checkboxes to enable or disable the Force low-level SCSI format and Enable Compression (on this media) options.
- 4 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.

- 5 Click Next to add the media and the Format task to the Media Task Queue or click Add Next Task to add another media task.

Once media has been formatted (and before it is labeled) it will appear in the Blank media node of the Available Media list.

NOTE 

Formatting double-sided optical media in a standalone drive formats only one side of the media. You must dismount, flip, and format the reverse side as well. Always format both sides of double-sided media at one time, to avoid confusion.

NOTE 

DISKXTENDER does not support formatting of WORM media. WORM media cannot be formatted through DX.

LABELING MEDIA

When media is inserted in a device, DX inventories the media to determine if it recognizes the file system format, and reads the media label as well. If the media is properly formatted but has not been labeled, DX identifies the media as blank and adds it to the Available Media list under the Blank media node. Once media has been labeled, the media appears with the new label in the Original Media list. Media in the Original Media list can be assigned to a media folder.

Labeling assigns a name and serial number to a piece of media, allowing it to be tracked by DISKXTENDER. Labeling a piece of formatted media adds the media to the Original media node, making it available to be added to a media folder. No two pieces of original media should have the same label, because the media label should be a unique identifier.

The Label task can be assigned to follow a Format task for a piece of media, or blank media can be labeled as needed. For example, you can format all the media in a library, making it ready for use, but wait until a piece of media is needed to label it. This creates a reserve of blank media, available to be used when needed and then labeled accordingly.

Media Naming Conventions

Media label names may be up to sixteen alphanumeric (a-z or 0-9) characters in length, with no spaces. Media names may also include the following special characters: \$! - _ ?.

Certain standards should be applied when naming media. It is best to use a descriptive and consistent naming convention (as opposed to the date and time, or 1,2,3...). This will assure easy tracking of all media by name, and reduce confusion if different media are accidentally mixed together.

The recommended approach to naming media is to use a prefix and a sequence number. The prefix should represent the extended drive name, application name, or other similar quality that identifies the use of the media (i.e., CAD, IMAGES, DOCS). The sequence number represents the order of the media in the group and optionally should reflect the side of media (i.e., 1,2,3 or 1A, 1B, 2A, 2B, 3A, 3B). Combined, they give an orderly system for naming media (i.e., CAD1A, CAD1B, CAD2A, CAD2B, etc.).

Depending upon data organization, all media could be given the same prefix, with the only difference being the number following the prefix. Or, different prefixes could be given to media depending upon file type or location. When labeling media in a standalone drive, one side should be labeled LABEL1A, while the other side should be labeled LABEL1B, where LABEL is the descriptive prefix.

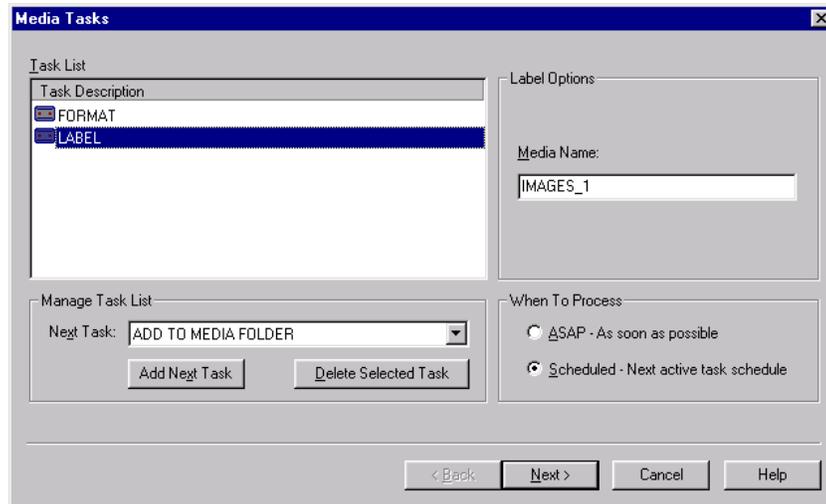
Assigning a Label Task

The Media Tasks window allows you to assign a Label task.

To assign a label task:

- 1 There are two ways to open the Media Tasks page:
 - ✎ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ✎ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Label from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 126: Label Media Task



- 3 In the Label Options section, enter a label in the Media Name text box. For recommendations on labeling media, see *Media Naming Conventions* on page 229.
- 4 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see the *Media Task Scheduling* section on page 268.
- 5 Click Next to add the media and the Label task to the Media Task Queue or click Add Next Task to add another media task.

Once media has been labeled it will appear in the Original media node of the Available Media list.

LABELING COPY MEDIA

The Label Copy task allows you to assign a piece of blank media to be used as a copy of a piece of existing media. Label Copy can only be performed on Blank media that has size and file type specifications *identical* to the piece of Original media being copied. The Label Copy task is processed in the same way as any other media task (ASAP or added to the Media Task Queue for scheduled processing during the Process scheduled media tasks schedule).

Copy media has the same label as the Original it corresponds to, but has a unique serial number.

The Label Copy task discussed here allows you to Label individual pieces of Blank media for use as copies. To assign Label Copy to multiple pieces of media, use the Copy Media Manager function. For information, see *Copy Media Manager* on page 252.

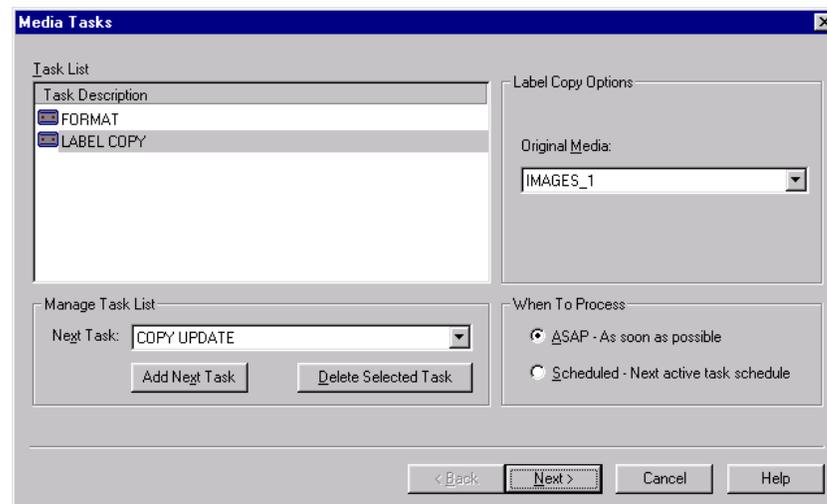
NOTE

The Blank media selected for the Label Copy task must have the exact same storage size and file type as the original piece of media being copied.

To assign a label copy task:

- 1 There are two ways to open the Media Tasks page:
 - ✎ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ✎ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Label Copy from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 127: Label Copy Media Task



- 3 In the Label Copy Options section, select the piece of media you want to want to make a copy of from the Original Media drop down list.
- 4 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 5 Click Next to add the media and the Label Copy task to the Media Task Queue or click Add Next Task to add another media task.

Once the Label Copy task has completed, the media appears with the new label in the Copy media node of the Available Media list.

WARNING 

For media in standalone drives, DISKXTENDER allows you to Label Copy the flip side of an original piece of media as a copy of that same original. However, if you use the other side of an original for its copy, DX is unable to update the copy.

RESTORING FILES FROM MEDIA

The File Restore task makes files on media available for access through DISKXTENDER by placing tags on the extended drive that point to the files on the media. Whenever media is added to a media folder, this task is automatically assigned and can be viewed from the Media Task Manager. However, the file restore task can be performed any time necessary.

During a File Restore, file tags for all files on the media are placed in the media folder on the extended drive. If there are duplicate files, the newest file (tag) is restored and older versions are always replaced. Since all files from media are restored during this task, you may wish to delete restored file tags deemed unnecessary from the extended drive after the restore is complete. Files from CD-ROM and WORM media are restored with tags having a read-only attribute. You must remove that attribute to delete the file tag.

Restore File Options

The File Restore task has two options that can be enabled or disabled when adding the task to media: Log Duplicates (list file names in media log) and Direct Read (read files directly from media).

The Log Duplicates option creates a list of all files on the media that had duplicate file tags on the extended drive. This list can be found in the media log. This is

particularly useful if a piece of media becomes corrupted and you have to replace it with a copy.

The Direct Read option places the direct read attribute on all files restored from the media. Setting direct read causes files to be retrieved directly from media when accessed by a client rather than fetched to the extended drive first and read from there.

NOTE

File tags are information about the file including: name, location, attributes, size and create time.

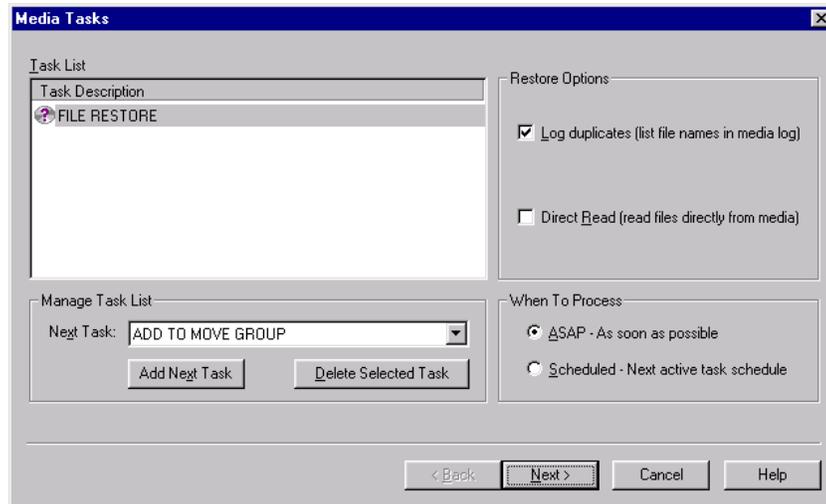
Assigning a File Restore Task

The Media Tasks window allows you to assign a file restore task.

To assign a file restore task:

- 1 There are two ways to open the Media Tasks page:
 -  Select the Edit Tasks option from the shortcut menu for a piece of media.
 -  Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select File Restore from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 128: File Restore Media Task



- 3 In the Restore Options section, select to enable or disable the Log Duplicates and Direct Read options. (For detailed information on these options, see *Restore File Options* above).
- 4 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 5 Click Next to add the media and the File Restore task to the Media Task Queue or click Add Next Task to add another media task.

NOTE

The restore process can be time-consuming for media with a large number of files; therefore, you may want to configure the File Restore task as a scheduled event rather than processing it immediately.

COMPACTING MEDIA

Media compaction allows you to reclaim deleted space on media formatted with OTG file systems by relocating files from one or more pieces of media to other storage media. Compaction also allows you to migrate files from one type of media to another (e.g., CD-ROM to optical or optical to tape).

The compaction process copies all files from a piece of media into the media folder on the extended drive to which it is assigned. Then the file tag for each of those files is deleted from the media and the media is automatically removed from the media folder. The compacted files (those placed on the extended drive) remain in the media folder until transferred back to storage media based on the move rules established for that folder.

Since most if not all of the compacted files will qualify for migration, those files will be written back to the storage media assigned to the move group as soon as the Move files to Media schedule is active. Once a piece of media has been compacted, it can be reformatted for reuse or removed from the system (depending upon the type of media).

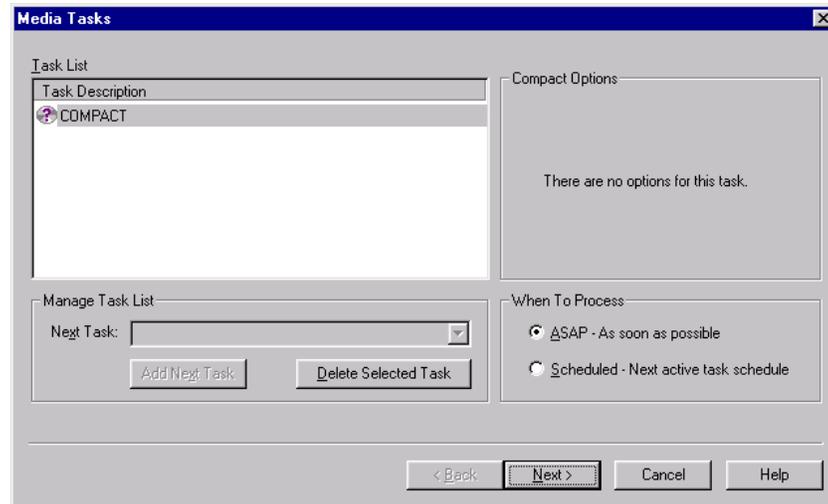
NOTE

To help ensure successful compaction, you should have free space equivalent to one side of media available on the extended drive.

To assign a compact task:

- 1 There are two ways to open the Media Tasks page:
 - ✎ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ✎ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Compact from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 129: Compact Media Task



- 3 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 4 Click Next to add the media and the Compact task to the Media Task Queue.

NOTE

If media compaction fails, some, all or none of the data may have been moved to the next media in the move group. If the cause of the compaction failure can be determined, make the appropriate adjustments and reschedule the compaction. The compaction process will resume with the next file that must be compacted (compaction of already moved files will not be duplicated).

PREFETCHING FILES FROM MEDIA

The Prefetch media task writes all files from the selected media to the media folder on the extended drive (ignoring duplicates). This task makes it possible to eject the media from the system without the risk that it may be needed to provide file data to complete client requests.

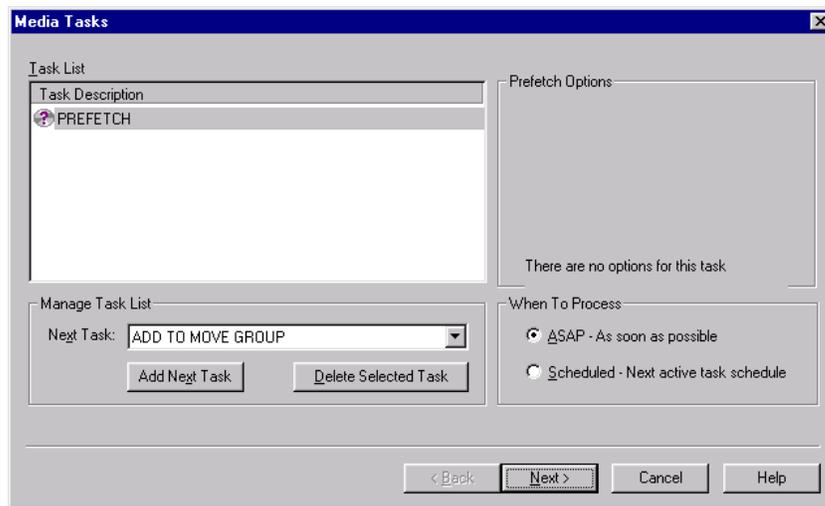
NOTE 

The Prefetch media task is governed by the Process scheduled media tasks activity schedule, and is in no way affected by the Allow fetches from media schedule.

To assign a prefetch task:

- 1 There are two ways to open the Media Tasks page:
 - ✎ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ✎ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Prefetch from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 130: Prefetch Media Task



- 3 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 4 Click Next to add the media and the Prefetch task to the Media Task Queue or click Add Next Task to add another media task.

NOTE 

Running Prefetch through the Media Task function does not allow you to prefetch specific files. To prefetch specific files or to schedule prefetch activities separately from media tasks, use the Prefetch Request manager. For more information, see *Prefetch Requests* on page 117.

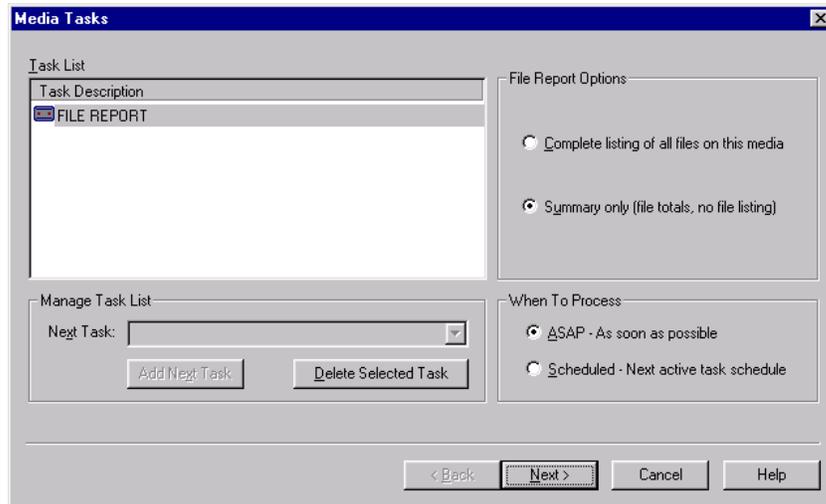
REPORTING FILES ON MEDIA

The File Report task obtains information from media, making that information available for a media files report. The media files report is created separately using the Report Generator in the Administrator. You must run this task before running a report in order to have current media information in the report. You can select to obtain a complete listing of all files on the media or summary information about the media files.

To assign a file report task:

- 1 There are two ways to open the Media Tasks page:
 - ✎ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ✎ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select File Report from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 131: File Report Media Task



- 3 In the File Report Options section, select to obtain a Complete listing of all files on this media or a Summary only (file totals, no file listing).
- 4 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 5 Click Next to add the media and the File Report task to the Media Task Queue.

NOTE 

The File Report task only generates the information about the files on the media. For details on using the Report Generator to run the Media Files Report, see the Reports chapter of the DX2000 System Guide.

RUNNING CHECK DISK ON A PIECE OF MEDIA

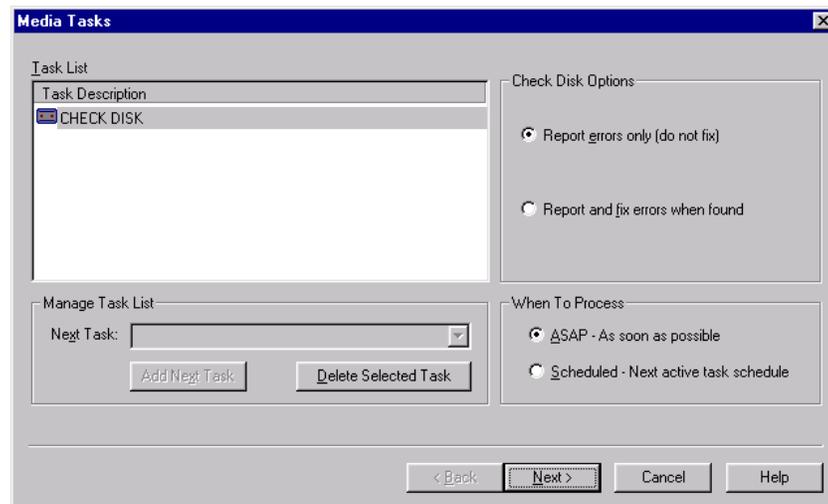
The Check Disk task is used to run NT’s CHKDSK.EXE on NTFS media. For OTG rewritable media, DX will perform a scan of DX file trailers.

To assign a check disk task:

- 1 There are two ways to open the Media Tasks page:

- ↵ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ↵ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Check Disk from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 132: Check Disk Media Task



- 3 In the Check Disk Options section, select to Report errors only (do not fix) or to Report and fix errors when found.
- 4 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 5 Click Next to add the media and the Check Disk task to the Media Task Queue.

ADDING MEDIA TO A MEDIA FOLDER

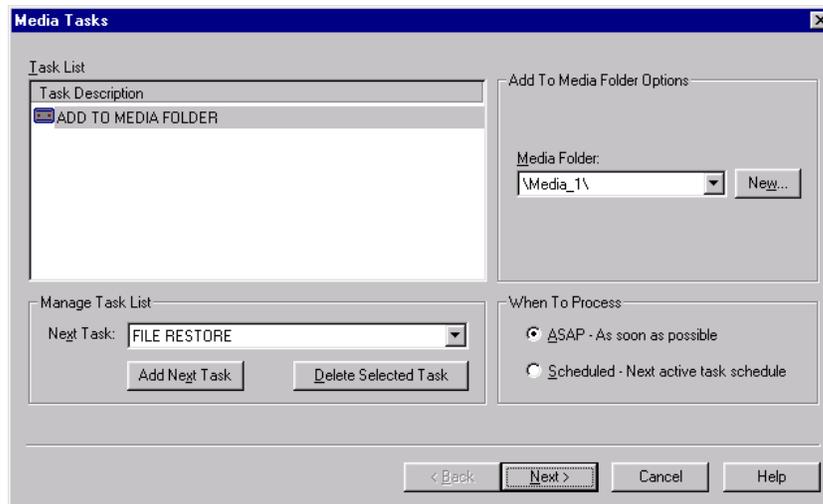
The Add Media to Media Folder task can only be assigned to media that has been formatted and labeled. The task is available for Original media, or for other media that have the Format and/or Label tasks scheduled. This allows you to add media

after other tasks are completed without any need for manual intervention, This task can also be used in conjunction with the Add to Move Group task to automatically add media to a media folder, then to a move group, all within a single process. For more information about adding media to a media folder, see *Adding Media to a Media Folder* on page 54.

To assign an add to media folder task:

- 1 There are two ways to open the Media Tasks page:
 - ✎ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ✎ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Add To Media Folder from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 133: Add to Media Folder Task



- 3 In the Add To Media Folder Options section, you have two choices:
 - ✎ Add the media to an existing media folder by selecting one from the Media Folder drop-down list.

- ↳ Create a new media folder for the media by clicking New and following the prompts. When finished, the new media folder will appear in the Media Folder drop-down text box.
- 4 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 5 Click Next to add the media and the Add To Media Folder task to the Media Task Queue or click Add Next Task to add another media task.

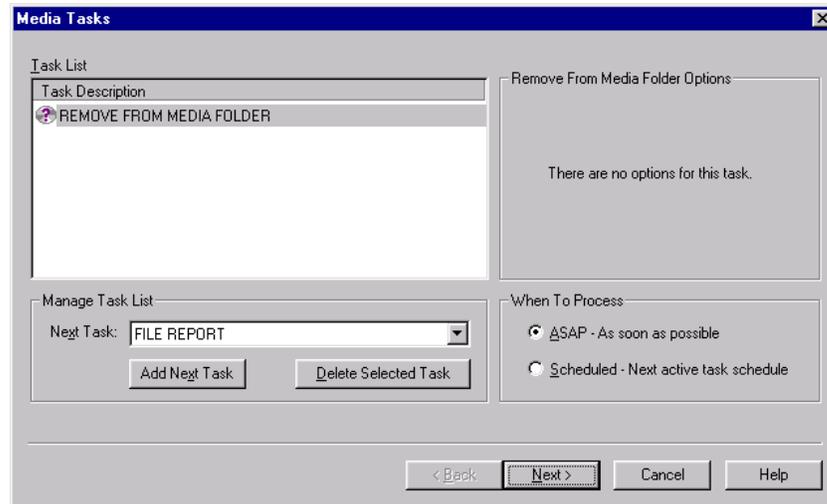
REMOVING MEDIA FROM A MEDIA FOLDER

The Remove Media from Media Folder task automatically removes the media from the media folder on the extended drive. When media is removed from a media folder, the file tags for the files on that piece of media are removed from the media folder as well. The media is then placed in the Original Media list until it is moved back into a media folder, deallocated from the extended drive, or reformatted.

To assign a remove from media folder task:

- 1 There are two ways to open the Media Tasks page:
 - ↳ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ↳ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Remove From Media Folder from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 134: Remove From Media Folder Media Task



- 3 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 4 Click Next to add the media and the Remove From Media Folder task to the Media Task Queue or click Add Next Task to add another media task.

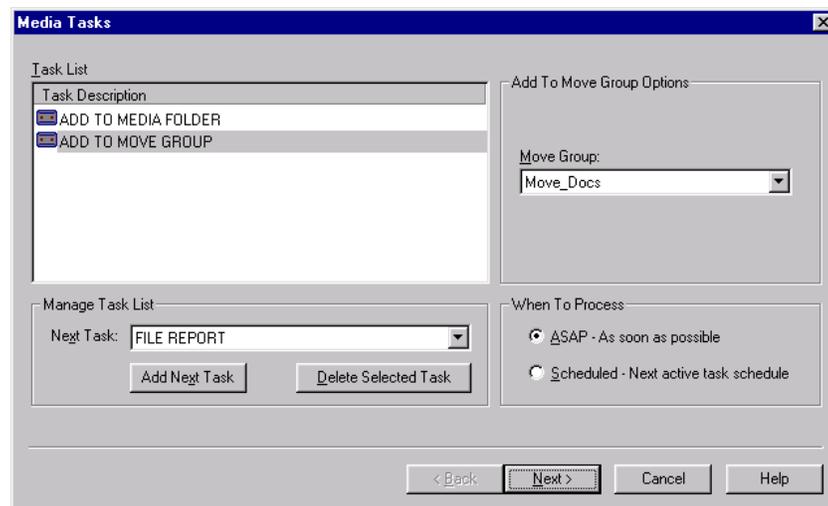
ADDING MEDIA TO A MOVE GROUP

This task adds a piece of media to a move group making it available for DX to write files to it based on the move rules configured for that move group. The task is available for media already assigned to a media folder, or for other media that have the Format and/or Label and/or Add Media To Media Folder tasks scheduled. This allows you to add media after other tasks are completed without any need for manual intervention. Used in conjunction with the Add To Media Folder task, you can automatically add media to a media folder, then to a move group, all within a single process.

For more information about adding media to move groups, see *Move Groups* on page 60.

To assign an add to move group task:

- 1 There are two ways to open the Media Tasks page:
 - ✦ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ✦ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Add To Move Group from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 135: Add To Move Group Media Task

- 3 In the Add To Move Group Options section, select the move group for the media from the Move Group drop down list.
- 4 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.
- 5 Click Next to add the media and the Add To Move Group task to the Media Task Queue or click Add Next Task to add another media task.

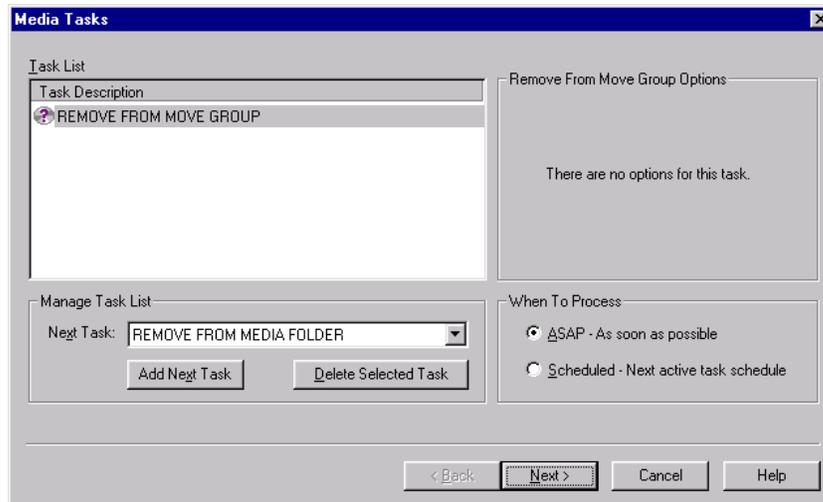
REMOVING MEDIA FROM A MOVE GROUP

This task removes a piece of media from a move group making it unavailable for DX to write files to it based on the move rules configured for that move group. Unless specified by scheduling a subsequent Remove From Media Folder task, the piece of media remains in the media folder, though no longer part of the move group.

To assign a remove from move group task:

- 1 There are two ways to open the Media Tasks page:
 - ✎ Select the Edit Tasks option from the shortcut menu for a piece of media.
 - ✎ Select Media Task Manager from the Tools menu and use the Add new media or Edit Tasks button as appropriate. For more information on the Media Task Queue Manager, see *Using the Media Task Queue Manager* on page 257.
- 2 In the Media Tasks page, select Remove From Move Group from the Next Task drop-down list in the Manage Task List section and click Add Next Task.

Figure 136: Remove From Move Group Media Task



- 3 Select an option of When To Process, either ASAP – As soon as possible or Scheduled – Next active task schedule. A scheduled task will process when the next media task schedule is active. For more information, see *Media Task Scheduling* on page 268.

- 4 Click Next to add the media and the Remove From Move Group task to the Media Task Queue or click Add Next Task to add another media task.

MEDIA PREPARE MANAGER

The Media Prepare Manager allows you to assign the Format and/or Label tasks to multiple pieces of library media at one time. This is particularly useful if you have a library with a large number of media that need to be formatted and/or labeled for use in DX.

The Media Prepare Manager uses an easy-to-follow format that lets you format media, label media, or format *and* label media. For recommendations and information pertaining to the available options for the Format and Label media tasks, see the discussions in the *Formatting Media* section on page 226 and the *Labeling Media* section on page 229.

Once you have assigned the Format and/or Label tasks to media through the Media Prepare Manager, you can view the media and the tasks through the Media Task Queue Manager. For more information, see *Using the Media Task Queue Manager* on page 257.

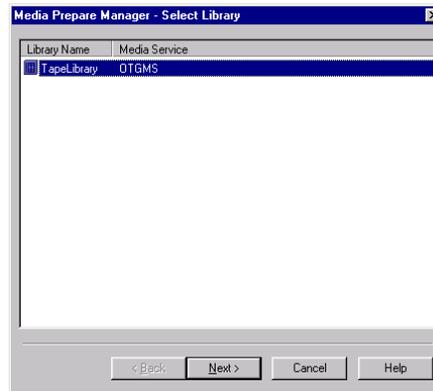
NOTE

The Media Prepare Manager can only be used for media in libraries configured for use with DISKXTENDER.

To open the media prepare manager:

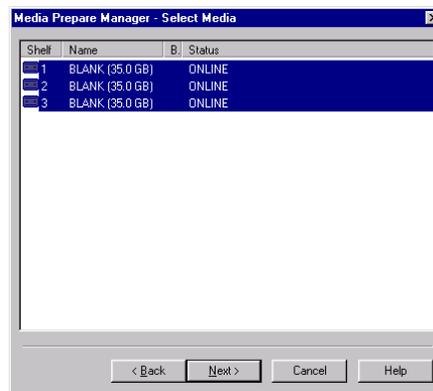
- 1 From the Tools menu, select Media Prepare Manager. The Media Prepare Manager – Select Library page appears.

Figure 137: Media Prepare Manager: Select Library Page



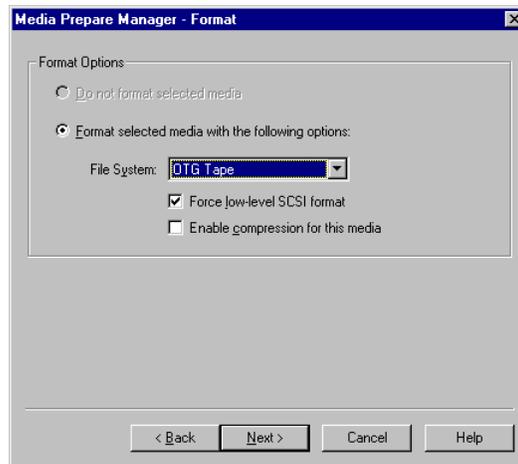
- 2 From the Library Name list, select a library. Click Next. The Media Prepare Manager – Select Media page appears.

Figure 138: Media Prepare Manager: Select Media Page



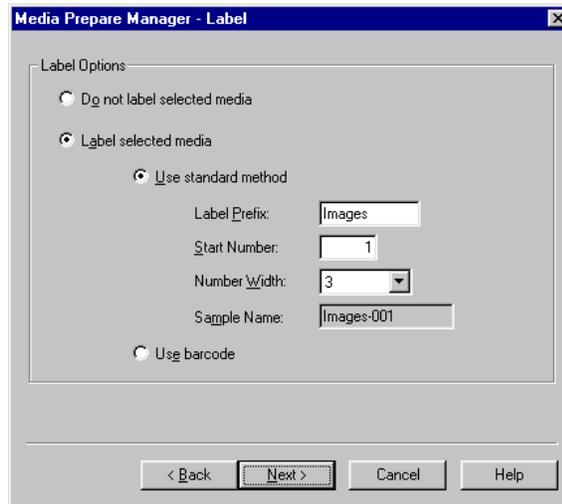
- 3 Select the media that you would like to prepare from the list. Click Next. The Media Prepare Manager – Format page appears.

Figure 139: Media Prepare Manager: Format Page



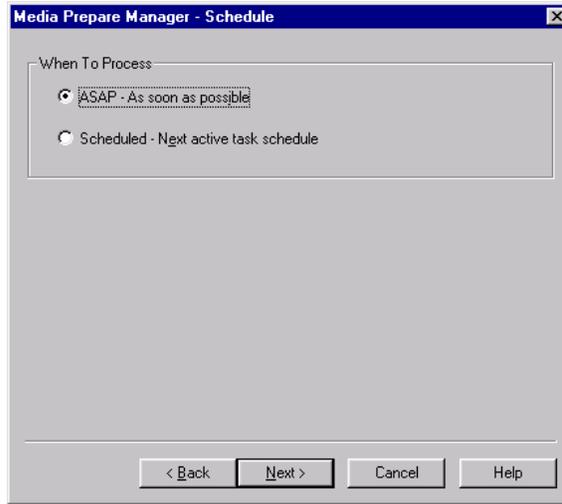
- 4 You can choose to format or not to format the selected media. If you choose to format the media, select a file system from the dropdown list box. The file system must match that configured for the selected library.
- 5 Under the File System drop-down list, enable or disable the Force low-level SCSI format and Enable compression for this media options (if available).
- 6 Once you have selected formatting options, click Next. The Media Prepare Manager – Label page appears.

Figure 140: Media Prepare Manager: Label Page



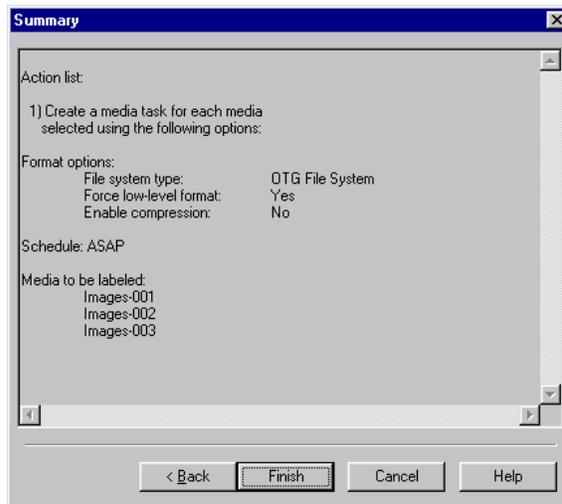
- 7 You can choose to label or not to label the selected media. If you choose to label the media, you have the following choices:
 - ↪ You can choose to use the standard method. Type in a Label Prefix. Type in a Start Number to configure the first number that DX should use when labeling media. Select a Number Width to limit the length of the number that DX adds to the prefix to create the media label. The Sample Media Name box displays a sample of the configured label settings.
 - ↪ You can choose to use the barcode. (Barcode labeling is only available for some libraries. For more information, refer to your hardware manual.)
- 8 Once you have selected labeling options, click Next. The Media Prepare Manager – Schedule page appears.

Figure 141: Media Prepare Manager: Schedule Page



- 9 Select whether you want the media prepare task(s) to occur immediately or to occur when the next Process media tasks schedule is active.
- 10 Once you have selected the appropriate formatting, labeling and scheduling options, click Next. The Summary page appears.

Figure 142: Summary Page



- 11 Click Finish to assign the configured media tasks to the media. Each format and label task will be assigned to the selected media as configured, and can be viewed in the Media Task Queue.

COPY MEDIA MANAGER

The Copy Media Manager allows you to label new copies, promote existing copies, and view the status of existing copies. This chapter discusses using the Copy Media Manager to label new copies. For more information on the other functions available through the Copy Media Manager, see *Chapter Five: Managing Storage Media* on page 177.

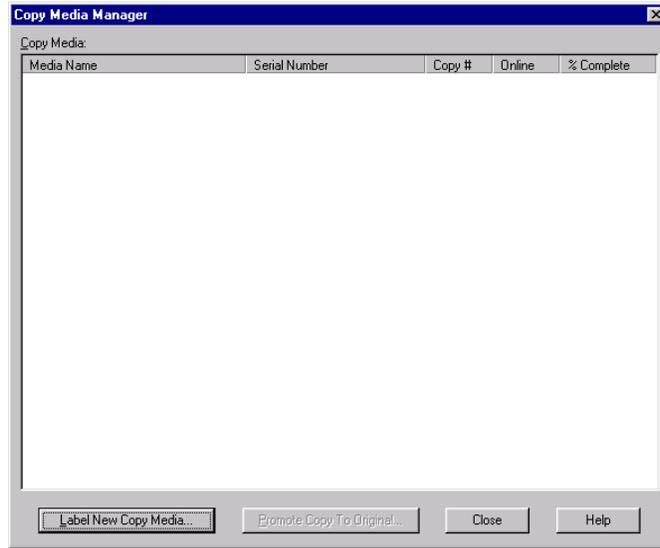
The Label New Copy Media function of the Copy Media Manager provides you with the ability to assign the Label Copy task to multiple pieces of Blank Media at once. This is particularly useful if you have several pieces of Blank media (formatted but not labeled) that you need to use as copies of Original media.

Once you have assigned the Label Copy tasks to media through the Copy Media Manager, you can view the media and the tasks through the Media Task Queue Manager. For more information, see *Using the Media Task Queue Manager* on page 257.

To open the copy media manager

- From the Tools menu, select Copy Media Manager. The Copy Media Manager dialog box appears.

Figure 143: Copy Media Manager Dialog Box



The Copy media manager window appears listing all currently existing copy media. The information listed with each piece of media is summarized in the following table.

Table 28: Copy Media Manager Information

COLUMN:	DESCRIPTION:
Media Name	The media label for the piece of copy media (this is the same the media label for the original).
Serial Number	The unique serial number for the piece of copy media.
Copy Number	The number of that copy (i.e., if this was the first copy of an original created, it would be copy number one; if another copy already existed when it was created, it would be copy number two.)

COLUMN:	DESCRIPTION:
Online	Whether or not the piece of copy media is currently online.
% Complete	The percentage at which the copy is currently synchronized to the original.

CREATING NEW COPY MEDIA

You can create one or more copies of an original piece of storage media from the Copy Media Manager using the Label New Copy Media option.

NOTE

DISKXTENDER supports remote media copying, meaning that copy media and selected blank media for copy do not have to be resident on the same MEDIASTOR server as their associated originals. This allows you to create and maintain off-site copies of original media for disaster recovery.

To create a new copy:

- 1 Click Label New Copy Media in the Copy Media Manager to label a new piece (or pieces) of media for copy. The Label Copy Media page appears.

Figure 144: Label Copy Media Page



- 2 You have the following choices:
 - ↳ If you are creating a copy of an original piece of media that does not already have a copy in the DX system, select Label first copy media.
 - ↳ If you are making additional copies of original media that already has a copy or copies in the DX system, select Label additional copy media.
- 3 Click Next. The Select Original Media page appears.

Figure 145: Select Original Media Page

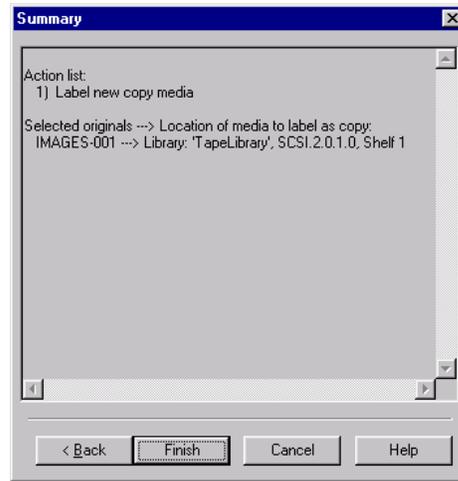


- 4 Select the piece (or pieces) of media that you would like to copy and click Next.

NOTE

You must always select the front *and* back of two sided media to copy the media in this wizard. To copy a single side of a piece of media, you must assign the Label Copy task to that media individually. For details on how to configure a Label Copy task for a single piece of media, see *Labeling Copy Media* on page 231.

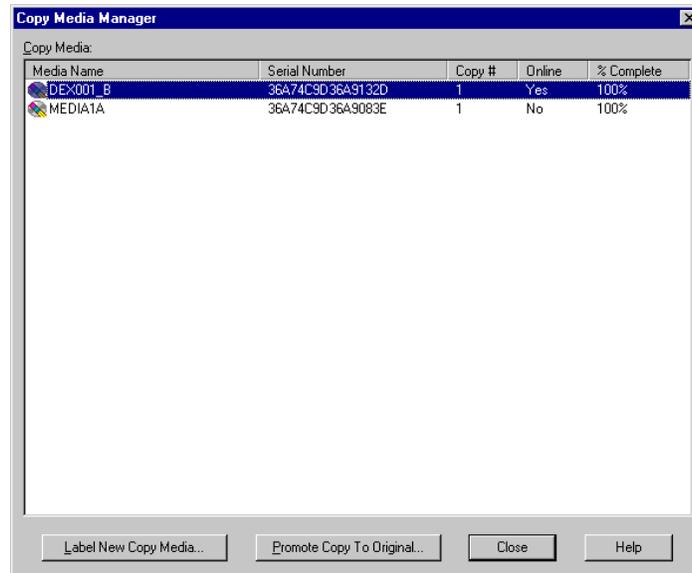
Figure 146: Summary Page



- 5 The Summary page appears. Click Finish to complete the copy media labeling process.

After completing the wizard, the selected blank media will be scheduled for Label Copy for the selected originals in the Media Task Manager. Once the copy process is complete, copy media appear in the Copy Media list.

Figure 147: Copy Media Manager



For more information on using the Copy Media Manager to manage copies once they have been made, see *Chapter Five: Managing Storage Media* on page 177.

USING THE MEDIA TASK QUEUE MANAGER

The Media Task Manager allows you to manage the processing order for all media that have pending tasks. Opening the Media Task Manager displays the Media Task Queue, which lists all media that have assigned tasks ready to be performed. When a piece of media is processed, all tasks for that media are processed before DX moves to the next media in the queue. Media are processed in the order they appear in the Media Task Queue, meaning you can alter the order in which pieces of media are processed by changing their order in the Media Task Queue.

You can also use the Media Task Manager to edit tasks for a particular piece of media in the queue. When a piece of media is in the task queue, the task listed is the one that will be processed first. Using the Edit Tasks function, you can view all tasks assigned to the media. If new tasks are available for that piece of media, you can add tasks. You can also delete existing tasks, or change the options for existing tasks.

DX only allows you to set up certain combinations of tasks. Which tasks are available is dependent on the status of that piece of media. For example, if you set a Format task for a piece of media, DX will allow you to set up a Label task to follow it, but will not offer you the option of adding the media to a media folder until it is labeled (or until you schedule a Label task). Or if a piece of media is configured to a Move Group, the Remove from Move Group task is available, but not the Add to Move Group task. For tasks that cannot be queued in combination, you can set up one set of tasks, allow the tasks to process, and then set up another set of tasks.

NOTE

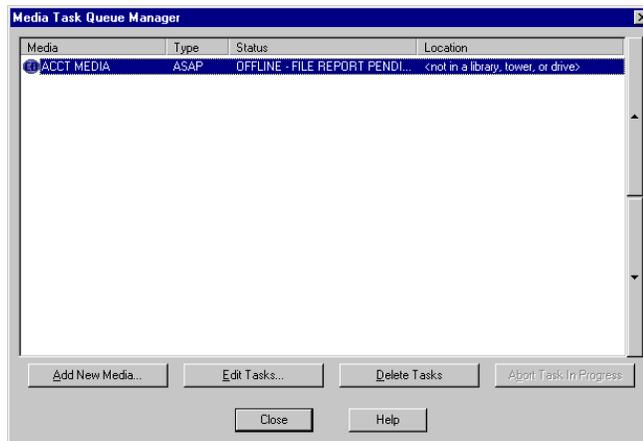
Each Media Task Queue is specific to each extended drive. If you have more than one extended drive listed in your tree view, make sure the active extended drive is the one for which you want to view pending media tasks.

OPENING THE MEDIA TASK QUEUE MANAGER

To open the media task queue manager:

- From Tools menu, select Media Task Manager. The Media Task Queue Manager dialog box appears.

Figure 148: Media Task Queue Manager Dialog Box



Media with pending tasks are listed in the order in which they will be processed.

The following sections provide instructions for each of the functions available from the Media Task Queue Manager. Those functions include:

- ✎ Assigning tasks to media not already in the queue. For instructions, see *Adding New Media to the Queue* on page 259.
- ✎ Viewing tasks (seeing what tasks are assigned to each piece of media in the queue).
- ✎ Changing what tasks are assigned, or the options for assigned tasks for media already in the queue. For instructions, see *Editing Tasks for Media in the Queue* on page 263.
- ✎ Removing all tasks for media in the queue. For instructions, see *Deleting Tasks for Media in the Queue* on page 267.
- ✎ Stopping a task from completing. For instructions, see *Canceling a Task in Progress* on page 265.
- ✎ Changing the order in which media is processed. For instructions, see *Ordering Media in the Queue* on page 266.

Adding New Media to the Queue

Media is added to the Media Task Queue whenever you assign a task to a piece of media that did not have a task assigned to it before. Using the Add New Media button in the Media Task Queue Manager, you can select a piece of media and assign tasks to it, thereby adding it to the Media Task Queue.

NOTE

You can add tasks to media through the Edit Tasks option on the shortcut menu for media. Adding a task to media automatically adds that media to the Media Task Queue.

To add a new piece of media to the queue:

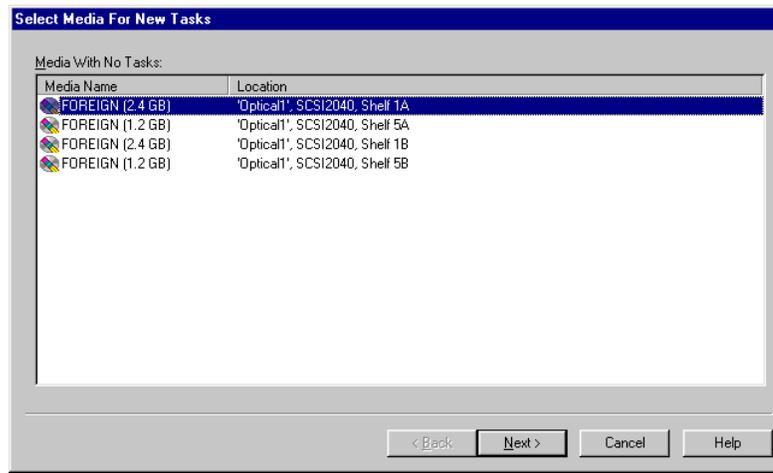
- 1 Open the Media Task Queue Manager by selecting Media Task Manager from the Tools menu.
- 2 Click Add New Media.

Figure 149: Add New Media button



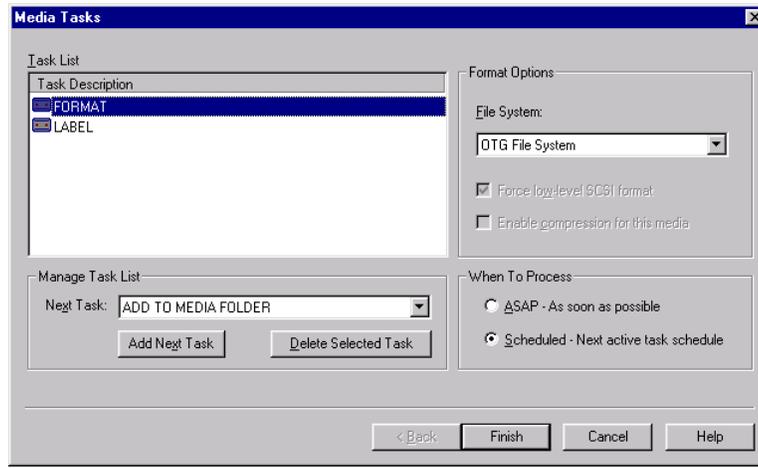
The Select Media for New Tasks page of the Add Media wizard appears listing all Media With No Tasks currently assigned.

Figure 150: Select Media For New Tasks Page



- 3 Select a piece of media for assignment of one or more tasks and click Next. The Media Tasks page appears.

Figure 151: Media Tasks Page



This page allows you to add and configure media tasks for the media. The following table briefly outlines the options available for configuration for each media task. For detailed discussions on media task options as well as information on sequencing media tasks, see *Using the Media Task Queue Manager* on page 257.

Table 29: Available Media Tasks and Options

MEDIA TASK:	MEDIA TASK OPTIONS:
Format	<ul style="list-style-type: none"> ↪ File System – select the file system appropriate to the media and the device ↪ Force low-level SCSI format – enable if formatting for a different file system of if media has failed due to media errors ↪ Enable compression – select to allow DX to compress files when writing to this media
Label	<ul style="list-style-type: none"> ↪ Media Name – type in a name for the piece of media
Label Copy	<ul style="list-style-type: none"> ↪ Original Media – select the piece of media of which you want to create and maintain a copy

MEDIA TASK:	MEDIA TASK OPTIONS:
File Restore	<ul style="list-style-type: none">↘ Log Duplicates – select to create a list of files in the media log that existed on both the media and the extended drive↘ Direct Read – select to mark all files being restored from the media for direct read (rather than allowing them to be fetched to the extended drive when requested by a client)
Compact	No options available for this task
Prefetch	No options available for this task
File Report	<ul style="list-style-type: none">↘ Complete Listing – select to provide complete file information for files on the media, including name and file size↘ Summary Only – select to provide only file totals for the media
Check Disk	<ul style="list-style-type: none">↘ Report errors only – select to only report errors found by the Check Disk function↘ Report and fix errors – select to allow the Check Disk function to fix errors it finds
Add Media to Media Folder	↘ Media Folder text box – either select an existing media folder from the drop-down list or click New to create a new media folder
Remove Media from Media Folder	No options available for this task
Add Media to Move Group	↘ Move Group text box – select an existing move group from the drop-down list
Remove Media from Move Group	No options available for this task
Copy Update	No options available for this task. (They are available only for blank media after label copy task is assigned.)

In addition to the options available for the media tasks listed above, you must also select whether to process the task(s) immediately or when the Process scheduled media tasks schedule is active. For more information, see *Media Task Scheduling* on page 268.

NOTE 

Since all tasks for media are processed at once, if you schedule multiple tasks for media, be sure to select the same When to Process option for all tasks. If one task has the ASAP – as soon as possible option selected, all tasks will process ASAP by default.

- 4 Once tasks have been added and configured as needed in the Media Tasks page, click Finish. The Media Task Queue Manager appears with the new media listed and the tasks pending. Clicking Cancel will exit the Media Tasks dialog box and discard all tasks added to the media.

All media with tasks assigned will appear in the Media Task Queue Manager until they are processed. For media with tasks selected to process ASAP – as soon as possible, those media may only appear briefly in the queue before the processing completes and the media is removed from the queue.

Editing Tasks for Media in the Queue

The Media Task Queue Manager provides access to the Media Tasks dialog box, which allows you to edit tasks assigned to media already in the queue. When editing tasks for a piece of media, you can change what tasks are assigned (add or remove tasks) or change the options configured for existing tasks.

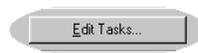
NOTE 

You can access the Media Tasks dialog box either through the Media Task Queue Manager or through the Edit Tasks option on the shortcut menu for media.

To edit the tasks assigned to media in the queue:

- 1 Open the Media Task Queue Manager by selecting Media Task Manager from the Tools menu.
- 2 Select the media for which you want to edit the assigned tasks.
- 3 Click Edit Tasks.

Figure 152: Edit Tasks Button



The Media Tasks page appears.

Figure 153: Media Tasks Page

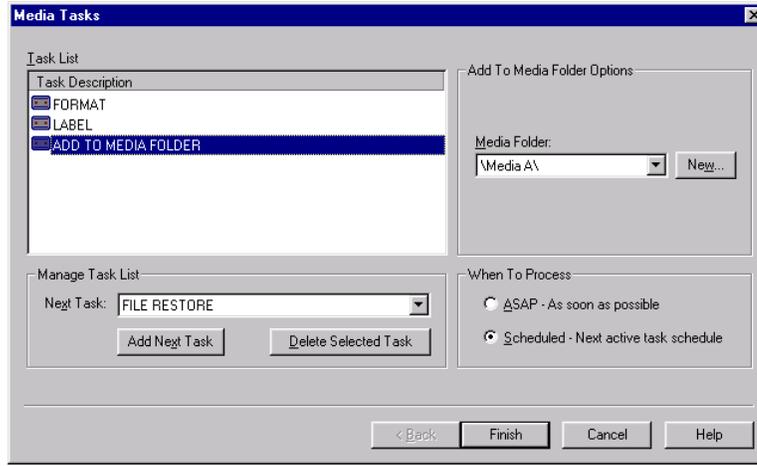


Table 30: Using The Media Tasks Dialog Box

TO DO THIS:	PERFORM THESE STEPS:
Add a task to the Task List	↵ From the dropdown list, select the task.
	↵ Click Add Next Task.
	↵ Configure the appropriate options in the Options section.
	↵ Configure a processing option in the When to Process section.
Edit the options for a task in the Task List	↵ From the Task List, select the task
	↵ Change the Options selected and When To Process selection as appropriate
Remove a task (and all tasks listed below it) from the Task List	↵ From the Task List, select the task.
	↵ Click Delete Selected Task.
	↵ In the confirmation message, click Yes

- 4 Add, Delete, or change the options for tasks as appropriate.

- 5 Click Finish. Changes to the tasks assigned for the selected media are saved. The Media Task Queue Manager dialog box reappears. Clicking Cancel will close the Media Tasks dialog box and discard any changes made.

Canceling a Task in Progress

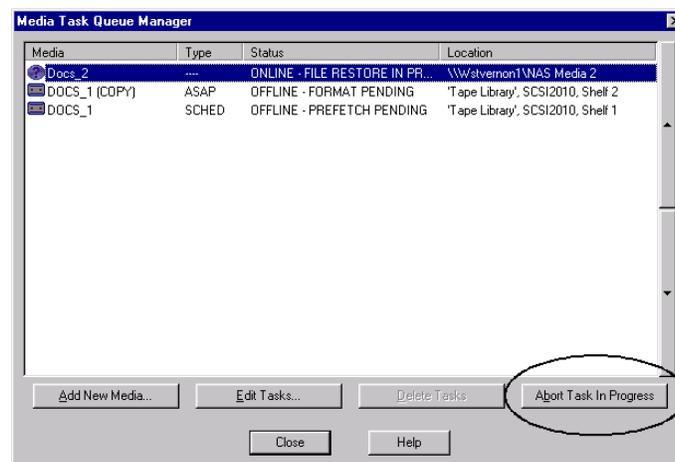
The Media Task Queue Manager lists the status of media with pending tasks, to include the task currently in progress. You can choose to stop the task currently in progress using the Abort Task in Progress button in the Media Task Queue manager.

All media tasks with the exception of the Format task can be stopped in progress. Once you stop a media task in progress you may have to clear the error status for the media before the next scheduled task will begin. If there is no error status to be cleared, the next pending media task will start processing automatically.

To stop a task already in process:

- 1 Open the Media Task Queue Manager by selecting Media Task Manager from the Tools menu.
- 2 Select the media for which you want to cancel the processing task.
- 3 Click Abort Task in Progress.

Figure 154: Abort Task In Progress Button



A message appears, prompting you to confirm that the task should be stopped.

- 4 Click Yes. The task is stopped and removed from the list of pending tasks.

- 5 If stopping the process caused an error status on the media, you will have to clear the error status before the next pending task will process. Right-click on the media in the extended drive tree and select Clear Error Status from the shortcut menu.
- 6 If there is no error status on the media the next pending task will automatically begin processing.

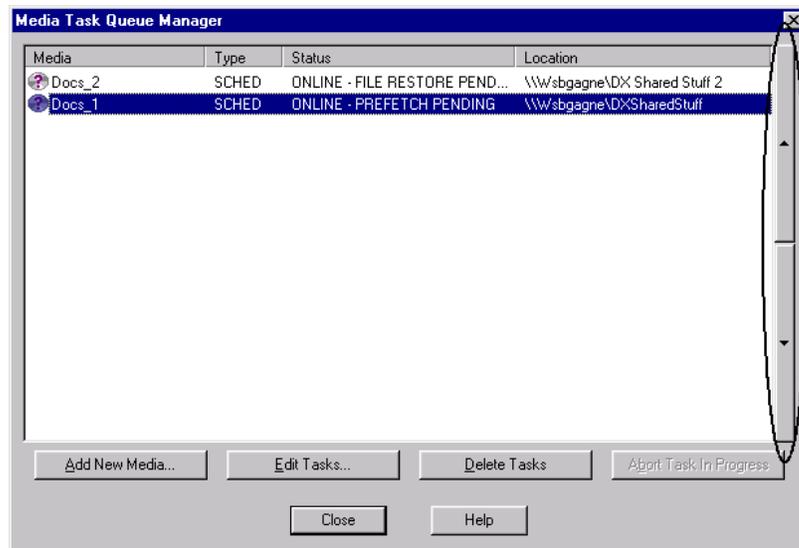
NOTE 

The Format task cannot be canceled once it is in progress.

Ordering Media in the Queue

You can change the processing order of the media in the Media Task Queue Manager using the arrows on the right side of the dialog box.

Figure 155: Promote/Demote Arrow Buttons



Since all assigned tasks for a piece of media are processed at once, moving a piece of media in the queue also moves all tasks assigned to that media.

To promote a piece of media in the queue:

- ➡ Select the piece of media and click the up button.

To demote a piece of media in the queue:

- ➔ Select the piece of media and click the down button.

Deleting Tasks for Media in the Queue

You can remove all pending tasks for a piece of media from the Media Task Queue Manager dialog box. When you use the Delete Tasks button for a piece of media, *all* assigned tasks are deleted which removes the media from the queue.

NOTE 

To delete only a portion of assigned tasks for a piece of media, use the Edit Tasks function.

To delete tasks for media in the queue:

- 1 Open the Media Task Queue Manager by selecting Media Task Manager from the Tools menu.
- 2 Select the media for which you want to delete all assigned tasks.
- 3 Click Delete Tasks.

Figure 156: Delete Tasks Button



- 4 A message appears, confirming that all tasks should be deleted for the piece of media. Click Yes. All tasks are deleted and the media is removed from the queue. The Media Task Queue Manager dialog box reappears, without the media in the queue.

MEDIA TASK SCHEDULING

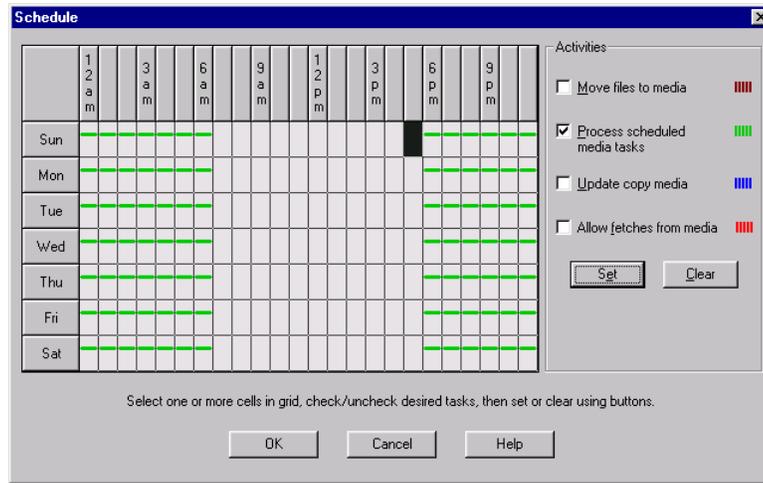
When assigning tasks to media, whether through the Edit Tasks option on the shortcut menu, the Manage Media Tasks option in the tools menu, the Copy Media Manager, or the Media Prepare manager, you can choose whether to have those tasks process immediately using the ASAP – as soon as possible option, or to schedule the processing of the tasks at a time when system resources are more readily available and system traffic is at a minimum.

Each extended drive configured for the DISKXTENDER system has its own scheduling capability that allows you to set up specific processing schedules for DX system events. This scheduling capability allows you to process the tasks for extended drive media at whatever time is most convenient for you.

The DISKXTENDER scheduler allows you to schedule begin and end times for four different media activities: Move files to media; Process scheduled media tasks; Update copy media; and Allow fetches from media. This section deals specifically with configuring the scheduler to activate the media task queue and run the scheduled tasks listed there by enabling the Process scheduled media tasks option in the scheduler. The above sections of this chapter describe these media tasks and how to add them to the media task queue.

DISKXTENDER media activities can be scheduled for a time range (e.g., 2am-4am). This range provides a “window of opportunity” for the task(s) to occur. If for any reason the task does not begin during this time, it will not be performed until the next time the schedule is active.

Figure 157: Media Activity Schedule Dialog Box



You can access the scheduler by opening the extended drive properties, clicking on the Settings tab then clicking the Schedule button. Colored lines represent each activity and, when scheduled for a timeframe, appear in the appropriate block(s).

The schedule grid contains columns for each hour of the day and rows for each day of the week, creating cells which each represent one hour. For example, the blacked out cell in Figure 157 above represents 5 p.m. to 6 p.m. on Sunday. DISKXTENDER'S scheduler allows you to set scheduled activities by selecting one or many cells in the grid. You can easily schedule all activities for a large block of time, or you can schedule specific activities for smaller blocks of time. In Figure 157 above the Process scheduled media tasks activity is the only activity scheduled and will run from 6 p.m. to 6 a.m. every day of the week.

For details on how to use the extended drive scheduler to set up media activity schedules, see the *Media Activity Scheduler* section on page 219.

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