CDRWIN

USER'S GUIDE

For Windows 95, 98, and NT

Software v3.8

1 November 2000

Revision History

Date	Description
10 Sept. 00	Basic Issue
24 Sept. 00	Added the following new features for CDRWIN v3.8c: • Compute Disc Running Time feature in the Load Tracks dialog box. • BURN-Proof option in Record Disc and Backup Disc dialog boxes.
29 Oct. 00	• Added BURN-Proof option to File Backup and Tools dialog box. • Added hyperlink to list of CDRWIN's supported devices. Removed Appendix. • Miscellaneous corrections.

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P<small>REFACE</small>

About This Manual

This document is a task-oriented manual to be distributed electronically. The procedures herein explain how to use CDRWIN commands to create legal copies of:

- CD-ROMs as image files on a computer hard drive

- Compact Disc-Recordable (CD-R), and Compact Disc-Rewriteable (CD-RW) discs

If you have questions about duplicating copyrighted material, see Using Copyrighted Material on page xviii.

Objectives

This manual describes how to use Golden Hawk Technology's CDRWIN 3.8 to create image files, CD-Rs, and CD-RWs. The procedures included enable you to:

- Install, configure, and use CDRWIN.

- Create image files of an entire audio or data CD-ROM, individual tracks, or sectors on a disc.

- Create audio or data CD-Rs or CD-RWs from image files using disc-at-once recording.

- Use a CD-R or CD-RW for high capacity file storage with CDRWIN's Import Previous Session feature.

- Create multisession CD-Rs or CD-RWs from image files, including CD Extra discs and discs using track-at-once recording.

- Record a CD-ROM directly to a CD-R or CD-RW using on-the-fly recording.

Intended Audience

This manual is intended for first time users of CDRWIN. These are individuals who know how to use a CD-R recorder and are familiar with the terms associated with the process, but want to advance to more sophisticated CD recording software, such as CDRWIN. Basic knowledge of Windows 95/98/NT is assumed.

Chapters

This manual contains the following chapters:

Chapter	Contents
Chapter 1 Getting Started	Describes how to download, install, configure, and use CDRWIN.
Chapter 2 Creating Image Files	Describes how to create image files of entire discs, individual tracks, or sectors on your computer's hard drive. Also describes how to read disc information only and erase a CD-RW.
Chapter 3 Disc-at-Once Recording	Describes how to record an audio or data disc from image files using disc-at-once recording.
Chapter 4 On-the-Fly Recording	Describes how to copy one disc directly to another using on-the-fly recording.
Chapter 5 Creating Data File Discs	Describes how to create ISO 9660 data file discs.
Chapter 6 Storing Computer Files	Describes how to archive computer files incrementally using CDRWIN's Import Previous Session feature.

Chapter 7 Creating a Cuesheet	Describes how to create and edit a cuesheet.
Chapter 8 Creating a CD-Text Disc	Describes how to create a CD-TEXT file and add it to a cuesheet.
Chapter 9 Creating a CD+G Disc	Describes how to create CD+G discs.
Chapter 10 Special Operations	Describes how to do special operations with CDRWIN, such as Erasing a CD-RW, creating a File Backup List, and making a bootable disc.
Appendix A – Supported Devices	Lists CD recorders supported by CDRWIN.
Appendix A – Cuesheet Commands	Describes individual cuesheet commands in detail.
Glossary	Describes commonly used terms.

Document Conventions

Conventions used in this manual are explained in the following table:

Convention	Meaning
Bold	Used to highlight items in a dialog box.
Numbered step	Used where sequence is important.
Bulleted item	Used where sequence is not important.
`Courier` in text	Used to show input or dialog displays in examples.
Text in blue	Used to show a hyperlink (electronic version only).

Using Hyperlinks (Electronic Version)

Words and terms highlighted in blue are hyperlinks. For example, if you click on the hyperlinked word, you will jump to the glossary definition of the word or term. The table of contents, list of figures, and procedures referenced in text are also similarly hyperlinked. Index entries are hyperlinked, but not highlighted in blue.

Using Copyrighted Material

CDRWIN enables you to make legal copies of CDs for your own use as allowed by the *Fair Use* clause of U.S. copyright law. If you own the CD, law permits you to duplicate all or part of it for your personal use. You will violate federal copyright laws if you either:

• Duplicate CDs for other people to use, even if you don't sell those copies.

• Duplicate other people's CDs for your own use.

It is illegal to duplicate copyrighted CDs for any reason other than personal use, unless you happen to be the copyright owner. CDRWIN is not intended for illegal duplication. Golden Hawk Technology discourages any CDRWIN user from doing so. Golden Hawk Technology takes no responsibility for any illegal use of CDRWIN by our customers.

Reproduction or other use of copyrighted material, such as a CD, usually requires permission from the copyright owner. Failure to obtain permission from the owner of the copyright to reproduce or otherwise use copyrighted material can result in both civil and criminal liability.

If you are duplicating discs for sale or commercial distribution, and you use material created and/or copyrighted by someone else, make sure that you have the legal right to use and sell it.

If you have any questions concerning copyright laws, consult an attorney for assistance in obtaining rights to copyrighted material for your own use. The information provided here is informational; Golden Hawk Technology cannot provide legal advice.

Technical Support

Golden Hawk Technology provides technical support for CDRWIN users. If you encounter technical difficulties, our technical support staff will assist you in solving your problem.

In most cases, however, you will find the answer to your problem in Golden Hawk Technology's documentation. For example, a majority of the problem reports Golden Hawk receives are caused by improper setup of the software or ASPI drivers. Much of the information about how to correct these problems is already available in this manual and on our web site. Before reporting any problems, please read the following pages at the Golden Hawk Technology web site:

Frequently Asked Questions
http://www.goldenhawk.com/faq.htm

Important Installation Instructions
http://www.goldenhawk.com/setup.txt

Contact Information

If you do not find the answer to your technical problem in our documentation, we encourage you to contact Golden Hawk's Technical Support department. When you contactTechnical Support, please have the following information ready to help us recommend a solution to your problem:

• The operating system you are using.

• The version of the CDRWIN software you are using.

• Whether you are a registered CDRWIN user, or if you are using the demonstration version as part of your free 30-day trial.

• A description of the operation you were trying to perform when the error occurred.

• The exact two line error message (if any) you received, including the error codes on the second line.

• The CDROM recorder and reader models you use.

• SCSI card model (if any).

• The recording speed you are using.

Hours

Golden Hawk's Technical Support for CDRWIN is available Monday through Friday, 10AM to 6PM EST.

E-mail

You can contact Golden Hawk Technology Technical Support through e-mail at the following address:

support@goldenhawk.com

Phone

You can contact Golden Hawk Technology's Technical Support department by phone at one of the following numbers:

(603) 429-1027
(603) 429-1025

FAX

Contact Golden Hawk Technology by Fax at the following number:

(603) 429-0073

Mail

Contact Golden Hawk Technology by mail at the following address:

Golden Hawk Technology
909 Columbia Circle
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USA

1

GETTING STARTED

This chapter describes how to install, use, and set up CDRWIN so you can create CD-R and CD-RW discs with your computer.

Contents
- Installing CDRWIN
- Opening CDRWIN
- Unlocking CDRWIN
- Uninstalling CDRWIN
- Navigating the Main Toolbar
- Setting Up CDRWIN

Installing CDRWIN

♦ **To install CDRWIN:**

1 Download the CDRWIN executable software for Windows 95/ 98 (filename: cdr38a-e.exe) from the Golden Hawk Technology web site:

http://www.goldenhawk.com/download.htm

2 From the Windows Start menu, select Run.

The Run dialog box appears (Figure 1-1):

Figure 1-1: Run Dialog Box

3 Click Browse and select cdr38a-e.exe.

4 Click OK.

CDRWIN installs on your computer.

Opening CDRWIN

You can open CDRWIN from the Windows Start menu. You can also drag the CDRWIN icon from the Start menu onto your desktop.

♦ **To open CDRWIN:**

1   Click the Start button on the Windows taskbar, and go to Programs.

2   From the Golden Hawk Technology folder, choose CDRWIN (Figure 1-2).

Figure 1-2: Golden Hawk Technology Folder

The CDRWIN main toolbar appears. For more information about toolbar icons, see Navigating the Main Toolbar on page 1-8.

Unlocking CDRWIN

Overview

CDRWIN is in demonstration mode when you first open the program. You must purchase CDRWIN before you can unlock its full functionality. After you purchase CDRWIN, Golden Hawk Technology sends you an Authorization e-mail message containing the following information necessary to complete the Unlock Program Dialog Box:

• Name
• Company/E-mail
• Unlock Key
• Check Key

Enter the supplied information from the Authorization e-mail into the appropriate field **exactly** as it appears in your email, including spaces and upper and lowercase letters.

CDRWIN
Demonstration
Mode

If you do not unlock the program, CDRWIN remains in demonstration mode. The demonstration version of CDRWIN is fully functional, except that all recording operations are limited to 1X speed. You are entitled to use the demonstration version for a maximum of 30 days. After this period, you must purchase the software or remove it from your system.

NOTE

Some recorder models do not support 1X recording speed. The demonstration version of CDRWIN will not work with these recorder models.

♦ **To unlock CDRWIN:**

1 Open CDRWIN. For detailed instructions, see Opening CDRWIN on page 1-3.

The CDRWIN – Demonstration Version dialog box appears
(Figure 1-3):

Figure 1-3: CDRWIN – Demonstration Version

2 Click OK to continue.

The CDRWIN main toolbar with the unlock icon appears
(Figure 1-4):

Figure 1-4: Main Toolbar with Unlock Icon

NOTE

The unlock icon remains on the main toolbar until you unlock CDRWIN.

3 Click the unlock icon.

The Unlock Program dialog box appears (Figure 1-5):

Figure 1-5: Unlock Program Dialog Box

4 In the Unlock Program dialog box, enter the information contained in your authorization e-mail message.

5 Click Unlock.

The CDRWIN dialog box appears (Figure 1-6):

Figure 1-6: CDRWIN Welcome Message

6 Click OK.

CDRWIN closes. After unlocking CDRWIN, the Unlock Icon (Figure 1-4) is removed from the main toolbar.

Uninstalling CDRWIN

If you do not purchase CDRWIN, you must uninstall the demonstration version from your computer at the end of your 30 day evaluation period.

♦ **To uninstall CDRWIN:**

1 Click the Start button on the Windows taskbar, and go to Programs.

2 From the Golden Hawk Technology folder, select Uninstall CDRWIN (Figure 1-2).

The Uninstall CDRWIN wizard appears (Figure 1-7):
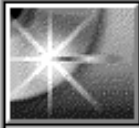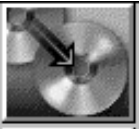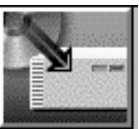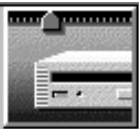
Figure 1-7: Uninstall CDRWIN Wizard
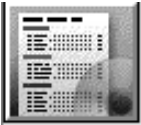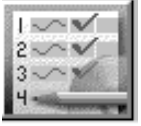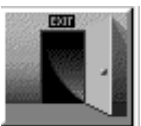
3 Follow the prompts to complete the Uninstall CDRWIN wizard.

CDRWIN is removed from your computer.

Navigating the Main Toolbar

The main toolbar allows you to access all operations within CDRWIN and contains the following icons:

Icon	Name	Description
	Record Disc	Displays the Record Disc dialog box, where you record image files from your hard drive onto a disc using disc-at-once recording.
	Backup Disc	Displays the Backup Disc dialog box, where you record an existing CD-ROM to a blank disc on-the-fly.
	Extract Disc/ Tracks/ Sectors	Displays the Extract Disc/Tracks/ Sectors dialog box, where you perform all image file creating operations.
	File Backup and Tools	Displays the File Backup and Tools dialog box, where you back up directories and files from your hard drive to an ISO 9660 compatible CD-R disc. You can also perform miscellaneous disc operations, such as finalizing a multisession disc, erasing a CD-RW, or creating a bootable disc.
	Devices and Settings	Displays the Devices and Settings dialog box, where you specify and display the devices and settings that CDRWIN uses during recording.

Icon	Name	Description
	Table of Contents	Displays the Table of Contents dialog box, which displays the table of contents (TOC) of an existing disc.
	CD-Text Editor	Displays the CD-Text Editor dialog box, where you enter information to be encoded onto a CD-TEXT disc.
	Sector Viewer	Displays the Sector Viewer dialog box, which displays individual data sectors on a disc. This operation is for advanced users only.
	Read Online Help	Displays the online help for CDRWIN.
	Exit Program	Closes the main toolbar and exits CDRWIN.

Setting Up CDRWIN

After installing CDRWIN, you can configure CDRWIN's settings for your computer. You configure CDRWIN's settings from the Devices and Settings dialog box (Figure 1-8). The Devices and Settings dialog box contains the following tabs:

- **Readers** – Displays your CD-ROM reader device. Features supported by the selected device are signified with grey checks in the boxes. CDRWIN supports most newer CD-ROM reader models. For a list of supported devices, visit Golden Hawk's web site at http://www.goldenhawk.com.

- **Recorders** – Displays your CD-R recorder device. Features supported by the selected device are signified with grey checks in the boxes. For a list of supported devices, visit Golden Hawk's web site at http://www.goldenhawk.com.

- **Transporters** – Displays your disc transporter device. To configure your default disc transporter settings, see Configuring a Default Disc Transporter on page 1-18.

- **Disks** – Displays information about all fixed (such as your hard drive) and removable disks on your system.

- **Adapters** – Displays information about the SCSI and IDE adapters on your system. Use this tab to set global adapter settings.

- **ASPI** – Displays ASPI driver options. To set ASPI driver options, see Configuring ASPI Settings on page 1-16.

- **Caching** – Displays file or disc caching options. To specify file or disc caching options, see Enabling File and Disc Caching on page 1-11.

- **Defaults** – Displays recording completion and format options. To configure these defaults, see Configuring CDRWIN Defaults on page 1-14.

Enabling File and Disc Caching

Overview

CDRWIN's File/Disc Caching function enables you to specify the size of your CD recorder's buffer (also called a cache), and how data is supplied to the buffer to reduce the chance of a buffer underrun.

Buffer Underruns

Buffer underruns are the most common problem encountered when recording discs, caused by interrupted flow of data from your computer to the recorder. CDRWIN uses the following features to ensure consistent data flow to your CD recorder:

Preventing Buffer Underruns

- **Cyclic Buffering** – Allows you to specify the full to empty ratio of CDRWIN's cyclic buffering function. Cyclic buffering makes the computer incrementally empty and fill the CD recorder's buffer to best optimize your computer's memory resources during recording.

- **Variable Buffer Size** – Allows you to specify the size of your CD recorder's buffer. If you experience a buffer underrun, you can enlarge the buffer as necessary to ensure consistent data flow to the recorder. For recording audio, 2 to 4 MB of buffer is adequate.

- **CPU Priority Level** – Allows you to set the priority level for recording data processed by your CPU. Selecting the High CPU priority level gives recording data first priority when your CPU processes data. For example, if you are working on a word processing application while recording a disc, your CPU processes the recording data ahead of data going to your word processing application.

♦ **To enable file and disc caching:**

1 From the main toolbar, click the Devices and Settings icon.

The Device and Settings dialog box appears.

2 Click the Caching tab.

The Caching tab appears (Figure 1-8):
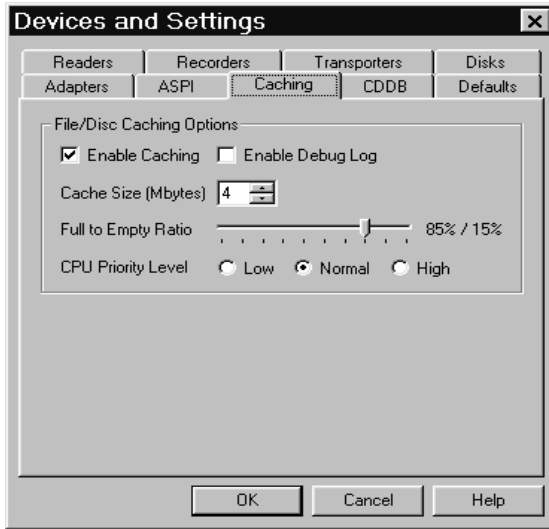
Figure 1-8: Devices and Settings – Caching Tab

3 In the Caching tab, complete the following:

- **Enable Caching** – Check the box to enable CDRWIN's caching function.

CAUTION

Use the Enable Debug Log option only if you are having a problem with the caching feature. Please contact Golden Hawk Technology for assistance.

- **Enable Debug Log** – In most cases, leave this box unchecked. Check to enable CDRWIN's debug log. CDRWIN writes the debug information to the file C:\ THREAD.LOG.

- **Cache Size (Mbytes)** – Specify the size of the cache in megabytes. The minimum size is 1MB. The maximum size is 32 MB. A larger buffer reduces the chance of a buffer underrun. For audio recording, 2 to 4 MB is usually adequate.

- **Full to Empty Ratio** – Move the slider to specify the full to empty ratio for CDRWIN's cyclic buffering capability. 85% full and 15% empty is the default setting.

- **CPU Priority Level** – Select one of the following:

  - **Low** – Sets a low CPU priority level for recording data.

  - **Normal** – Sets a normal CPU priority level for recording data. Normal is the default setting.

  - **High** – Sets a high CPU priority level for recording data. Select this setting if you have an older computer and experience buffer underruns during recording.

4 Click OK.

Configuring CDRWIN Defaults

You can configure CDRWIN's default recording completion and file options to specify:

- What the program does during recording
- How the program notifies you when recording is finished

♦ **To configure CDRWIN defaults:**

1 From the main toolbar, click the Devices and Settings icon.

The Devices and Settings dialog box appears.

2 Click the Defaults tab.

The Defaults tab appears (Figure 1-9):

Figure 1-9: Devices and Settings – Defaults Tab

3 In the Defaults tab, complete the following:

- **Eject disc from recorder** – Check to eject the disc automatically when recording is complete.

- **User Notification** – Select one of the following:

    - **Message Box Only** – Message box appears when recording is complete.

    - **Play Beep** – Message box appears and beeps when recording is complete.

    - **Play Sound File** – Message box appears and sound file plays when recording is complete.

- **Sound File** – Select the sound file you want to play when recording is complete. You must specify the sound file.

- **Overwrite Existing** – Check to automatically overwrite any existing image or cuesheet file. If you do not check the box, CDRWIN prompts you to overwrite the files when you copy tracks to your hard drive.

4 Click OK.

Configuring ASPI Settings

You can specify ASPI driver options from the ASPI tab in the Devices and Settings dialog box.

◆ **To configure ASPI settings:**

1 From the main toolbar, click the Devices and Settings icon.

The Devices and Settings dialog box appears.

2 Click the ASPI tab.

The ASPI tab appears (Figure 1-10):
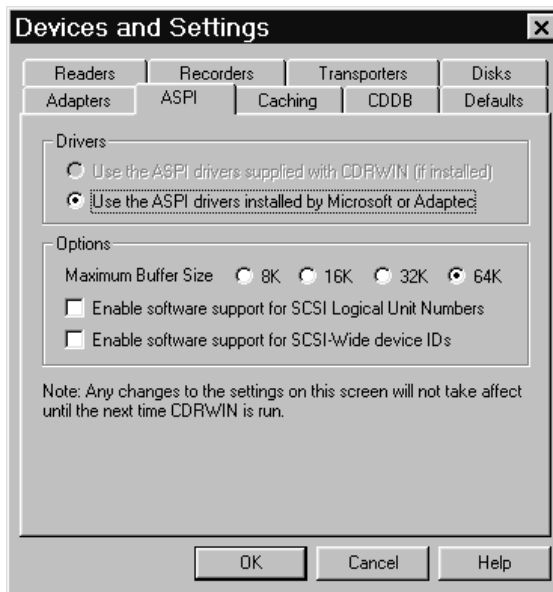
Figure 1-10: Devices and Settings – ASPI Tab

NOTE

In the Drivers panel, CDRWIN automatically selects "Use the ASPI drivers installed by Microsoft or Adaptec."

3 In the Options panel, complete the following:

- **Maximum Buffer Size** - Select a radio button to specify the maximum buffer size to be used when reading or writing from all CDROM devices. 64K byte is the default setting.

NOTE

Some IDE/SCSI adapters or drivers do not support 64 Kb buffers. If your adapters or drivers do not support 64 Kb buffer, the error message Buffer too big appears.

- **Enable software support for Logical Unit Numbers** – Check the box to enable software support for SCSI logical unit numbers. In most cases, leave this box unchecked.

NOTE

It may be necessary to enable Logical Unit Numbers in the SCSI card or drivers.

- **Enable software support for SCSI-Wide device IDs** – Check the box to enable software support for SCSI-Wide IDs greater than seven.

4 Click OK.

Your ASPI settings are saved. The updated settings take effect the next time you open CDRWIN.

Configuring a Default Disc Transporter

You can set and configure your default disc transporter from the Transporters tab in the Devices and Settings dialog box. CDRWIN supports the Kodak (SCSI) and Discmatic AD1050 (Serial) models.

♦ **To configure your default disc transporter:**

1   From the main toolbar, click the Devices and Settings icon.

The Devices and Settings dialog box appears.

2   Click the Transporters tab.

The Transporters tab appears (Figure 1-11):
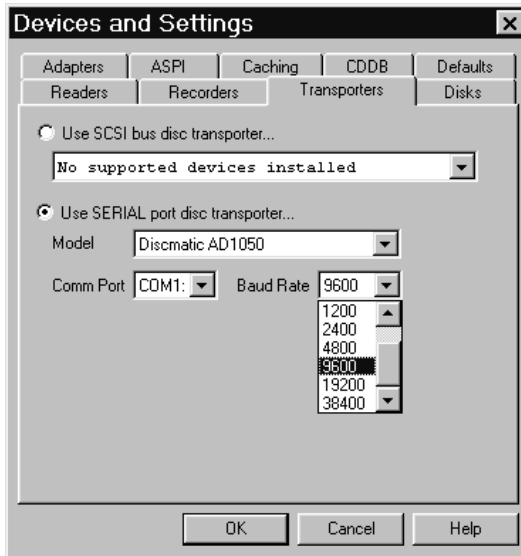
Figure 1-11: Devices and Settings – Transporters Tab

3   Click either:

- **Use SCSI bus disc transporter** – If you have a SCSI connection to your disc transporter, select your transporter from the list. No configuration is required.

or

- **Use SERIAL port disc transporter** – If you have a serial connection to your transporter, complete the following:

   - **Model** – Select your disc transporter from the list.

   - **Comm Port** – Select the communication port that your disc transporter is connected to.

   - **Baud Rate** – Select the baud per second (bps) rate of the connection to your disc transporter. 9600 bps is the default bps.

4   Click OK.

Your default disc transporter settings are configured.

2

CREATING IMAGE FILES

About this
chapter

This chapter describes how to create image files from the Extract Disc/Tracks/Sectors to Image File dialog box. An image file is an audio or data disc, track, or sector copied (extracted) from an existing CD-ROM to your computer's hard drive.

Contents

- About the Extract Disc/Tracks/Sectors Dialog Box
- Copying a Disc
- Copying Tracks
- Copying Sectors
- Reading a Disc

About the Extract Disc/Tracks/Sectors Dialog Box

Dialog Box
Windows

You create image files of audio discs from the Extract Disc/Tracks/ Sectors to Image File dialog box. This dialog box contains four embedded windows. You must select one of the Extract Mode radio buttons located at the top of the dialog box to display one of the following embedded windows:

- **Extract Disc Image/Cuesheet Window** – Where you copy an entire CD-ROM to one large file on your hard drive and create an accompanying cuesheet. This window appears by default when you activate the Extract Disc/Tracks/Sectors dialog box.

- **Extract Tracks Window** – Where you copy one or more tracks from a CD-ROM to your hard drive.

- **Extract Sectors Window** – Where you copy a range of sectors from a CD-ROM to your hard drive.

- **Read Disc Only Window** – Where you test a disc for flaws without creating an image file.

Audio File
Formats

CDRWIN creates image files in one of the following file formats:

- **WAVE** – Waveform (44 kHz, 16-bit Stereo). WAVE is the standard audio format for PCs. The file extension is .wav.

- **AIFF** – Audio Interchange File Format (44 kHz, 16-bit stereo). AIFF is the standard audio format for Macintosh computers. The file extension is .aif.

- **INTEL** – Intel (least significant byte first) binary format. The file extension is .bin.

- **MOTOROLA** – Motorola (most significant byte last) binary format. The file extension is .mot.

You can also create, or build, ISO 9660 image files of data tracks or discs from the File Backup and Tools dialog box. The data files are created in ISO 9660 format with an .iso file extension. For more information, see Chapter 5, Creating Data File Discs.

Load Disc
Error

If there is no disc in your CD reader when you open the Extract Disc/Tracks/Sectors to Image File dialog box, the following error message appears:

CDRWIN ☒

❌ Error: 'LOAD DISC' command failed on device 0:0:0
Device contains no disc or is not ready (04h 00h 02h 02h 3Ah 00h)

[OK]

Figure 2-1: Load Disc Error Message

If this error appears, click OK. The Extract Disc/Tracks/Sectors to Image File dialog box appears with an empty Track Selection grid. To correct this error, exit the dialog box and insert a disc into your CD reader.

Copying a Disc

You create an image file of a CD-ROM from the Extract Disc/ Cuesheet window. CDRWIN copies all individual tracks on the CD-ROM to one large image file on your hard drive in Intel binary format. CDRWIN also automatically creates a cuesheet for the disc, which you can use to record subsequent copies of the image file to a CD-R or CD-RW using disc-at-once recording.

For more information about editing a cuesheet, see Chapter 7, Creating a Cuesheet.

NOTE

You cannot copy a multisession disc using this method.

♦ **To copy a disc:**

1 From the main toolbar, click the Extract Disc/Tracks/Sectors icon.

The Extract Disc Image/Cuesheet window of the Extract Disc/
Tracks/Sectors to Image File dialog box appears (Figure 2-2):
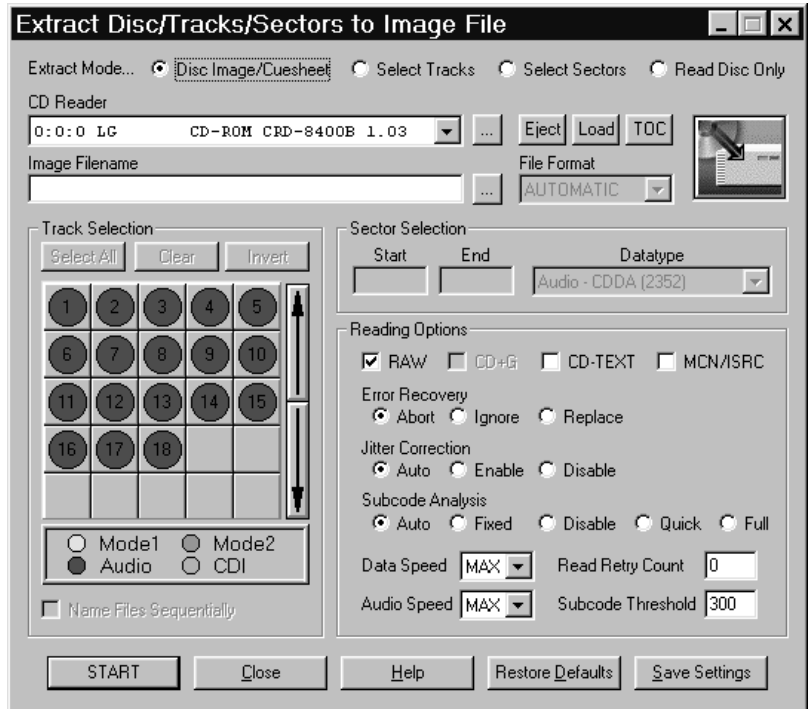
Figure 2-2: Extract Disc Image/Cuesheet Window

NOTE

The Extract Disc Image/Cuesheet window appears by default when you open the Extract Disc/Tracks/Sectors to Image file dialog box.

2 In the Extract Disc Image/Cuesheet window, complete the
following:

- **CD Reader** – Select your CD Reader from the pull-down
  menu.

- **Image Filename** – Enter the directory and name of the image file. Use the ... button to specify the directory and image filename. CDRWIN also writes a cuesheet file with the same filename, but with a `.cue` file extension.

- **Eject** – Click to eject the CD currently in your CD reader.

- **Load** – Click to load a CD into your CD reader.

- **TOC** – Click to update the table of contents for the CD in your reader. Clicking TOC updates the tracks in the track selection panel.

3   In the Reading Options panel, complete the following:

- **RAW** – CDRWIN automatically checks this box for you. It copies an image file as raw sectors (2352 bytes). Unchecking the box has no effect when recording an image file of an audio disc.

- **CD-TEXT** – Check to copy CD-TEXT information from a CD-TEXT compatible audio disc. Checking this box has no effect if your CD reader or recorder does not support CD-TEXT.

- **MCN/ISRC** – Check to copy the media catalog number (MCN) and track International Standard Recording Code (ISRC) codes.

NOTE

The MCN/IRSC option slows the recording process and is not supported by all reading or recording devices.

- **Error Recovery** – Select one of the following:

    - **Abort** – Stops recording if any unreadable sector is found. This is the default setting.

    - **Ignore** – Replaces any unreadable sector with another unreadable sector and continues recording the disc. For audio image files, this option is identical to Replace.

    - **Replace** – Replaces any unreadable sector with a readable one, and continues recording the disc.

- **Jitter Correction** – To enable or disable the jitter correction algorithm, select one of the following:

    - **Automatic** – Chooses the best jitter correction setting for you. Automatic is the default setting.

    - **Enabled** – Enables the jitter correction algorithm.

    - **Disabled** – Disables the jitter correction algorithm.

- **Subcode Analysis** – To specify subcode analysis, select one of the following:

    - **Auto** – Selects the best analysis mode for the selected CD reader. If your reading or recording device supports the reading of subcodes, the Quick option is selected. Otherwise, the Fixed option is selected.

    - **Fixed** – Analyzes the first two seconds of all audio tracks encoded as a pre-gap without actually analyzing the subcode. Use this option if your CD reader does not support the reading of subcodes.

    - **Disable** – Disables all subcode analysis.

    - **Quick** – Analyzes only the pre-gaps (Index 0) of each track.

- **Full** – Analyzes all subcodes on the disc. This option is useful only for discs that contain index numbers greater than one.

- **Data Speed** – Select a speed from the pull-down menu for reading data tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Audio Speed** – Select a speed from the pull-down menu for reading audio tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Read Retry Count** – Enter the maximum number of times to retry a failed reading operation. The range is 0 to 10. 0 is the default.

- **Subcode Threshold** – This feature is disabled and has no effect on the copying process.

4 Click START.

The Copy Progress dialog box appears (Figure 2-3):

Copy Progress

Reading AUDIO Sectors 000000 to 206002
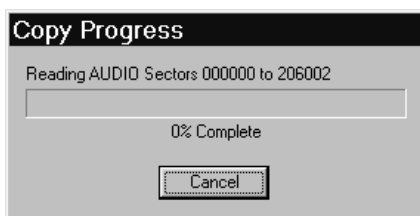
0% Complete

Cancel

Figure 2-3: Copy Progress Dialog Box

The image file and cuesheet are copied to the specified directory. The Copy Progress dialog box shows the percentage of the image file recording process completed. Click Cancel if you want to stop recording the image file.

When recording of the image file is complete, the Operation Successfully Completed! message box appears (Figure 2-4):
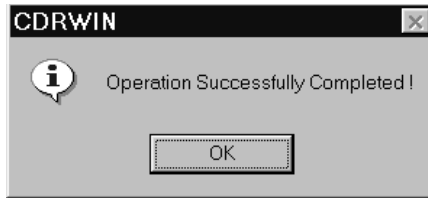
Figure 2-4: Operation Successfully Completed Message Box

5 Click OK.

Your image file is complete.

Copying Tracks

You can create image files of CD-ROM tracks from the Extract Tracks window of the Extract Disc/Tracks/Sectors to Image File dialog box.

Copying
Process

Copying tracks is a two step process. You first must select the tracks to be copied from your CD-ROM, then specify recording and image file attributes.

File Formats

CDRWIN copies the tracks from your CD-ROM onto your computer's hard drive in the file format you specify. The default file format for audio tracks is WAVE (`.wav` extension, 44 MHz, 16-bit stereo). You can also copy audio tracks in AIFF format (`.aif` extension, 44 MHz, 16-bit stereo).

Intel binary format (`.bin` extension) is the default file format for data tracks. You can also copy data tracks in Motorola binary format (`.mot` extension).

NOTE

You cannot record tracks from a multisession *CD-ROM using this method.*

Selecting Tracks

You select the tracks you want to copy in the Track Selection panel. Each track on your CD-ROM is graphically represented as a colored circle in the track selection grid:
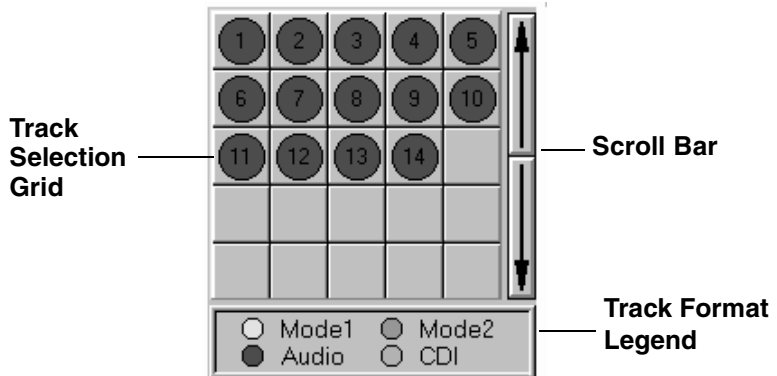
Figure 2-5: Extract Tracks Window – Track Selection Grid

The format type of each track is represented with one of the following colors:

- **Red** – Audio Track
- **Yellow** – Mode 1 Track
- **Green** – Mode 2 Track
- **Light Blue** – CD-I Track

NOTE

If there are tracks in the Track Selection Grid with more than one color, your disc is a multisession disc. You cannot copy tracks from a multisession disc from the Extract Tracks window.

The track selection grid displays the first 25 tracks on your disc. Use the scroll bar to view tracks on discs with more than 25 tracks.

♦ **To select tracks:**

1 From the main toolbar, click the Extract Disc/Tracks/Sectors icon.

The Extract Disc/Tracks/Sectors to Image File dialog box appears (Figure 2-6):
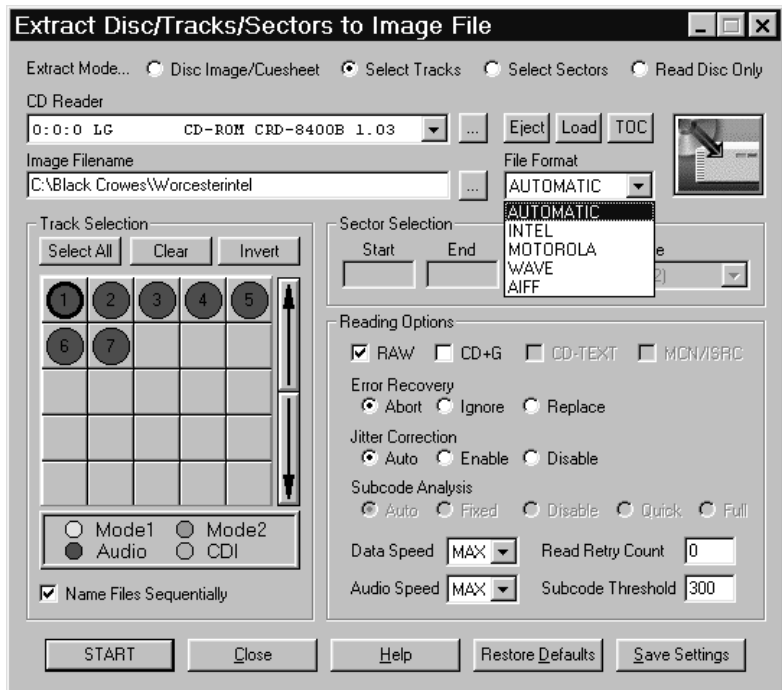
Figure 2-6: Extract Tracks Window

2 In the Extract Mode area, click the Select Tracks button.

The Extract Tracks window appears (Figure 2-6).

3 Enter the directory and name of your image file in the Image Filename field. Use the ... button to specify the directory and image filename.

4 Complete the following:

- **CD Reader** – Select your CD Reader from the pull-down menu.

- **Eject** – Click to eject the CD currently in your CD reader.

- **Load** – Click to load a CD into your CD reader.

- **TOC** – Click to update the table of contents for the CD in your reader. Clicking TOC updates the tracks in the Track Selection Grid.

5 From the Track Selection panel, complete the following:

- **Track Selection Grid** – Left-click a grid square to select a track for recording. A black ring appears around the disc when you have selected a track. You can select more than one track. Right-click a grid square to display track information.

- **Select All** – Click to select all tracks for recording.

- **Name Files Sequentially** – If you select more than one track to record, check to name each image file with a sequential number starting at 1. For example, if you are copying tracks 5 and 8 using the image filename `TRACK.WAV`, then CDRWIN names the two files `TRACK01.WAV` and `TRACK02.WAV`.

- **Clear** – Click to unselect tracks.

- **Invert** – Click to invert order of selected tracks.

Specifying Recording and Image File Attributes

When copying tracks, you must specify how the image files are recorded to your hard drive and the file format they are recorded in.

◆ **To specify recording and image file attributes:**

1 In the Extract Tracks window, complete the following to specify image file and recording attributes:

- **File Format** – To specify the image file's format, select one of the following:

    - **AUTOMATIC** – Chooses the image file's format for you. WAVE is the default format for audio tracks. For all other operations, INTEL is the default format for Mode 1, Mode 2, and CDI Tracks.

    - **INTEL** – Writes image file in Intel (least significant byte first) binary format. The image file will have a `.bin` file extension.

    - **MOTOROLA** – Writes image file in Motorola (most significant byte last) binary format. The image file will have a `.mot` file extension.

    - **WAVE** – Writes image file in Waveform, or WAVE, format. WAVE is the standard audio file format for PCs. The image file will have a `.wav` file extension.

    - **AIFF** – Writes image file in Audio Interchange File Format, or AIFF, format. AIFF is the standard audio file format for Macintosh computers. The image file will have a `.aif` file extension.

- **RAW** – CDRWIN automatically checks this box for you. It copies an image file as raw sectors (2352 bytes). Unchecking the box has no effect when recording an image file of an audio or CD+G track.

- **CD+G** – Check to enable copying of CD+G (Karaoke) discs. If you do not select this option when copying a CD+G disc, the graphics information is not copied to the image file. This option has no effect on data discs.

- **Error Recovery** – Select one of the following:

  - **Abort** – Stops recording if any unreadable sector is found. This is the default setting.

  - **Ignore** – Replaces any unreadable sector with another unreadable sector and continues recording the disc. For audio image files, this option is identical to Replace.

  - **Replace** – Replaces any unreadable sector with a readable one, and continues recording the disc.

- **Jitter Correction** – To enable or disable the jitter correction algorithm, select one of the following buttons:

  - **Automatic** – Chooses the best jitter correction setting for you. Automatic is the default setting.

  - **Enabled** – Enables the jitter correction algorithm.

  - **Disabled** – Disables the jitter correction algorithm.

- **Data Speed** – Select a speed from the pull-down menu for reading data tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Audio Speed** – Select a speed from the pull-down menu for reading of audio tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Read Retry Count** – Enter the maximum number of times to retry a failed reading operation. The range is 0 to 10. 0 is the default.

- **Subcode Threshold** – This feature is disabled and has no effect on the copying process.

2 Click START.

The Copy Progress dialog box appears (Figure 2-3).

The image file is copied to the specified directory. The Copy Progress dialog box shows the percentage of the image file recording process that is completed. Click Cancel if you want to stop recording the image file.

When recording of the image file is complete, the Operation Successfully Completed! message box appears (Figure 2-4).

3 Click OK.

Your image file is complete.

Copying Sectors

You can copy, or extract, a range of sectors to your computer's hard drive from the Extract Sectors window of the Extract Disc/Tracks/ Sectors to Image File dialog box.

Copying Range

The range of sectors you copy can encompass part or all of an audio or data track, multiple tracks, or part or all of a disc. You can also copy audio tracks from a multisession disc, such as a CD Extra disc, using this procedure. To copy data tracks from a CD Extra disc, see Creating an ISO 9660 Image File on page 5-2.

Beginning and End of Sectors

To copy sectors, you must specify the beginning and ending sectors using one of the following formats:

- **Logical Block Address (LBA)** – Each sector on a disc has its own LBA, expressed as a six digit number that serves as the sector's address, or location, on the disc. LBAs are numbered sequentially from the beginning to the end of the disc, starting with the beginning of track number 1 (LBA 000000) and ending with the last sector on the disc.

- **Time Value** – Time values start at track number 1 (00:02:00) and are expressed the following format:

  ```
  <minutes>:<seconds>:<frames>
  ```

  There are 75 frames per second.

Track 0

On all discs, track number 0 is reserved for the lead-in track, which contains two seconds of digital silence and the table of contents (TOC) in the subcode Q-channel. Track 0 has no LBA.

Copying Process

Copying sectors is a two step process. You must first get sector data from the Table of Contents dialog box, then use the data to specify the sectors you want to copy to an image file.

Reading Sector Information

You can get Logical Block Address (LBA) and time value information from a disc using the Table of Contents dialog box, which displays data contained in the disc's lead-in track. Print or write down the following information for the sectors you want to copy:

- **Track** – The track number.

- **Type** – The track type:

    - Audio
    - Data
    - Mode1
    - Mode2

- **MM:SS:FF** – The starting time of the track in minutes, seconds, and frames.

- **LBA** – The track's starting Logical Block Address (LBA).

♦ **To read sector information:**

1 From the main toolbar, click the Table of Contents icon.

The Table of Contents dialog box appears (Figure 2-7):
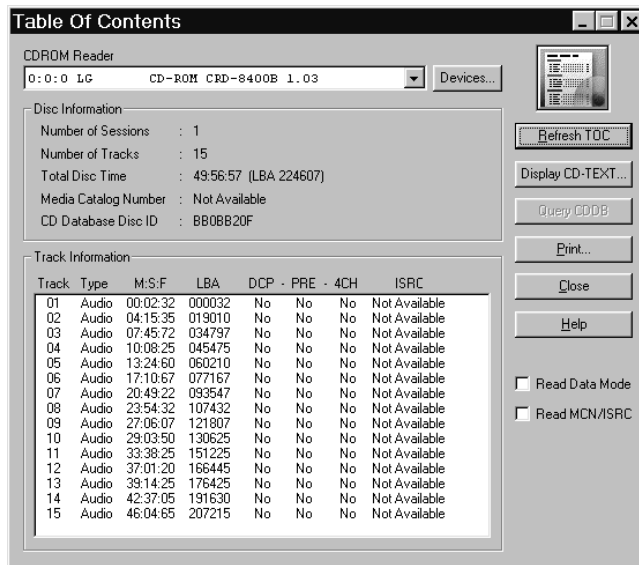
Figure 2-7: Table of Contents Dialog Box

The Disc Information panel displays the following information:

- **Number of Sessions** – The total number of sessions on the disc.

- **Number of Tracks** – The total number of tracks in all sessions.

- **Total Disc Time** – The disc's total running time in minutes, seconds, and frames and the last LBA on the disc.

- **Media Catalog Number** – The disc's media catalog number.

- **CD Database Disc ID** – The disc's CD database identification number.

The Track Information panel displays the following information:

- **Track** – Displays the track number.

- **Type** – Displays the type of each track:

    - Audio
    - Data
    - Mode1
    - Mode2

- **MM:SS:FF** – Displays the starting time in minutes, seconds, and frames for each track.

- **LBA** – Displays the starting logical block address (LBA) for each track.

- **DCP** – Displays:

    - `Yes` if the Digital Copy Permitted (DCP) subcode flag is turned on.

    - `No` if DCP subcode flag is not turned on.

- **PRE** – Displays:

    - `Yes` if the Preemphasis (PRE) subcode flag is turned on.

    - `No` if PRE subcode flag is not turned on.

- **4CH** – Displays:

  - Yes if the Four Channel Audio (4CH) subcode flag is turned on.

  - No if 4CH subcode flag is not turned on.

- **ISRC** – Displays the International Standard Recording Code (IRSC) for each track.

2 Click Print.

The Print dialog box appears (Figure 2-8):
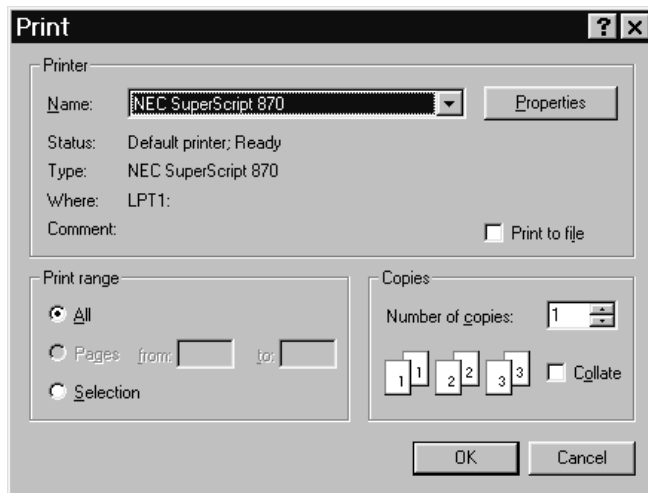
Figure 2-8: Print Dialog Box

3 Click OK.

The disc's table of contents (TOC) prints.

4 Click Close in the Table of Contents dialog box (Figure 2-7).

Copying Sectors to Your Hard Drive

You can extract, or copy, sectors from a disc using the information from the Table Of Contents dialog box (Figure 2-7). For more information, see Reading Sector Information on page 2-18.

Acceptable
Sector Ranges

This procedure describes selecting a range of sectors from the start of a track to the end of it. You can also copy any range of sectors from a disc, provided the sectors are of the same datatype. For example, you can start the range of sectors in the middle of a track and end the range in the middle of another track.

Unacceptable
Sector
Datatypes

You cannot copy sectors from two different datatypes. For example, you cannot copy part of an audio track and part of a data track in the same operation.

♦ **To extract sectors:**

1 Read sector information. For detailed instructions, see Reading Sector Information on page 2-18.

2 From the main toolbar, click the Extract Disc/Tracks/Sectors icon.

The Extract Disc/Tracks/Sectors to Image File dialog box
appears (Figure 2-9):
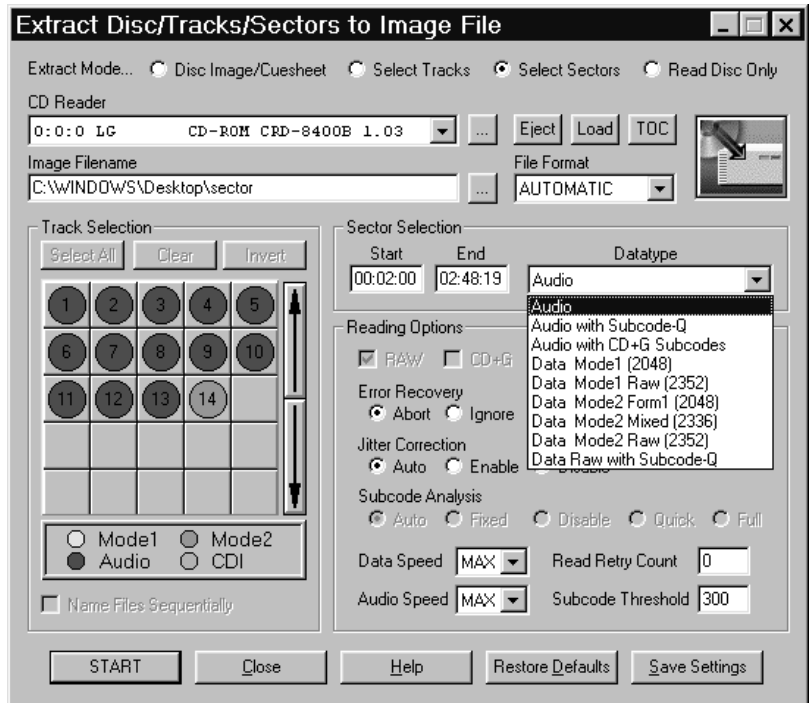
Figure 2-9: Extract Sectors Window

3   In the Extract Mode area, click the Select Sectors button.

   The Extract Sectors window appears (Figure 2-9).

4   In the Extract Sectors window, complete the following:

   • **CD Reader** – Select your CD Reader from the pull-down
     menu.

   • **Image Filename** – Enter the directory and name of the
     image file. Use the ... button to specify the directory and
     image filename.

   • **Eject** – Click to eject the CD currently in your CD reader.

- **Load** – Click to load a CD into your CD reader.

- **TOC** – Click to update the table of contents for the CD in your reader. Clicking TOC updates the tracks in the track selection panel.

- **File Format** – To specify the image file's format, select one of the following:

  - **AUTOMATIC** – Chooses the image file's format for you. WAVE is the default format for audio tracks. For all other operations, INTEL is the default format.

  - **INTEL** – Writes image file in Intel (least significant byte first) binary format. The image file will have a `.bin` file extension.

  - **MOTOROLA** – Writes image file in Motorola (most significant byte last) binary format. The image file will have a `.mot` file extension.

  - **WAVE** – Writes image file in Waveform, or WAVE, format. WAVE is the standard audio file format for PCs. The image file will have `.wav` file extension.

  - **AIFF** – Writes image file in Audio Interchange File Format, or AIFF, format. AIFF is the standard audio file format for Macintosh computers. The image file will have `.aif` file extension.

5 In the Sector Selection panel, complete the following:

- **Start** – Enter either:

  - **LBA** – The starting Logical Block Address for the range of sectors you want to copy. For example, for track number 1 in Figure 2-7, the starting LBA is 000000.

  or

  - **Time Value** – The starting time in minutes:seconds:frames for the range of sectors you want to copy. For example, for track number 1 in Figure 2-7, the starting time value is 00:02:00.

- **End** – Enter either:

  - **LBA** – The ending Logical Block Address for the range of sectors you want to copy. For example, for track number 1 in Figure 2-7, the ending LBA is 012470.

  or

  - **Time Value** – The ending time value in minutes:second:frames for the range of sectors you want to copy. For example, for track number 1 in Figure 2-7, the ending time value is 02:48:20.

- **Datatype** – Use the information from the table of contents (Figure 2-7) to select one of the following datatypes (bytes) for the sectors you want to copy:

  - **Audio** – For sectors extracted from an audio disc. You also use this option for audio tracks taken from a multisession disc, such as a CD Extra disc.

  - **Audio with Subcode-Q** – For sectors extracted from an audio disc. The sector's corresponding timing information contained in the subcode Q-channel is copied with the sector's audio data.

  - **Audio with CD+G Subcodes** – For audio sectors from a CD+G disc. Text and graphics from the subcode R- and W-channels are copied along with the sector's audio data.

  - **Data Mode1 (2048)** – For sectors extracted from a Mode 1 (2048 bytes) track or disc.

  - **Data Mode1 Raw (2352)** – For sectors extracted from a mode 1 track or disc saved as raw sectors (2352 bytes).

  - **Data Mode2 Form 1 (2048)** – For sectors extracted from a mode 2 Form 1 (2048 bytes) track or disc.

  - **Data Mode2 Mixed (2336)** – For sectors extracted from a Mode 2 Mixed (2336 bytes) track or disc.

  - **Data Mode2 Raw (2352)** – For sectors extracted from a Mode 2 track or disc saved as raw sectors (2352 bytes).

  - **Data Raw with Subcode-Q** – For sectors extracted from a data disc saved as raw sectors. The sector's corresponding timing information contained in the subcode Q-channel is also copied with the sector's data.

6 In the Reading Options panel, complete the following:

- **Error Recovery** – Select one of the following:

  - **Abort** – Stops recording if any unreadable sector is found. This is the default setting.

  - **Ignore** – Replaces any unreadable sector with another unreadable sector and continues recording the disc. For audio image files, this option is identical to Replace.

  - **Replace** – Replaces any unreadable sector with a readable one, and continues recording the disc.

- **Jitter Correction** – To enable or disable jitter correction algorithm, select one of the following:

  - **Automatic** – Chooses the best jitter correction setting for you. Automatic is the default setting.

  - **Enabled** – Enables the jitter correction algorithm.

  - **Disabled** – Disables the jitter correction algorithm.

- **Data Speed** – Select a speed from the pull-down menu for reading data tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Audio Speed** – Select a speed from the pull-down menu for reading of audio tracks. MAX is the maximum speed of your default CD-ROM reader. In most cases, MAX is adequate.

- **Read Retry Count** – Enter the maximum number of times to retry a failed reading operation. The range is 0 to 10. 0 is the default.

- **Subcode Threshold** – This feature is disabled and has no effect on the copying process.

7   Click START.

The Copy Progress dialog box appears (Figure 2-3).

The image file is copied to the specified directory. The Copy Progress dialog box shows the percentage of the image file recording process completed. Click Cancel if you want to stop recording the image file.

When recording of the image file is complete, the Operation Successfully Completed! message box appears (Figure 2-4).

8   Click OK.

Your image file is complete.

Reading a Disc

Overview   You can read a disc before creating an image file, allowing you to
test the disc for any flaws before recording it to an image file.
CDRWIN prompts you when any flaws are detected during
recording. You can adjust one or more of the following to correct a
flaw and retry:

- Error Recovery
- Jitter Correction
- Read Retry Count
- Subcode Threshold
- Audio Speed
- Data Speed

◆ **To read a disc:**

1 Click the Extract Disc/Track/Sector icon.

The Extract Disc/Tracks/Sectors to Image File dialog box
appears.

2 From the Extract Mode area, click Read Disc Only.

The Read Disc Only window appears (Figure 2-10):
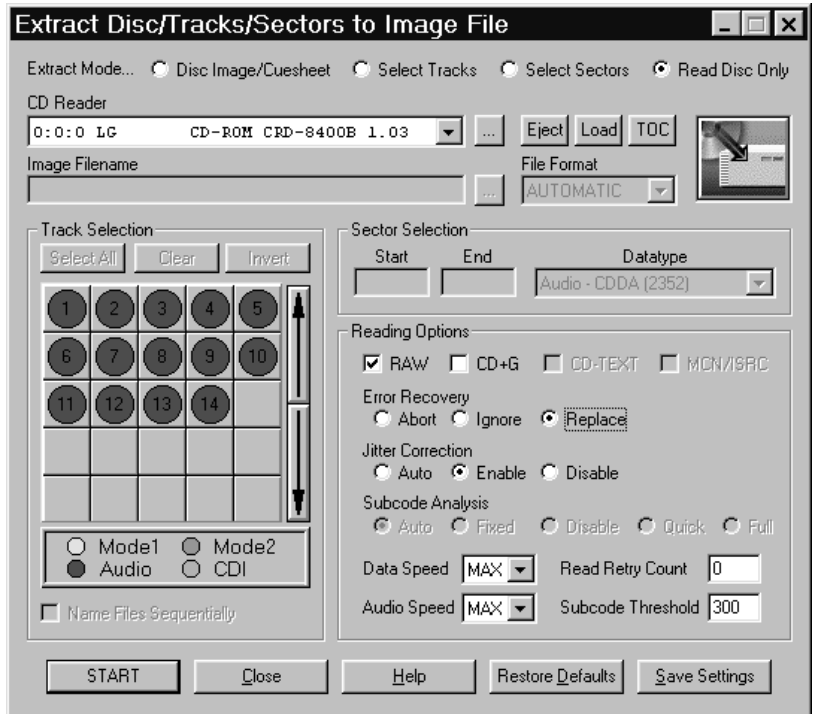
Figure 2-10: Read Disc Only Window

3 From the Read Disc Only dialog box, complete the following:

- **CDROM Recorder** – Select your CDROM recorder from the pull down menu.

- **Eject** – Click to eject the CD currently in your CD reader.

- **Load** – Click to load a CD into your CD reader.

- **TOC** – Click to update the table of contents for the CD in your reader. Clicking TOC updates the tracks in the track selection panel.

4 From the Reading Options panel, complete the following:

- **RAW** – CDRWIN automatically checks this box for you. It reads an image file as raw sectors (2352 bytes).

- **CD+G** – Check box to enable reading of CD+G (Karaoke) discs. If you do not select this option when reading a CD+G disc, the graphics information is not read. This option has no effect on data discs.

- **Error Recovery** – Select one of the following buttons:

  - **Abort** – Stops recording if any unreadable sector is found. This is the default setting.

  - **Ignore** – Replaces any unreadable sector with another unreadable sector and continues recording the disc. For audio image files, this option is identical to Replace.

  - **Replace** – Replaces any unreadable sector with a readable one, and continues recording the disc.

- **Jitter Correction** – To enable or disable the jitter correction algorithm, select one of the following:

  - **Automatic** – Chooses the best setting for you. This is the default setting.

  - **Enabled** – Enables the jitter correction algorithm.

  - **Disabled** – Disables the jitter correction algorithm.

- **Data Speed** – Select a speed from the pull-down menu for reading of data tracks. MAX is the maximum speed of your default CD-ROM reader. In most cases, MAX is adequate.

- **Audio Speed** – Select a speed from the pull-down menu for reading of audio tracks. MAX is the maximum speed of your default CD-ROM reader. In most cases, MAX is adequate.

- **Read Retry Count** – Enter the maximum number of times to retry a failed reading operation. The range is 0 to 10. 0 is the default.

- **Subcode Threshold** – This feature is disabled and has no effect on the copying process.

5 Click START.

The Copy Progress dialog box appears (Figure 2-3).

CDRWIN reads the disc. The Copy Progress dialog box shows the percent complete of the reading process. Click Cancel to stop reading the disc.

When reading of the disc is complete, the Operation Successfully Completed! message box appears (Figure 2-4).

6 Click OK.

Reading is complete.

3

DISC-AT-ONCE RECORDING

About this Chapter

This chapter describes how to record a disc using disc-at-once recording. To record disc-at-once means one or more tracks are recorded from permanent image files on your computer's hard drive to your disc in a single session.

Unlike track-at-once recording, the CD recorder's laser does not turn off during disc-at-once recording, and the disc is closed when recording is finished. Disc-at-once recording requires a blank disc, and by definition, cannot be used for recording multisession discs.

Using Disc-at-Once Recording

Disc-at-once recording is most often used to record audio discs with a variable gap or no gap between tracks. You can also use disc-at-once to record discs containing audio and data tracks, such as a CD Extra disc. It is also useful when making more than one copy of a disc.

Contents

- Recording a Disc Using a Cuesheet
- Creating a Disc from Image Files
- Computing the Running Time of Loaded Tracks

Recording a Disc Using a Cuesheet

You can perform disc-at-once recording using a cuesheet. A cuesheet is a file that specifies a list of tracks your recorder uses to record your disc in a particular order. For more information about creating cuesheets, see Chapter 7 – Creating a Cuesheet and Appendix A – Cuesheet Commands.

Recording
Process

Perform the following tasks to record a disc using a cuesheet:

1 Loading the Cuesheet into the Record Disc dialog box
2 Setting Recording Attributes
3 Checking Disc Layout (Optional)
4 Recording the Disc

Loading the Cuesheet

You must first load your cuesheet into the Record Disc dialog box. For more information about how to create and edit a cuesheet, see Chapter 7 – Creating a Cuesheet and Appendix A – Cuesheet Commands.

♦ **To load the cuesheet:**

1 From the main toolbar, click the Record Disc icon.

The Record Disc dialog box appears (Figure 3-1):

Figure 3-1: Record Disc Dialog Box

2 Click Load Cuesheet.

The Open Cuesheet File dialog box appears (Figure 3-2):
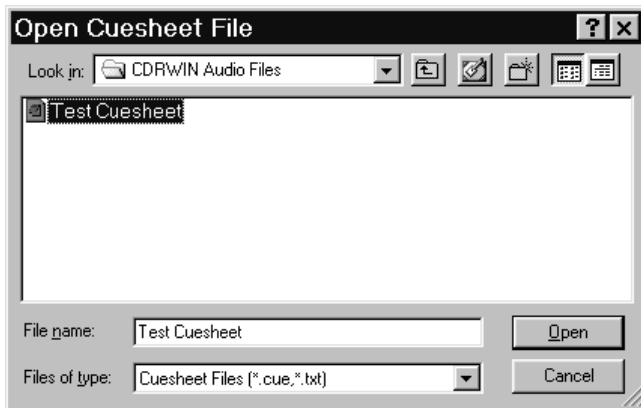
Figure 3-2: Open Cuesheet File Dialog Box

3 Select your cuesheet and click Open.

The Record Disc dialog box appears (Figure 3-3):
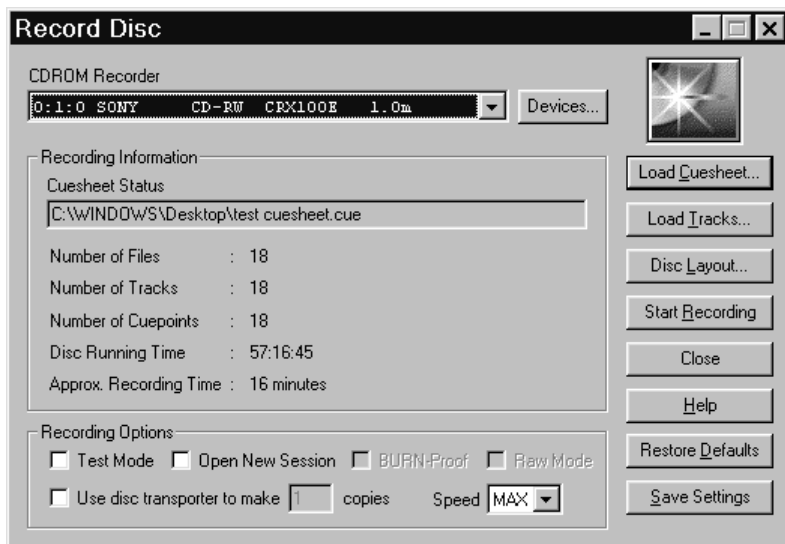
Figure 3-3: Record Disc Dialog Box with Cuesheet Loaded

After loading the cuesheet, the Record Disc dialog box displays status information in the Recording Information panel:

- **Cuesheet Status** – The cuesheet's path and filename.

- **Number of Files** – The number of files to be recorded.

- **Number of Tracks** – The number of tracks to be recorded.

- **Number of Cuepoints** – The number of cuepoints to be recorded.

- **Total Disc Time** – The total time for tracks specified in the cuesheet.

- **Approx. Recording Time** – Approximate amount of time needed to record the tracks onto the disc.

Setting Recording Attributes

You can set the recording attributes for your disc. Save your settings if you plan to use them often.

♦ **To set your recording attributes:**

1 Select your CD recorder from the CDROM Recorder pull-down menu (Figure 3-3). CDRWIN automatically selects your default recorder.

2 In the Recording Options panel, complete the following:

- **Open New Session** – Leave is box unchecked. CDRWIN closes the disc when recording is complete.

- **Test Mode** – Check if you want CDRWIN to test your recorder before recording the disc.

NOTE

Most recorders require you to eject and reload the disc between a test recording and final recording.

- **Speed** – Select a recording speed from the pull-down menu. MAX is the maximum speed for your default recorder.

- **BURN-Proof (v3.8c or later)** – Check to enable BURN-proof. BURN-proof is a feature in newer CD recorders that prevents buffer underruns. If your recorder does not support BURN-proof, CDRWIN automatically disables this option.

- **Use Disc Transporter** – If you are using a disc transporter, either:

    - Check and specify the number of copies you want to make.

  or

    - Leave unchecked if you are not using a disc transporter to make multiple discs at once.

3 Click either:

- **Restore Defaults** – Click to restore the Record Disc dialog box to its default settings.

  or

- **Save Settings** – Click to save your settings in the Windows registry. The new settings appear the next time you open the Record Disc dialog box.

Checking Disc Layout (Optional)

You can check your disc's layout from the Disc Layout dialog box. Save or print the disc's layout for future reference.

◆ **To check your disc's layout:**

1 From the Record Disc dialog box (Figure 3-3), click the Disc Layout button.

The Disc Layout dialog box appears (Figure 3-4):

Figure 3-4: Disc Layout Dialog Box

The Disc Information panel displays the following information:

- **Number of Tracks** – The total number of tracks.

- **Total Disc Time** – The disc's total running time in minutes, seconds, and frames. There are 75 frames per second.

- **Media Catalog Number** – The disc's media catalog number.

The Track/Index Information panel displays the following information:

- **Track** – Displays the track number.

- **Index** – Displays the numbers of the track's indexes.

- **Title/ISRC** – Displays the title and International Standard Recording Code (IRSC) for each track.

- **Type** – Displays the type of each track:

    - Audio
    - Data
    - Mode1
    - Mode2

- **Copy** – Displays:

    - `Yes` if the Digital Copy Permitted (DCP) subcode flag is turned on.

    - `No` if DCP subcode flag is not turned on.

- **Emph** – Displays:

    - `Yes` if the Preemphasis (Emph) subcode flag is turned on.

    - `No` if Emph subcode flag is not turned on.

- **4Chan** – Displays:

    - `Yes` if the Four Channel Audio (4Chan) subcode flag is turned on.

    - `No` if 4Chan subcode flag is not turned on.

- **Start M:S:F** – Displays the track's starting time in minutes, seconds, and frames for each track.

- **Length M:S:F** – Displays the length of the track time in minutes, seconds, and frames.

2 Click Save.

The Save Disc Layout File dialog box appears (Figure 3-5):
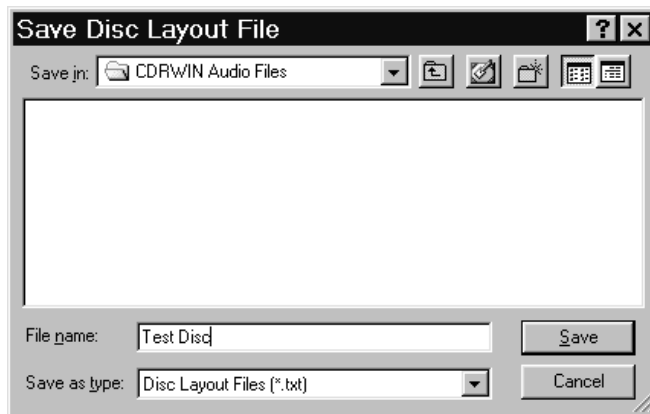
Figure 3-5: Save Disc Layout File Dialog Box

3 Enter the name and directory on your hard drive where you want to save the disc layout file.

4 Click Save.

The Disc Layout dialog box appears (Figure 3-4).

5 Click Close.

Your disc layout is saved.

Recording the Disc

After loading the cuesheet and setting recording attributes, you are ready to record your disc.

♦ **To record your disc:**

1 In the Record Disc dialog box (Figure 3-3), click Start Recording.

The Record Disc Progress dialog box appears (Figure 3-6):

Record Disc Progress

Disc Completion Status...

1% Complete
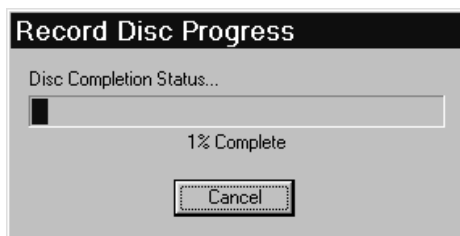
Cancel

Figure 3-6: Record Disc Progress Dialog Box

CDRWIN records your disc.

CAUTION

If recording to a CD-R, do not click the Cancel button while recording. Otherwise, CDRWIN will close the recording session and your disc will be ruined.

When the recording session is near completion, the Operation In Progress message box appears (Figure 3-7):

Operation In Progress

Writing Leadout Track... Please Wait...

Figure 3-7: Operation In Progress Message Box

When the recording session is successfully completed, the Operation Successfully Completed! message box appears (Figure 3-8):

CDRWIN

(i) Operation Successfully Completed !

OK
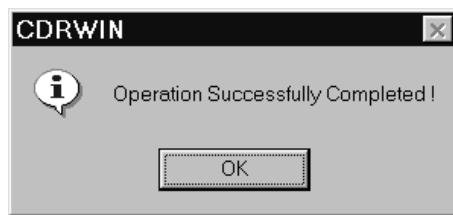
Figure 3-8: Operation Successfully Completed Message Box

2 Click OK.

Your disc is complete.

Creating a Disc from Image Files

CDRWIN allows you to record a CD-R or CD-RW disc from a compilation of individual image files, or tracks. You can also create a cuesheet from the tracks you load in to the Record Disc dialog box.

Recording a disc from image files is a four step process:

1 Loading Tracks into the Record Disc dialog box
2 Setting Recording Attributes
3 Checking Disc Layout (Optional)
4 Recording the Disc

Loading Tracks

You must first load your image files into the Record Disc dialog box before you can record the image files to your disc. CDRWIN supports the following audio file formats:

File Formats
for Recording

- **MP3** – Moving Pictures Expert Group, Audio Layer 3 (44.1 kHz, 16- bit Stereo). The file extension is .mp3.

- **WAVE** – Waveform (44 kHz, 16-bit Stereo). WAVE is the standard audio format for PCs. The file extension is .wav.

- **AIFF** – Audio Interchange File Format (44 kHz, 16-bit stereo). AIFF is the standard audio format for Macintosh computers. The file extension is .aif.

- **INTEL** – Intel (least significant byte first) binary format. The file extension is .bin.

- **MOTOROLA** – Motorola (most significant byte last) binary format. The file extension is .mot.

♦ **To load tracks:**

1 From the main toolbar, click the Record Disc icon.

The Record Disc dialog box appears (Figure 3-9):

Figure 3-9: Record Disc Dialog Box

2 Click Load Tracks.

The Load Tracks dialog box appears (Figure 3-10):

Figure 3-10: Load Tracks Dialog Box

3 In the Disc Type area, complete the following:

- **Audio** – Click to record audio tracks only.

- **CD+G** – Click to record a CD+G (karaoke) tracks.

- **Track Pregap** - Enter the number of seconds of silence you want before each track. Two seconds is a typical pregap for studio audio tracks. Zero is typical for live audio recordings and is the default setting.

4 Click Add.

The Select Track File dialog box appears (Figure 3-11):
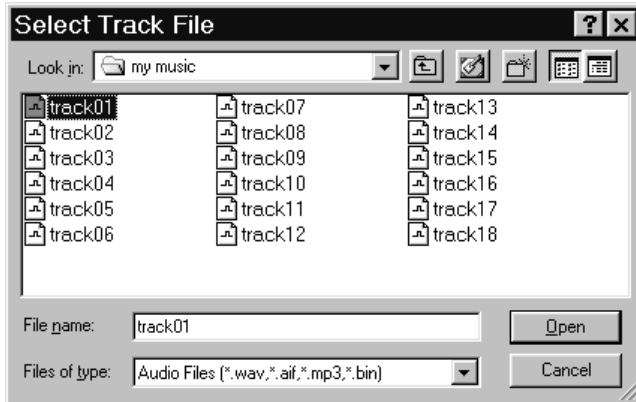

Figure 3-11: Select Track File Dialog Box

5 Select a track and click Open.

The track filename appears in the Load Tracks dialog box (Figure 3-12):
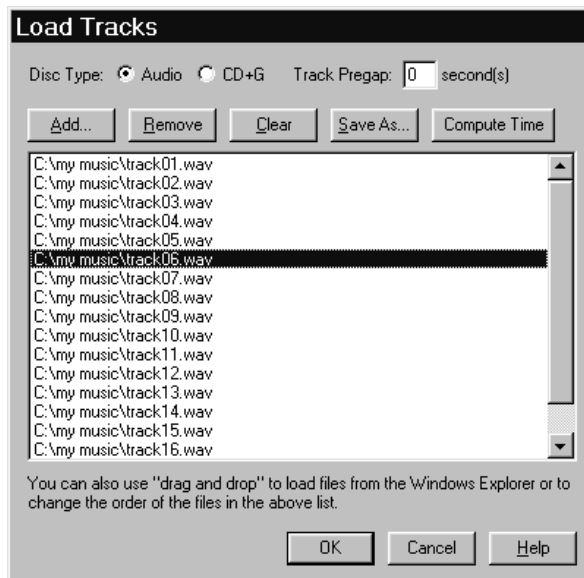
Figure 3-12: Load Tracks Dialog Box with Track Filenames

6 Repeat steps 4 and 5 to add tracks as necessary until you complete your disc's track list.

7 After loading tracks, click one of the following buttons as desired:

- **Delete** – Deletes the selected track from your track list.

- **Remove (v3.8c and later)** – Removes a selected track from the track list.

- **Clear** – Clears all tracks from your track list.

- **Save As (Cuesheet)** – Creates and saves a cuesheet from the loaded tracks. For more information, see Chapter 7 – Creating a Cuesheet and Appendix A – Cuesheet Commands.

- **Compute Time (v3.8c and later)** – Computes the disc running time for the tracks you have loaded. For detailed instructions, see Computing the Running Time of Loaded Tracks on page 3-21.

8 Click OK.

The Operation In Progress message box appears (Figure 3-13):
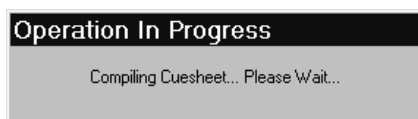
Figure 3-13: Operation in Progress Message Box

The Record Disc dialog box appears with disc information the Recording Information panel (Figure 3-14):
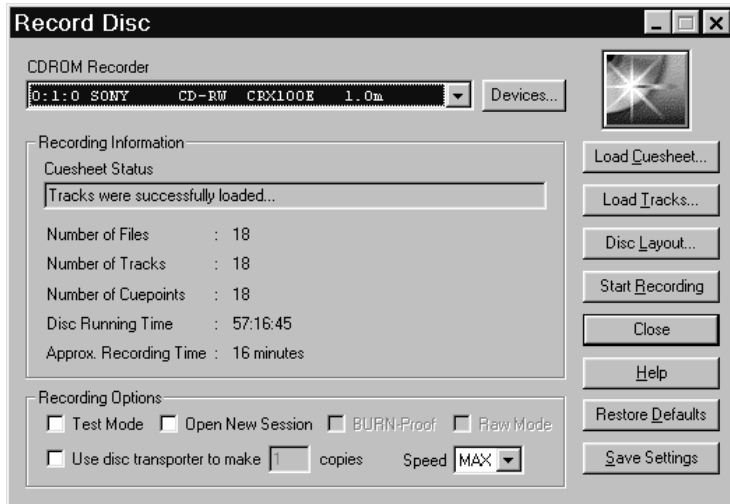
Figure 3-14: Record Disc Dialog Box with Loaded Tracks

After loading your tracks, the Record Disc dialog box displays the following information in the Recording Information panel:

- **Cuesheet Status** – Message telling you if the tracks were successfully loaded or not. If your tracks load successfully, the "Tracks were successfully loaded" message appears.

- **Number of Files** – The number of files to be recorded.

- **Number of Tracks** – The number of tracks to be recorded.

- **Number of Cuepoints** – The number of cuepoints to be recorded.

- **Total Disc Time** – The total time for the loaded tracks.

- **Approx. Recording Time** – Approximate amount of time needed to record the tracks.

Setting Recording Attributes

After loading your tracks, set your recording attributes. You can save your settings so they appear the next time you open the Record Disc dialog box.

◆ **To set recording attributes:**

1 In the Recording Options panel (Figure 3-14), complete the following:

- **Open New Session** – Leave the box unchecked if recording Disc-at-Once. CDRWIN closes the disc when recording is complete.

- **Test Mode** – Check to set your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

NOTE

Most recorders require you to eject the disc and reload it between a test recording and recording.

- **Speed** – Select a recording speed from the pull-down menu. MAX is the maximum speed for your default recorder.

- **BURN-Proof (v3.8c or later)** – Check to enable BURN-proof. BURN-proof is a feature in newer CD recorders that prevents buffer underruns. If your recorder does not support BURN-proof, CDRWIN automatically disables this option.

- **Use Disc Transporter** – If you are using a disc transporter, either:

    - Check and specify the number of copies.

  or

    - Leave unchecked if you are not using a disc transporter to make multiple discs at once.

2 Click either:

- **Restore Defaults** – Click to restore the Record Disc dialog box to its default settings.

  or

- **Save Settings** – Click to save your settings in the Windows registry. The new settings appear the next time you open the Record Disc dialog box.

Checking Disc Layout (Optional)

You can check your disc's layout before recording to verify if it is correct. For more information, see Checking Disc Layout (Optional) on page 3-6.

Recording the Disc

After loading the image files (tracks) and setting attributes, you are ready to record your disc.

◆ **To record your disc:**

1 Click the Start Recording button.

The Record Disc Progress dialog box appears (Figure 3-6).

CDRWIN records the loaded tracks onto your disc.

CAUTION

If you are recording to a CD-R, do not click the Cancel button while recording. Otherwise, CDRWIN will close the recording session and your disc will be ruined.

When the recording session is near completion, the Operation In Progress message box appears (Figure 3-7).

When the recording session is successfully completed, the Operation Successfully Completed! message box appears (Figure 3-8).

2 Click OK.

Your disc is complete.

Computing the Running Time of Loaded Tracks

If you use CDRWIN version 3.8c or later, you can compute the disc running time of the tracks you load into the Load Tracks dialog box. Computing the disc running time allows you to estimate how many more tracks you can add to the disc before exceeding the disc's maximum running time, or determine if the tracks you have loaded exceed the disc's maximum running time.

Table 3-1 below shows the running times for standard 74-minute and high-capacity 80-minute discs.

Table 3-1: Maximum Disc Running Times

Disc Time (Minutes)	Maximum Capacity (MB)	Maximum Disc Running Time
74	656	73 minutes 59 seconds
80	700	79 minutes 59 seconds

If the total running time of your loaded tracks exceeds your disc's maximum running time, you must remove tracks from the track list.

♦ **To compute the disc running time of your loaded tracks**

1 In the Load Tracks dialog box (Figure 3-15), load your tracks. For detailed instructions, see Loading Tracks on page 3-12.
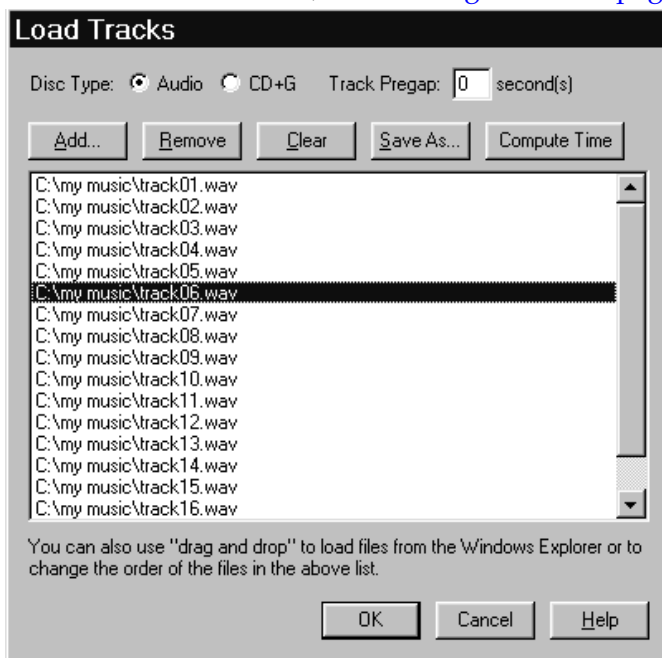
Figure 3-15: Load Tracks Dialog Box (v3.8c and Later)

2 Click Compute Time.

The Operation in Progress message box appears (Figure 3-13). When the compiling process is complete, the CDRWIN message box appears (Figure 3-16).

Figure 3-16: CDRWIN Message Box – Disc Running Time

The message box displays the number of tracks you have loaded into the Load Tracks dialog box and their total disc running time. If the Disc Running Time exceeds the maximum running time for your disc, you must remove tracks from your track list.

3 Click OK.

The computing of your disc running time is complete.

4

ON-THE-FLY RECORDING
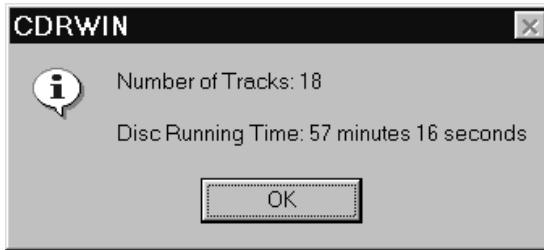
About this chapter

To record on-the-fly means to record directly from a source CD-ROM to a blank CD-R or CD-RW without first copying a permanent disc image to your hard drive. You can also store files and directories from computer's your hard drive to a disc on-the-fly.

Contents

- Preparing to Record
- Backing Up a Disc
- Copying Hard Drive Files and Directories

Preparing to Record

On-the-Fly recording obligates your computer's memory resources, and as such, introduces complicating variables to the recording process which can result in inaccurate recording or buffer underruns.

To avoid these problems, use the following precautions before copying your disc on-the-fly:

Preparing to
Record

- Do a test recording. Check the **Test Mode Only** option in the Backup Disc dialog box to insure that your hardware is operating properly. Checking the box sets your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

- Use the **Copy to Image and Record** option when recording on-the-fly. When you select this option, CDRWIN copies the disc to a temporary image file on your hard drive, then records the disc automatically. This method is the safest way to copy a disc that might have errors or other problems.

- Be sure the **Data Speed** and **Audio Speed** settings are at least twice as fast as your Recording **Speed** (located in the Recording Options panel). If in doubt, select the MAX option from the speed selection pull-down menus, which allows CDRWIN to select the appropriate Data, Audio, and Recording Speeds for you.

- Many recorders read data at a faster rate than the recorder can accommodate, resulting in flaws in your disc when you record. Enable **Jitter Correction** to overcome this problem.

- Enable File/Disc Caching to insure that your computer has adequate resources dedicated to recording your disc. See Enabling File and Disc Caching on page 1-11.

Backing Up a Disc

You can copy one CD-ROM directly to CD-R or CD-RW in one operation from the Backup Disc dialog box.

♦ **To back up a disc:**

1 From the main toolbar, click the Backup Disc icon.
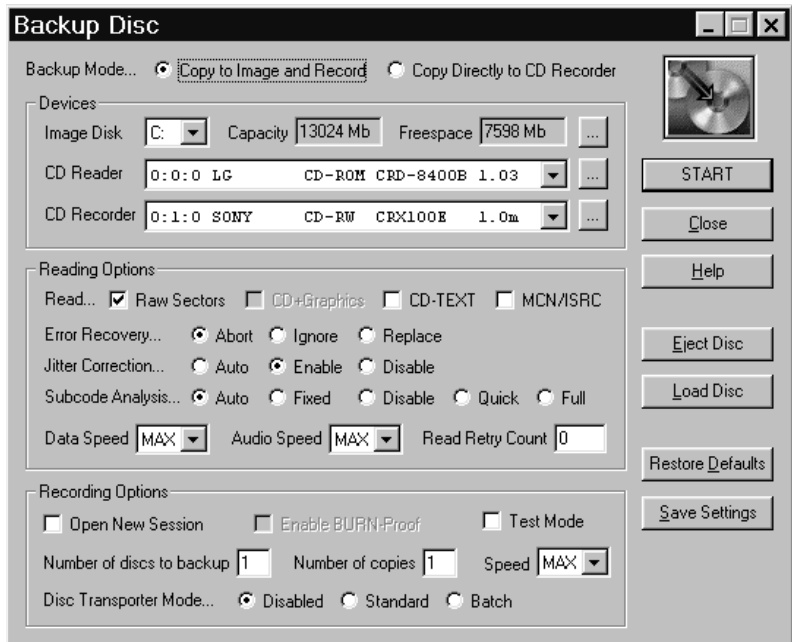
The Backup Disc dialog box appears (Figure 4-1):

Figure 4-1: Backup Disc Dialog Box

2 In the Backup Mode area, click either:

- **Copy to Image and Record** – Copies the disc to a temporary image file on your hard drive, then records the disc automatically. This method is the safest way to copy a disc that might have errors or other problems.

or

- **Copy Directly to CD Recorder** – Select this option to copy the disc directly to the CD recorder without creating a temporary image file first.

3 In the Devices panel, complete the following:

- **Image Disk** – Select the drive where you want the temporary image file to be stored.

- **CD Recorder** – Select your CD-ROM recorder from the pull-down menu.

- **CD Reader** – Select your CD-ROM reader from the pull-down menu.

4 From the Reading Options panel, complete the following:

- **RAW Sectors** – CDRWIN automatically checks this box for you. Checking the box means CDRWIN writes the temporary image file in raw sectors (2352 bytes). Unchecking the box has no effect on recording.

- **CD-TEXT** – Check to copy CD-Text information from a CD-Text compatible audio disc. Checking this box has no effect if your CD reader or recorder does not support CD-Text.

- **MCN/ISRC** – Check to copy the Media Catalog Number (MCN) and track International Standard Recording Code (ISRC) codes.

NOTE

The MCN/ISRC option slows the recording process and is not supported by all reading or recording devices.

- **Error Recovery** – Select one of the following:

  - **Abort** – Stops recording if any unreadable sector is found. This is the default setting.

  - **Ignore** – Replaces any unreadable sector with another unreadable sector and continues recording the disc. For audio image files, this option is identical to Replace.

  - **Replace** – Replaces any unreadable sector with a readable one, and continues recording the disc.

- **Jitter Correction** – To enable or disable the jitter correction algorithm, select one of the following:

  - **Automatic** – Automatically chooses the best setting for you. This is the default setting.

  - **Enabled** – Enables the jitter correction algorithm.

  - **Disabled** – Disables the jitter correction algorithm.

- **Subcode Analysis** – To specify subcode analysis, select one of the following:

  - **Auto** – Automatically selects the best analysis mode for the selected CD reader. If your reading or recording device supports the reading of subcodes, the Quick option is selected. Otherwise, the Fixed option is selected.

  - **Fixed** – Analyzes the first two seconds of all audio tracks encoded as a pre-gap without actually analyzing the subcode. Use this option if your CD reader does not support the reading of subcodes.

  - **Disable** – Disables all subcode analysis.

  - **Quick** – Analyzes only the pre-gaps (Index 0) of each track.

  - **Full** – Analyzes all subcodes on the disc. This option is useful only for discs that contain index numbers greater than one.

- **Data Speed** – Select a speed from the pull-down menu for reading of data tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Audio Speed** – Select a speed from the pull-down menu for reading of audio tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Read Retry Count** – Enter the maximum number of times to retry a failed reading operation. The range is 0 to 10. 0 is the default setting.

5 From the Recording Options panel, complete the following:

- **Open New Session** – Check to keep disc open for recording a multisession disc.

NOTE

Most recorders require you to eject the disc and reload it between a test recording and recording.

- **Enable BURN-Proof (v3.8c or later)** – Check to enable BURN-proof. BURN-proof is a feature in newer CD recorders that prevents buffer underruns. If your recorder does not support BURN-proof, CDRWIN automatically disables this option.

- **Test Mode** – Check to set your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

CAUTION

Your CD reader's reading speed must be greater than your recorder's recording speed. Otherwise, a buffer underrun will occur during recording.

- **Speed** – Select a recording speed from the pull-down menu. MAX is the maximum speed for the currently selected recorder device.

- **Number of discs to backup** – Enter the number of source discs that you want to backup. For example, if you backup a two CD album, enter 2 as the number of discs you want to backup. CDRWIN prompts you to insert the second source disc at the appropriate time.

- **Number of copies** – Enter the number of copies you want to make of each source disc. For example, if you want to make 10 copies of a source disc, enter 10. CDRWIN prompts you to insert the next blank disc at the appropriate time.

- **Disc Transporter Mode** – If using a disc transporter, select one of the following radio buttons:

  - **Disable** – CDRWIN selects this option for you. Select this option if you do not use a disc transporter.

  - **Standard** – Select to enable your disc transporter to make multiple copies of your source disc.

  - **Batch** – Select to enable your disc transporter to make multiple copies of multiple source discs.

6 Click START.

If you chose the Copy to Image and Record option**,** the Copy Progress dialog box (Figure 4-2) appears:
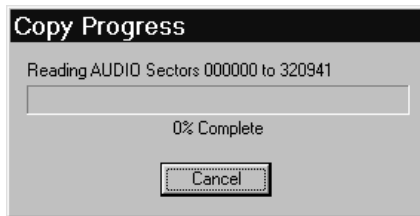

Figure 4-2: Copy Progress Dialog Box

After the temporary image file is recorded, the Record Disc progress dialog box (Figure 4-3) appears.

NOTE

Some CD recorders prompt you to insert a blank disc between the recording image file and disc recording operations.

If you chose the Copy Directly to CD Recorder option, only the Record Progress dialog box appears (Figure 4-3):
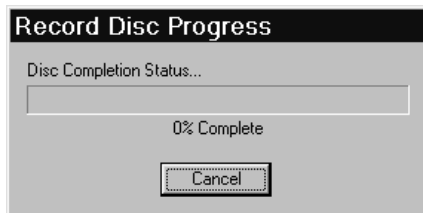
Figure 4-3: Record Progress Dialog Box

As the recording of your disc nears completion, the Operation in Progress message box appears:

Figure 4-4: Operation in Progress Message Box

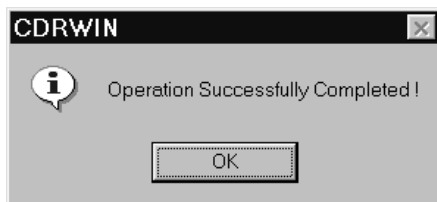When recording is complete, the Operation Successfully Completed! message box appears (Figure 4-5):

Figure 4-5: Operation Successfully Completed Message Box

7 Click OK.

Your disc is complete.

Copying Hard Drive Files and Directories

You can copy files and directories from your computer's hard drive directly to a CD-R or CD-RW on-the-fly.

◆ **To record files and directories from your hard drive:**

1   From the main menu, click the File Backup and Tools icon.
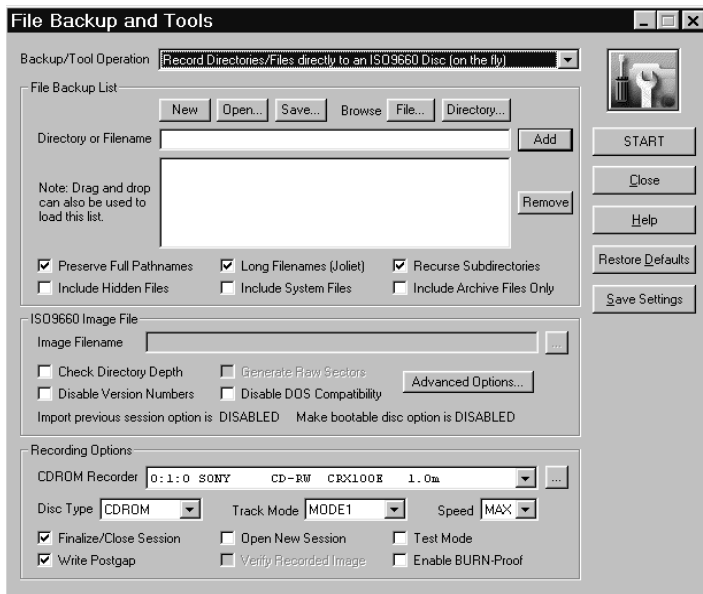
The File Backup and Tools dialog box appears (Figure 4-6):

Figure 4-6: File Backup and Tools Dialog Box

2 In the Backup/Tool Operation area, select Record Directories/ Files Directly to an ISO9660 Disc (on the fly) from the pull-down menu.

3 Complete the File Backup List, ISO9660 Image File, and Recording Options panels. See Recording an ISO 9660 Data File Disc on page 5-14.

4 Click START.

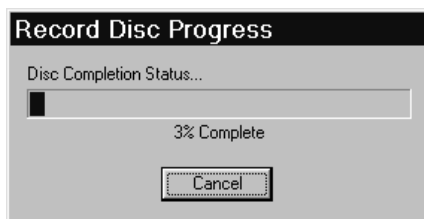The Record Disc Progress dialog box appears (Figure 4-7):

Figure 4-7: Record Disc Progress Dialog Box

CAUTION

If recording to CD-R, do not click Cancel while recording. Otherwise, your disc will be ruined.

Your directories are recorded to your disc.

When recording is complete, the Operation Successfully Completed! message box appears (Figure 4-5).

5 Click OK.

Your disc is complete.

5

CREATING DATA FILE DISCS

This chapter describes how to create an ISO 9660 image file for data files and record them to your disc.

Contents

- Creating an ISO 9660 Image File
- Recording an ISO 9660 Data File Disc

Creating an ISO 9660 Image File

From the File Backup and Tools dialog box, you can copy, or build, an image file of data files and directories. Your image file is copied as one large file to your computer's hard drive in ISO 9660 format with an `.iso` file extension. You can also use this procedure to copy a data track from a CD Extra disc.

File Backup List

For files and directories that you frequently backup to disc, you can create a file backup list. This list allows you to load your list of files and directories into the File Backup and Tools dialog box without choosing each file and directory individually. For more information, see Creating a File Backup List on page 10-11.

Copying an ISO 9660 image file from your disc to your computer's hard drive requires that you perform the following tasks:

1 Choosing a File
2 Choosing a Directory
3 Saving the ISO 9660 Image File
4 Specifying ISO 9660 Image File Attributes
5 Copying the ISO 9660 Image File

♦ **To create an ISO 9660 image file:**

1 From the main toolbar, click the File Backup and Tools icon.
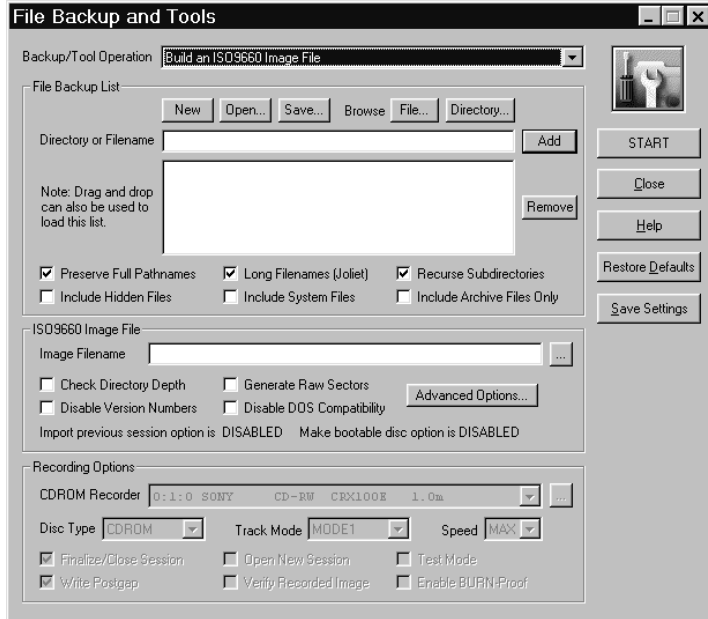
The File Backup and Tools dialog box appears (Figure 5-1):

Figure 5-1: File Backup and Tools Dialog Box

2 From the File Backup/Tool Operation pull-down menu, select Build an ISO 9660 Image File.

3 In the File Backup List panel, choose the files and directories you want to copy with the following methods:

• Choose the files you want to copy to disc. See "Choosing a File" on page 5-4.

or

• Choose the directories you want to copy to disc. See "Choosing a Directory" on page 5-6.

Choosing a File

In the File Backup and Tools dialog box's File Backup List panel, you can select individual data files to copy from your disc onto your computer's hard drive in ISO 9660 format.

♦ **To choose a file:**

1 In the File Backup List panel, click File.
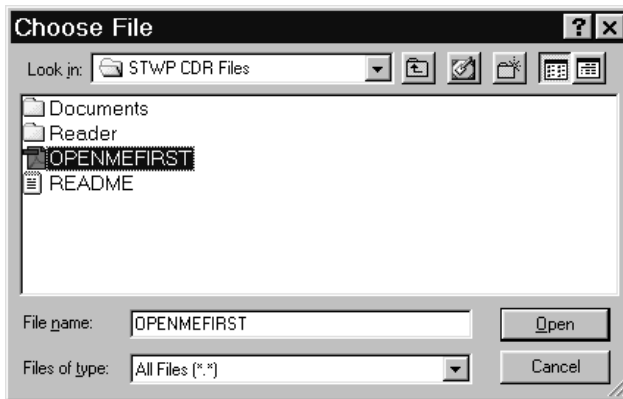
The Choose File dialog box appears (Figure 5-2):

Figure 5-2: Choose File Dialog Box

2 Select the file you want to copy to your disc.

3 Click Open.

The file's directory and name appear in the Directory or Filename field in the File Backup List panel (Figure 5-3):
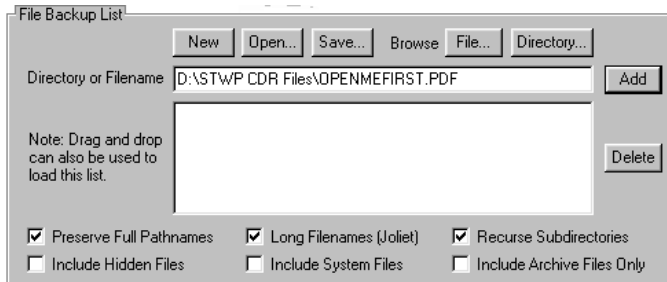

Figure 5-3: File Backup List Panel: Choosing a File

4   Click Add.

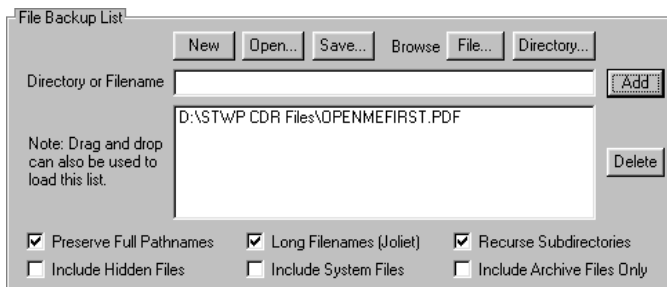The directory and filename move to the Directory or Filename box (Figure 5-4):

Figure 5-4: File Backup List Panel with File Loaded

5   Repeat the above steps as necessary to add your files.

Choosing a Directory

In the File Backup and Tools dialog box's File Backup List panel (Figure 5-3), you can choose data directories to copy from your disc onto your computer's hard drive in ISO 9660 format.

◆ **To choose a directory:**

1 In the File Backup List panel, click Directory.
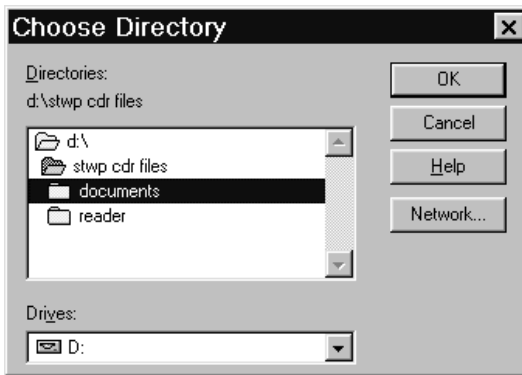
The Choose Directory dialog box appears (Figure 5-5):

Figure 5-5: Choose Directory Dialog Box

2 Select the directories you want to copy to disc. You cannot select individual files.

3 Click OK.

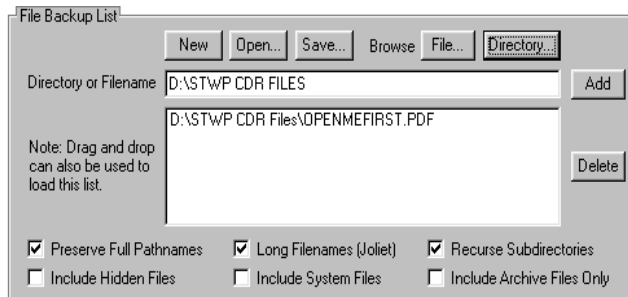The directory name appears in the Directory or Filename field (Figure 5-6):

Figure 5-6: File Backup List Panel: Choosing a Directory

4 Click Add.

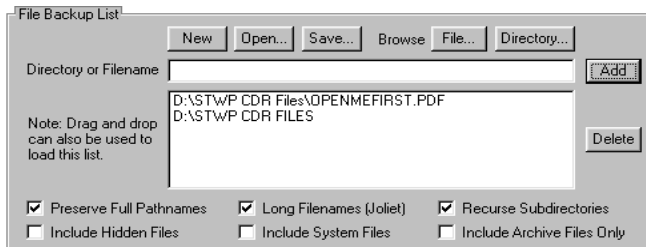The directory name moves to the Directory or Filename box (Figure 5-7):

Figure 5-7: File Backup List Panel with Directory Loaded

5 Repeat the above steps as necessary to add the remaining directories.

Saving the ISO 9660 Image File

After loading your files and directories, you must select a directory and filename for your ISO 9660 image file.

◆ **To select a directory and filename for you ISO 9660 image file:**

1 In the ISO 9660 Image File panel, click the ... button.

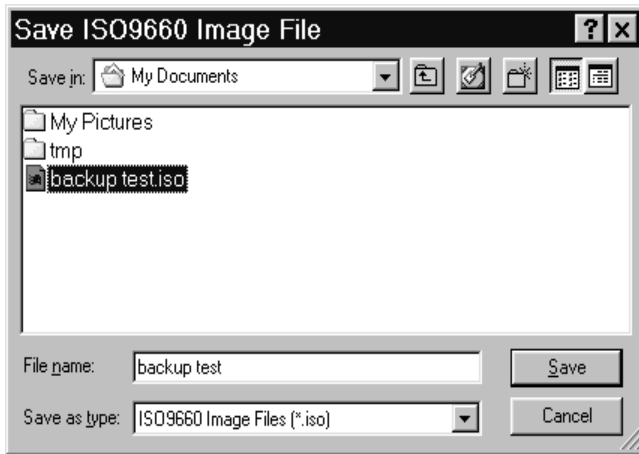The Save ISO9660 Image File dialog box appears (Figure 5-8):

Figure 5-8: Save ISO9660 Image File Dialog Box

2 Enter the name and directory on your hard drive where you want to save ISO 9660 image file.

3 Click Save.

The destination path and filename appear in the Image Filename field (Figure 5-1).

Specifying ISO 9660 Image File Attributes

You can specify the file and directory attributes of your ISO 9660 image file.

◆ **To specify ISO 9660 image file attributes:**

1 In the File Backup List panel, complete the following:

- **Preserve Full Pathnames** – CDRWIN automatically checks this box for you. Checking the box preserves the full pathname of the directories specified in the Directories to Backup box. If you uncheck this box, the pathnames are shortened to the root directory of each entry.

- **Long Filenames (**Joliet**)** – CDRWIN automatically checks this box for you. Check to create long filenames (Joliet) compatible disc for Windows 95/98/NT. If you do not check the box, CDRWIN shortens the filenames to eight characters with a three character extension.

NOTE

A Joliet disc contains both the short and long versions of all filenames, so that the disc will be compatible with older DOS and Windows 3.1 based systems.

- **Recurse Subdirectories** – CDRWIN automatically checks this box for you. Check to recursively process all directories and files below the specified directories in the list. If you uncheck this box, files in subdirectories will not be recorded to your disc.

- **Include Hidden Files** – Check to include all hidden files on your disc.

- **Include System Files** – Check to include all system files on your disc.

- **Include Archive Files Only** – Check to include only files with the archive attribute.

2 In the ISO 9660 Image File panel, complete the following:

- **Image Filename** – Enter the name and directory of the ISO 9660 image file. Use this option only if you want to save your directories as an image file in addition to recording them to disc.

- **Check Directory Depth** – Select to make sure that the number of directory levels does not exceed eight, which is the maximum allowed by the ISO 9660 specification. If you ignore this limit, your disc might not be readable on some operating systems.

- **Disable Version Numbers** – Check to disable version numbers. When recording an ISO 9660 image file to disc, CDRWIN appends a version number string to the filenames in accordance with the ISO 9660 specification.   The version number string causes incompatibilities with certain operating systems.

- **Disable DOS Compatibility** – Check to allow the use of non-DOS compatible filenames. CDRWIN converts all DOS filenames (8.3 format) to uppercase. This option disables this conversion and allows filenames with lowercase letters.

NOTE

UNIX systems do not read files with uppercase file extensions.

Copying the ISO 9660 Image File

You can record your ISO 9600 image file to your computer's hard drive. CDRWIN records your data files and directories to one large image file in ISO 9660 format.

◆ **To copy your ISO 9660 image file:**

1 Load the files and directories into the File Backup and Tools dialog box. See Choosing a File on page 5-4 and Choosing a Directory on page 5-6.

2 Select the filename and directory where you want to copy your ISO 9660 image file. See Saving the ISO 9660 Image File on page 5-8.

3 Specify your ISO 9660 image file's attributes. See Specifying ISO 9660 Image File Attributes on page 5-9.

4 Click START.

The Directory/File Statistics dialog box appears (Figure 5-9):
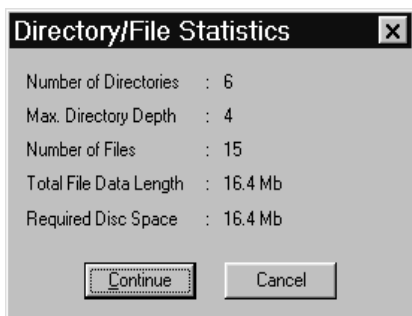

Figure 5-9: Directory/File Statistics Dialog Box

5 Read the statistics. Click either:

- **Continue** – Starts recording the image file onto your hard drive.

or

- **Cancel** – Returns you to the File Backup and Tools dialog box.

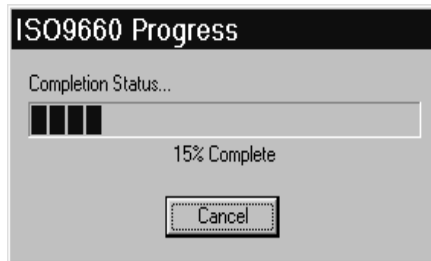If you click Continue, the ISO9660 Progress dialog box appears (Figure 5-10):

ISO9660 Progress

Completion Status...

15% Complete

Cancel

Figure 5-10: ISO 9660 Progress Dialog Box

The ISO 9660 image file is copied to the specified directory. The ISO9660 Copy Progress dialog box shows the percentage of the image file recording process completed. Click Cancel if you want to stop recording the image file.

When recording is complete, the Operation Successfully Completed! message box appears (Figure 5-11):
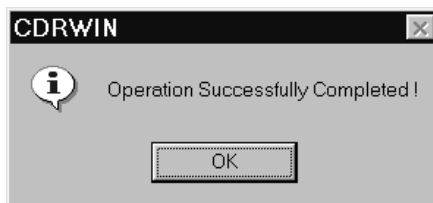
CDRWIN   ✕

ⓘ   Operation Successfully Completed !

OK

Figure 5-11: Operation Successfully Completed Message Box

6 Click OK.

Your ISO 9660 image file is complete.The image file has an `.iso` file extension.

Recording an ISO 9660 Data File Disc

Overview
You can record an ISO 9660 data file disc using disc-at-once recording from the File Backup and Tools dialog box. Use this procedure if you want to back up files and directories from your computer's hard drive onto a CD-R or CD-RW. You can copy any combination of files and directories.

File Backup List
For files and directories that you frequently backup to disc, you can create a File Backup List. This list allows you to load your list of files and directories into the Backup Files and Tools dialog box without choosing each file and directory individually. For more information, see Creating a File Backup List on page 10-11.

After selecting the Build and Record ISO9660 Image File from the pull-down menu, you must complete the following tasks:

1 Choosing Data Files or Directories
2 Setting Disc Attributes
3 Setting Recording Attributes and Recording the Disc

♦ **To record an ISO 9660 data file disc:**

1 From the main toolbar, click the File Backup and Tools dialog box.

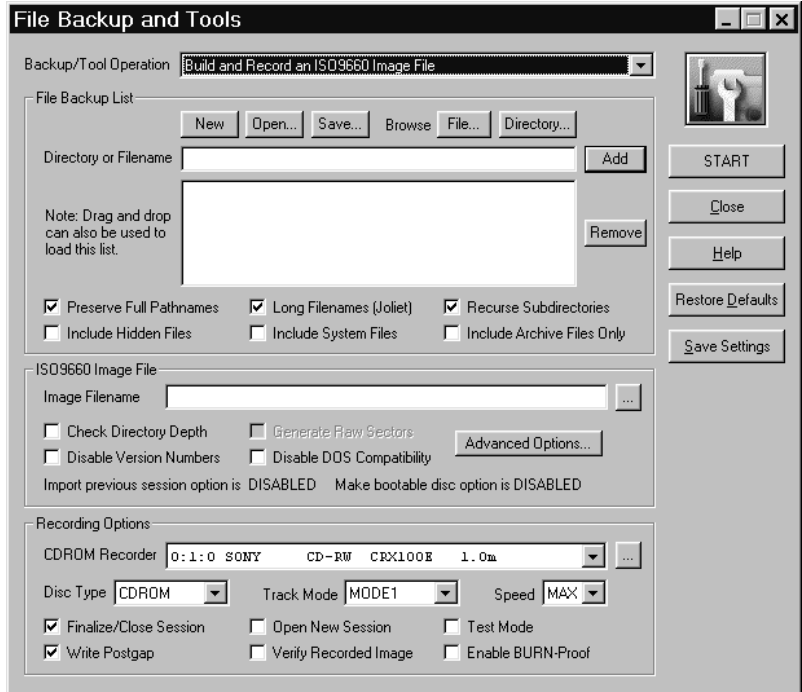The File Backup and Tools dialog box appears (Figure 5-12):

Figure 5-12: File Backup and Tools Dialog Box

2 In the Backup/Tool Operation area, select Build and Record an ISO 9660 Image File from the pull-down menu.

3 In the File Backup List panel, load the files and directories you want to copy with one of the following methods:

- Loading the files you want to copy to disc. See "Choosing a File" on page 5-4.

- Loading the directories you want to copy to disc. See "Choosing a Directory" on page 5-6.

- Open a File Backup List.

Setting Disc Attributes

After specifying which files and directories you want recorded to your ISO 9660 disc, you can specify the disc's attributes.

◆ **To set your ISO 9660 disc's attributes:**

1 In the File Backup List panel (Figure 5-12), complete the following:

- **Preserve Full Pathnames** – CDRWIN automatically checks this box for you. Checking the box preserves the full pathname of the directories specified in the Directories to Backup box. If you uncheck this box, the pathnames are shortened to the root directory of each entry.

- **Long Filenames (**Joliet**)** – CDRWIN automatically checks this box for you. Check to create long filenames (Joliet) compatible disc for Windows 95/98/NT. If you uncheck the box, CDRWIN shortens the filenames to eight characters with a three character extension.

NOTE

A Joliet disc contains both the short and long versions of all filenames, so that the disc will be compatible with older DOS and Windows 3.1 based systems.

- **Recurse Subdirectories** – CDRWIN automatically checks this box for you. Check to recursively process all directories and files below the specified directories in the list. If you uncheck this box, files in subdirectories are not recorded to your disc.

- **Include Hidden Files** – Check to include all hidden files on your ISO 9660 disc.

- **Include System Files** – Check to include all system files on your ISO 9660 disc.

- **Include Archive Files Only** – Check to include only files with the archive attribute.

2   In the ISO 9660 Image File panel (Figure 5-12), complete the following:

- **Image Filename** – Enter the name and directory of the ISO 9660 image file. Use this option only if you want to save your directories as an image file in addition to recording them to disc.

- **Check Directory Depth** – Select to make sure that the number of directory levels does not exceed eight, which is the maximum allowed by the ISO 9660 specification. If you ignore this limit, your disc might not be readable on some operating systems.

- **Disable Version Numbers** – Check to disable version numbers. When recording an ISO 9660 image file to disc, CDRWIN appends a version number string to the filenames in accordance with the ISO 9660 specification.

- **Disable DOS Compatibility** – Check to allow the use of non-DOS compatible filenames. CDRWIN converts all DOS filenames (8.3 format) to uppercase. This option disables this conversion and allows filenames with lowercase letters.

NOTE

UNIX systems will not read files with uppercase file extensions.

Setting Recording Attributes and Recording the Disc

After choosing the files and directories you want to copy and
setting your disc's attributes, you can set the recording attributes
and record your ISO 9600 disc.

♦ **To set recording attributes and record the disc:**

1 In the Recording Options panel (Figure 5-12), complete the
following:

- **CDROM Recorder** – Select your CDROM recorder from the
pull-down menu.

- **Disc Type** – Select a disc type from the pull-down menu.
Select CD-ROM if you are copying your computer
directories to disc.

- **Track Mode** – Select mode 1 from the pull-down menu if
copying directories from your computer onto disc. Mode 1
is the default setting.

- **Speed** – Select your recorder's recording speed from the
pull-down menu. Select MAX if you want CDRWIN to
automatically detect and use your recorder's maximum
recording speed.

- **Finalize Session/Disc** – CDRWIN automatically checks this
box for you. Check to finalize your disc after writing the
disc. Your disc will not be readable on a regular CDROM
drive until your disc is finalized.

- **Enable BURN-Proof (v3.8c or later)** – Check to enable
BURN-proof. BURN-proof is a feature in newer CD
recorders that prevents buffer underruns. CDRWIN ignores
this option if your recorder does not support BURN-Proof.

- **Write Postgap** – CDRWIN automatically checks this box for you. Check to write a 150 block post-gap at the end of the track. This option is recommended when recording an ISO 9660 image file.

- **Verify Recorded Image** – Check to verify that information recorded to the disc is correct by comparing it to the data in the ISO9600 image file.

- **Open New Session** – Check to open a new session on the disc after finalizing the current session. Checking the box keeps the disc open, allowing you to add more files and directories to your disc later.

- **Test Mode Only** – Check to set your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

2   Click START.

    The Directory/File Statistics dialog box appears (Figure 5-13):

Directory/File Statistics	☒
Number of Directories	: 4
Max. Directory Depth	: 3
Number of Files	: 119
Total File Data Length	: 43.2 Mb
Required Disc Space	: 43.3 Mb
[Continue]	Cancel
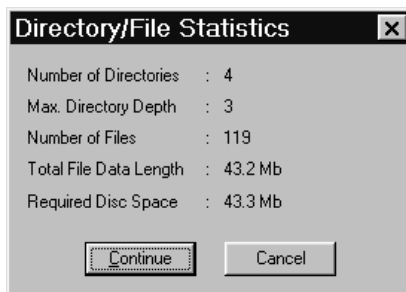
    Figure 5-13: Directory/File Statistics Dialog Box

3   Read the statistics. Click either:

- **Continue** – Starts recording image file onto your hard drive.

    or

- **Cancel** – Returns you the File Backup and Tools dialog box.

If you click Continue, the ISO9660 Progress dialog box appears (Figure 5-14):
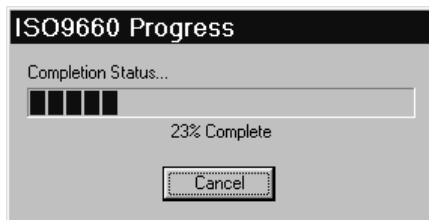
Figure 5-14: ISO9660 Progress Dialog Box

The ISO9660 Progress dialog box displays the status as the ISO 9660 image file is recorded to your computer's hard drive. Click Cancel to stop copying.

The Record Disc Progress dialog box then appears (Figure 5-15), which displays CDRWIN's progress as it copies the directories to your disc:
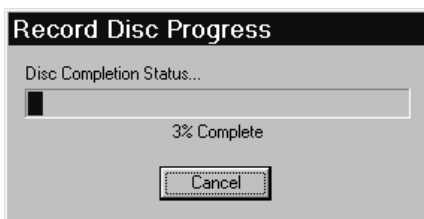

Figure 5-15: Record Disc Progress Dialog Box

CAUTION

If recording to CD-R, do not click Cancel while recording. Otherwise, your disc will be ruined.

As the recording process nears completion, the Operation in Progress message box (Figure 5-16) appears as CDRWIN writes the lead-out blocks onto your disc:

Operation In Progress

Writing Leadout Track... Please Wait...

Figure 5-16: Operation in Progress Message Box

The Operation Successfully Completed! message box (Figure 3-8) appears when recording is complete.

CDRWIN ☒

ⓘ Operation Successfully Completed !

OK
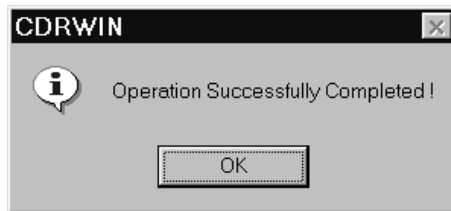
Figure 5-17: Operation Successfully Completed Message Box

4 Click OK.

Your disc is complete.

6

STORING COMPUTER FILES

About this
chapter

This chapter describes how to archive your computer files on a disc incrementally using CDRWIN's Import Previous Session feature. CDRWIN's Import Previous Session feature allows you to use multisession recording, which enables you to use your CD-R or CD-RW for large capacity file storage.

A multisession disc is a CD-R or CD-RW to which data is added incrementally in more than one recording session. CD Extra, CD-ROM XA, and CD-I discs are examples of multisession discs. Discs created with track-at-once recording are, by definition, multisession discs.

Contents

- Using a Disc for File Storage
- Storing Data Files Incrementally

Using a Disc for File Storage

Overview   You can create an incremental multisession disc when you enable
CDRWIN's import previous session feature in the ISO9660–
Advanced Topics dialog box. Importing previous sessions allows
you to record a disc, use it, then update and add files to the disc in
subsequent recording sessions.

When you incrementally record a disc, no information from the
previous session is removed. All sessions remain on your disc and
continue to take up memory, but only the information in the latest
session is accessible. Each session is separated by 14 to 30
megabytes of empty space. You can add sessions to your disc until
your disc's capacity is full.

About Importing Previous Sessions

CDRWIN's import previous session feature allows you to use your
disc for storage, similar to storing information on your hard drive
or other large capacity disk. When you incrementally save files
using the import previous session feature, you can

- Add files to your disc
- Overwrite existing files
- Erase files

Example:
Incremental
Session 1

For example, you create a file backup list consisting of the
`importing sessions` directory, which contains the following files:

Table 6-1: Filenames and Sizes in Incremental Session 1

File Name	Size
`test file 1.fm`	9,120 KB
`test file 2.doc`	24 KB
`test file 3.log`	1 KB

In the first session, you record these files to your disc using the Build and Record an ISO9660 Image File option in the File Backup and Tools dialog box:
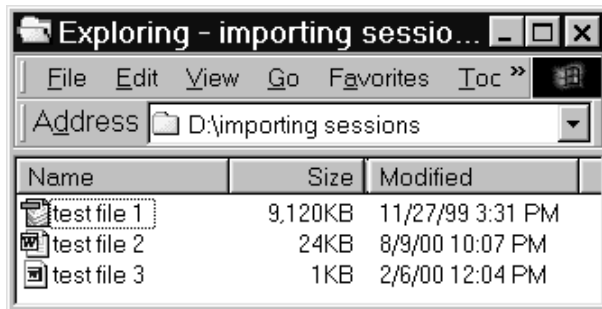
Figure 6-1: Incremental Session 1

NOTE

When you record your first session, be sure to select the **Open New Session** *option in the Recording Options panel of the File Backup and Tools dialog box. Selecting this option keeps your disc open for future recording sessions.*

Recording Session 2

In the next session, the following changes are made to the `importing sessions` directory:

- `test file 2` is updated, increasing the size from 24KB to 29KB.
- `test file 3` is removed.
- `test file 4` is added.

Importing Sessions

To make the data from the first recording session available, you must enable the Import Previous Session feature in the ISO9660–Advanced Options dialog box. When enabled, all data from Incremental Session 1 is imported into Incremental Session 2,

allowing you to update `test file 2,` erase `test file 3,` and add `test file 4:`
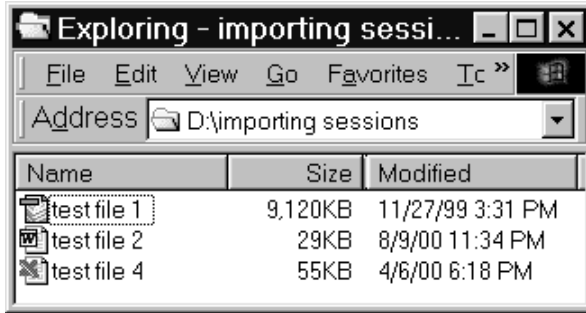
Figure 6-2: Incremental Session 2 - New and Updated Files

Erasing a file

Note that `test file 3` is no longer available in Incremental Session 2. The file has not actually been "erased" from the disc. `test file 2` physically remains on the disc as part of Incremental Session 1. It was not removed from the disc, nor was memory space regained. Rather, when recording the new session, the file's location was not updated in the session's table of contents (TOC), making the file inaccessible in the second session, effectively erasing it.

The following table summarizes the changes made in Incremental Session 2:

Table 6-2: Comparison: Incremental Recording Sessions 1 and 2

Incremental Session 1		Incremental Session 2	
File	**Size**	**File**	**Size**
`test file 1.fm`	9,120 KB	Same	Same
`test file 2.doc`	24 KB	Same	**29 KB**
`test file 3.log`	1 KB	**Removed**	**Removed**
–	–	**`test file 4.xls`**	**55 KB**

You can define how CDRWIN overwrites imported files and directories that have duplicate names. For more information, see Importing Previous Sessions on page 6-6.

You can also add a descriptor for each volume (session) and specify the dates and times of the volume and files and directories within the volume. For detailed instructions, see Adding a Volume Descriptor to a Session on page 6-10 and Specifying the Date and Time for a Session on page 6-13.

Importing Previous Sessions

Overview

You enable CDRWIN's Import Previous Session feature from Import Session tab in the ISO9660 – Advanced Options dialog box. The Import Previous Session feature allows you to incrementally archive files to your disc in multiple recording sessions.

Overwriting
duplicate
directories

In the Duplicate Directory Options panel, you specify which action the CDRWIN takes when a duplicate directory name is found between the imported directories and any new directories.

Overwriting
duplicate files

In the Duplicate File Options panel, you can specify which action the CDRWIN takes when a duplicate filename is found between imported files and any new files.

Preliminary
Steps

Before importing sessions, complete the following tasks:

1   Record the first session of your data disc. You must select the Open New Session option to keep the disc open for future recording sessions. For detailed instructions, see Storing Data Files Incrementally on page 6-16.

2   (Optional) Complete a volume descriptor for the new session. You can specify the Volume label, which is displayed by most device and directory applications, such as Explorer, in DOS and Windows. The descriptor also adds various information for future reference. For detailed instructions, see Adding a Volume Descriptor to a Session on page 6-10.

3   (Optional) Specify the dates and times for volume and files and directories in the volume for the new session. For detailed instructions, see Specifying the Date and Time for a Session on page 6-13.

♦ **To import previous sessions:**

1 From the main toolbar, click the File Backup and Tools icon.

The File Backup and Tools dialog box appears.

2 In the ISO9660 Recording Options panel, click Advanced Options.

The ISO9660 – Advanced Options dialog box appears.

3 Click the Import Session tab.

The Import Session tab appears.
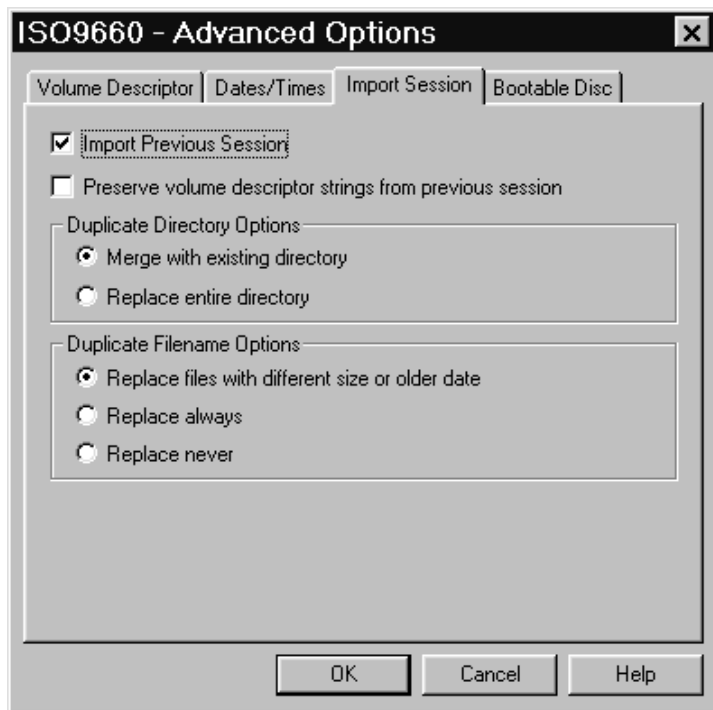
Figure 6-3: Advanced Options – Import Session Tab

4 Check Import Previous Session.

5 (Optional) Check **Preserve volume descriptor strings from previous session** to import the volume descriptor from the previous session into the current session. To create a volume descriptor, see Adding a Volume Descriptor to a Session on page 6-10.

NOTE

If you check the **Preserve volume descriptor strings from previous session** *box, all information entered in the Volume Descriptor tab for the new session is disabled.*

6 In the Duplicate Directory Options panel, complete the following:

- **Merge with existing directory** – Select to overwrite only those files that differ from the files in the previous session. Selecting this option reduces the amount of data CDRWIN must record, thus reducing recording time.

- **Replace entire directory** – Select to overwrite the entire directory from the previous session.

7 In the Duplicate Filename Options panel, complete the following:

- **Replace files with different size or older date** – Select to overwrite files with different size or older dates. If two files have duplicate names, CDRWIN overwrites the imported file with the file having a different size or more recent date.

- **Replace Always** – Select to overwrite files with duplicate names. If two files have duplicate names, CDRWIN overwrites the imported file with the file from the new session.

- **Replace Never** – Select to disable overwriting of duplicate filenames. If two files have duplicate names, CDRWIN records the imported file in the new session.

8 Click Ok.

The message *Import previous session option is ENABLED* appears in the ISO9660 Image File panel of the File Backup and Tools dialog box.

You can now record the new incremental session on your disc. For detailed instructions, see Storing Data Files Incrementally on page 6-16.
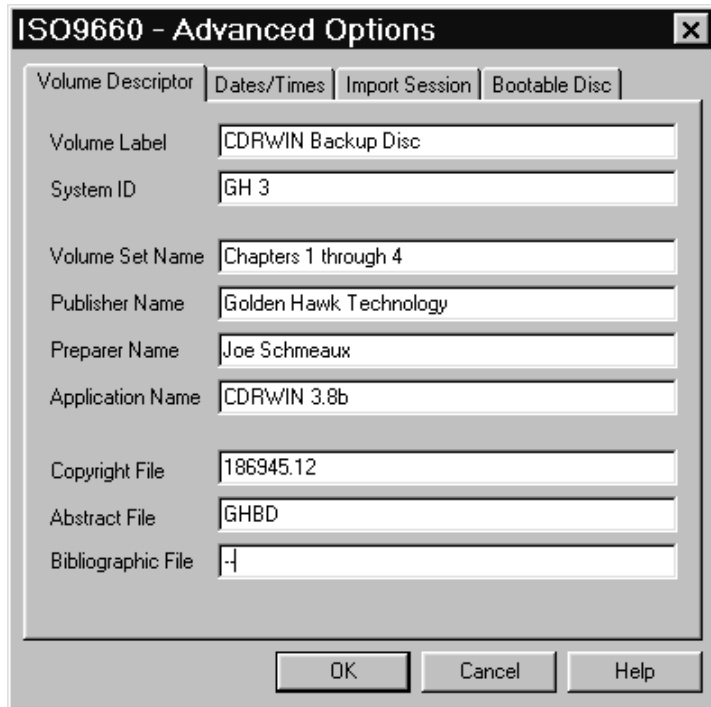
Adding a Volume Descriptor to a Session

You can add a volume descriptor to a recording session from the ISO9660 – Advanced Options dialog box. A volume descriptor is descriptive text stored in Block 16 of your disc. Most device and directory applications in DOS and Windows display the volume label. The other information in the volume descriptor is for documentation purposes only.

◆ **To add a volume descriptor:**

1 From the main toolbar, click the File Backup and Tools icon.

The File Backup and Tools dialog box appears.

2 In the ISO9660 Recording Options panel, click Advanced Options.

The ISO9660 – Advanced Options dialog box appears.

3 Click the Volume Descriptor tab.

The Volume Descriptor tab appears (Figure 6-4):

Figure 6-4: Advanced Options – Volume Descriptor Tab

4 In the Volume Descriptor tab, complete the following:

NOTE

On Joliet discs, all strings described below are limited to 1/2 of the lengths specified.

- **Volume Label** – Enter the volume label. The maximum length is 32 characters. This label is displayed by most device and directory utilities in DOS and Windows, such as Explorer.

- **System ID** – Enter the System ID. The maximum length is 32 characters.

- **Volume Set Name** – Enter the name of the volume set. The maximum length is 128 characters.

- **Publisher Name** – Enter the name of the publisher. The maximum length is 128 characters.

- **Preparer Name** – Enter the preparer's name. The maximum length is 128 characters.

- **Application Name** – Enter the application name. The maximum length is 128 characters.

- **Copyright File** – Enter the copyright file. The maximum length is 37 characters.

- **Abstract File** – Enter the abstract file. The maximum length is 37 characters.

- **Bibliographic File** – Enter the bibliographic file. The maximum length is 37 characters.

5   Click Ok.

Your volume descriptor is complete. The descriptor is included when you record the session onto your disc.

Specifying the Date and Time for a Session

You can specify the date and time for a session and each file and
directory in it from the Dates/Times tab in the ISO9660 –
Advanced Options dialog box.

If you do not specify the date and time for a session, CDRWIN uses
the date and time from your computer. If you do not specify the
date and time for the files and directories, CDRWIN uses the
existing dates and times for each file and directory.

Use the following formats to specify the date and time:

Table 6-3: Date and Time Formats

	Format	**Example**
Date	MM/DD/YYYY	1/1/2000
Time	HH:MM:SS AM/PM	09:13:21 PM

◆ **To specify the dates and times of a session:**

1 From the main toolbar, click the File Backup and Tools icon.

    The File Backup and Tools dialog box appears.

2 In the ISO9660 Recording Options panel, click Advanced
    Options.

    The ISO9660 – Advanced Options dialog box appears.

3 Click the Dates/Times tab.

The Dates/Times tab appears (Figure 6-5):
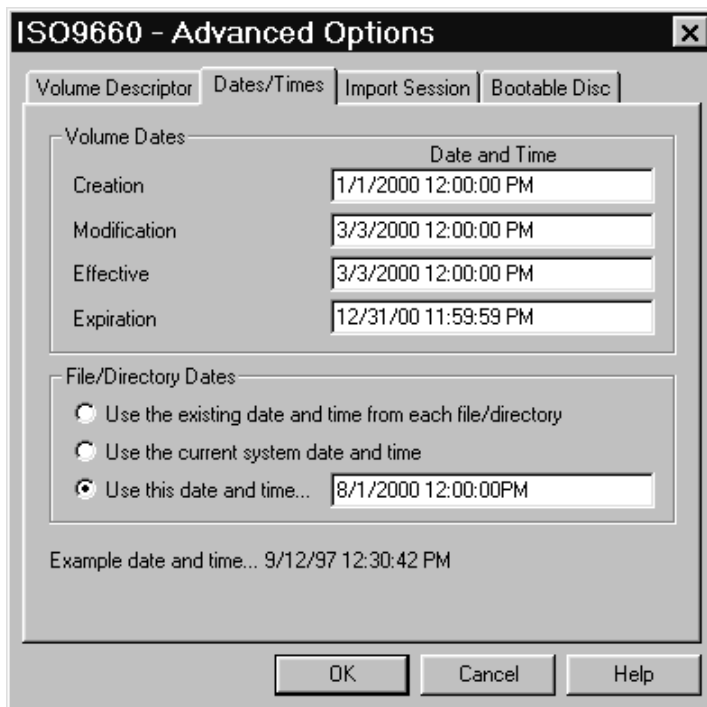
Figure 6-5: Advanced Options – Dates/Times Tab

4 In the Volume Dates panel, complete the following:

- **Creation** – Enter the date and time the volume is created. If this date is not specified, CDRWIN uses your computer's current date and time.

- **Modification** – Enter the date and time that the volume is modified. If this date is not specified, CDRWIN uses your computer's current date and time.

- **Effective** – Enter the volume's effective date and time.

- **Expiration** – Enter the volume's expiration date and time.

5 In the File/Directory Dates panel, complete the following:

- **Use the existing date and time from each file/directory** – This is the default setting. Select to record the date and time of each file and directory to your disc.

- **Use the current system date and time** – Select to apply your computer's date and time to all files and directories being recorded.

- **Use this date and time** – Select and enter the date and time you want to appear for all files and directories being recorded.

6 Click Ok.

The Dates and Times are specified.

Storing Data Files Incrementally

Overview
You can store data files to your disc incrementally using CDRWIN's import previous session feature and track-at-once recording from the Backup Disc and Tools dialog box. In track-at-once recording, the recording laser is turned off after each track is finished and on again when a new track is written. Track-at-Once recording is, by definition, a form of multisession recording.

Open New Session
You must check the Open New Session box in the Recording Options panel to leave the disc open so you can record the data tracks in subsequent sessions.

Before You Begin
Before recording your data files to your disc, you must complete the following preliminary steps:

1 Build an image file of the data files you want to save to your disc. For detailed instructions, see Creating an ISO 9660 Image File on page 5-2.

2 Enable the Import Previous Sessions feature. For detailed instructions, see Importing Previous Sessions on page 6-6.

♦ **To store data files using the Import Previous Session feature:**

1 From the main toolbar, click the File Backup and Tools icon.

The File Backup and Tools dialog box appears (Figure 6-6):
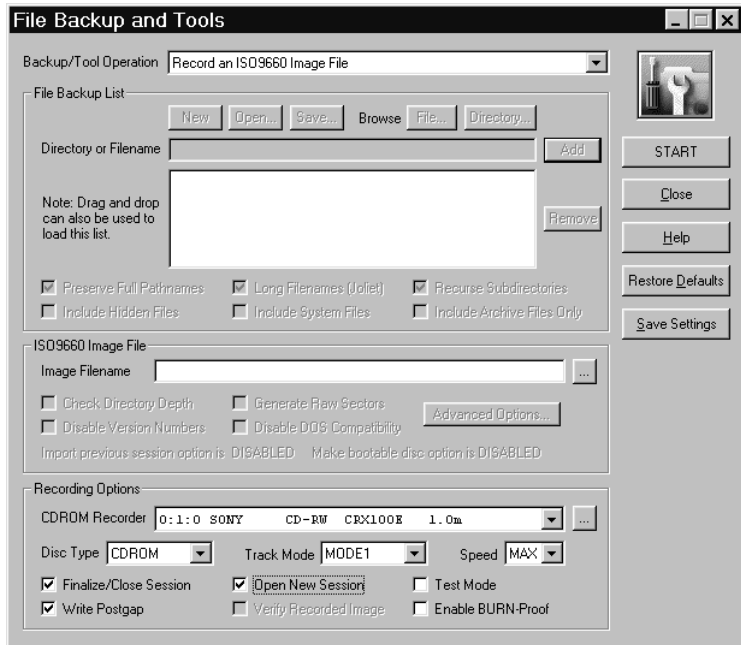
Figure 6-6: File Backup and Tools – Open New Session

2 From the Backup/Tool Operation pull-down menu, select Record an ISO9660 Image File.

3 In the Recording Options panel, check the Open New Session box. Checking the box leaves your disc open, allowing you to add subsequent data sessions.

4 In the ISO9660 Image File panel, click the ... button, located next to the Image Filename field.

The Open ISO9660 Image File dialog box appears (Figure 6-7):
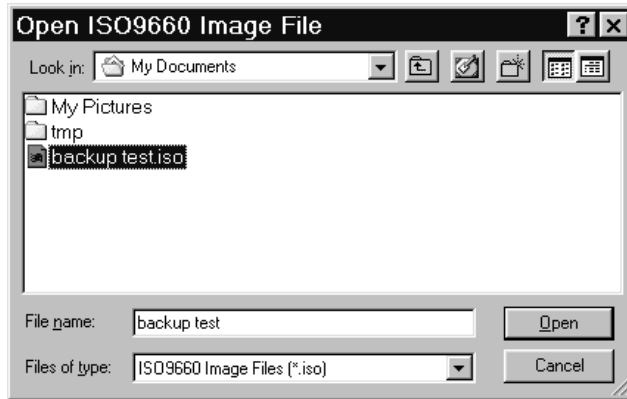
Figure 6-7: Open ISO9660 Image File Dialog Box

5 Select the ISO 9660 file (.iso) you want to record and click Open.

The File Backup and Tools dialog box reappears (Figure 6-6). Your selected file is loaded into the Image Filename field.

6 In Recording Options panel, complete the following:

- **CDROM Recorder** – Select your CDROM recorder from the pull-down menu.

- **Track Mode** – Select mode 1 from the pull-down menu if copying ISO 9660 files from your computer onto disc. Mode 1 is the default setting.

- **Speed** – Select your recorder's recording speed from the pull-down menu. Select MAX if you want CDRWIN to automatically detect and use your recorder's maximum recording speed.

- **Finalize Session/Disc** – CDRWIN automatically checks this box for you. Check to finalize the current session after writing the track. Your session or disc will not be readable on a regular CDROM drive until it is finalized.

- **Write Postgap** – CDRWIN automatically checks this box for you. Check to write a 150 block post-gap at the end of the track. This option is recommended when recording an ISO 9660 image file.

- **Test Mode** – Check to set your recorder to write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

- **Enable BURN-Proof (v3.8c or later)** – Check to enable BURN-proof. BURN-proof is a feature in newer CD recorders that prevents buffer underruns. CDRWIN ignores this option if your recorder does not support BURN-Proof.

7 Click START.

The session is recorded to your disc.

8 Repeat steps 4 through 7 as necessary to record other data sessions onto your disc.

9 Close your disc. For detailed instructions, see Closing a Multisession Disc on page 10-20.

7

CREATING A CUESHEET

This chapter describes how to create and edit a cuesheet. A cuesheet is a configuration file for your disc in which you define the files to be recorded and the starting time of each track and index. The cuesheet gives you complete control over the layout of your disc. You can control the spacing between tracks, define subindexes, pre-gaps, post-gaps, media catalog numbers, and ISRCs. You can also add a CD-TEXT file (.cdt) to your cuesheet to specify CD-TEXT for your disc and its individual tracks.

You can create a cuesheet from the Load Tracks dialog box. Cuesheet files are standard text (ASCII) files. You can use any text editor, such as Notepad or Wordpad, to edit a cuesheet. Do not save your cuesheet in any non-text format. The recommended file extensions for your cuesheet are .cue or .txt.

Contents

- Creating a Cuesheet
- Editing a Cuesheet

Creating a Cuesheet

You can create a cuesheet when you use the LoadTracks feature in the Record Disc dialog box.

◆ **To create a cuesheet:**

1 From the main toolbar, click the Record Disc icon.

The Record Disc dialog box appears (Figure 7-1):
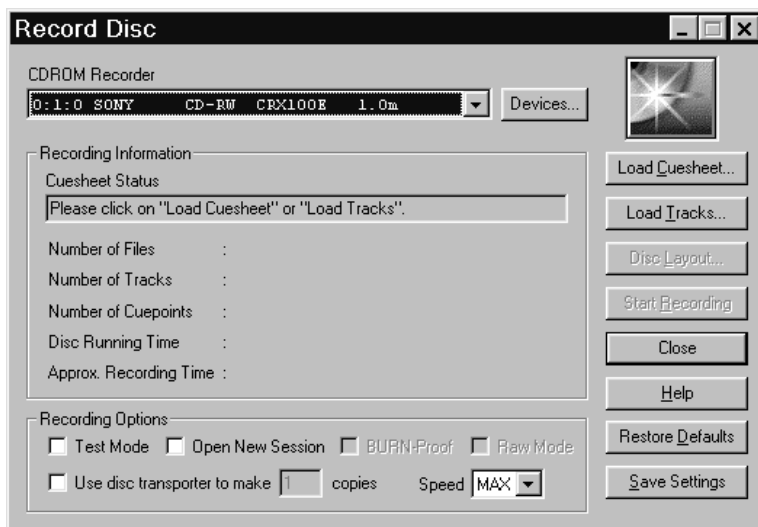
Figure 7-1: Record Disc Dialog Box

2 Click Load Tracks.

The Load Tracks dialog box appears (Figure 7-2):

Figure 7-2: Load Tracks Dialog Box

3 In the Disc Type area, complete the following:

- **Audio** – Click to record audio tracks only.

- **CD+G** – Click to record a CD+G (Karaoke) tracks.

- **Track Pregap** - Enter the number of seconds of silence you want before each track. Two seconds is a typical pregap for studio audio tracks. Zero is typical for live audio recordings.

4 Click Add.

The Select Track File dialog box appears (Figure 7-3):
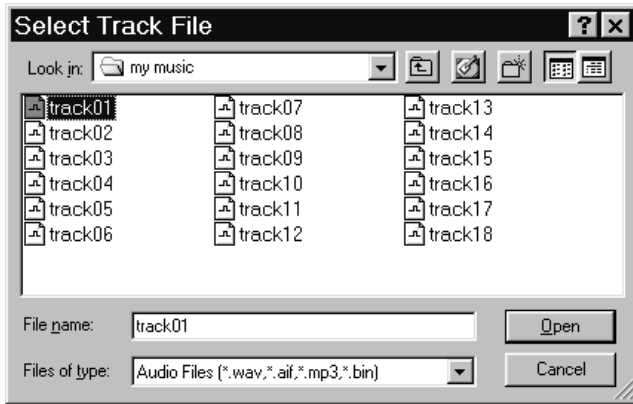
Figure 7-3: Select Track File Dialog Box

5 Select a track and click Open.

The track filename appears in the Load Tracks dialog box
(Figure 7-4):

Figure 7-4: Load Tracks Dialog Box with Track Filenames

6 Repeat steps 4 and 5 to add tracks as necessary until you complete your disc's track list.

7 After loading tracks, click one of the following buttons to edit your track list:

- **Delete** – Deletes the selected track from your track list.

- **Remove (v3.8c and later)** – Removes a selected track from the track list.

- **Clear** – Clears all tracks from your track list.

- **Compute Time (v3.8c and later)** – Computes the disc running time for the tracks you have loaded. For detailed instructions, see Computing the Running Time of Loaded Tracks on page 3-21.

8 Click Save As (Cuesheet).

The Save Cuesheet File dialog box appears (Figure 7-5):
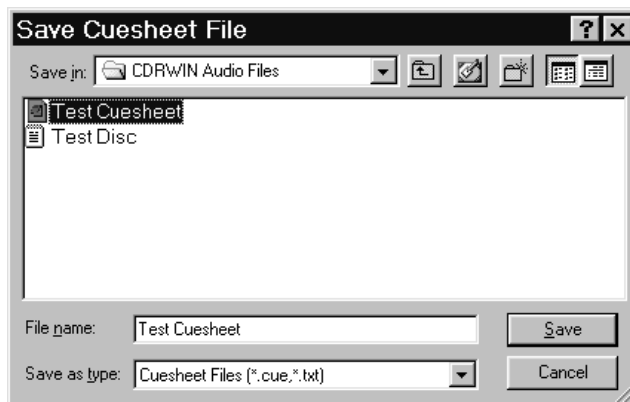
Figure 7-5: Save Cuesheet File Dialog Box

9 Select the cuesheet's directory and enter the filename. Click Save.

Your cuesheet is saved to the specified directory with a .cue file extension.

Editing a Cuesheet

CDRWIN's cuesheet scripting language allows you to edit your cuesheet in any text editing program, such as Notepad or Wordpad. You must save the file as an ASCII text file.

For example, if you open Test Cuesheet.cue created in Creating a Cuesheet above, it appears as follows:

```
FILE "C:\MY MUSIC\TRACK01.WAV" WAVE
  TRACK 01 AUDIO
    INDEX 01 00:00:00
FILE "C:\MY MUSIC\TRACK02.WAV" WAVE
  TRACK 02 AUDIO
    INDEX 01 00:00:00
FILE "C:\MY MUSIC\TRACK03.WAV" WAVE
  TRACK 03 AUDIO
    INDEX 01 00:00:00
FILE "C:\MY MUSIC\TRACK04.WAV" WAVE
  TRACK 04 AUDIO
    INDEX 01 00:00:00
FILE "C:\MY MUSIC\TRACK05.WAV" WAVE
  TRACK 05 AUDIO
    INDEX 01 00:00:00
FILE "C:\MY MUSIC\TRACK06.MP3" MP3
  TRACK 06 AUDIO
    INDEX 01 00:00:00
```

Figure 7-6: Sample Cuesheet (Test Cuesheet.cue)

CDRWIN's Cuesheet Compiling Process

You can record a disc with a cuesheet using disc-at-once recording from the Record Disc dialog box. When you load the cuesheet into the Record Disc dialog box, CDRWIN compiles the cuesheet from top-to-bottom and left-to-right. As CDRWIN compiles the cuesheet, the following message appears:
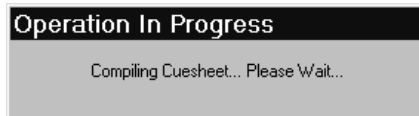
Figure 7-7: Compiling Cuesheet Message Box

When the cuesheet is successfully loaded, the cuesheet's directory and filename appear in the Cuesheet Status field in the Record Disc dialog box:
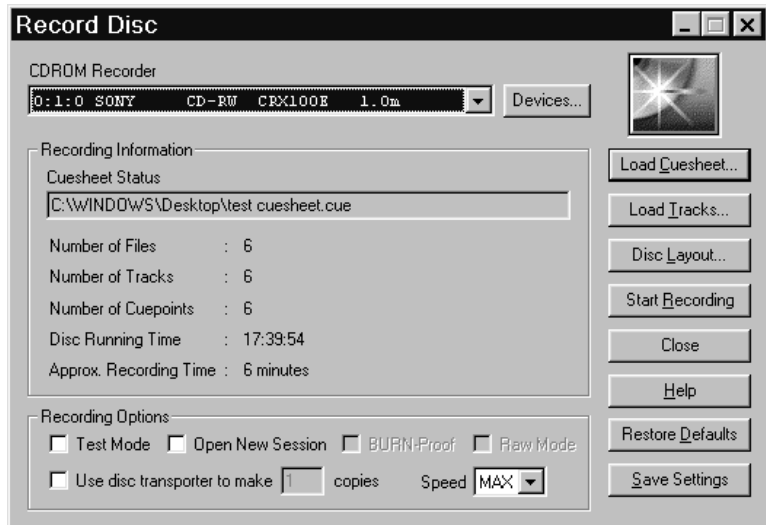
Figure 7-8: Record Disc Dialog Box – Cuesheet Status

To record a disc using a cuesheet, see Recording a Disc Using a Cuesheet on page 3-2.

Entering Cuesheet Commands

When editing your cuesheet, you must pay special attention to the top-to-bottom order of each cuesheet command. Some cuesheet commands have a particular top-to-bottom order in the cuesheet and cannot be transposed.

Example

When CDRWIN compiles a cuesheet, CDRWIN expects the TRACK command to follow immediately after the FILE command. You cannot put the TRACK command before the FILE command.

For example, if you reverse the order of the FILE and TRACK command on lines 1 and 2 of Figure 7-6, you receive the following error message:
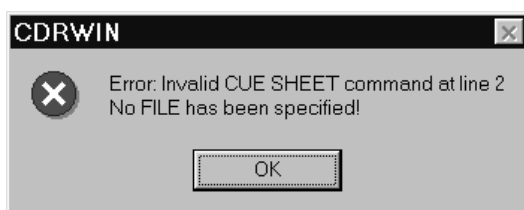
Figure 7-9: Cuesheet Error – Transposed Commands

Error
Messages

CDRWIN error messages provide the line number of the first line where it encounters a syntax error. This information helps you pinpoint the error in the cuesheet command syntax.

Typographical
considerations

Indentation and spacing between command lines do not interfere with CDRWIN compiling a cuesheet. However, when editing a cuesheet, it is good idea to use indentation and spacing to keep your cuesheet orderly.

Cuesheet commands are not case sensitive.

When compiling a cuesheet, CDRWIN is sensitive to typographical errors. A single mis-typed character in a cuesheet causes a compiling error.

For example, if you mis-type the filename in the first line of Figure 7-6, you would receive the following error message when you load the cuesheet:
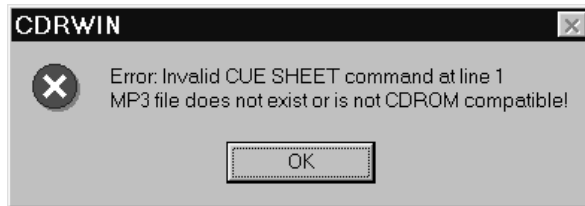
Figure 7-10: Cuesheet Error – Typographical Error

For more information about individual cuesheet commands, see Appendix A – Cuesheet Commands.

8

CREATING A CD-TEXT DISC

About this chapter

A CD-TEXT disc contains text information for the disc and individual tracks on the disc. If your CD player supports CD-TEXT, the disc and track information displays in your CD player's console window when you play your disc.

Contents

- Creating a CD-TEXT File
- Adding a CD-TEXT File to a Cuesheet

Creating a CD-TEXT File

Overview

You can create a CD-TEXT file in the CD-TEXT Editor dialog box. When you create the CD-TEXT file, you can specify the following information for your disc and its individual tracks:

- **Genre** – The genre of music for the disc you want to make.
- **Identifier** – Your disc's catalog number, SKU number, or other identification.
- **Title** – The title of your disc or track.
- **Performer** – The performer of your disc or track.
- **Songwriter** – The name of the disc's songwriter or track.
- **Composer** - The name of the disc's composer or track.
- **Arranger** - The name of the disc's arranger or track.
- **Message** - A text message for your disc or track.
- **UPC / ISRC** - The UPC or ISRC for the disc or track.

CD-Text in
Tracks 0 and 1
through 99

You enter your disc information in Track 0. You enter information about individual tracks in tracks 1 through 99. The track information must correspond with the track order of your cuesheet.

File format

After entering your CD-TEXT information, you must save your CD-TEXT file so you can include it in your cuesheet. The CD-TEXT file is saved with a `.cdt` extension.

♦ **To create a CD-TEXT file:**

1 From the main toolbar, click the CD-TEXT Editor icon.

The CD-TEXT Editor dialog box appears (Figure 8-1):
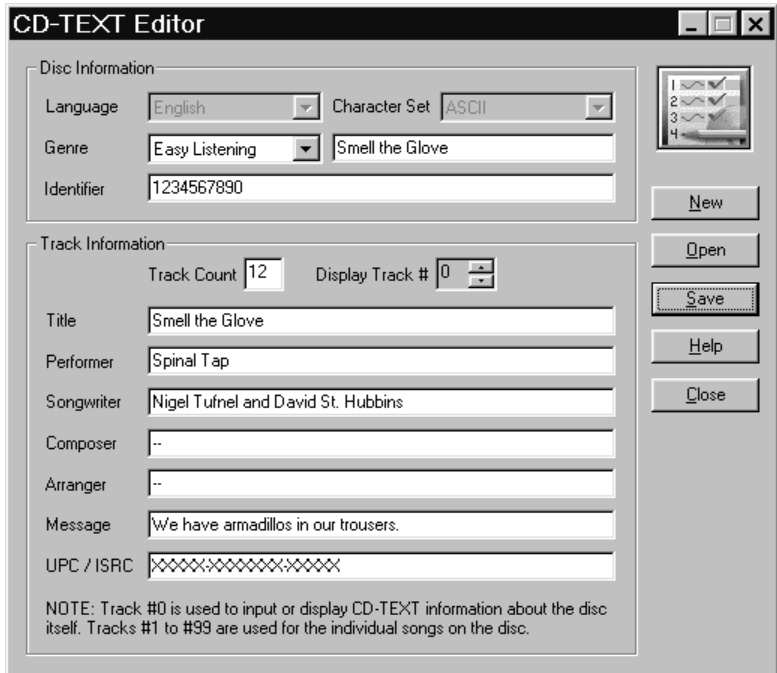
Figure 8-1: CD-TEXT Editor Dialog Box

2   In the Disc Information panel, complete the following:

- **Genre** – From the pull-down menu, select the genre of music for the disc you want to make.

- **Identifier** – Enter as necessary your disc's catalog number, SKU number, or other identification.

3   In the Track Information panel, enter the number of tracks on your disc in the Track Count field.

4 In the Track Information panel, enter the following information as desired for your disc:

NOTE

For track 0, you can enter information about the disc itself, such as the title, artist, or date.

- **Title** – Enter the title of your disc.

- **Performer** – Enter the name(s) of the performer of your disc.

- **Songwriter** – Enter the name of the disc's songwriter.

- **Composer** - Enter the name of the disc's composer.

- **Arranger** - Enter the name of the disc's arranger.

- **Message** - Enter a text message for the disc.

- **UPC / ISRC** - Enter the UPC or ISRC for the disc or track.

5 In the Display Track # field, click the scroll bar ⬍ to go to track 1.

An empty Track Information panel for the track 1 appears. All information for the previous track is saved. Click the down arrow on Display Track # scroll bar to return to the previous track's information panel.

6 Enter your track information for track 1, then click the Display Track # scroll bar to enter information for track 2 of your disc.

7 Repeat the previous steps as necessary to enter information for the remaining tracks on your disc.

8 Click Save.

The Save CD-Text File dialog box appears (Figure 8-2):
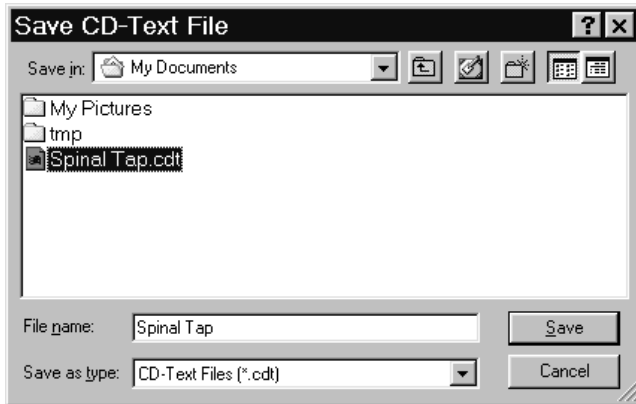
Figure 8-2: Save CD-Text Dialog Box

9 Specify the directory and file name for your CD-Text file and click Save.

Your CD-Text file is saved to the specified directory with a `.cdt` extension.

Adding a CD-TEXT File to a Cuesheet

To create a CD-Text disc, you must add your CD-TEXT file to your cuesheet with the CDTEXTFILE command. The CDTEXTFILE command is usually entered at the top of your cuesheet immediately before the FILE command for track 1.

You can add the CD-TEXT file to your cuesheet using any text editing program such as Notepad or Wordpad. To create a cuesheet, see Creating a Cuesheet on page 7-2.

♦ **To add a CD-TEXT file to your cuesheet**

Enter the CDTEXTFILE command at the top of the cuesheet:

CDTEXTFILE *filename*

where *filename* is the directory and filename of your CD-TEXT file. If there are any spaces in the filename, you must add parentheses ("") around the filename.

For example, to add the CD-TEXT file created earlier in this chapter, enter the following at the top of the cuesheet:

```
CDTEXTFILE "C:\My Documents\Spinal Tap.CDT"
FILE "C:\TRACKS\TEST01.WAV" WAVE
  TRACK 01 AUDIO
    INDEX 01 00:00:00
FILE "C:\TRACKS\TEST02.WAV" WAVE
  TRACK 02 AUDIO
    INDEX 01 00:00:00
FILE "C:\TRACKS\TEST03.WAV" WAVE
  TRACK 03 AUDIO
    INDEX 01 00:00:00
```

Figure 8-3: Cuesheet with CD-Text File

When you load the cuesheet into the Record Disc dialog box, CDRWIN compiles the CD-TEXT file and applies the disc (track 0 only) and track (tracks 1 through 99) information to the specified tracks. When you create the disc, CDRWIN encodes the information in your disc's R- through W- subcode channels.

To create a CD-Text disc using your edited cuesheet, see Recording a Disc Using a Cuesheet on page 3-2.

9

CREATING A CD+G DISC

About this
chapter

This chapter describes how to make a CD+G (Karaoke) disc. A CD+G (Karaoke) disc is a special audio compact disc that contains graphics data in addition to the audio data on the disc. The audio tracks are contained in the main data area of the CD. The text and graphics are contained in the disc's R- through W- subcodes. You can play a CD+G disc on a regular Audio CD player, but when played on a special CD+G player, it outputs a graphics signal. This type of disc is usually used for Karaoke machines.

Contents

- About Subcodes and CD+G Discs
- CD+G Recording Process
- Creating CD+G Image Files
- Recording a CD+G Disc from Image Files
- Recording a CD+G Disc On-the-Fly

About Subcodes and CD+G Discs

Overview   The typical audio CD contains two kinds of data sectors:

- **Content** – An area of the sector used to store audio and data.

- **Subcode** – A low speed data channel used to help control the disc.

The subcode data is interleaved with the content data in 8 different channels, designated P through W. The following table describes each subcode channel and its function on audio and data and CD+G discs:

Table 9-1: P through W Subcode Channel Functions

Subcode Channel	Audio and Data Disc Function	CD+G (Karaoke) Disc Function
P	Contains pre-gap and post-gap information about gaps between tracks.	Contains pre-gap and post-gap information about gaps between tracks.
Q	Contains the table of contents (TOC) time code information for each sector. The timing information appears in your CD player's console window as the track is playing.	Contains the table of contents (TOC) time code information for each sector. The timing information appears in your CD player's console window as the track is playing.
R thru W	Unused	Contains graphics and text for the corresponding track. The text is displayed on a compatible monitor when the track is played.

Each sector on a CD contains 2448 bytes of data:

- 2352 bytes of content data, including sector header, Error Correction Codes (ECC), and the data (audio or data). These are also known as raw sectors.

- 96 bytes of subcode data.

Recording Subcodes with CDRWIN

By default, CDRWIN extracts and records only the 2352 bytes of content data, ignoring the 96 bytes of subcode channel data. When recording a CD+G (Karaoke) disc, you must specify that you are extracting or recording CD+G sectors. CDRWIN extracts and records the 2448 bytes of content and subcode channel data.

CD+G Disc Playback

When you play a CD+G disc, the content and subcode data are separated. You can play the audio portion of a CD+G disc on most CD players, but to view the text and graphics in the R- through W-channels, you must use a CD player capable of reading and displaying the subcodes.

Supported CD+G Readers and Recorders

When you backup a CD+G disc, or extract CD+G tracks or sectors, your must use a CD reader capable of reading the text and graphics information contained in the R- through W- subcode channels. If your reader does not read subcode channel information, you can play the data (usually audio) portion of the disc, but not the subcode data.

For a list of supported devices, visit Golden Hawk's web site at http://www.goldenhawk.com.

CD+G Recording Process

There are two ways to record a CD+G disc with CDRWIN:

- **Disc-at-Once** – This method requires that you perform the following procedures:

    1 Extracting (copying) tracks from your CD+G disc onto your computer's hard drive as image files. See Creating CD+G Image Files on page 9-5.

    2 Recording the image files onto disc using disc-at-once recording. See Recording a CD+G Disc from Image Files on page 9-10.

- **On-the-Fly** – Backup (copy) the source CD+G disc directly to a CD-R. See Recording a CD+G Disc On-the-Fly on page 9-20.

Disc-at-Once method is the recommended method of recording your CD+G disc, especially for novices. On-the-Fly recording obligates your computer's memory resources, and as such, introduces complicating variables to the recording process.

Creating CD+G Image Files

You can copy (extract) tracks from your CD+G and save them as image files on your computer's hard drive from the Extract Tracks window in the Extract Disc/Tracks/Sectors to Image File dialog box. You must specify that you are copying CD+G tracks, so CDRWIN copies all of the content and subcode data.

CD+G File Format

CDRWN saves your CD+G image files in Intel binary format with a `.bin` file extension.

♦ **To create a CD+G image file:**

1 From the main toolbar, click the Extract Disc/Tracks/Sectors icon.

The Extract Disc/Tracks/Sectors to Image File dialog box appears.

2 In the Extract Mode... area, click Select Tracks.

The Extract Tracks window appears:
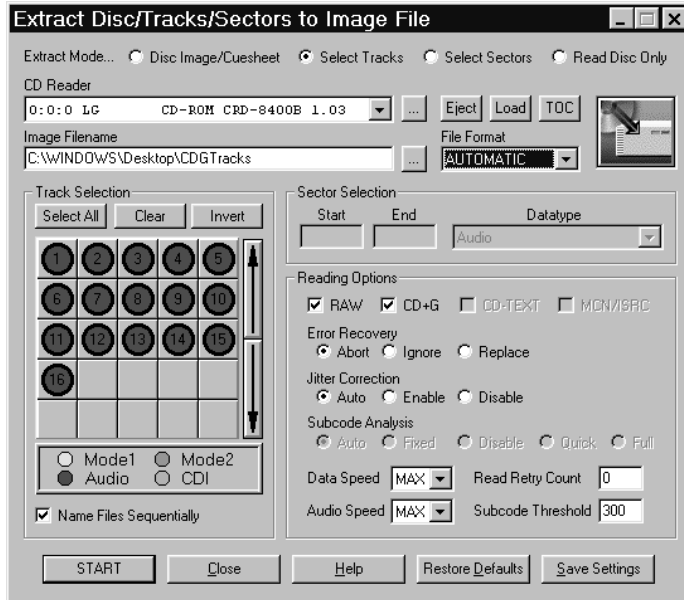
Figure 9-1: Extract Tracks Window – CD+G Tracks

3 Enter the directory and name of your image file in the Image Filename field. Use the ... button to specify the directory and image filename.

4 In the Reading Options panel, check the CD+G box. Checking the box enables CDRWIN to copy all CD+G audio and subcode data as part of the image file.

5 In the Track Selection panel, complete the following:

- **Track Selection Grid** – Left-click a grid square to select a track for recording. A black ring appears around the button when you have selected a track. You can select more than one track. Right-click a grid square to display track information.

- **Select All** – Click to select all tracks for recording.

- **Name Files Sequentially** – If you select more than one track to record, check to name each image file with a sequential number starting at 1. For example, if you are copying tracks 5 and 8 using the image filename `TRACK.WAV`, then CDRWIN names the two files `TRACK01.WAV` and `TRACK02.WAV`.

- **Clear** – Click to unselect tracks.

- **Invert** – Click to invert the order of selected tracks.

NOTE

For more information about selecting tracks, see Selecting Tracks on page 2-11.

6   In the remainder of the Extract Tracks window, complete the following:

- **CD Reader** – Select your CD Reader from the pull-down menu.

- **Eject** – Click to eject the CD currently in your CD reader.

- **Load** – Click to load a CD into your CD reader.

- **TOC** – Click to update the table of contents for the CD in your reader. Clicking TOC updates the tracks in the Track Selection Grid.

- **RAW** – Unchecking the box has no effect when recording an image file of a CD+G track.

- **Error Recovery** – Select one of the following:

  - **Abort** – Stops recording if any unreadable sector is found. This is the default setting.

  - **Ignore** – Replaces any unreadable sector with another unreadable sector and continues recording the disc. For audio image files, this option is identical to Replace.

  - **Replace** – Replaces any unreadable sector with a readable one, and continues recording the disc.

- **Jitter Correction** – To enable or disable the jitter correction algorithm, select one of the following buttons:

  - **Automatic** – Chooses the best jitter correction setting for you. Automatic is the default setting.

  - **Enabled** – Enables the jitter correction algorithm.

  - **Disabled** – Disables the jitter correction algorithm.

- **Data Speed** – Select a speed from the pull-down menu for reading data tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Audio Speed** – Select a speed from the pull-down menu for reading of audio tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Read Retry Count** – Enter the maximum number of times to retry a failed reading operation. The range is 1 to 10. 0 is the default.

- **Subcode Threshold** – This feature is disabled and has no effect on the copying process.

7 Click START.

The Copy Progress dialog box appears:
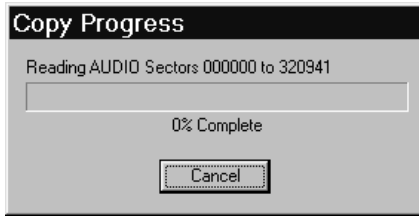
Figure 9-2: Copy Progress Dialog Box

The image file is copied to the specified directory. The Copy Progress message box shows the percentage of the recording process completed. Click Cancel if you want to stop recording the image file.

When recording of the image file is complete, the Operation Successfully Completed! message box appears:
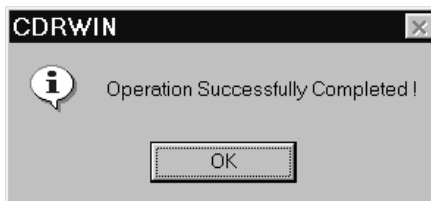
Figure 9-3: Operation Successfully Completed Message Box

8 Click OK.

Your CD+G image file is complete.

Recording a CD+G Disc from Image Files

You can record your CD+G (Karaoke) images files to a disc from the Record Disc dialog box. You can also create a cuesheet from the tracks you load in to the Record Disc dialog box.

Recording a CD+G disc from image files is a three step process:

- Loading CD+G Tracks
- Setting Recording Attributes
- Recording the Disc

Loading CD+G Tracks

You must first load your tracks (image files) into the Record Disc dialog box before you can record the image files to your disc.

◆ **To load CD+G tracks (image files):**

1 From the main toolbar, click the Record Disc icon.

The Record Disc dialog box appears (Figure 9-4):
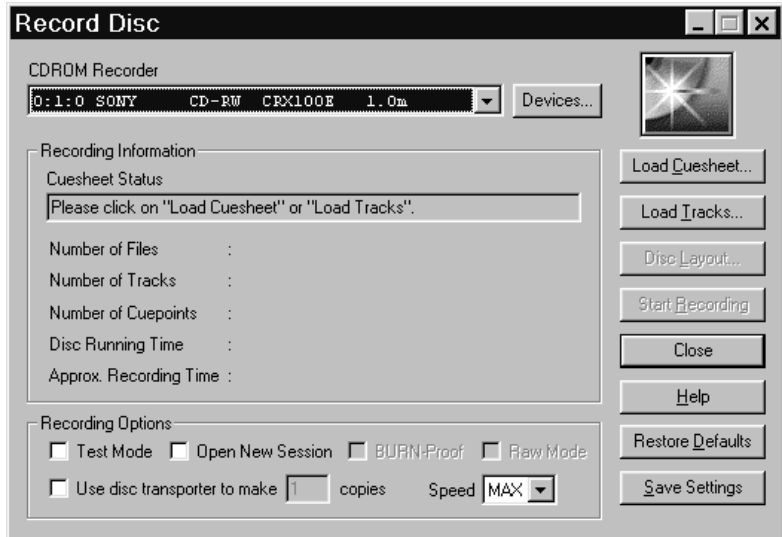
Figure 9-4: Record Disc Dialog Box

2 Click Load Tracks.

The Load Tracks dialog box appears (Figure 9-5):
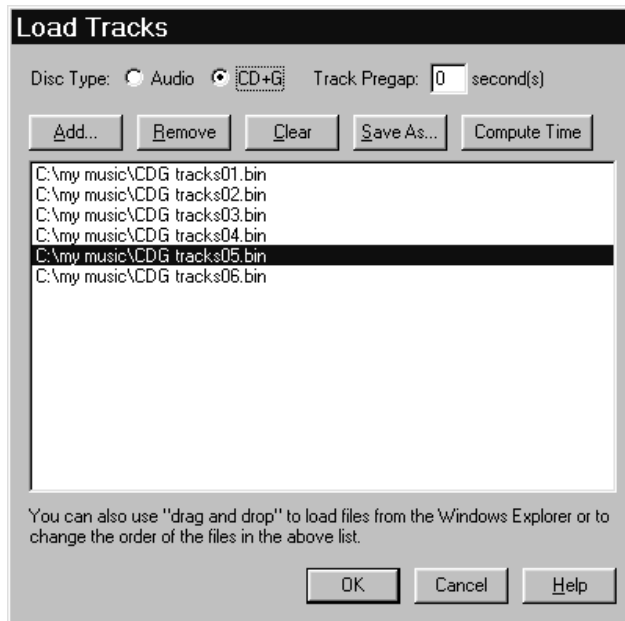
Figure 9-5: Load Tracks Dialog Box – CD+G Tracks

3   In the Disc Type area, click the CD+G button. CDRWIN records all CD+G audio and subcode data to your disc for each track.

4   Click Add.

The Select Track File dialog box appears (Figure 9-6):
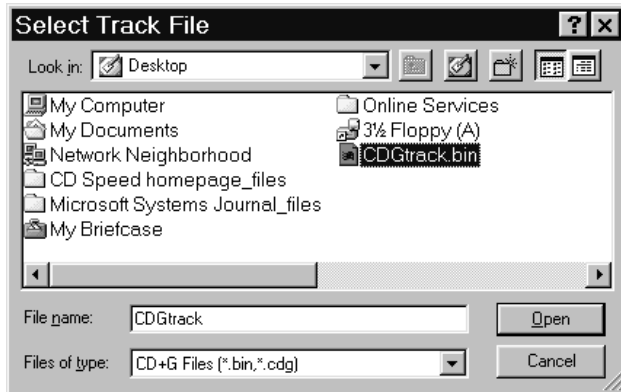
Figure 9-6: Select Track File Dialog Box

5   Select your CD+G image file and click Open.

The track appears in the Load Tracks window.

6   Repeat steps 4 and 5 as necessary to load your remaining tracks.

7 After loading tracks, click one of the following buttons as necessary:

- **Track Pregap** - Enter the number of seconds of silence you want before each track. Two seconds is a typical pregap for studio audio tracks. Zero is typical for live audio recordings and is the default setting.

- **Delete** – Deletes the selected track from your track list.

- **Remove (v3.8c and later)** – Removes a selected track from the track list.

- **Clear** – Clears all tracks from your track list.

- **Save As (Cuesheet)** – Creates and saves a cuesheet from the loaded tracks. For more information, see Chapter 7 – Creating a Cuesheet and Appendix A – Cuesheet Commands.

- **Compute Time (v3.8c and later)** – Computes the disc running time for the tracks you have loaded. For detailed instructions, see Computing the Running Time of Loaded Tracks on page 3-21.

8 Click OK.

The Operation In Progress message box appears (Figure 9-7):
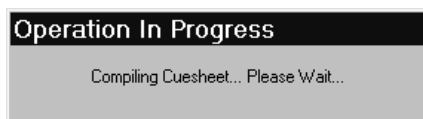
Figure 9-7: Operation in Progress – Compiling Cuesheet

The Record Disc dialog box appears with disc information the Recording Information panel (Figure 9-8):
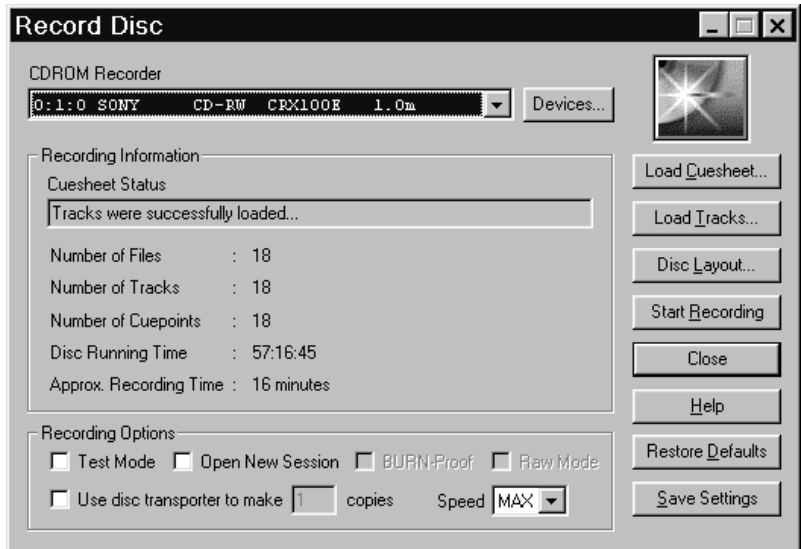
Figure 9-8: Record Disc Dialog Box with Loaded Tracks

After loading your tracks, the Record Disc dialog box displays the following information in the Recording Information panel:

- **Cuesheet Status** – Message telling you if the tracks were successfully loaded or not. If your tracks load successfully, the "Tracks were successfully loaded" message appears.

- **Number of Files** – The number of files to be recorded.

- **Number of Tracks** – The number of tracks to be recorded.

- **Number of Cuepoints** – The number of cuepoints to be recorded.

- **Total Disc Time** – The total time for the loaded tracks.

- **Approx. Recording Time** – Approximate amount of time needed to record the tracks.

Setting Recording Attributes

After loading your tracks, set your recording attributes. You can save your settings so they appear the next time you open the Record Disc dialog box.

◆ **To set recording attributes:**

1 In the Recording Options panel (Figure 9-8), complete the following:

- **Open New Session** – Leave the box unchecked. CDRWIN closes the disc when recording is complete.

- **BURN-Proof (v3.8c or later)** – Check to enable BURN-proof. BURN-proof is a feature in newer CD recorders that prevents buffer underruns. If your recorder does not support BURN-proof, CDRWIN automatically disables this option.

- **Test Mode** – Check to set your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

NOTE

Most recorders require you to eject the disc and reload it between a test recording and recording.

- **Speed** – Select a recording speed from the pull-down menu. MAX is the maximum speed for your default recorder.

- **Use Disc Transporter** – If you are using a disc transporter, either:

    - Check and specify the number of copies.

or

    - Leave unchecked if you are not using a disc transporter to make multiple discs at once.

2 Click either:

- **Restore Defaults** – Click to restore the Record Disc dialog box to its default settings.

or

- **Save Settings** – Click to save your settings in the Windows registry. The new settings appear the next time you open the Record Disc dialog box.

Recording the Disc

After loading the image files (tracks) and setting attributes, you are ready to record your disc.

♦ **To record the disc:**

1   Click Start Recording.

The Record Disc Progress dialog box appears:

```
Record Disc Progress
Disc Completion Status...
[█                                    ]
            1% Complete
          [   Cancel   ]
```
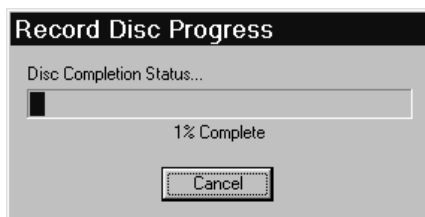
Figure 9-9: Record Disc Progress Dialog Box

CDRWIN records the loaded tracks onto your disc.

CAUTION

If you are recording to a CD-R, do not click the Cancel button while recording. Otherwise, CDRWIN closes the recording session and your disc will be ruined.

When the recording session is near completion, the Operation In Progress message box appears:

Figure 9-10: Operation In Progress Message Box

When the recording session is successfully completed, the Operation Successfully Completed! message box appears (Figure 9-3).

2 Click OK.

Your CD+G disc is complete.

Recording a CD+G Disc On-the-Fly

Creating a disc on-the-fly means to copy a source CD directly to a CD-R without first creating an image file of the source disc. You can copy a CD+G disc on-the-fly from the Backup Disc dialog box.

On-the-Fly recording and buffer underruns

On-the-Fly recording obligates your computer's memory resources, and as such, introduces complicating variables to the recording process which can result in inaccurate recording or buffer underruns.

To avoid these problems, use the following precautions before copying your disc on-the-fly:

Preparing to Record

- Do a test recording. Check the **Test Mode Only** option in the Backup Disc dialog box to test to insure that your hardware is operating properly. Checking the box sets your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

- Use the **Copy to Image and Record** option when recording on-the-fly. When you select this option, CDRWIN copies the disc to a temporary image file on your hard drive, then records the disc automatically. This method is the safest way to copy a disc that might have errors or other problems.

- Be sure the **Data Speed** and **Audio Speed** settings are at least twice as fast as your Recording **Speed** (located in the Recording Options panel). If in doubt, select the MAX option from the speed selection pull-down menus, which allows CDRWIN to select the appropriate Data, Audio, and Recording Speeds for you.

- Many recorders read data at a faster rate than the recorder can accommodate, resulting in flaws in your disc when you record. Enable **Jitter Correction** to overcome this problem.

- Enable File/Disc Caching to insure that your computer has adequate resources dedicated to recording your disc. See Enabling File and Disc Caching on page 1-11.

♦ **To create a CD+G disc on-the-fly:**

1 From the main toolbar, click the Backup Disc icon.

The Backup Disc dialog box appears (Figure 9-11):
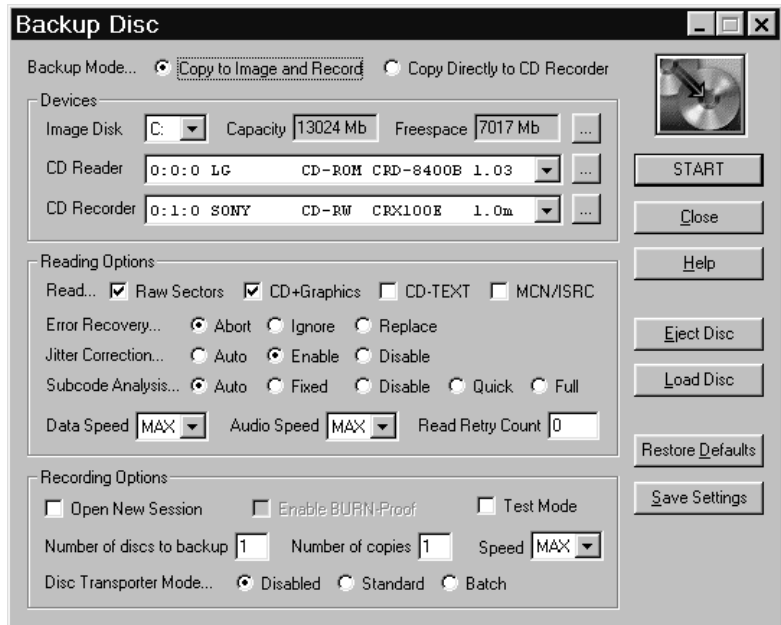
Figure 9-11: Backup Disc Dialog Box

2 In the Backup Mode area, click either:

- **Copy to Image and Record** – Copies the disc to a temporary image file on your hard drive, then records the disc automatically. This method is the safest way to copy a disc that might have errors or other problems.

or

- **Copy Directly to CD Recorder** – Select this option to copy the disc directly to the CD recorder without creating a temporary image file first.

3   In the Reading Options panel, check the CD+Graphics box. Checking this box enables CDRWIN to read and record the contents of the CD+G subcode channels.

4   In the Devices panel, complete the following:

- **Image Disk** – Select the drive where you want the temporary image file to be stored.

- **CDROM Reader** – Select your CD-ROM reader from the pull-down menu.

- **CDROM Recorder** – Select your CD-ROM recorder from the pull-down menu.

5   From the Reading Options panel, complete the following:

- **RAW Sectors** – CDRWIN automatically checks this box for you. Unchecking the box has no effect on recording a CD+G disc.

- **CD-TEXT** – Checking this box has no effect when you record a CD+G disc.

- **MCN/ISRC** – Check to copy the Media Catalog Number (MCN) and track International Standard Recording Code (ISRC) codes.

NOTE

The MCN/ISRC option slows the recording process and is not supported by all reading or recording devices.

- **Error Recovery** – Select one of the following:

    - **Abort** – Stops recording if any unreadable sector is found. This is the default setting.

    - **Ignore** – Replaces any unreadable sector with another unreadable sector and continues recording the disc. For audio image files, this option is identical to Replace.

    - **Replace** – Replaces any unreadable sector with a readable one, and continues recording the disc.

- **Jitter Correction** – To enable or disable the jitter correction algorithm, select one of the following:

    - **Automatic** – Automatically chooses the best setting for you. This is the default setting.

    - **Enabled** – Enables the jitter correction algorithm.

    - **Disabled** – Disables the jitter correction algorithm.

- **Subcode Analysis** – To specify subcode analysis, select one of the following:

    - **Auto** – Automatically selects the best analysis mode for the selected CD reader. If your reading or recording device supports the reading of subcodes, the Quick option is selected. Otherwise, the Fixed option is selected.

    - **Fixed** – Analyzes the first two seconds of all audio tracks encoded as a pre-gap without actually analyzing the subcode. Use this option if your CD reader does not support the reading of subcodes.

    - **Disable** – Disables all subcode analysis.

    - **Quick** – Analyzes only the pre-gaps (Index 0) of each track.

    - **Full** – Analyzes all subcodes on the disc. This option is useful only for discs that contain index numbers greater than one.

- **Data Speed** – Select a speed from the pull-down menu for reading of data tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Audio Speed** – Select a speed from the pull-down menu for reading of audio tracks. MAX is the maximum speed of your default CD-ROM reader.

- **Read Retry Count** – Enter the maximum number of times to retry a failed reading operation. The range is 0 to 10. 0 is the default.

6 From the Recording Options panel, complete the following:

- **Open New Session** – Check to keep disc open for recording a multisession disc.

NOTE

Most recorders require you to eject the disc and reload it between a test recording and recording.

- **Enable BURN-Proof (v3.8c or later)** – Check to enable BURN-proof. BURN-proof is a feature in newer CD recorders that prevents buffer underruns. If your recorder does not support BURN-proof, CDRWIN automatically disables this option.

- **Test Mode** – Check to set your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

CAUTION

Your CD reader's reading speed must be greater than your recorder's recording speed. Otherwise, a buffer underrun will occur during recording.

- **Speed** – Select a recording speed from the pull-down menu. MAX is the maximum speed for the currently selected recorder device.

- **Number of discs to backup** – Enter the number of source discs that you want to backup. For example, if you backup a two CD album, enter 2 as the number of discs you want to backup. CDRWIN prompts you to insert the second source disc at the appropriate time.

- **Number of copies** – Enter the number of copies you want to make of each source disc. For example, if you want to make 10 copies of a source disc, enter 10. CDRWIN prompts you to insert the next blank disc at the appropriate time.

- **Disc Transporter Mode** – If using a disc transporter, select one of the following radio buttons:

  - **Disable** – CDRWIN selects this option for you. Select this option if you do not use a disc transporter.

  - **Standard** – Select to enable your disc transporter to make multiple copies of your source disc.

  - **Batch** – Select to enable your disc transporter to make multiple copies of multiple source discs.

7 Click START.

If you chose the Copy to Image and Record option**,** the Copy Progress message box (Figure 9-2) appears.

After the temporary image file is recorded, the Record Disc Progress dialog box (Figure 9-9) appears.

NOTE

Some CD recorders prompt you to insert a blank disc between the recording image file and disc recording operations.

If you chose the Copy Directly to CD Recorder option, only the Record Disc Progress dialog box appears (Figure 9-9).

As the recording of your disc nears completion, the Operation in Progress message box appears (Figure 9-10).

When recording is complete, the Operation Successfully Completed! message box appears (Figure 9-3).

8 Click OK.

Your CD+G disc is complete.

10

SPECIAL OPERATIONS

About this chapter

This chapter describes how to perform special operations with CDRWIN.

Contents

- Making a Bootable Disc
- Creating a File Backup List
- Erasing a CD-RW
- Creating a CD Extra Disc
- Closing a Multisession Disc

Making a Bootable Disc

A bootable disc is a system disc containing files that enable your computer to start when you turn your computer on. A 3.5 inch floppy disk is usually used as a bootable disc, but you can create a bootable CDR from the ISO9660 – Advanced Options dialog box.

About the Bootable Disc Creation Process

Overview   To make a bootable disc, you must perform the following tasks:

1   You must first create a boot disk on a 3.5 inch floppy disc. If you are using Windows 95/98/NT, see "Boot Disk, Creating" in your Windows 95/98/NT online help for instructions.

2   After creating a bootable floppy disk, you must create an image file of the bootable floppy disc. CDRWIN cannot make this image file for you. Use a disk editor utility, such as Norton Utilities' DISKEDIT.EXE or Winimage.

3   After creating an image file of your boot disk, enable CDRWIN's Make Bootable Disc function in the ISO9660– Advanced Options dialog box. For detailed instructions, see Enabling the Make Bootable Disc Feature on page 10-3.

4   To complete your bootable disc, write your boot image file to your disc. For detailed instructions, see Recording the Bootable Disc on page 10-5.

Enabling the Make Bootable Disc Feature

You enable CDRWIN's Make Bootable Disc function from the ISO9660–Advanced Options dialog box.

◆ **To enable the Make Bootable Disc function:**

1 From the main toolbar, click the File Backup and Tools icon.

The File Backup and Tools dialog box appears (Figure 10-1):
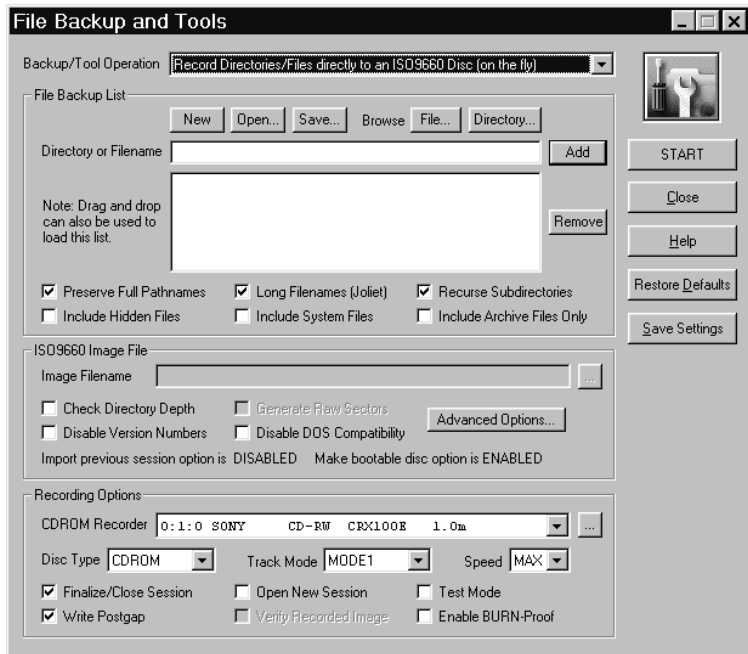
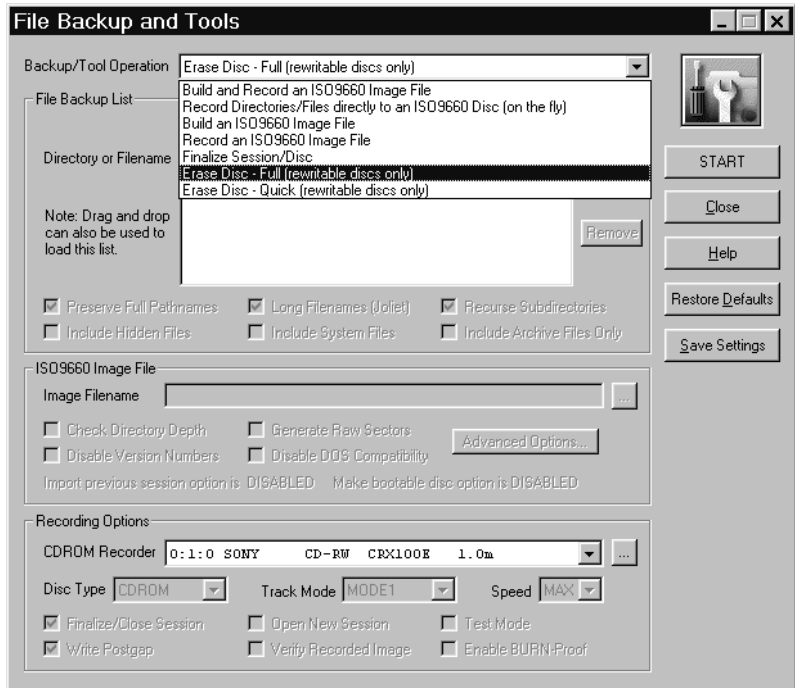**Figure 10-1: File Backup and Tools – Bootable Disc**

2 In the ISO9660 Image File panel, click Advanced Options.

The ISO9660 – Advanced Options dialog box appears.

3 Click the Bootable Disc tab.

The Bootable Disc tab appears (Figure 10-2):
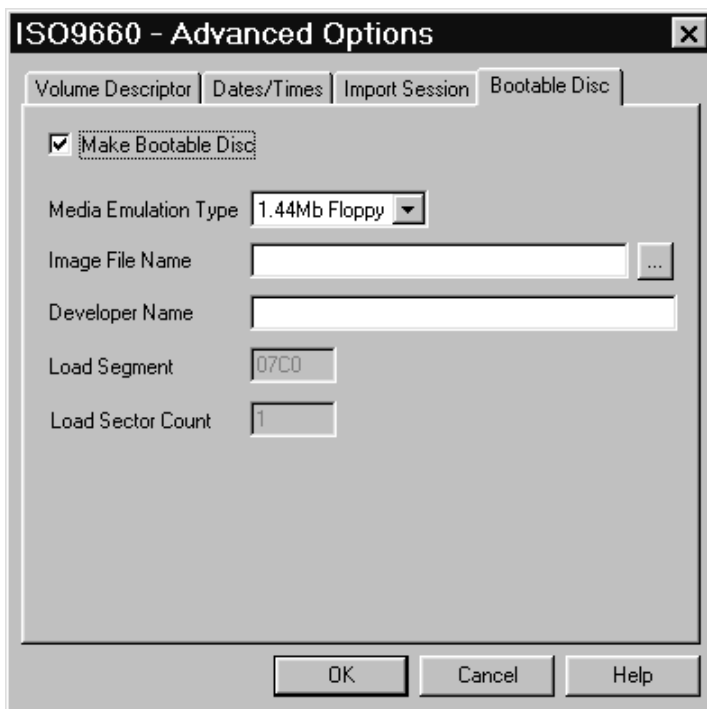
Figure 10-2: Advanced Options – Bootable Disc Tab

4 Check Make Bootable Disc.

5 In the Bootable Disc tab, complete the following:

- **Media Emulation Type** – Select an emulation mode from the pull-down menu.

NOTE

Do not use the Harddisk emulation option. It is not fully implemented at this time.

- **Image File Name** – Select the name of the boot image file you created with your disk editing utility program.

- **Developer** – Enter the name of the developer who created the bootable disc. The name can be up to 24 characters.

NOTE

CDRWIN automatically selects the Load Count and Load Sector Count options for you.

---

6 Click OK.

The "Make bootable disc option is ENABLED" message appears in the ISO9660 Image File panel of the File Backup and Tools dialog box.

Recording the Bootable Disc

After you enable CDRWIN's Make Bootable Disc function, record your bootable disc from the File Backup and Disc dialog box.

◆ **To record your bootable disc:**

1 In the Backup/Tool Operation area (Figure 10-1), select Record Directories/Files Directly to an ISO9660 Disc (on the fly) from the pull-down menu.

2 In the File Backup List panel, load your boot image file. For detailed instructions, see Choosing a File on page 5-4.

3 In the File Backup List panel (Figure 10-1), complete the following:

- **Preserve Full Pathnames** – Uncheck the box. The pathnames are shortened to the root directory of each entry.

- **Long Filenames (**Joliet**)** – CDRWIN automatically checks this box for you. Check to create long filenames (Joliet) compatible disc for Windows 95/98/NT. If you uncheck the box, CDRWIN shortens the filenames to eight characters with a three character extension.

NOTE

A Joliet disc contains both the short and long versions of all filenames, so that the disc will be compatible with older DOS and Windows 3.1 based systems.

- **Recurse Subdirectories** – CDRWIN automatically checks this box for you. Check to recursively process all directories and files below the specified directories in the list. If you uncheck this box, files in subdirectories are not recorded to your disc.

- **Include Hidden Files** – Check to include all hidden files on your ISO 9660 disc.

- **Include System Files** – Check to include all system files on your ISO 9660 disc.

- **Include Archive Files Only** – Check to include only files with the archive attribute.

4 In the ISO 9660 Image File panel (Figure 10-1), complete the following:

- **Check Directory Depth** – Leave this box unchecked.

- **Disable Version Numbers** – Leave this box unchecked.

- **Disable DOS Compatibility** – Leave this box unchecked.

5 In the Recording Options panel (Figure 10-1), complete the following:

- **CDROM Recorder** – Select your CDROM recorder from the pull-down menu.

- **Disc Type** – Select a disc type from the pull-down menu. Select CD-ROM if you are copying your computer directories to disc.

- **Track Mode** – Select mode 1 from the pull-down menu if copying directories from your computer onto disc. Mode 1 is the default setting.

- **Speed** – Select your recorder's recording speed from the pull-down menu. Select MAX if you want CDRWIN to automatically detect and use your recorder's maximum recording speed.

- **Finalize Session/Disc** – CDRWIN automatically checks this box for you. Check to finalize your disc after writing the disc. Your disc will not be readable on a regular CDROM drive until your disc is finalized.

- **Write Postgap** – CDRWIN automatically checks this box for you. Check to write a 150 block post-gap at the end of the track. This option is recommended when recording an ISO 9660 image file.

- **Open New Session** – Leave this box unchecked.

- **Test Mode Only** – Leave this box unchecked.

6 Click START.

The Directory/File Statistics dialog box appears (Figure 10-3):
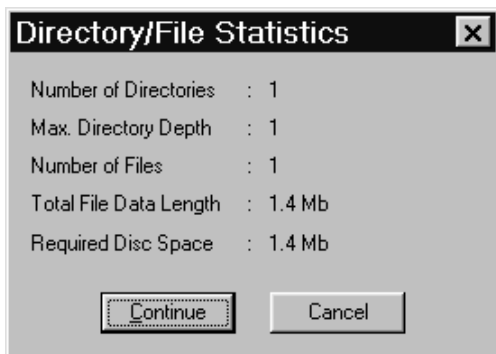
Figure 10-3: Directory/File Statistics Dialog Box

7 Read the statistics. Click either:

- **Continue** – Starts recording image file onto your hard drive.

or

- **Cancel** – Returns you the File Backup and Tools dialog box.

If you click Continue, the Record Disc Progress dialog box appears (Figure 10-4), which displays CDRWIN's progress as it copies the directories to your disc:
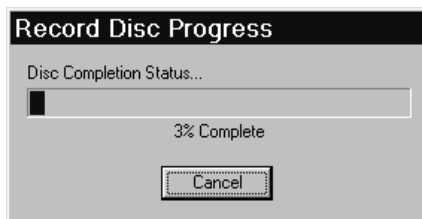
Figure 10-4: Record Disc Progress Dialog Box

CAUTION

If recording to CD-R, do not click Cancel while recording. Otherwise, your disc will be ruined.

As the recording process nears completion, the Operation in Progress message box (Figure 10-5) appears as CDRWIN writes the lead-out blocks onto your disc:

Figure 10-5: Operation in Progress Message Box

The Operation Successfully Completed! message box (Figure 10-6) appears when recording is complete.
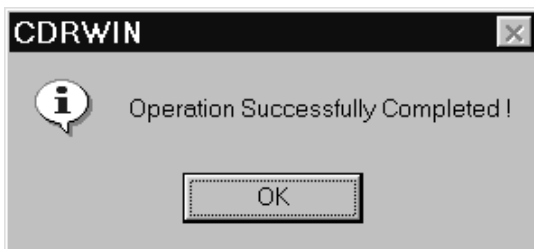
Figure 10-6: Operation Successfully Completed Message Box

8   Click OK.

Your bootable disc is complete.

Creating a File Backup List

From the File Backup and Tools dialog box you can create a File Backup List. A File Backup List is a list of files and directories you can copy to your disc. This list allows you to save settings for files and directories that you frequently backup to CD-R or CD-RW.

♦ **To create an file backup list:**

1 Choose the files and directories you want to copy to disc. See Choosing a File on page 5-4 or Choosing a Directory on page 5-6.

2 In the File Backup List panel (Figure 5-3), click New.

The Save Project dialog box appears (Figure 10-7):
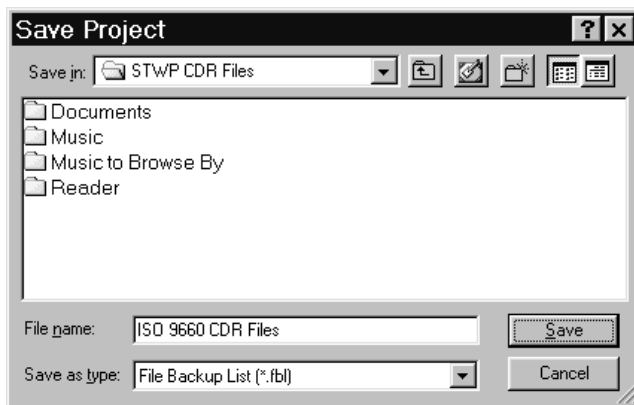
Figure 10-7: Save Project Dialog Box

3 Enter the name of the file and select the directory where you want the file to be saved.

4 Click Save.

Loading a file backup list

CDRWIN creates a File Backup List (.fbl) file. Click Open in the File Backup List panel (Figure 5-7) to load your File Backup List.

Erasing a CD-RW

You can remove data from a CD-RW disc using the Erase Disc option in the File Backup and Tools dialog box.

You can choose one of two disc erasing options from the File and Backup Tools dialog box:

- **Erase Disc – Full (rewritable discs only)** – This option removes data from your CD-RW, but erasing time takes longer.

- **Erase Disc – Quick (rewritable discs only)** – This option removes data from your CD-RW more quickly, but not as thoroughly as the Full option.

♦ **To erase a CD-RW disc:**

1   Insert the CD-RW you want to erase into your CD-ROM recorder.

2   From the main toolbar, click the File Backup and Tools icon.

The File Backup and Tools dialog box appears (Figure 10-8):

Figure 10-8: File Backup and Tools – Erasing Disc

3 In the File Backup and Tools dialog box, complete the following:

- **Backup/Tool Operation** – From the pull-down menu, select either:

    - **Erase Disc – Full (rewritable discs only)** – Removes data from your CD-RW, but erasing time is longer.

or

    - **Erase Disc – Quick (rewritable discs only)** – Removes data from your CD-RW more quickly, but not as thoroughly as the Full option.

- **CDROM Recorder** – Select your CD-ROM recorder from the pull-down menu.

4 Click Start.

The Erase Warning dialog box appears (Figure 10-9):
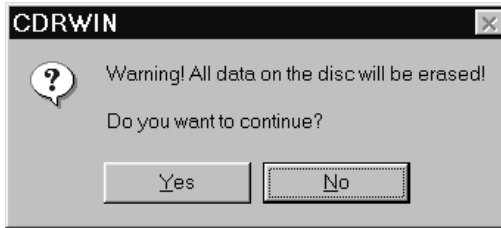
Figure 10-9: Erase Warning Dialog Box

5 Click Yes to erase your CD-RW.

The Operation in Progress message box appears (Figure 10-10):

Figure 10-10: Operation in Progress Message Box

CDRWIN removes all data from your CD-RW.

Creating a CD Extra Disc

A CD Extra disc contains multiple audio tracks and one data track.

Recording
Process

Creating a CD Extra disc is a two step process. You first record the audio tracks in a single operation using disc-at-once recording, but must leave the disc open for recording the data track. In the second recording session, you record the data track onto your disc from an ISO 9660 image file and close the disc.

Recording CD Extra Audio Tracks

You record the CD Extra disc's audio tracks using disc-at-once recording from the Record Disc dialog box. You can use a cuesheet or load tracks method of recording the audio tracks.

NOTE

You must check the **Open New Session** *box in the Recording Options panel to leave the disc open so you can record the data track in the second session.*

♦ **To record audio tracks:**

1 From the main toolbar, click Record Disc icon.

The Record Disc dialog box appears (Figure 10-11):
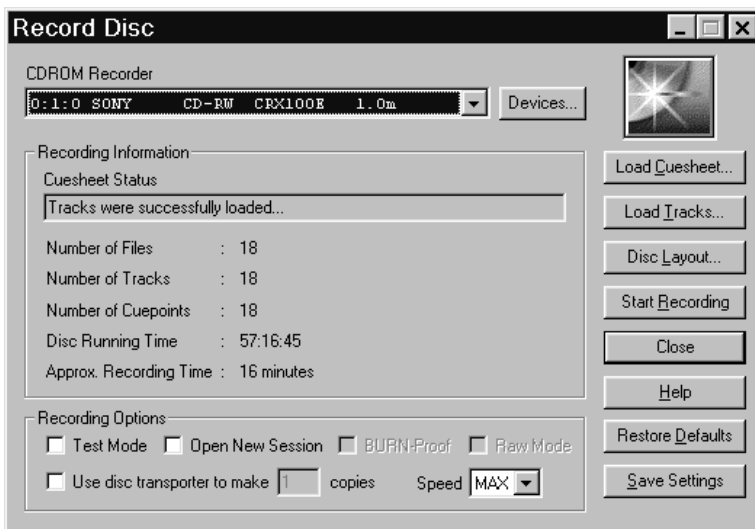
Figure 10-11: Record Disc – CD Extra Recording

2 In the Recording Options panel, check Open New Session. Checking this box opens a new session after finalizing the current recording session. Checking this box leaves your disc open so you can record the data track in the second recording session.

3 Record the audio tracks to your disc, using either:

• Cuesheet. See Recording a Disc Using a Cuesheet on page 3-2.

or

• Individual Image Files. See Creating a Disc from Image Files on page 3-12.

4 Close the Record Disc dialog box when recording is complete.

Recording the CD Extra Data Track

After recording your audio tracks (see Recording CD Extra Audio Tracks on page 10-15), you must record the data track and close your disc to complete your CD Extra disc.

♦ **To record the CD Extra data track:**

1 On the main toolbar, click File Backup and Tools icon.

The File Backup and Tools dialog box appears (Figure 10-12):
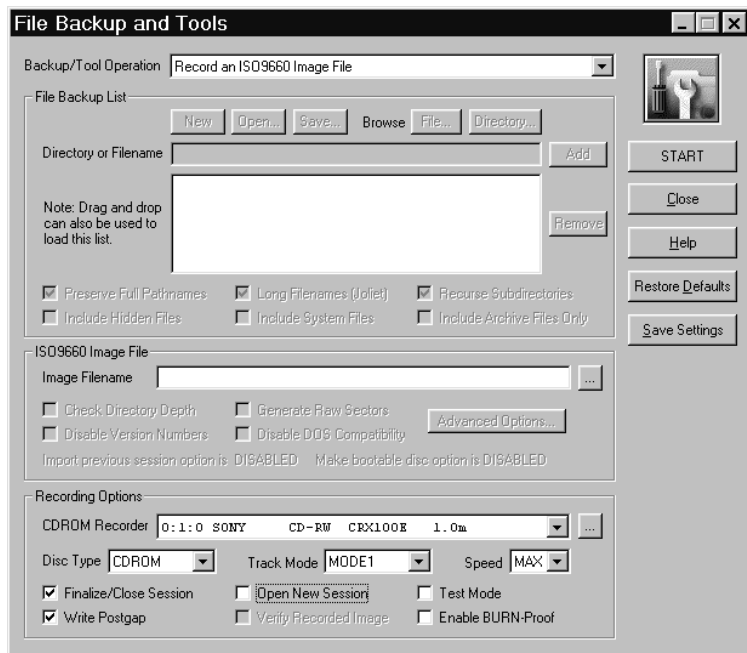
Figure 10-12: File Backup and Tools Dialog Box

2 From the Backup/Tool Operation pull-down menu, select Record an ISO 9660 Image File.

3 In the ISO9660 Image File field, click the ... button located next to the Image Filename field.

The Open ISO9660 Image File dialog box appears (Figure 10-13):
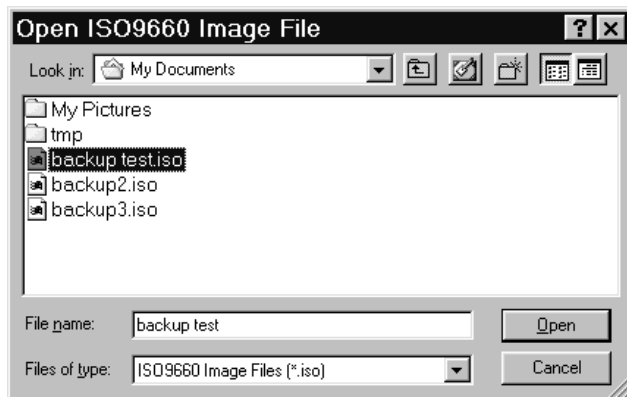
Figure 10-13: Open ISO9660 Image File Dialog Box

4   Select the ISO9660 image file you want to record.

5   Click Open.

The track appears in the Image Filename field (Figure 10-12).

6   In the Recording Options panel, complete the following:

- **Track Mode** – Select Mode 1 from the pull-down menu.

- **Disc Type** – Select CDROM from the pull-down menu.

- **Speed** – Select MAX from the pull-down menu.

- **Write Postgap** – Check to write a 150 block post-gap at the end of the track. This option is recommended when recording any ISO 9660 image file.

- **Test Mode** – Check to set your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

- **Finalize Session/Disc** – CDRWIN automatically checks this box for you.   This box must be checked to close the disc after writing the data track.

- **Open New Session** – Leave this box unchecked. This box must be unchecked to close the disc after recording the data track.

- **Enable BURN-Proof (v3.8c or later)** – Check to enable BURN-proof. BURN-proof is a feature in newer CD recorders that prevents buffer underruns. CDRWIN ignores this option if your recorder does not support BURN-Proof.

7 Click START.

The ISO 9660 image file is added to the disc. After the image file is recorded, the disc is closed and your CD Extra disc is complete.

Closing a Multisession Disc

You can close, or finalize, a multisession disc using the Finalize
Session/Disc option in the File Backup and Tools dialog box.

In the Recording Options panel, you must select the disc type you
want to finalize from the Disc Type pull-down menu. You must
finalize your disc based on the mode of the first track recorded on
the disc. For example, if the first track on the disc is in mode 1
format (such as an audio track), select CDROM. If the first track
was written in mode 2 format, select CD-ROM XA.

You will not be able to add more sessions to your disc after closing
it.

♦ **To close a multisession disc:**

1 From the main toolbar, click the File Backup and Tools icon.

The File Backup and Tools dialog box appears (Figure 10-14):
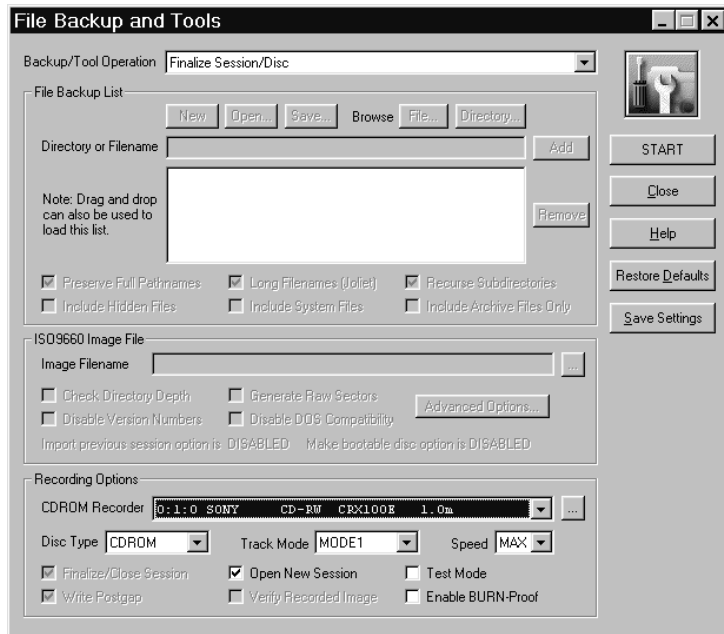
Figure 10-14: File Backup and Tools Dialog Box

2 From the Backup/Tool Operation pull-down menu, select Finalize Session/Disc.

3 In the Recording Options panel, complete the following:

- **CDROM Recorder** – Select your CD-ROM recorder from the pull-down menu.

- **Disc Type** – Select the type of disc you are finalizing from the pull-down menu.

- **Track Mode** – Select the track mode from the pull-down menu.

- **Speed** – Select a recording speed from the pull-down menu.

- **Test Mode** – Check to set your recorder in write emulation mode. This option can be used to test your hardware for proper operation without wasting a disc.

- **Open New Session** – Leave this box unchecked.

- **Enable BURN-Proof (v3.8c or later)** – Check to enable BURN-proof. BURN-proof is a feature in newer CD recorders that prevents buffer underruns. CDRWIN ignores this option if your recorder does not support BURN-Proof.

4 Click START.

Your disc is finalized.

GLOSSARY

.aif   File extension for Audio Interchange File Format (AIFF). AIFF is the standard audio format for Macintosh computers.

.bin   File extension for Intel (least significant byte first) binary format. This is the default file format when you create an image file from the Extract Disc Image/Cuesheet Window.

.cue   File extension for a CDRWIN generated cuesheet.

.cdt   File extension for a CD-TEXT file created with CDRWIN's CD-Text Editor.

.fbl   File extension for a File Backup List.

.iso   File extension for files saved in ISO 9660 format.

.mot   File extension for Motorola (most significant byte last) binary format.

.mp3   File extension for Moving Pictures Expert Group, Audio Layer 3 (MP3).

.wav   File extension for waveform audio format. Waveform is the standard audio format for PCs and is the default file format when you create an image file with the Select Tracks option in the Extract Tracks Window.

ASPI   Advanced SCSI Programming Interface.

autoloader   See disc transporter.

block   See sector.

buffer	An amount of memory that temporarily stores data to help compensate for differences in the transfer rate from one device to another.
buffer underrun	A disc writing error that occurs when your computer cannot maintain a steady stream of data to the CD recorder. This is the most common problem in CD recording. For a CD recorder to successfully create a disc, it must receive an uninterrupted flow of data transferred at a speed equal to or greater than the recording speed of the CD recorder.
	To insure a constant flow of data during recording, CDRWIN creates a holding area for data, known as a buffer, in your computer's system memory. During recording, the data is loaded into the buffer, where it waits until the data is moved into the CD recorder. However, if the CD recorder empties the buffer faster than it can be refilled, the buffer empties, resulting in a interruption in data flow to the CD recorder, or a buffer underrun. The CD recorder halts writing and your recordable CD is irretrievably damaged. CDRWIN uses cyclic buffering to optimize filling of the buffer during recording.
CD Extra	An Enhanced CD that includes two sessions: the first contains up to 98 CD-DA audio tracks, and the second session contains a CD-ROM XA format data track, sometimes called CD-Plus.
CD+G	CD+Graphics. Audio, text, and graphics used in the same application. The audio tracks are contained in the main data area of the CD. The text and graphics are contained in the disc's R- through W- subcodes. This type of disc is usually used for Karaoke machines.
CD-DA	Compact Disc–Digital Audio. A CD-DA disc contains tracks with audio sectors only. CD-DA tracks are written in raw sectors (2352 bytes with no ECC or EDC) or mode 1.
CD-I	Compact Disc – Interactive. A compact disc format designed to allow interactive multimedia applications to be played through a computer/disc player attached to a television. This format is good for real-time animation, video, and sound.

CD-R Compact Disc – Recordable. A type of media that allows you to record information using a CD Recorder.

CD-ROM Compact Disc – Read Only Memory. A standard for compact disc used as a digital memory medium for personal computers.

CD-ROM XA Compact Disc-Read Only Memory Extended Architecture. An enhanced version of CD-I, CD-ROM XA is a format designed to add audio and video capabilities so that the CD-ROM can more easily be used for multimedia applications. Data tracks are recorded in mode 2. CD-ROM XA is also the physical format for Photo CD discs.

CD-RW Compact Disc - ReWritable.   CD-RW is a reusable media and recording system that allows you to erase previously recorded information, then record new information onto the same physical location on the disc.

CD-Text A disc with text embedded in the disc's R- through W- subcodes. The text contained in the subcodes for each track displays in your CD player's main window. On an audio disc, the text displayed is usually the artist's name, album title, and title for each track.

close disc To finalize a recordable disc so that no further data can be written to it. This is done when the last session's lead-in is written – the next writable address is not recorded in that lead-in, so the CD recorder in subsequent attempts to write has no way of knowing where to begin writing. It is not necessary to close a disc in order to read it in a normal CD-ROM drive.

close session To finalize a recording session so that information about its contents is written into the disc's table of contents (TOC), and a lead-in and lead-out are written to prepare the disc for a subsequent session.

cuesheet A list of tracks to be recorded one after the other in the same session without user intervention.   The cuesheet is an important part of CDRWIN's disc-at-once capability, and is effective when making multiple copies of a CD. Cuesheets are usually used to create multi-track audio or CD Extra discs.

cyclic buffering	A method of filling the CD Recorder's buffer to optimize computer resources during recording. Cyclic buffering means a certain percentage of the CD Recorder's buffer is emptied before the computer begins to refill the buffer. For example, if CDRWIN's full-to-empty ratio is set to 85% full, 15% empty, your computer fills the Recorder's buffer to 100%, waits for the recorder to read 15% of the data, and then fills the buffer again to 100%. This cycle repeats until there is no more data to buffer. Cyclic buffering reduces your computer's memory usage during recording, and thus reduces the chance of a buffer underrun.
DAO	See disc-at-once.
data area	In the ISO 9660 specification, the space on a CD-ROM where user data is written. It begins at the address 00:02:16.
data formats	The types of data that can be recorded on CD. They all share the same physical block size (2352 bytes). However, they have different user block sizes (bytes available to the user for recording) depending on the level of error correction adopted: the lower the read accuracy required, the smaller the error correction code required, the bigger the user data block is. The following is a list of CD compatible data formats:

Audio

No extra error correction is required to read and play back audio. The user blocks size matches the physical block size and is 2352 bytes.

Mode 1/Form 1

Mode 1 and Mode 2/Form 1 formats are used to store digital data; therefore, the highest read accuracy is required. The user block size is 2048 bytes (2KB). The remaining bytes are used to store sync patterns, block headers, and error correction and detection codes (ECC/EDC).

Mode 2/Form 2

This format is used almost exclusively to store digital video data, thus requiring only moderate read accuracy. The user blocks size is 2324 bytes. The remaining bytes are used to store sync patterns, block headers and EDC.

disc-at-once	A method of writing one or more tracks in a single operation. Disc-at-once is available only in newer CD recorders and recent firmware upgrades.
disc transporter	A CD recorder capable of holding multiple CD-Rs or CD-RWs for recording. After the first disc is recorded, the disc transporter automatically loads the next blank disc into position for recording, sometimes called an *autoloader*.
ECC	Error Correction Code. A system of scrambling data and recording redundant data onto disc as it is premastered. On playback, this redundant information helps to detect and correct errors that can arise during data transmission.
EDC	Error Detection Code. 32-bits in each sector that are used to detect errors in the sector data.
file backup list	A list of data files and directories to copy to disc. This list allows you to save settings for files and directories that you frequently backup to CD-R or CD-RW.
IDE	Integrated Drive Electronics.
image file	A file containing an exact representation of the data that will be placed on your CD-R. Image files are files copied from the source CD, copied onto your computer's hard drive, then transferred to the CD Recorder.
import previous session	A CDRWIN function that enables you to use multisession recording, allowing you to archive your computer files on a disc incrementally. Importing previous sessions allows you to record a disc, use it, then update and add files to the disc in subsequent recording sessions.

When you incrementally record a disc, no information from the previous session is removed. All sessions remain on your disc and continue to take up memory, but only the information in the latest session is accessible. Each session is separated by 14 to 30 megabytes of empty space. You can add sessions to your disc until your disc's capacity is full. |

ISO 9660   An internationally accepted standard specifying the logical format for files and directories on a CD-ROM. The standard allows different computers with different operating systems to access the same data format.

ISRC   International Standard Recording Code. Some recorders allow the ISRC to be recorded for each audio track on a disc. The code is made up of:

- Country Code (2 ASCII characters)
- Owner Code (3 ASCII characters)
- Year of Recording (2 digits)
- Serial Number (5 digits)

jitter   A type of recording error caused by synchronization errors on the CD-R. Jitter results in audible clicks, or chirps, when you play the recorded CD-R. CDRWIN allows you to control jitter.

Joliet   An extension of the ISO 9660 standard developed by Microsoft to allow long filenames when recording CDs. Joliet allows you to use filenames up to 64 characters in length, including spaces. Joliet also records the associated eight character DOS name for each file so that DOS and early Windows systems can read the names. The number of characters in the combination of Joliet file name plus its file path cannot exceed 128.

LBA   Logical Block Address. Each sector on a disc has its own LBA, expressed as a six digit number that is the sector's address, or location, on the disc. LBAs are numbered sequentially from beginning to end of the disc, starting with the beginning of track number 1 (LBA 000000) and ending with the last sector on the disc.

lead-in   An area at the beginning of each session on a disc left blank for the session's table of contents (TOC) (track numbers and start-and-stop points), and other miscellaneous information about the disc and recorded tracks. CDRWIN writes the lead-in when a session is closed, and takes up 4500 sectors on disc. The lead-in also indicates whether the disc is a multisession disc, and if the disc is not closed, where the next recordable address is located on the disc.

lead-out	An area at the end of a session indicating that the end of the data for that session. No actual data is written in the lead-out. The first lead-out on a disc is 6750 sectors (1.5 minutes, about 13 megabytes) long. Any subsequent lead-outs are 2250 sectors (0.5 minute, about 4 megabytes).
mode 1	See data formats.
mode 2	See data formats.
MCN	Media Catalog Number.
MP3	Moving Pictures Expert Group, Audio Layer 3. A type of audio compression that provides high quality sound in reduced file sizes when compared to uncompressed audio formats, such as waveform. CDRWIN does not create image files in MP3 format, but you can record MP3 files to a disc from the Record Disc dialog box.
multisession	A disc to which data is added incrementally in more than one recording session.
on-the-fly	A method of recording the contents of an existing CD onto CD-R or CD-RW without writing a permanent image file onto your hard drive. CDRWIN's Backup Disc function provides two methods of writing discs on-the-fly:

- Copy to Image and Record – Copies the CD to a temporary image file on your hard drive, then records the temporary image file to disc. The image file is deleted from your hard drive automatically after recording is complete. This method is the safest way to copy a disc because copying the temporary image file allows CDRWIN to diagnose any potential errors in the source CD.

- Copy Directly to CD Recorder – Copies the disc directly to the CD recorder without first creating an image file.

post-gap   A space dividing tracks, recorded at the end of the track's data area. The post-gap is 150 sectors (2 seconds) long and is required only where successive tracks are of different types.

pre-gap   A space dividing tracks, recorded before the track data area. The length of the pre-gap varies with the CD recorder and the types of tracks. Where successive tracks are both of data, one track is separated from another by a track pre-gap of 150 sectors (2 seconds). Where successive tracks are of different types (audio or data), the pre-gap is usually of 225 sectors (or three seconds).

raw sectors   mode 1 sectors with 2352 bytes. Raw sectors contain no EDC or ECC bits.

run-in blocks   Part of the lead-in marking the beginning of a new session. When the recording laser is turned off after writing, the CD Recorder writes two run-out blocks.

run-out blocks   Part of the lead-in marking the end of a session.   When the recorder's laser is turned back on again, it writes five run-in blocks.

SCSI   Small Computer System Interface (pronounced "scuzzy").

sector   A sector is the smallest recordable unit on a CD. A disc can contain

[(75 sectors per second) x (60 seconds per minute) x (number of minutes on disc)]

sectors. The amount of data contained in a sector depends on what physical format and mode it is recorded in. Sometimes called blocks.

session   An area on the disc consisting of a lead-in area, a data area, and a lead-out area; a recorded segment of a compact disc which may contain one or more tracks of any type (data or audio). In data recording, there is usually only one track per session, but there may be multiple sessions on a disc. In audio recording, all audio tracks should be in a single session. A lead-in and lead-out are recorded for every session on a disc.

subcode   A separate low speed data channel running alongside audio data, which can be read by a player at the same time as the audio. Audio CDs have 8 subcode channels, designated P through Q, of non-audio data interleaved with the audio data.

The P- and Q-channels contain timing information. The R-through W-channels are empty in audio and data discs. On Cd-TEXT discs, the R- through W- channels contain text information and the disc and individual tracks. On CD+G (Karaoke) discs, the R- through W- channels contain text and graphics information.

The following table summarizes the function of the subcodes on each type of disc.

Subcode Channel	Audio Disc Function	CD-Text Disc Function	CD+G Disc Function
P	Contains pre-gap and post-gap information about gaps between tracks.	Contains pre-gap and post-gap information about gaps between tracks.	Contains pre-gap and post-gap information about gaps between tracks.
Q	Contains the table of contents (TOC) time code information for each sector. The timing information appears in your CD player's console window as the track is playing.	Contains the table of contents (TOC) time code information for each sector. The timing information appears in your CD player's console window as the track is playing.	Contains the table of contents (TOC) time code information for each sector. The timing information appears in your CD player's console window as the track is playing.
R thru W	Unused	Contains text information for the corresponding track. If your CD player supports CD-Text, the text is displayed on your CD player's console window.	Contains graphics and text for the corresponding track. The text is displayed on a compatible monitor when the track is played.

table of contents (TOC) A part of the lead-in track that shows the number of tracks, their starting locations, and the total length of the data area of the disc. The disc's time code information is contained in the Q-channel subcode. When you close a session, the TOC is written in the lead-in track. With an unfinished (unclosed) recording of the disc, however, you cannot write the TOC to the disc.

track An area of data on the disc that is preceded by a pre-gap and followed by a post-gap. Every time you write to disc, you create at least one track. Any session may contain one or more tracks, and the tracks within a session can be of the same or different types.

track-at-once A method of recording a disc one track at a time. In between every two tracks (unless you are recording only a single track), the CD recorder's laser stops while the hard drive is prepared for the contents of the next track.

Each time the laser stops recording, it writes run-out blocks. When starting again, it writes run-in blocks. CD-ROM readers ignore these blocks, but in some audio players you might hear a click between tracks. This is why disc-at-once recording is preferable for audio discs.

transporter See disc transporter

volume descriptor A type of descriptive text you can add to your disc. The volume descriptor is stored in Block 16 of your disc. The volume label is displayed by most device and directory applications in DOS and Windows. The other information in the volume descriptor is for documentation purposes only.

waveform See .wav

APPENDIX A – CUESHEET COMMANDS

Overview

A cuesheet is a configuration file for your disc, where you define all of the files to be recorded and the starting time of each track/index. The cuesheet gives you complete control over the layout of your disc. You can control the spacing between tracks, define subindexes, pre-gaps, post-gaps, media catalog numbers (MCN), and ISRCs. You can also add a CD-TEXT file (.cdt) to your cuesheet to specify CD-Text for the disc and individual tracks.

You can create a cuesheet from the Load Tracks dialog box.

File format

Cuesheet files are standard text (ASCII) files. You can use any text editor, such as Notepad or Wordpad, to edit your cuesheet. Do not save your cuesheet in any non-text format. The recommended file extensions for your cuesheet are .cue or .txt.

Formatting syntax

Indentation and spacing between command lines does not interfere with CDRWIN compiling a cuesheet. Cuesheet commands are not case sensitive. However, when editing a cuesheet, it is good programming practice to use indentation and spacing to keep your cuesheet orderly.

Recording with
a cuesheet

After creating and editing your cuesheet, you can record your disc from the Record Disc dialog box. See "Recording a Disc Using a Cuesheet" on page 3-2.

This appendix describes the following cuesheet commands:

- CATALOG
- CDTEXTFILE
- FILE
- FLAGS
- INDEX
- ISRC
- PERFORMER
- POSTGAP
- PREGAP
- REM
- SONGWRITER
- TITLE
- TRACK

CATALOG

You can use the CATALOG command to specify your disc's Media Catalog Number (MCN). The MCN is encoded according to UPC/EAN rules. You typically use this command only when mastering a CD-ROM for commercial production.

Syntax

```
CATALOG M-C-N
```

Argument

M-C-N   Media Catalog Number. Must be 13 characters.

Examples

```
CATALOG 1234567890123
CATALOG 8340218374610
```

Restrictions

This command can appear only once in the cuesheet file. You can place this command anywhere in the cuesheet file, but it is usually placed in the first line of the cuesheet.

CDTEXTFILE

You can use the CDTEXTFILE command to specify the name of the file that contains the encoded CD-Text information for the disc. This command is only used with files that were either created with CDRWIN's graphical CD-Text editor, or generated automatically by the software when copying a CD-Text enhanced disc.

To create a CD-Text file with CDRWIN's graphical CD-Text editor, see Creating a CD-TEXT File on page 8-2.

Syntax

```
CDTEXTFILE filename
```

Argument

filename   The CD-Text file's filename (can include device/directory). If the filename contains any spaces, then it must be enclosed in quotation marks.

Examples

```
CDTEXTFILE C:\TEST\DISC.CDT
CDTEXTFILE "C:\LONG FILENAME.CDT"
```

Restrictions

If your recorder does not support CD-Text, CDRWIN ignores this command.

FILE

Use the FILE command to specify the data or audio file to be written to your recorder.

Syntax

```
FILE filename filetype
```

Arguments

filename	The audio or data file's filename (can include device and directory). If the filename contains any spaces, the filename must be enclosed in quotation marks.
filetype	The audio or data file's filetype. The following audio filetypes are allowed:

BINARY	Intel binary file (least significant byte first). Use for data files.
MOTOROLA	Motorola binary file (most significant byte first). Use for data files.
AIFF	Audio AIFF file (44.1KHz 16-bit stereo)
WAVE	Audio WAVE file (44.1KHz 16-bit stereo)
MP3	Audio MP3 file (44.1KHz 16-bit stereo)

Examples

```
FILE C:\DATA\TRACK1.ISO BINARY
FILE C:\MUSIC\TRACK2.WAV WAVE
FILE "C:\MUSIC\LONG FILENAME.MP3" MP3
```

Restrictions

- FILE commands must appear before any other command, except CATALOG and CDTEXTFILE.

- For AUDIO files, if the length of the data within the file is not an exact multiple of the CDROM sector size (2352 bytes), CDRWIN pads the last sector with zeros when it is recorded to the blank disc.

FLAGS

You can use the FLAGS command to set special subcode flags within a track. You can specify one or more flags for a track.

Syntax

```
FLAGS flags
```

Arguments

flags	Specifies one or more track flags. The following flags are allowed:	
	DCP	Digital copy permitted
	4CH	Four channel audio
	PRE	Pre-emphasis enabled (audio tracks only)

SCMS	Serial Copy Management System (not supported by all recorders)

Example

```
FLAGS DCP
FLAGS 4CH PRE
```

Restrictions

- The FLAGS command must appear after a TRACK command, but before any INDEX commands. Only one FLAGS command is allowed per track.

- There is a fifth subcode flag called DATA, which is set for data files. This flag is set automatically based on the track's filetype.

INDEX

You can use the INDEX command to specify indexes (or subindexes) within a track.

Syntax

INDEX *number mm:ss:ff*

Arguments

number	Index number. The range is 0 to 99.
mm:ss:ff	Starting time of index in minutes (mm), seconds (ss), and frames (ff). There are 75 frames per second. All times are relative to the beginning of the current file.

Example

INDEX 01 00:00:00
INDEX 05 02:34:50

Restrictions

- The first index must be 0 or 1 with all other indexes being sequential to the first one.

- The first index of a track must start at 00:00:00.

- INDEX 0 specifies the starting time of the track pregap.

- INDEX 1 specifies the starting time of the track data. Index 1 is the only index that is stored in the disc's table-of-contents.

- INDEX numbers greater than 1 specify a subindex within a track.

ISRC

You can use the IRSC command to specify a track's International Standard Recording Code (ISRC). You typically use this command only when mastering a CD-ROM for commercial production.

Syntax

```
ISRC code
```

Argument

code   The ISRC code. Must be 12 characters in length. The first five characters are alphanumeric, the last seven are numeric only.

Example

```
ISRC ABCDE1234567
```

Restriction

The ISRC command must be specified after a TRACK command, but before any INDEX commands.

PERFORMER

You can use the PERFORMER command to specify the name of a performer for a CD-Text enhanced disc.

Syntax

```
PERFORMER performer-string
```

Argument

performer-string   Name of the performer. The range is 1 to 80 characters. If the string contains any spaces, it must be enclosed in quotation marks.

Examples

```
PERFORMER "The Beatles"
```

Restrictions

- If the PERFORMER command appears before any TRACK commands, the performer-string is encoded as the performer of the entire disc.

- If the command appears after a TRACK command, the performer string is encoded as the performer of the current track.

- If your recorder does not support CD-Text, CDRWIN ignores the PERFORMER command.

POSTGAP

You can use the POSTGAP command to specify the length of a track post-gap. CDRWIN internally generates the post-gap data. No data is consumed from the current data file.

Syntax

```
POSTGAP <mm:ss:ff>
```

Argument

mm:ss:ff   Specifies the postgap length in minutes (mm), seconds (ss), and frames (ff). There are 75 frames per second.

Example

```
POSTGAP 00:02:00
```

Restrictions

- The POSTGAP command must appear after all INDEX commands for the current track.

- Only one POSTGAP command is allowed per track.

PREGAP

You can use the PREGAP command to specify the length of a track pre-gap. CDRWIN internally generates the pre-gap data. No data is consumed from the current data file.

Syntax

```
PREGAP mm:ss:ff
```

Argument

mm:ss:ff   Specifies the pre-gap length in minutes (mm), seconds (ss), and frames (ff). There are 75 frames per second.

Examples

```
PREGAP 00:02:00
```

Restrictions

- The PREGAP command must appear after a TRACK command, but before any INDEX commands.

- Only one PREGAP command is allowed per track.

REM

You can use the REM command to add comments in your CUE SHEET file. CDRWIN does not compile lines in your cuesheet that start with the REM command. Successive lines of comments must begin with the REM command.

Syntax

```
REM comment
```

Argument

comment   You comments. There is no restriction on how long your comments can be, but successive lines of comments must begin with the REM command.

Example
```
REM This is a
REM long comment
```

SONGWRITER

You can use the SONGWRITER command to specify the name of a songwriter for a CD-Text enhanced disc.

Syntax

```
SONGWRITER songwriter-string
```

Argument

songwriter-string   Name of the songwriter. The range is 1 to 80 characters. If the string contains any spaces, it must be enclosed in quotation marks.

Examples

```
SONGWRITER "Paul McCartney"
```

Restrictions

- If the SONGWRITER command appears before any TRACK commands, the songwriter-string is encoded as the songwriter of the entire disc.

- If the command appears after a TRACK command, the songwriter-string is encoded as the songwriter of the current track.

- If your recorder does not support CD-TEXT, CDRWIN ignores the SONGWRITER command.

TITLE

You can use the TITLE command to specify a title for a CD-Text enhanced disc.

Syntax

```
TITLE title-string
```

Argument

`title-string`	Title of the disc or track. The range is 1 to 80 characters. If the string contains any spaces, it must be enclosed in quotation marks.

Examples

```
TITLE "The Beatles - Abbey Road"
TITLE "Here Comes the Sun"
```

Restrictions

- If the TITLE command appears before any TRACK commands, the title-string is encoded as the title of the entire disc.

- If the command appears after a TRACK command, the title-string is encoded as the title of the current track.

- If your recorder does not support CD-Text, the TITLE command is ignored.

TRACK

Use the TRACK command to start a new TRACK.

Syntax

```
TRACK number datatype
```

Arguments

number	Track number. The range is 1 to 99.
datatype	Track datatype. The following datatypes are allowed:

AUDIO	Audio/Music (2352)
CDG	Karaoke CD+G (2448)
MODE1/2048	CD-ROM Mode1 Data (cooked)
MODE1/2352	CD-ROM Mode1 Data (raw)
MODE2/2336	CD-ROM XA Mode2 Data
MODE2/2352	CD-ROM XA Mode2 Data
CDI/2336	CD-I Mode2 Data
CDI/2352	CD-I Mode2 Data

The following table describes supported datatypes and sector sizes by recorder model

	AUDIO 2352	AUDIO 2448	MODE1 2048	MODE1 2352	MODE2 2336	MODE2 2352
JVC	Yes	No	Yes	No	Yes	No
OLYMPUS	Yes	No	Yes	Yes	Yes	Yes
PANASONIC	Yes	Yes	Yes	Yes	Yes	Yes
PHILIPS	Yes	No	No	Yes	No	Yes
PINNACLE	Yes	No	Yes	No	Yes	No
RICOH	Yes	No	No	Yes	No	Yes
SONY	Yes	No	Yes	Yes	Yes	Yes
YAMAHA	Yes	Yes	Yes	Yes	Yes	Yes

Examples

```
TRACK 1 MODE1/2048
TRACK 20 AUDIO
```

Restrictions

- All track numbers must be between 1 and 99 inclusive.

- The first track number can be greater than one, but all track numbers after the first must be sequential.

- You must specify at least one track per file.

INDEX