GEAR

Multi-OS Desktop Version

Printed in the Netherlands.
May, 1996

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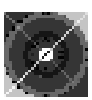

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Welcome to Elektroson GEAR

This chapter welcomes you to Elektroson's GEAR ™ and introduces important concepts that will help you understand CD recordable and its application for data storage, premaster testing, archiving, and so on. In this chapter, you can read about the following:

- ❏ CD formats
- ❏ CD concepts
- ❏ How to use this manual

If you're already familiar with CD recordable and its concepts, skip to chapter 2, *Installing* GEAR, to get started.

What is a CD?

A *CD* (compact disc) is a non-magnetic, polished metal disc with a protective plastic coating. This disc is used to store digital information which can be read by an optical scanning device that uses a high-intensity light source—a laser—and mirrors.

CD-R (CD recordable) is an outgrowth of CD-ROM technology. A CD-recordable drive can write one disc or hundreds of discs for a very low cost. You can even use CD-Rs to create a premaster that can be used for the traditional pressing of high-volume runs of CDs.

What is GEAR?

Elektroson's GEAR is a premastering/mastering software package that supports all phases of compact disc authoring and production. GEAR lets you do the following:

- ❏ Format data files into a CD-ROM image that conforms to the ISO-9660 standard. Versions are also available for SGI, Apple Macintosh, Sun, DEC, HP, OS/2 and other platforms.
- ❏ Write a compact disc on any of the available CD recorders, including Sony, Philips, Kodak, Pioneer, RICOH, JVC, Yamaha, Pinnacle, Smart and Friendly, Playwrite, and virtually all OEM recorder versions. The CD-R discs you produce with GEAR are fully compatible with normally mastered CDs. Additional supported models are listed in the GEAR ReadMe file. Double-click the ReadMe icon in the GEAR program group for information.
- ❏ Create a master tape in DDP format on 8mm Exabyte, 9 track tape, or 4mm DAT for CD reproduction.

GEAR supports the following formatting engines:

- ❏ CD-ROM, ISO-9660
- ❏ CD-ROM Mixed Mode
- ❏ CD-ROM XA
- ❏ CD Plus (Blue Book)
- ❏ Mac hybrid
- ❏ ISO-9660 with Rockridge extension
- ❏ Multi-session
- ❏ CD Digital Audio
- ❏ MMCD
- ❏ HFS (Hierarchical File System)

If you choose CD-ROM or any of its derived products as the distribution and storage medium for your information, you need GEAR to produce it. GEAR bridges the gap between your application on hard disk and your application on CD-ROM.

In addition, GEAR supports recording the following authored file formats:

- ❏ CD-I (Compact Disc Interactive)
- ❏ CDTV
- ❏ EB (XA)
- ❏ Photo CD

- ❏ Proprietary video game authoring (3DO, Nintendo, Sega, CD Karaoke, and other game titles)
- ❏ VideoCD
- ❏ Compressed and encrypted file formats
- ❏ Custom-generated images

What You Should Know About CDs

Before you begin production, you should understand the following CD and CD-R concepts. In this section, you'll read about:

- ❏ Single-session discs
- ❏ Multi-session discs
- ❏ Multi-volume discs
- ❏ CD-R tracks
- ❏ Incremental write functionality
- ❏ CD recorders

Single-Session

A *session* is a recorded segment of a compact disc that contains one or more tracks (data or audio) surrounded by a lead-in and lead-out. When you record a session, information about the recorded data is stored within the table of contents. The recorded disc will have the lead-in, the track contents, and the lead-out.

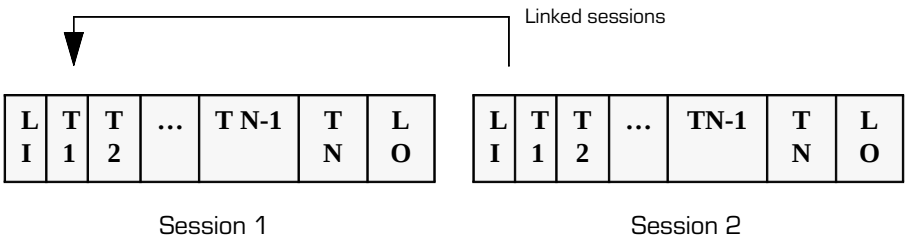
Single-session refers to discs that contain data written during one session. Once you fixate a single-session disc, you can add no more data to the disc. The following illustrates a single session CD.

Lead in	Track 1	Track 2	…	Track N-1	Track N	Lead out

Multi-Session

Multi-session refers to discs on which data is recorded in several different sessions and can be done the same or different recorders. You can add, update, or delete files on a recordable CD. Each session can contain information according to one of the CD standards—ISO, XA, DA, for example. You can link data in different sessions, for example, data in a newer session can refer to data in previously-recorded sessions. When you read

a multi-session disc using a multi-session capable CD-ROM drive and multi-session driver, all data is seen as a whole, regardless of the number of sessions in which it was recorded. Each session introduces a data overhead—lead in and lead out—of about 15MB. This limits the number of sessions on a 650MB disc to about 40. The following illustrates a multi-session CD.



Multi-session is good for activities like document archiving and updating catalogs of information on a regular basis.

In most cases, only a multi-session CD-ROM drive can play an audio track on a multi-session disc. You need a multi-session CD-ROM drive to play audio tracks recorded in the second and following sessions. Each session always contains at least one track. A true multi-session CD-ROM reader automatically goes to the last session and presents all linked sessions as one. You are never aware of the number of sessions on the disc

GEAR fully supports the creation of multi-session discs. If you want to append a session to a CD-R disc, GEAR reads back the last session and creates a virtual image of it. This image is then used like any other image to add, delete, and update information. If you delete information from a session, the reference to the data is deleted, however, the actual data remains on the session. When you write the new session to a disc, only the changes are written.

Multi-Volume Discs

Multi-volume discs use the same principal as multi-session discs with one exception. When you write a multi-volume disc, each session or volume on the disc is independent and has no reference to other volumes on the disc. You can read each volume as a separate CD. In order to read a multi-volume disc, you need a device driver that allows you to select a volume on the CD-R as a separate drive letter or partition.

GEAR fully supports the creation of multi-volume discs. If you want to add a volume to a disc, you can create the volume as you do any other volume. When the image is ready, you put the CD-R disc you want to add the volume to in the recorder and write the new volume.

CD-R Tracks

A *track* is a section of the disc that contains data. A CD-R can contain up to 99 tracks, regardless of the number of sessions or the type of tracks on the disc. GEAR lets you create up to 99 tracks on a CD.

The following table shows the possible track structures for a session or virtual image:

	Number of Tracks		
Structure	ISO	XA	DA
1	1	0	Up to 98
2	0	1	Up to 98
3	0	0	From 1 to 99

You can use structures 1 and 2 for each session of a multi-volume or multi-session disc. However, the maximum number of tracks for the session is 99. Another structure, called CD Enhanced or CD Plus, enables the combination of audio-track *and* multi-session. This type of CD-R has multiple audio tracks in the first session and uses the second session for data. This means that an audio player sees only the first session (that is, audio tracks), whereas a multi-session player sees both the DA tracks and data track.

Incremental Write

Incremental write, as described in the Orange Book, is the ability to write in packets to a CD-R disc. Each packet contains a small amount of data and is linked to the previous packet. A link consists of seven link blocks. You can use incremental write in a variety of ways: you can use a fixed or variable packet size and you can incrementally write with or without ISO-9660 compatibility.

Following are two requirements for incremental writing:

- ❏ The CD recorder and software must support incremental write. For information, refer to your CD recorder documentation. While most CD recorders do *not* support incremental write, GEAR does.
- ❏ The ISO-9660 file system standard has to be extended because it doesn't support incremental write. A new European standard, ECMA 168, is an extension of the ISO-9660 standard and describes the necessary enhancements required for the support of incremental write. Support for the new ECMA 168 standard will be available in future releases of GEAR.

The *packet size* determines the amount of overhead. For a 64KB packet size, the overhead is about 15%. A special driver is required to read incrementally-written discs. Currently, most CD-ROM readers on the market *can't* read an incrementally-written disc.

CD Recorders

A CD recorder is a piece of computer equipment you use to write data to a CD disc. When a recorder is writing data to a disc, it can't wait for the data like a tape unit can, for example. The data buffer of the recorder must *always* contain data.

You can stop data transfer at specific points only. These points are determined by the way you write the disc—disc at once, track at once, or incrementally. At these points—end of disc, end of track, or end of packet—the recorder finalizes the writing of data and you can resume writing at a later time.

Warning! *If the recorder can't finalize the disc because it runs out of data unexpectedly, the CD-R disc is wasted and can't be reused. This is referred to as a data underrun. The data transfer rate to a CD recorder is very important.*

GEAR lets you estimate the transfer rate for your system *before* you write data. GEAR also supports a CD recorder's test mode. In this mode, all data is transferred but the disc isn't actually written. This lets you check your system performance for writing discs. When you start recording CDs, we recommend you use this test option for the first few discs. This lets you get to know the software and hardware, and prevents you from wasting CD-R discs.

Disc at Once vs. Track at Once

Currently, there are two types of CD recorders on the market: disc at once and track at once.

Type	Brand
Disc at once	Sony CDW E1/W1, Sony CDW 900, and Yamaha YPR301
Track at once	All others
Both	Yamaha CD-100, Philips CDD-522, and Sony CDW-920

When you use a track-at-once recorder, the recorder first writes the track data, then finalizes the disc by writing a lead in and lead out. Track at once is particularly useful for multi-session writing. *Only* track-at-once recorders can write multi-session discs. Some track-at-once recorders can write disc at once *and* track at once.

When you use a disc-at-once recorder, the recorder starts by writing the lead in, then the track data, then the lead out. Link blocks are not inserted. Disc at once is useful for audio-only discs and discs that should be an exact copy of the image.

How to Use This Manual

This manual is separated into four sections: installation instructions, GEAR forWindows and OS/2, GEAR for Mac O/S, and appendixes.

Installation Instructions

Chapter 2, *Installing GEAR*, explains the required system configuration and the installation of the GEAR software for the Windows, O/S 2, and Macintosh platform.

GEAR for Windows 95

Chapter 3 includes a tutorial to help you start and learn to use GEAR under Windows 95.

Chapters 4 through 10 include information for creating virtual images, CD-ROM XA, and audio CDs, as well as how to work with virtual images, foreign images and how to premaster and write CD images.

GEAR for Windows and OS/2

Chapter 11 includes a tutorial to help you start and learn to use GEAR under Windows.

Chapters 12 through 19 include information for creating virtual images, CD-ROM XA, and audio CDs, as well as how to work with virtual images, foreign images, log and batch files, and how to premaster and write CD images.

GEAR for Mac OS

Chapter 20 includes a tutorial to help you start and learn to use GEAR under Mac OS.

Chapters 21 through 28 include information for creating ISO and CD-ROM XA images, audio CDs, and HFS, hybrid, or SCSI CD-ROMs. Information about how to work with multi-session discs, virtual and foreign images, and how to premaster and write CD images are included, as well.

Appendixes

Appendix A contains a glossary.

Appendix B describes each of the GEAR formatting commands.

Appendix C contains detailed information about the gear.ini file.

Appendix D is a list of error codes reported by CD recorders.

Appendix E describes information about ISO-9660 file and directory naming.

Appendix F describes how to use GEAR to develop your CD-BRIDGE and Electronic Book applications.

Appendix G is a troubleshooting guide for GEAR.

Conventions In This Manual

Special information is denoted as a **Note**, **Tip**, or **Warning**.

Buttons you should click on the toolbar to perform a function appear in the margin next to their corresponding text.

New terms you may not be familiar with appear in *italics.*

Values you should enter as they appear in the manual are in ***boldface***.

2

Installing GEAR

This chapter provides information about installing GEAR for Windows, OS/2, and Mac OS. In this chapter, you can read about the following:

- ❏ Viewing the online user's manual (Acrobat Reader)
- ❏ System requirements
- ❏ Configuring your hardware
- ❏ Installing the software for Windows 95
- ❏ Installing the software for Windows NT
- ❏ Installing the software for Windows 3.1 and Windows for Workgroups
- ❏ Installing the software for OS/2
- ❏ Installing the software for Mac OS

Viewing the Online User Manual (Acrobat Reader)

In addition to the printed documentation we have provided the complete user manual in several languages on the installation CD. The documentation has been formatted under the Adobe Acrobat Portable Document Format (PDF), and includes a copy of Adobe Acrobat Reader v2.1 to search, view, retrieve, and print the online user manual.

Installing the Acrobat Reader

Windows 95/NT/3.1

To install Acrobat Reader v2.1 on your hard disk drive:

- ❏ From the Windows Program Manager, choose Run from the File menu
- ❏ Type: [CD ROM drive]:\acroread.exe. Depending on which version of the GEAR Install CD that you have, the acroread.exe may either be located in the root directory or operating system subdirectory. Please make sure to choose the correct language version.
- ❏ Follow the instructions on your screen.

Mac OS

To install Acrobat Reader v2.1 on your hard disk drive:

- ❏ Double click on the file called “AcroRead. mac” and follow the instructions on your screen. Depending on which version of the GEAR Install CD that you have, the acroread.exe may either be located in the root directory or operating system subdirectory. Please make sure to choose the correct language version.

OS/2

Currently there is no Adobe Acrobat Reader support under OS/2.

Note: *If you have problems locating or installing the Adobe Acrobat Reader file please contact Elektroson Technical support or reseller. To update or get additional information about the Acrobat Reader, please contact Adobe directly.*

System Requirements

The following sections list the system requirements for the following platforms:

- ❏ Windows 95/NT
- ❏ Windows 3.1 and Windows for Workgroups
- ❏ OS/2
- ❏ Mac OS

Windows 95/NT

To run GEAR under Windows 95, you need the following:

- ❏ A 486 IBM-AT or compatible with 8MB of RAM
- ❏ Windows 95 or Windows NT 3.51
- ❏ Any WinASPI32- or miniport-compatible SCSI card
- ❏ A minimum of 25MB free disk space for image management
- ❏ 12ms or less HDD (non-thermal recalibration)

Windows 3.1 and Windows for Workgroups

To run GEAR under Windows 3.1 or Windows for Workgroups, you need the following:

- ❏ A 486 IBM-AT or compatible with 8MB of RAM
- ❏ 500KB of conventional memory for Windows 3.1 only
- ❏ MS-DOS 5.0 or later and Windows 3.1 or Windows for Workgroups
- ❏ Any ASPI, WinASPI or CAM compatlble card.
- ❏ A minimum of 25MB free disk space for image management
- ❏ 12ms or less HDD (non-thermal recalibration)

OS/2 Warp

To run GEAR under OS/2 Warp, you need the following:

- ❏ A 486 IBM-AT or compatible with 8MB of RAM
- ❏ OS/2 Warp
- ❏ Any SCSI card supported by OS/2 Warp
- ❏ A minimum of 25MB free disk space for image management
- ❏ 12ms or less HDD (non-thermal recalibration)

Mac OS

To run GEAR, you need the following:

- ❏ Macintosh Quadra or better with 8 MB of RAM
- ❏ System 7.0 or later
- ❏ A minimum of 25 MB free disk space for image management
- ❏ 12ms or less HDD (non-thermal recalibrating)

Important: *We recommend a fast hard drive with a fast controller (12 msec average access time or less). Use only hard drives that don't require thermal recalibration. These drives are sometimes referred to as AV drives. If thermal recalibration occurs during CD-R writing, the data stream stops and the disc is wasted.*

Configuring Your Hardware and Installing GEAR

This section includes information for configuring the necessary hardware for connecting a CD recorder or tape unit. Separate sections are included for Windows 95, Windows NT, Windows 3.1 and Windows for Workgroups, OS/2 Warp, and Mac OS.

Important: *Always read the manufacturer's instructions before installing hardware. Problems you may encounter during the installation of GEAR are usually due to hardware-related installation problems.*

Windows 95

Since Windows 95 is supplied with an integrated SCSI I/O driver, no additional third party adapter driver is required in most cases. This version of GEAR supports the WinASPI32 device driver.

Note: *You can verify the proper installation of your SCSI adapter by choosing Settings from the Control Panel. Double-click the system icon. Select the Device Manager. If a host adapter is installed, the SCSI Controllers item should be included in the list of available drivers. Click this item to display the supported host adapter. Select the device and click the Properties button to view the current status of the host adapter.*

Connecting Your Recorder

Installing a Non- Plug & Play-Compatible Recorder (Device Type 4, WORM)

Due to incompatibilities with device type 4 CD recorders and Windows 95 SCSI drivers, type 4 recorders currently cannot be mounted as CD readers. However, Windows 95 will automatically want to associate a driver with the recorder. When you are asked which driver to use, you must choose for the CD-R to be an 'Unsupported' device. Several third party utilities are currently under development. Please call Elektroson or your SCSI card manufacturer for updated information.

Note: *If you have purchased a type 4 recorder and don't have a CD-ROM drive to install GEAR, you can purchase a 3.5 floppy upgrade pak for Windows 95 and NT for a nominal shipping and handling charge. Contact Elektroson Technical Support. For a list of device type 4 recorders, see the CD Recorder Compatibility List at the end of this chapter.*

Installing a Plug & Play-Compatible Recorder (Device Type 5, CD-ROM)

If your recorder is a device type 5 recorder, Windows 95 installs a CD-ROM driver automatically. Windows 95 recognizes device type 5 recorders as CD-ROM drives. You should, however, turn off the Auto Insert Notification option to prevent Windows 95 from trying to access the CD-R while the system is recording. Choose Settings from the Control Panel. Double-click the system icon. Select the Device Manager and turn off the Auto Insert Notification check box.For a list of device type 5 recorders, see the CD Recorder Compatibility List at the end of this chapter.

1. To connect your CD recorder, shut down your system and connect your recorder to your SCSI host adapter.

Note: *Follow the manufacturer's instructions when you set up the SCSI host adapter and your CD recorder. Be sure to terminate both ends of the SCSI chain properly! All units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors.*

2. Restart Windows 95 with your recorder turned on.

   ❏ If your recorder is a device type 4 recorder, Windows 95 prompts you to install a device driver.

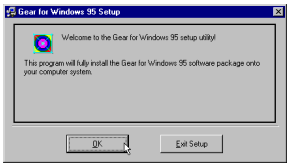
   Since Windows 95 doesn't provide drivers to mount type 4 recorders as readers, choose Unsupported in the window that appears. (See Installing a Non-Plug & Play-Compatible Recorder, above.)

   ❏ If your recorder is a device type 5 recorder, Windows 95 installs it automatically and doesn't prompt you. (Make sure the Auto Insert Notification option is disabled. See installing Plug & Play-Compatible Recorder, above.)

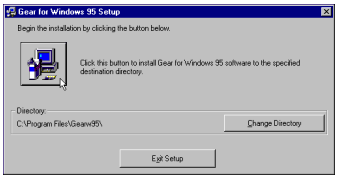
Note: *To verify whether the installation was successful, reboot your machine and check the system properties. If Windows doesn't find the CD recorder, run a system scan by choosing Add Hardware in the Control Panel. Be sure WinASPI32 is installed properly. If the recorder is still not recognized, contact Elektroson Technical Support.*

Installing GEAR

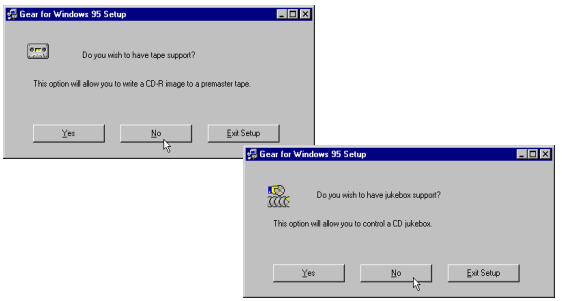
1. Insert the GEAR CD into your CD drive or recorder.
2. Open the Win95NT folder.
3. Open the English, French, or German folder, depending on the version you want to install.
4. Double-click the setup.exe icon.



5. In the GEAR for Windows 95 Setup window, click the OK button.
6. The Setup icon appears. Click it to begin the installation.



7. In the dialogs that appear, indicate whether you want to install premaster tape and jukebox support.



8. Continue to follow the dialogs as they prompt you for additional information.

   When the installation is complete, a dialog appears to indicate the installation was successful.

9. Click OK to exit the installation program.

We recommend you read the ReadMe file. It welcomes you to Elektroson's GEAR and includes last-minute information that couldn't be included in the manual.

10. To open the ReadMe file, click the Start menu icon, locate GEAR in the Programs menu and double-click the ReadMe icon in the GEAR program menu.

Windows NT

Since Windows NT is supplied with an integrated SCSI IO driver, no additional third party adapter driver will be required. We successfully tested GEAR with the Adaptec, Buslogic, Future Domain, and Bustek adapters. In all cases, we tested the adapter with the integrated NT SCSI IO driver.

For information about setting up your hardware, see your hardware documentation.

Connecting Your Recorder

Installing a Non- Plug & Play-Compatible Recorder (Device Type 4, WORM)

Due to incompatibilities with device type 4 CD recorders and Windows NT SCSI drivers, type 4 recorders currently cannot be mounted as CD readers. Several third party utilities are currently under development. Please call Elektroson or your SCSI card manufacturer for updated information.

Note: *If you have purchased a type 4 recorder and don't have a CD-ROM drive to install GEAR, you can purchase a 3.5 floppy upgrade pak for Windows 95 and NT for a nominal shipping and handling charge. Contact Elektroson Technical Support. For a list of device type 4 recorders, see the CD Recorder Compatibility List at the end of this chapter.*

Installing a Plug & Play-Compatible Recorder (Device Type 5, CD-ROM)

If your recorder is a device type 5 recorder, Windows NT installs a CD-ROM driver automatically since Windows NT recognizes device type 5 recorders as CD-ROM drives. When using a device type 5 recorder to record CD's with GEAR, you should always set the device to Manual mode and reboot the computer after installation. This will disable the driver conflicting with GEAR.

To disable the CD reader driver, please go to the Control Panel and select Devices:

- ❏ Change Startup to Disabled (disable SCSI CD ROM driver)
- ❏ Reboot your computer

Note: *At this time once the CD reader driver is disabled under Windows NT you will no longer be able to use or mount any CD ROM drive when using GEAR with your CD recorder. You must re-enable the CD ROM driver after the recording process to mount CD's.*

If you use a device type 5 recorder to install GEAR from the installation CD, do not set the device to Manual mode until the installation is complete. For a list of device type 5 recorders, see the CD Recorder Compatibility List at the end of this chapter.

1. To connect your CD recorder, shut down your system and connect your recorder to your SCSI host adapter.

Note: *Follow the manufacturer's instructions when you set up the SCSI host adapter and your CD recorder. Be sure to terminate both ends of the SCSI chain properly! All units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors.*

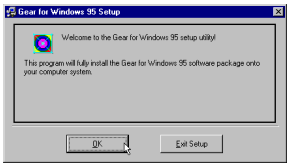
2. Restart Windows NT with your recorder turned on.
   - ❏ If your recorder is a device type 4 recorder, Windows NT does not install or prompt you to install a device driver.(See Installing a Non-Plug & Play-Compatible Recorder, above.)
   - ❏ If your recorder is a device type 5 recorder, Windows NT installs it automatically and doesn't prompt you.(Please make sure to disable the NT driver for CD-ROM support when using GEAR to record CD's. See installing Plug & Play-Compatible Recorder, above.)

Note: *Be sure to follow the manufacturer's instructions when you set up the SCSI host adapter. Be sure to terminate both ends of the SCSI chain properly! All units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors.*

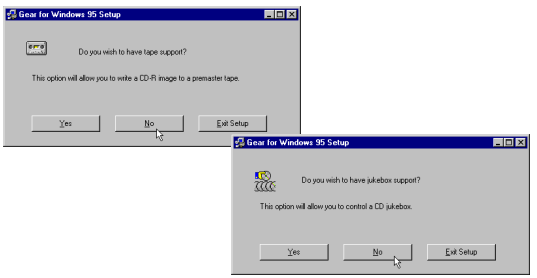
Installing GEAR

1. Insert the GEAR CD into your CD drive or recorder.
2. Open the Win95NT directory to install GEAR for Windows NT.
3. Open the English, French, or German directory, depending on the version you want to install.
4. Double-click the setup.exe file.

   The GEAR setup screen appears.



5. Click Continue.
6. Enter your name, company name, and registration number in the dialog that appears, then click Continue.
7. As the installation proceeds, you are prompted to enter additional information, such as where to install the program, what SCSI adapter to use, and whether to install tape or jukebox support.



Warning! *If you don't have a SCSI tape unit connected to your computer, don't install the tape support. You can install this later without reinstalling GEAR.*

Select the options you want to use and click Continue in each dialog that appears.

8. When the installation is complete, click OK in the dialog that appears.

The GEAR program group appears on your screen.

We recommend you read the ReadMe file. It welcomes you to Elektroson's GEAR and includes last-minute information that couldn't be included in the manual.

9. To open the ReadMe file, double-click its icon in the GEAR program group.

Windows 3.1 and Windows for Workgroups

Under Windows 3.1 only, your config.sys file should contain the following settings:

- ❏ Files = 20
- ❏ Buffers = 40
- ❏ The driver for the SCSI controller should match your SCSI card— for example, Device = aspi4dos.sys /d. (Refer to your card installation documentation for additional information.)

For information about editing your config.sys file, refer to your MS-DOS documentation.

Connecting Your Recorder

1. To connect your CD recorder, shut down your system and connect your recorder to your SCSI host adapter.
   - ❏ Since Windows 3.1 does not include intergrated SCSI or CD reader drivers, device type 4 and device type 5 recorders will require a third party driver for reader support. GEAR includes an optional CD Driver Utility disk with CD reader drivers that can be installed for most CD recorders, both device type 4 (WORM) and device type 5 (CD-ROM).

Note: *Follow the manufacturer's instructions when you set up the SCSI host adapter and your CD recorder. Be sure to terminate both ends of the SCSI chain properly! All units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors.*

2. Restart Windows with your recorder turned on.

Note: *If your recorder isn't seen when you start your computer, you won't be able to use your CD recorder as a CD-ROM drive. Verify that your hardware connections and device driver installation are correct.*

Important: *It's preferable but not necessary to use a separate host adapter board to control the CD recorder. If the data transfer rate is too slow, try placing your recorder on a separate controller. We also advise you not to use different types of adapters in the same computer.*

Installing GEAR

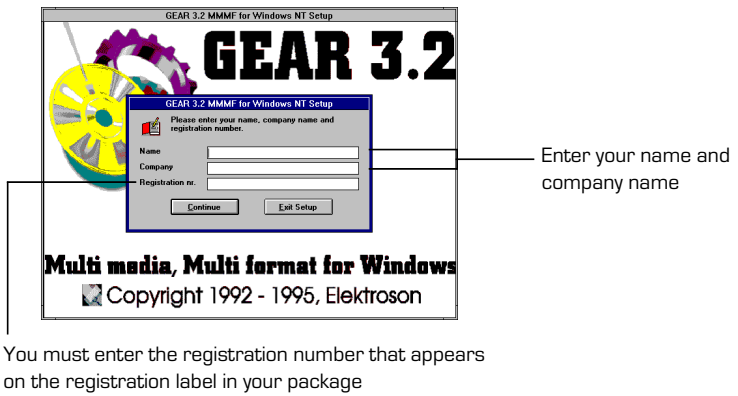
1. Insert the GEAR CD into your CD drive or recorder.

Note: *If your recorder isn't seen when you start your computer, you won't see the driver for the software installation. Check all hardware connections and try to install the optional GEAR CD Driver Utility. See appendix H. If you can't load your CD, contact Technical Support.*

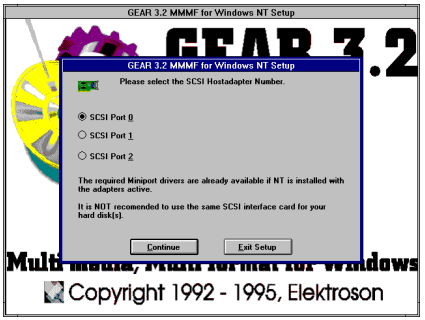
2. Open the Windows directory to install GEAR for Windows 3.1 or Windows for Workgroups.
3. Open the English, French, or German directory, depending on the version you want to install.
4. Double-click the setup.exe file.

   The GEAR setup screen appears.

5. Click Continue.
6. Enter your name, company name, and registration number in the dialog that appears, then click Continue.



7. As the installation proceeds, you are prompted to enter additional information, such as where to install the program, what SCSI adapter to use, and whether to install tape support.



Choose a driver for your SCSI controller, then click Continue

Warning! *If you don't have a SCSI tape unit connected to your computer, don't install the tape support. You can install this later without reinstalling GEAR.*

Select the options you want to use and click Continue in each dialog that appears.

8. When the installation is complete, click OK in the dialog that appears.

The GEAR program group appears on your screen.

Double-click this icon to read late-breaking news about GEAR

Double-click this icon to start GEAR

We recommend you read the ReadMe file. It welcomes you to Elektroson's GEAR and includes last-minute information that couldn't be included in the manual.

9. To open the ReadMe file, double-click its icon in the GEAR program group.

What is ASPI?

Advanced SCSI Programming Interface (ASPI) is an interface specification developed by Adaptec for sending commands to SCSI host adapters. This interface eliminates the need for a program such as GEAR to include device-dependent information.

Software drivers can be broken into two components: low-level ASPI manager and the ASPI module.

The low-level ASPI manager is OS- and hardware-dependent. It accepts ASPI commands and performs the necessary steps to send the SCSI command to the target.

The ASPI module is tailored to the command set of a particular peripheral, such as a CD-ROM. An ASPI-based CD-ROM driver must handle only the differences between different CD-ROM drivers, not the host adapter differences.

DOS ASPI Driver Support

If you're using an ASPI manager as the device interface for multiple controllers and your CD-R unit is recognized by ASPI but not by GEAR, you probably have to change the AspiHostAdapterNumber in the gear.ini file.

If ASPI is installed for more than one adapter, the ASPI manager numbers each adapter starting with 0. The gear.ini file defines which adapter GEAR should use to search for the CD-R unit.

Windows ASPI Driver Support

Windows ASPI (WinASPI) is a device driver that provides an easy access method for Windows applications requiring SCSI IO. This is provided in a *dynamic link library* called winaspi.dll. When you launch an application that requires a DLL, it's loaded into memory automatically. When it's not required, it's released from memory.

In addition to the WinASPI device driver, a virtual device driver (VxD) called vaspid.386 handles the locking and unlocking of the data buffers for virtual DMA requests during SCSI IO.

The winaspi.dll and vaspid.386 files must be loaded in your Windows directory in order to use the WinASPI layer.

CAM SCSI Driver Support

Common Access Method (CAM) is a software-oriented interface designed to simplify writing device drivers for SCSI peripherals attached to SCSI host bus adapters. Future/CAM allows all Future Domain SCSI host but adapters to be accessed in the same manner, allowing a single device driver to be written for all of the host adapters.

OS/2 Warp

The following sections include information about configuring your recorder and installing GEAR for OS/2 Warp.

Connecting Your Recorder

Installing a Non-Plug & Play-Compatible Recorder (Device Type 4, WORM)

Due to incompatibilities with device type 4 CD recorders and OS/2 SCSI drivers, type 4 recorders currently cannot be mounted as CD readers. Several third party utilities are currently under development. Please call Elektroson or your SCSI card manufacturer for updated information.

Note: *If you have purchased a type 4 recorder and don't have a CD-ROM drive to install GEAR, you can purchase a 3.5 floppy upgrade pak for OS/2 for a nominal shipping and handling charge. Contact Elektroson Technical Support. For a list of device type 4 recorders, see the CD Recorder Compatibility List at the end of this chapter.*

Installing a Plug & Play-Compatible Recorder (Device Type 5, CD-ROM)

If your recorder is a device type 5 recorder, OS/2 installs a CD-ROM driver automatically since OS/2 recognizes device type 5 recorders as CD-ROM drives. When using a device type 5 recorder to record CD's with GEAR, you should always disable the OS/2 CD-ROM device driver from the SCSI ID that the recorder occupies, and reboot the computer after installation. This will disable the CD reader driver from conflicting with GEAR during the recording process.

To disable the CD reader driver, please edit the OS/2 configuration file as follows:

- ❏ REM out the line containg the following driver statement; OS2 CDROM.DMD
- ❏ Reboot your computer

Note: *At this time once the CD reader driver is disabled under OS/2 you will no longer be able to use or mount any CD ROM drive when using GEAR with your CD recorder. You must re-enable the CD ROM driver after the recording process to mount CD's.*

If you use a device type 5 recorder to install GEAR from the installation CD, do not disable the OS/2 CD-ROM driver from the recorder ID until the installation is complete. For a list of device type 5 recorders, see the CD Recorder Compatibility List at the end of this chapter.

1. To connect your CD recorder, shut down your system and connect your recorder to your SCSI host adapter.

Note: *Follow the manufacturer's instructions when you set up the SCSI host adapter and your CD recorder. Be sure to terminate both ends of the SCSI chain properly! All units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors.*

2. Restart OS/2 with your recorder turned on.

   - ❏ If your recorder is a device type 4 recorder, OS/2 does not install or prompt you to install a device driver. (See Installing a Non-Plug & Play-Compatible Recorder, above.)
   - ❏ If your recorder is a device type 5 recorder, OS/2 installs it automatically and doesn't prompt you. (Please make sure to disable the OS/2 driver for CD-ROM support when using GEAR to record CD's. See installing Plug & Play-Compatible Recorder, above.)

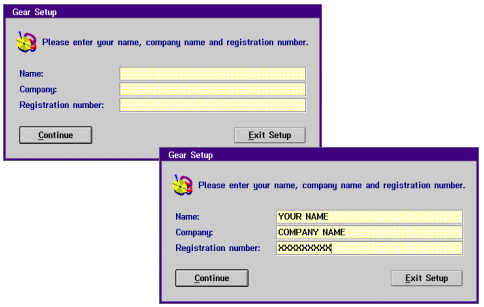
Note: *Be sure to follow the manufacturer's instructions when you set up the SCSI host adapter. Be sure to terminate both ends of the SCSI chain properly! All units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors.*

Installing GEAR

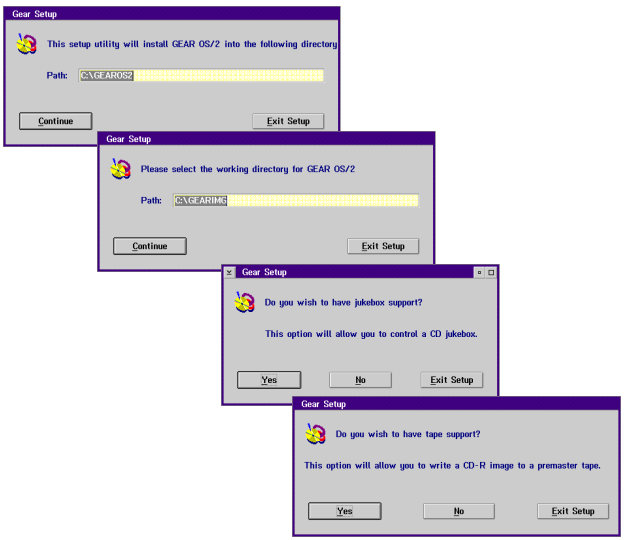
1. Insert the GEAR CD into your CD drive or recorder.
2. Open the OS2 directory to install GEAR for OS/2 Warp.
3. Open the English directory.
4. Double-click the setup.exe file.

   The GEAR setup screen appears.

5. Click Continue.
6. Enter your name, company name, and registration number in the dialog that appears, then click Continue.

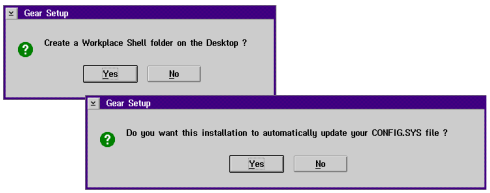


7. As the installation proceeds, you are prompted to enter additional information, such as where to install the program, and whether to install jukebox and tape support.



Select the options you want to use and click Continue in each dialog that appears.

8. The installation then prompts you to create a workplace shell and to update the config.sys file. In each dialog, click Yes or No.



9. When the installation is complete, click OK in the dialog that appears.

   The GEAR program group appears on your screen.

   We recommend you read the ReadMe file. It welcomes you to Elektroson's GEAR and includes last-minute information that couldn't be included in the manual.

10. To open the ReadMe file, double-click it's icon in the GEAR program group.

Mac OS

The following sections include information about configuring your recorder and installing GEAR for Mac OS.

Connecting Your Recorder

1. To connect your CD recorder, shut down your system and connect your recorder to your SCSI connector.

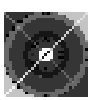
❏ Since Mac OS does not include intergrated CD recorder reader drivers, device type 4 and device type 5 recorders will require a third party driver for reader support. GEAR includes an optional FWB CD ROM Toolkit with CD reader drivers that can be installed for most CD recorders, both device type 4 (WORM) and device type 5 (CD-ROM). Please see Appendix I for installation and operation of the driver utility.

Note: *Follow the manufacturer's instructions when you set up your CD recorder. Be sure to terminate both ends of the SCSI chain properly! All units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors.*

2. Restart your Mac with your recorder turned on.

Installing GEAR

1. Insert the GEAR CD into your CD drive or recorder.
2. Open the MacOS folder.



Note: *If you want to use your CD recorder as a CD-ROM drive, install the optional FWB CD-ROM ToolKit. See appendix I. If you can't load your CD, contact Technical Support.*

3. Open the English, French, or German folder, depending on the version you want to install.
4. Double-click the installer icon.
5. Select standard or custom installation.

Warning! *New users should always select standard to ensure all the required files are installed.*

6. Enter your name, company name and registration number after the installation of the files.

   The software is now installed and ready for use.

   We recommend you read the ReadMe file. It welcomes you to Elektroson's GEAR and includes last-minute information that couldn't be included in the manual.

CD Recorder Compatibility List

This section includes important information specific to each of the CD recorders GEAR supports. See your hardware documentation for specific information about setting up your CD recorder.

We recommend you connect the recorder close to the SCSI Controller. The SCSI cable should be no longer than 1 meter (or 3 feet), but the shorter the cable, the better.

Be sure to terminate both ends of the SCSI chain properly! All units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors.

It's not necessary to connect the recorder on the fastest controller. In some cases, the faster controllers cause miscompares with the recordable and your original files making the CD-R unusable.

Device Type 4 CD Recorder

The following are examples of device type 4 (WORM) recorders:

- ❏ JVC XR-W2001
- ❏ Kodak PCD200, PCD225, PCD600
- ❏ Olympus Deltis 615
- ❏ Philips CDD521, CDD522
- ❏ Pinnacle Micro RCD 1000
- ❏ Pioneer DW-S114, DRM-5004X
- ❏ Plasmon RF4100, RF4102
- ❏ Ricoh RS1060, RS9200C
- ❏ Yamaha CD-R100, CD-R102

Contact your CD recorder manufacturer or Elektroson for an up-to-date list of type 4 CD recorders.

Device Type 5 CD Recorders

The following are examples of device type 5 (CD-ROM) recorders:

- ❏ Grundig CDR1001
- ❏ HP 4324/4325
- ❏ Kodak PCD240
- ❏ Philips CDD2000
- ❏ Sony CDU-920S

Contact your CD recorder manufacturer or Elektroson for an up-to-date list of type 5 CD recorders.

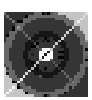
Detailed CD-Recorder Profiles (Partial List)

HP 4020i

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v1.08

High Tech CDR2000

- ❏ Connector Type: 2x50 pin
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: No
- ❏ Firmware (at printing): v1.28



High Tech CDR1002

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 21x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v1.2

Grundig CDR100IPW

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: yes
- ❏ Firmware (at printing): v1.20

JVC XR-W1001

- ❏ Connector Type: n/a (built-in type)
- ❏ Buffer Size: 64 KB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x
- ❏ Read CDDA through SCSI: No
- ❏ Firmware (at printing): v1.24

JVC XR-W2001

- ❏ Connector Type: n/a (built-in type)
- ❏ Buffer Size: 1 MB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x, 2x
- ❏ Read CD-DA through SCSI: Yes
- ❏ Firmware (at printing): v2.35

JVC XR-W2010

- ❏ Connector Type: 2x50 pin
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v1.26

Kodak Disc Transporter

- ❏ Connector Type: SCSI-2 (2 x 50 HD)
- ❏ Buffer Size: n/a
- ❏ Disc Loading: n/a
- ❏ Recording Speed: n/a
- ❏ Firmware (at printing): n/a

Kodak CDR-240

- ❏ Connector Type: SCSI-2 2x50HD
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v1.20

Kodak PCD200

- ❏ Connector Type: 2 x 50 pin SCSI-2
- ❏ Buffer Size: 512 KB
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CD-DA through SCSI: No
- ❏ Firmware (at printing): v2.07

Kodak PCD225

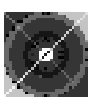
- ❏ Connector Type: 2 x 50 pin SCSI-2
- ❏ Buffer Size: 1MB to 32 MB
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v1.05

Kodak PCD600

- ❏ Connector Type: 2 x 50 pin
- ❏ Buffer Size: 2 MB standard, upgradable to 4 or 8 MB
- ❏ Disc Loading: Motorized Tray
- ❏ Recording Speed: 2x, 6x
- ❏ Firmware (at printing): v3.3

Mashushita CW70501

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v0.90



Microboards Playwrite 2002

- ❏ Connector Type: 2x50 pin
- ❏ Buffer Size: 2 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: No
- ❏ Firmware (at printing): v1.28

Mitsumi CDR2000

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 2 Mb
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v5046

Olympus Deltis CD-R2

- ❏ Connector Type: Centronics (2 x 50 pins)
- ❏ Buffer Size: 1 MB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 2x
- ❏ Firmware (at printing): v0.93

Olympus/Deltis CDS 615

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v2.0

Philips CDD521

- ❏ Connector Type: 2 x 50 pin SCSI-2
- ❏ Buffer Size: 512 KB
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CD-DA through SCSI: No
- ❏ Firmware (at printing): v2.07

Philips CDD522

- ❏ Connector Type: 2 x 50 pin SCSI-2
- ❏ Buffer Size: 1MB to 32 MB
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v1.06

Philips CD2000

- ❏ Buffer Size: 1 MB
- ❏ Connector Type: 2 x 50 pins
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x, 2x or (4x reader)
- ❏ Firmware (at printing): v0.16

Pinnacle Micro RCD1000

- ❏ Connector Type: Centronics (2 x 50 pins)
- ❏ Buffer Size: 1MB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x, 2x
- ❏ Read CD-DA through SCSI: No
- ❏ Firmware (at printing): v1.32

Pinnacle Micro RCD 202

- ❏ Connector Type: Centronics (2 x 50 pins)
- ❏ Buffer Size: 64KB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x
- ❏ Read CDDA through SCSI: No
- ❏ Firmware (at printing): v1.24

Pinnacle RCD 1000

- ❏ Connector: 2 x 50 pin Centronics
- ❏ Buffer Size: 1 MB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x, 2x
- ❏ Read CD-DA through SCSI: No
- ❏ Firmware (at printing): 1.28

Pinnacle RCD 5020

- ❏ Connector Type: 2x50 pin
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v2.35

Pinnacle RCD 5040

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v1.18

Pioneer DRM-5004X, DR 504X, DW-S114X

- ❏ Connector Type: n/a (Jukebox)
- ❏ Buffer Size: 1 MB
- ❏ Disc Loading: Robotics
- ❏ Recording Speed: 2x, 4x
- ❏ Read CD-DA through SCSI: Yes
- ❏ Firmware (at printing): v0.101

Pioneer DW-S114X

- ❏ Connector Type: n/a (Jukebox)
- ❏ Buffer Size: 1 MB
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 2x, 4x
- ❏ Read CD-DA through SCSI: Yes
- ❏ Firmware (at printing): v0.101

Plasmon RF4100, RF4102

- ❏ Connector Type: Centronics (2 x 50 pins)
- ❏ Buffer Size: 1MB and 2MB, respectively, up to 32 MB
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: No
- ❏ Firmware (at printing): v1.28

Plasmon CDR4220

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 1 Mb
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x, 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v1.20

RICOH 1420

- ❏ Connector Type: internal ribbon
- ❏ Buffer Size: 512KB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 2x
- ❏ Read CDDA through SCSI: Yes
- ❏ Firmware (at printing): v0.80

RICOH RS-1060C

- ❏ Connector Type: Centronics (2 x 50 pins)
- ❏ Buffer Size: 512KB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 2x
- ❏ Read CDDA through SCSI: No
- ❏ Firmware (at printing): v0.92

RICOH RS-9200C

- ❏ Connector Type: Centronics (2 x 50 pins)
- ❏ Buffer Size: 1 MB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x
- ❏ Read CDDA through SCSI: No
- ❏ Firmware (at printing): v0.167

Sony CDU-920S, CDU-921S

- ❏ Connector Type: n/a (built-in type), Centronics (2 x 50 pins), respectively
- ❏ Buffer Size: 1MB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 2x
- ❏ Read CDDA through SCSI: Yes (CDU-920S)
- ❏ Firmware (at printing): v2.0b

Sony CDW-E1/W1, CDW900E

- ❏ Connector Type: SCSI-2 (2 x 50 HD)
- ❏ Buffer Size: 1MB
- ❏ Disc Loading: Tray
- ❏ Recording Speed: 1x only (E1/W1), 1x, 2x (900E)
- ❏ Read CDDA through SCSI: No
- ❏ Firmware (at printing): n/a, v1.32, respectively

Yamaha CDR100/ CDE100

- ❏ Connector Type: 2 x 50 SCSI-2
- ❏ Buffer Size: 512 KB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 1x, 2x, or 4x
- ❏ Read CD-DA through SCSI: Yes
- ❏ Firmware (at printing): v1.10

Yamaha CDR102

- ❏ Connector Type: 2 x 50 SCSI-2
- ❏ Buffer Size: 512 KB
- ❏ Disc Loading: Caddy
- ❏ Recording Speed: 2x
- ❏ Read CD-DA through SCSI: Yes
- ❏ Firmware (at printing): v1.10

Other Recorders

GEAR also supports the following OEM recorders based on the mechanism listed under the section CD Recorder Compatibility List:

- ❏ DataDisc
- ❏ Dynatek
- ❏ FWB
- ❏ MicroNet
- ❏ Playwrite
- ❏ Smart & Friendly
- ❏ Trace
- ❏ Most SCSI-controlled jukeboxes, including ASM and K & S

For an up-to-date list of supported recorders, contact Elektroson at the following:

- ❏ CompuServe: GO GEAR
- ❏ Internet: support@elektroson.com
  gear.support@elektroson.nl
- ❏ Registration: register@elektroson.com

For Asia and South and North America:

Elektroson, Inc.
2105 South Bascom Avenue, Suite 160
Campbell, CA 95008
Tel: 1.408.371.4800
Fax: 1.408.371.4895

For Europe, Africa, and the Middle East:

Elektroson, BV.
Schootsestraat 14,5616 RD
5616 RD Eindhoven
The Netherlands
Phone: 31 40 2515 065
Fax: 31 40 2514 920

GEAR for Windows 95
Introduction

Chapter 3 *Getting Started With* GEAR helps you start and learn to use GEAR.

Chapter 4 *Creating a CD-ROM* shows you how to create and record a CD-ROM

Chapter 5 *Creating a CD-ROM XA* shows you how to create an extended architecture project.

Chapter 6 *Creating an Audio CD* shows you how to create and record a digital audio CD.

Chapter 7 *Working With Virtual Images* explains how to edit the contents of a project.

Chapter 8 *Working With Multi-Session Discs* explains how to append data to a disc.

Chapter 9 *Working With External Files* explains what an external image is and how to edit it, and discusses different formats.

Chapter 10 *Testing and Writing a CD Project File* shows you how to prepare for writing discs, test system performance, and write CD-R discs and premaster tapes.

3

Getting Started With GEAR for Windows 95

This chapter helps you create your first CD in just minutes. You can read about the following:

- ❏ Starting GEAR
- ❏ Loading data
- ❏ Choosing CD-Recorder settings
- ❏ Writing a CD-R
- ❏ Writing a master tape
- ❏ Using the on-line help

Starting GEAR

Before you start GEAR, make sure your recorder is turned on and recognized when you boot your system. The setup program of GEAR has added the GEAR folder to the Programs item in the Start menu.

click to start GEAR

1. Click Start in the Taskbar, and then locate the GEAR for Windows 95 folder.
2. Click the GEAR program icon.

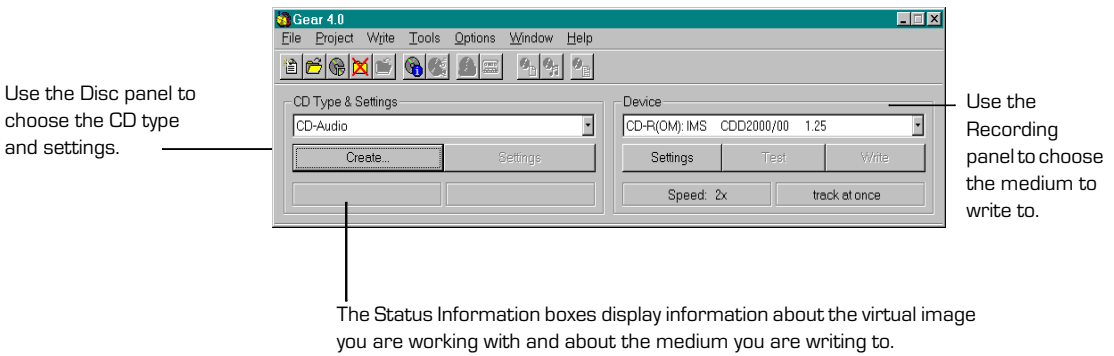
   The Workbench appears where you can create a new project. The new project is saved in a *virtual image file.* A virtual image file is a file that contains all the information you need to create a CD.

Create your CD in three steps

When creating a compact disc, there are three steps to follow:

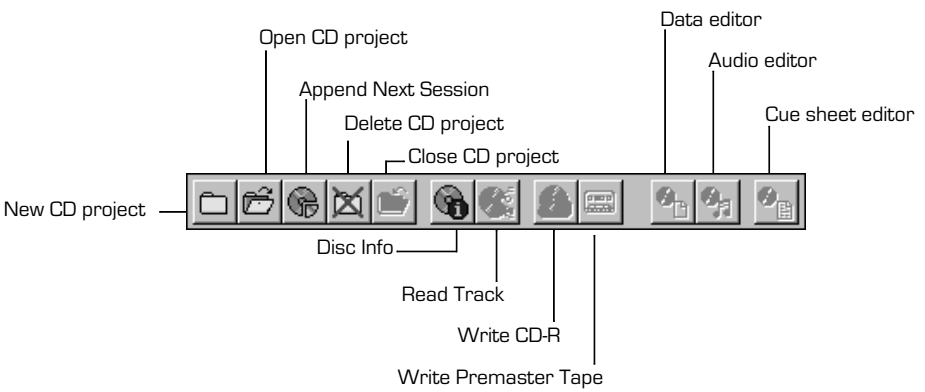
1. Select the type of disc to be created and set the appropriate parameters.
2. Select the data you want to write to disc.
3. Select the correct recording media and device and write the project.

You will find a detailed description of these steps below, in the sections ‘Creating a New CD Project’ (steps 1&2) and ‘Writing to a CD-R’ (step 3).



The GEAR Toolbar

GEAR displays the function of a button when you place your mouse on a button. The toolbar contains the following buttons:



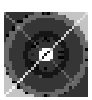
This toolbar button...	Lets you do this
New CD project	Create a new virtual image
Open CD project	Open an existing project
Append Next Session	Add another session to CD-R
Delete CD project	Delete an existing project
Close CD project	Close the current project
Disc Info	Get disc information
Read Track	Copy the selected track from CD-R
Write to CD-R	Burn a disc
Write Premaster Tape	Write to tape
Data Editor	Opens the Data Editor window
Audio Editor	Opens the Audio Editor window
Cue Sheet Editor	Opens the Cue Sheet Editor window

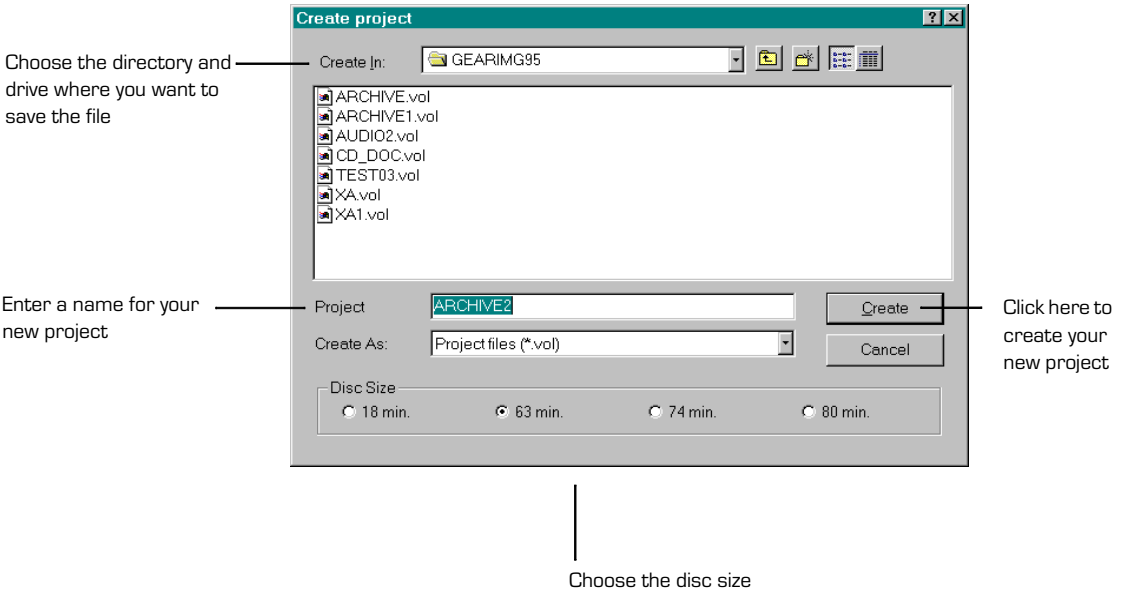
Creating a New CD project

The Create project dialog lets you enter a name for your GEAR project and choose a location for a new virtual image file. GEAR automatically provides the .vol extension.

1. Select the CD type you want to create.
2. Click Create to create a new virtual image.
3. Enter a name for the new project. If you use a non ISO name GEAR prompts you to change the file name to ISO standards.

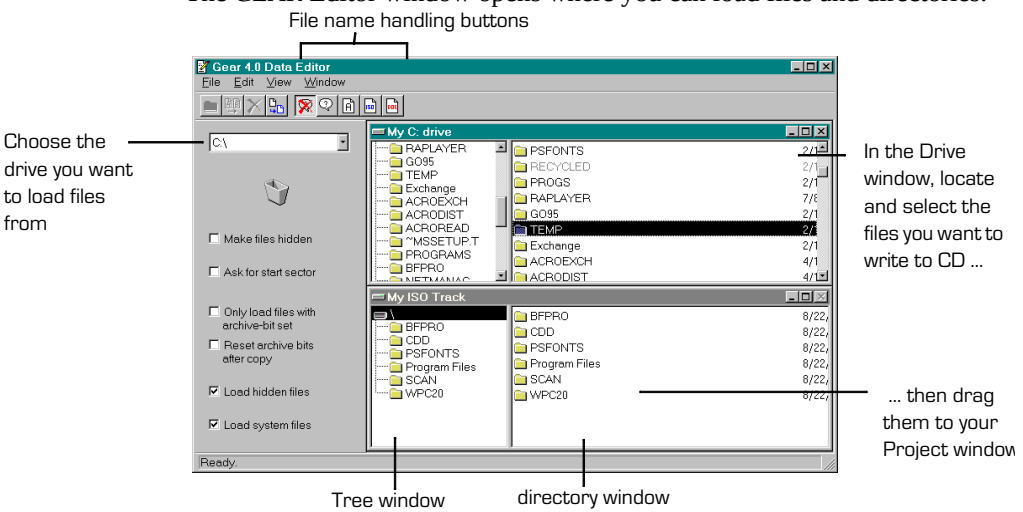
Note: *An ISO directory or file name is limited to uppercase alphanumeric characters and underscores (_). For more information see Appendix 'ISO-9660 file and directory naming'.*





4. Select the directory and drive where you want to save the new project file, then click Create. The Workbench reappears.

5. Click Edit to open the Data Editor.
The GEAR Editor window opens where you can load files and directories.



You can drag directories and files from the directory window *only*, not from the tree window.

6. Select the drive you want to load files from.

Tip: *You may want to resize the Drive window and the GEAR virtual image file window so it suits the way you like to work.*

7. Load the directories and files you want to write to CD

   If any of the files you load have Non ISO characters, GEAR warns you and prompts you to change the file name to ISO standards.

   - ❏ Click Yes to have GEAR translate the file name to valid characters.
   - ❏ Click No to load the file as is.

   An ISO directory or file name is limited to uppercase alphanumeric characters and underscores (_). For more information see Appendix 'ISO-9660 file and directory naming'.

Important: *For Data tracks you may change the way GEAR handles the file names in the current project. When you place your mouse on a button GEAR shows you its function. Choose the method you want to use with a click on one of the file name handling buttons.*

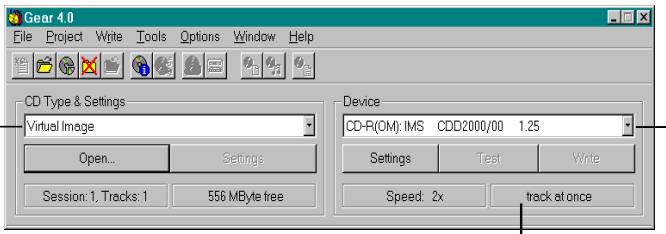
Note: *You can also drag files to your CD project window from the Navigator window, desktop or shortcuts.*

8. After you have loaded all the files you want to write to CD, check them by browsing through the file names as you do a directory tree in the Explorer.

   - ❏ If you have loaded files by mistake, select them and press the Delete key to remove them from the project file.

   Now you are ready to write your project to CD-R disc and/or premaster tape.

Writing to a CD-R



Select 'Virtual Image' in the Disc panel to open a project for testing or writing.

Use the Recording panel to choose the medium to write to and to select the Recorder Settings

The status information boxes display information about the virtual image you are working with and about the medium you are writing to

Now you are ready to write data to your CD. We recommend that you test before you write to CD-R. If you want, you can start writing immediately after a successful test. GEAR makes things easier for you.

Testing

1. If necessary open the project you want to test. To do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button or...
   - ❏ Click the Open CD project button in the toolbar.
2. Choose your CD recorder in the recording panel.
3. Click the Test button on the Recording Panel. A GEAR dialog appears asking you if you want to write the CD-R immediately after a successful test.
4. Click Yes if you want to start writing immediately after a successful test. If the test fails, GEAR displays a warning and does not begin recording.

   GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the project are verified. Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they are loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

Note: *To improve system performance, you can either minimize the fragmentation on your hard disk with a disk optimization program or you can use the physical image file of the project. See Creating a Physical Volume in Chapter 9 for more information.*

Writing

1. If necessary open the project you want to record. To do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button or ...
   - ❏ Click the Open CD project button in the toolbar
2. Select your CD recorder from the pull-down menu in the recording panel.
3. Click the Write button in the recording panel.

Premastering a Tape

As an alternative to writing to a CD, you can premaster a tape, then send it to a mastering plant where the data is written to CD. The tape, which is written in DDP format, is accepted as a standard at mastering plants. This tape is used to create a glass master, which is used to create daughters. Daughters are used to stamp silver or production CDs.

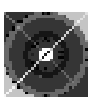
If you turned on the Verify after write check box in the Advanced Recording Settings dialog, GEAR compares the contents of the tape with the actual project. This means that the tape is read back and its data is checked against the contents of your virtual image. If there are differences, GEAR warns you.

The process for premastering a tape is just like writing to CD. Make sure your tape unit is connected to your computer and turned on and that there is a tape in the unit before you start GEAR.

1. Select a tape drive in the recording panel
2. Click the Write button.

   Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they are loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

   As GEAR writes data to the tape, it reports in the GEAR Information window the percentage written for each track of the volume. When writing is complete, the tape is ejected automatically. Your tape is ready to send to a CD-ROM mastering plant!



Using the On-line Help

On-line help is available at any time if you do not understand how to use the software. To access help, do any of the following:

- ❏ Press Shift+F1 or choose Index from the Help menu to display the help Index.
- ❏ Choose Using Help from the Help menu for information about using an on-line help system.
- ❏ Choose About GEAR from the Help menu to display version and registration information about your copy of GEAR.

4

Creating a CD-ROM (Windows 95)

This chapter teaches you how to create a CD-ROM. You can read about the following:

- Creating a new project
- Loading CD-ROM project contents
- Writing the CD-ROM project to your CD recorder
- Copying a CD-ROM track

About Creating a CD-ROM

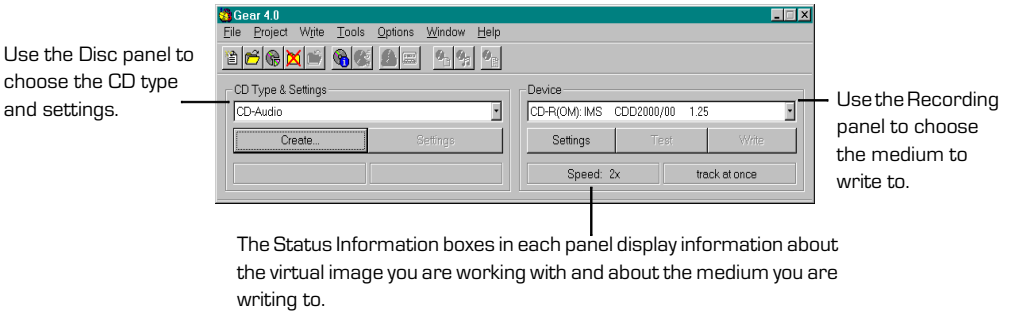
The CD-ROM type is used for recording computer data and always consists of one ISO track. The GEAR CD-ROM project is created to ISO standards with error-checking capabilities. This is referred to as MODE 1 format (yellow book).

When you create a new project, three administration files are created in your current working directory with the following extensions:

- .mxx
- .ixx
- .fxx

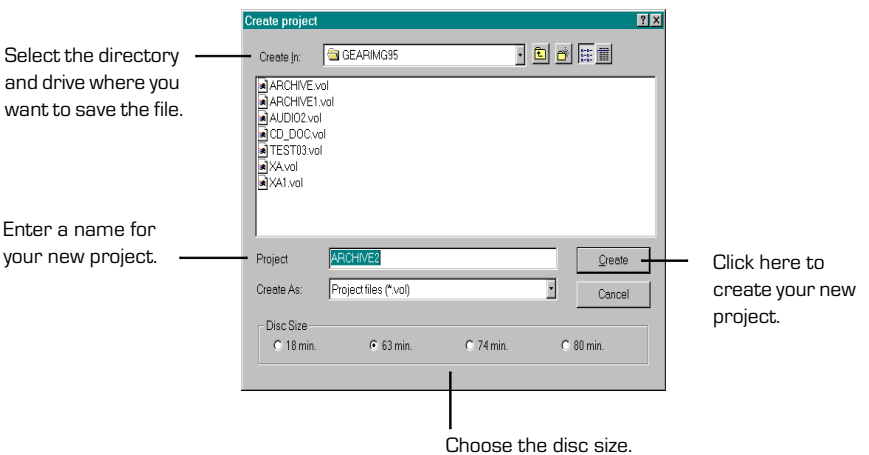
Do not delete or edit these files manually; this results in a corrupt and useless project.

Creating a new CD-ROM project



When you start GEAR, the Workbench appears where you can create a new project. The new project is saved in a *virtual image file*. A virtual image file is a file that contains all the information you need to create a CD.

1. Select CD-ROM as CD type in the Disc Panel.
2. Click Create in the Disc Panel.
   The Create Project window appears.



3. Enter a name for the project.
   GEAR automatically provides the name of the virtual image file.
4. Select the drive and directory where you want to save the file.
5. Select the length of the project.

   You may choose 80, 74, 63, or 18 minutes according to your CD-R disc size.

CD-ROM Disc Size	
18 min.	158 MB
63 min.	553MB
74 min.	650MB
80 min.	703MB

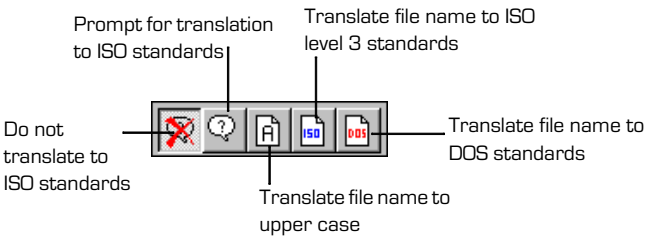
6. Click Create to close the dialog and create the new project. If you choose a Non ISO name, GEAR prompts you to translate to ISO standards.
   A valid ISO name may consist of up to eight alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix D.

You are now ready to start loading the contents of the project.

Creating the CD Project Contents

You can load the data for a virtual image by selecting files in Your Drive window and dragging them to your GEAR Project window. It is that easy!

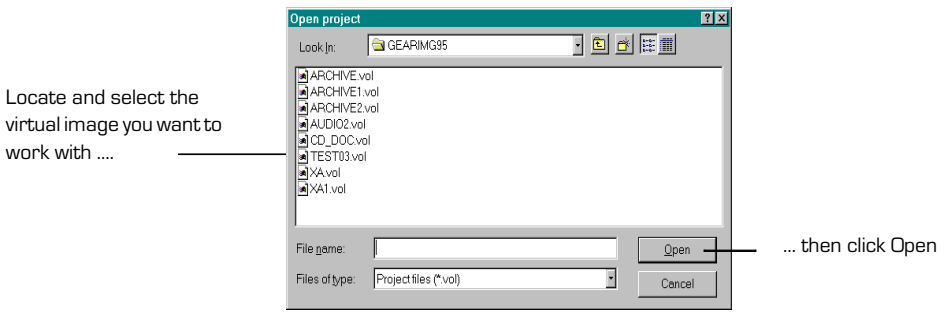
File name handling buttons



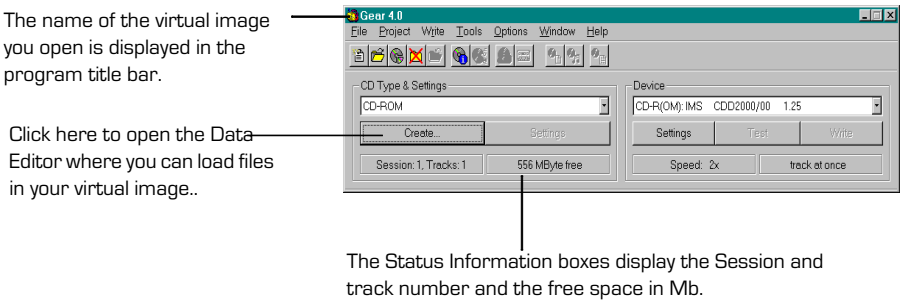
For data tracks only, you can determine how and when non-ISO file and directory names are translated with the File Name handling buttons. You can change the default setting in the GEAR preferences (in the Options menu in the workbench). The option not to translate the file name is particularly useful when you want to use the long Windows 95 file names on your CD. See appendix D for more information on ISO standards.

Loading Files

1. Open the project you want to load files for. To do this:
   - ❏ Choose Virtual Image in the Disc panel and click the Open button or ...
   - ❏ Click the Open CD project button in the toolbar.

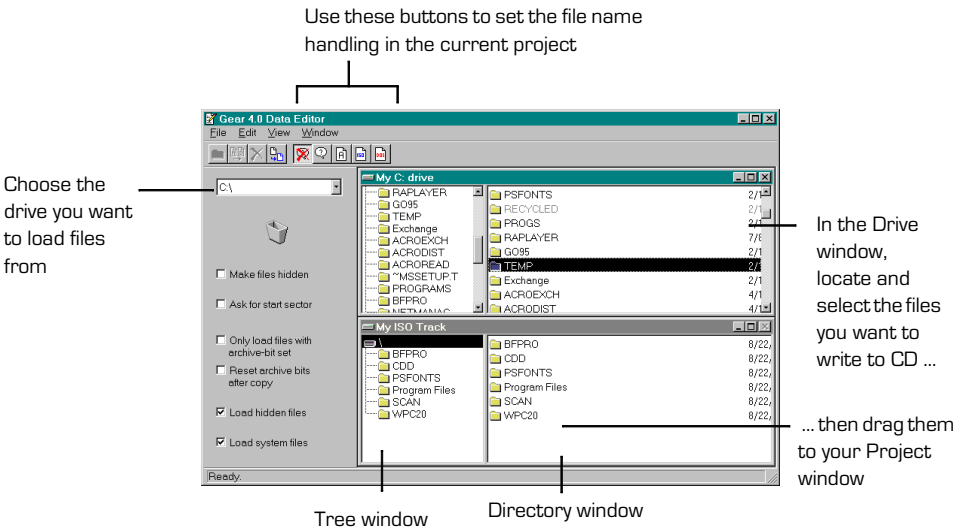


2. Locate and select the virtual image you want to open, then click Open. The workbench appears.



3. Click Edit to open the Data Editor. The Editor window appears.

4. In the Drive Window, locate and select the files you want to load, then drag them to the Project window.



Note: *You can drag directories and files from the directory window only, not from the tree window.*

Note: *You can also drag files to the* GEAR *project window from the Navigator window, desktop, shortcuts, or the* GEAR *File Manager window.*

5. Continue to select and load files for the project until your CD-ROM project is finished.

Recording A CD-ROM project

You can specify the types of settings appropriate for your CD recorder using the Settings button in the Recording Panel. There are three types of settings:

- ❏ Common
- ❏ Advanced
- ❏ SCSI

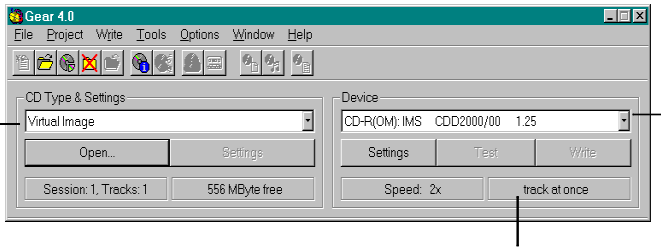
Changing Recorder Settings

1. Click the Setup button in the Recording panel of Workbench to display the CD Recorder Setup dialog or choose CD Recorder Setup (Edit menu).
2. Select the type of recording settings you want to use:
   - ❏ Common Recorder Settings lets you specify speed and multi session options.
   - ❏ Advanced Recorder Settings lets you enter the number of copies you want to record.
   - ❏ SCSI Settings lets you specify the driver and buffer options.

   (For details about these options, see chapter 10 Writing and testing of Projects.)
3. When you have specified your recording settings, click OK.

Testing and Writing to CD-R

Select Virtual Image in the Disc panel to open a project for testing or writing.



Use the Recording panel to choose the medium to write to and to select the Recorder Settings.

The status information boxes display information about the virtual image you're working with and about the medium you are writing to.

Now you are ready to write data to your CD. We recommend that you test before you write to CD-R. If you want, you can start writing immediately after a successful test. GEAR makes things easier for you.

Testing

1. If necessary open the project you want to test. To do this:
   - ❏ Choose Virtual Image in the Disc panel and click the Open button or...
   - ❏ Click the Open CD project button in the toolbar.
2. Choose your CD recorder in the recording panel.
3. Click the Test button on the Recording Panel. A GEAR dialog appears asking you if you want to write the CD-R immediately after a successful test.
4. Click Yes if you want to write the project after a successful test. If the test fails, GEAR displays a warning and does not begin recording.

   GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the project are verified. Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they are loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

Note: *To improve system performance, you can either minimize the fragmentation on your hard disk with a disk optimization program or you can use the physical image file of the project. See Creating a Physical Image in Chapter 10 for more information.*

Writing

1. If necessary open the project you want to record. To do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button or ...
   - ❏ Click the Open CD project button in the toolbar
2. Choose your CD recorder from the pull-down menu in the recording panel.
3. Click the Write button in the recording panel.

   As GEAR writes data to the CD-R, a buffer is filled with data to prevent a a shortage of data in the writing process. A shortage of data would cause a write failure and the loss of your CD-R. In the GEAR information window you can see the percentage of each track written to CD-R and the percentage of data remaining in the buffer. When writing is complete, the disc is ejected automatically. Your disc is ready for reading in any CD-ROM drive!

Copying a Track from CD-ROM

1. Insert a CD-ROM ISO CD in your CD recorder.
2. In the Workbench window, click the CD Info button to display a window containing information about the CD, such as the track types used.
3. Click the Copy button to copy the project to your hard disk.
4. In the GEAR dialog that appears, choose a name for the project and click OK. A GEAR information window displays the percentage of the project written to your hard disk.
5. Click OK to close the CD information window.
   You will now select the project you have copied and write it to CD-R.
6. In the Workbench window, select External Image from the CD Type pull-down menu.
7. Click the Open button in the Disc panel.
8. Select your project in the dialog that appears and click Open. The External Image dialog appears.
9. Select CD-ROM Mode 1 as Image type and click OK.

   You can now write your image to CD-R with a click on the Test or Write button in the Recording panel.

5

Creating a CD-ROM XA (Windows 95)

This chapter provides information about how to create a CD-ROM XA project. You can read about the following:

- ❏ Creating a new CD-ROM XA
- ❏ Opening an existing XA project
- ❏ Loading the project contents
- ❏ Writing the project to your CD recorder
- ❏ Copying a CD-ROM XA track

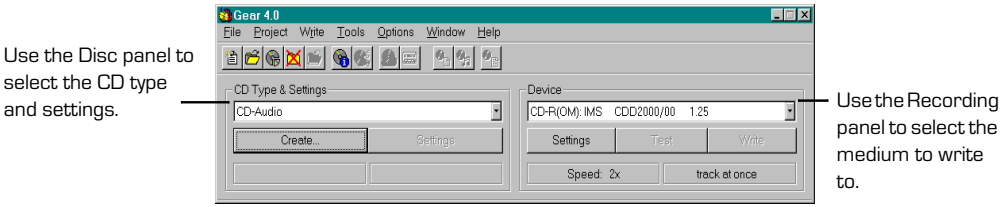
For information about editing the project contents, project settings and labels, see Chapter 7. For information about Audio CD, see Chapter 6.

About Creating a New CD-ROM XA project

XA (eXtended Architecture) is a track type for CD-ROM XA and CD-I. This format is used for multi-media applications and consists of *one track only*. XA is suited for the following formats: CD-ROM XA, CD-I, EB, MMCD, Photo CD, and VideoCD.

Creating a new XA project

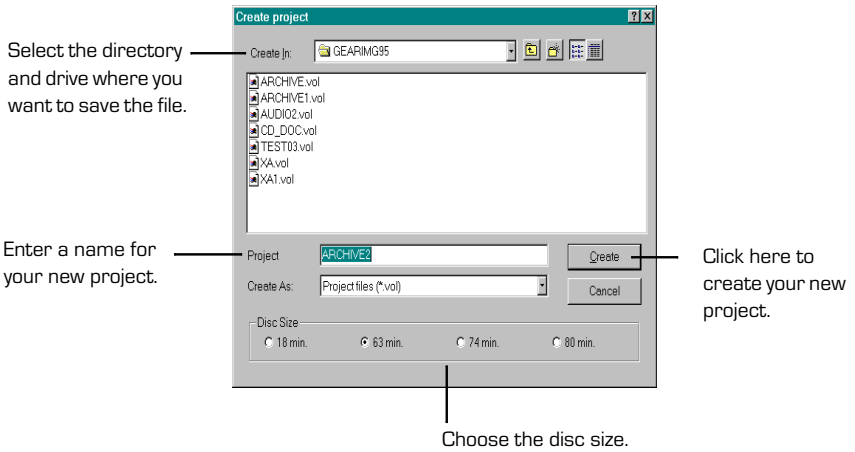
The process to create a new XA project is similar to creating a new virtual image as described in Chapter 3.



The Status information boxes each panel display information about the virtual image you're working with and about the medium you are writing to.

When you start GEAR, the Workbench appears where you can create a new project. The new project is saved in a *virtual image file.* A virtual image file is a file that contains all the information you need to create a CD.

1. Select CD-ROM XA as CD type in the Disc Panel.
2. Click Create in the Disc Panel.
   The Create CD project window appears.



3. Enter a name for the project.
   GEAR automatically provides the name of the virtual image file.
4. Select the drive and directory where you want to save the file.
5. Select the size of the project.

You may choose 80, 74, 63, or 18 minutes according to your CD-R disc size.

CD-ROM XA Disc Size	
18 min.	180MB
63 min.	631MB
74 min.	741MB
80 min.	802MB

6. Click Create to close the dialog and create the new project. If you choose a Non ISO name, GEAR prompts you to translate to ISO standards.
   A valid ISO name may consist of up to eight alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix D.

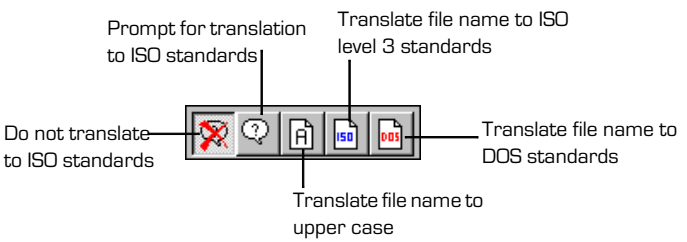
You are now ready to start loading the contents of the project.

Creating the CD project Contents

You can load files for the selected XA track by selecting the files in the File Manager and dragging them to the GEAR project window.

File name handling buttons

In the Data Editor you can determine buttons how and when non-ISO file and directory names are translated with the File Name handling. You can change the default setting in the GEAR preferences (in the Options menu in the workbench).
The option not to translate the file name is particularly useful when you want to use the long Windows 95 file names on your CD. See appendix D for more information on ISO standards.

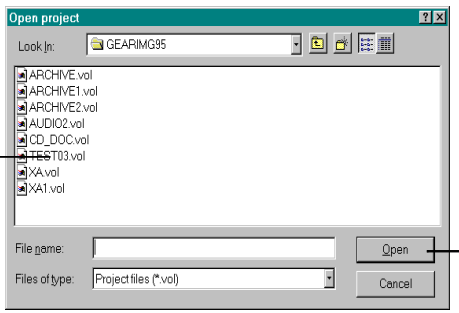


Loading Files

You can load the data for a virtual image by selecting files in Your Drive window and dragging them to your GEAR project window. It is that easy!

1. Open the project you want to load files for. To do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button or ...
   - ❏ Click the Open CD project button in the toolbar..

Locate and select the virtual image you want to work with ....



... then click Open.

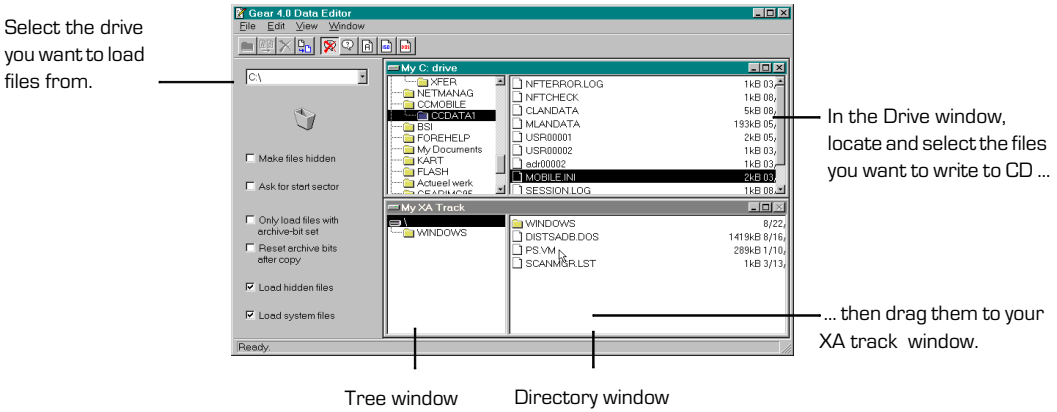
2. Locate and select the virtual image you want to open, then click Open. The workbench appears.

The name of the virtual image you open is displayed in the program title bar.

Click here to open the Data Editor where you can load files in your project.

The Status Information boxes display the Session and track number and the free space in Mb.

3. Click Edit to open the Data Editor. The Editor window appears.
4. In the Drive Window, locate and select the files you want to load, then drag them to your XA track window.



Note: *You can drag directories and files from the directory window only, not from the tree window.*

In Windows 95, you can also drag files to the GEAR window from the Navigator window, desktop, shortcuts, or the GEAR File Manager window.

5. Continue to select and load files until your CD-ROM XA project is finished.

Recording a CD-ROM XA project

Before you write to CD, we recommend you first select your Recording settings. You can specify the types of settings appropriate for your CD recorder using the Settings button in the Recording Panel. There are three types of settings:

- ❏ Common
- ❏ Advanced
- ❏ SCSI

Changing Recorder Settings

1. Click the Settings button in the Recording panel of Workbench to display the CD Recorder Setup dialog.
2. Choose the type of recording settings you want to change:
   - ❏ Common Recorder Settings lets you specify speed and multi session options.
   - ❏ Advanced Recorder Settings lets you enter the number of copies you want to record.

- ❏ SCSI Settings lets you specify the driver and buffer options.

(For details about these options, see chapter 7 Writing and Testing of Projects.)

3. When you have specified your recording settings, click OK.

Testing and writing to CD-R

Now you are ready to write data to your CD. We recommend that you test before you write to CD-R. If you want, you can start writing immediately after a successful test. GEAR makes things easier for you.

Testing

1. If necessary open the project you want to test. To do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button or...
   - ❏ Click the Open CD project button in the toolbar.
2. Select your CD recorder in the recording panel.
3. Click the Test button on the Recording Panel. A GEAR dialog appears asking you if you want to write the CD-R immediately after a successful test.
4. Click Yes if you want to write the image after a successful test. If the test fails, GEAR displays a warning and does not begin recording.

   GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the project are verified. Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they are loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

Note: *To improve system performance, you can either minimize the fragmentation on your hard disk with a disk optimization program or you can use the physical image file of the volume. See Creating a Physical Volume in Chapter 10 for more information.*

Writing

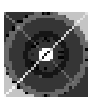
1. If necessary open the image you want to record. To do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button or ...
   - ❏ Click the Open CD project button in the toolbar.
2. Select your CD recorder from the pull-down menu in the recording panel.
3. Click the Write button in the recording panel.

As GEAR writes data to the CD-R, a buffer is filled with data to prevent a a shortage of data in the writing process. A shortage of data would cause a write failure and the loss of your CD-R. In the GEAR information window you can see the percentage of each track written to CD-R and the percentage of data remaining in the buffer. When writing is complete, the disc is ejected automatically. Your disc is ready for reading in any CD-ROM drive!

Copying a Track from a CD-ROM XA

1. Insert a CD-ROM XA CD in your CD recorder.
2. In the Workbench window, click the CD Info button to display a window containing information about the CD, such as the track types used.
3. Click the Copy button to copy the image to your hard disk.
4. In the GEAR dialog that appears, enter a name for the project and click OK.
   A GEAR information window displays the percentage of the image written to your hard disk. When the image is written to your hard disk the Disc information window reappears.
5. Click OK to close the CD information window.
   You will now select the image you have copied and write it to CD-R.
6. In the Workbench window, select External Image from the CD Type pull-down menu.
7. Click the Select external image button in the Disc panel.
8. Select your XA image in the dialog that appears and click Open. The External Image dialog appears.
9. Select CD-ROM XA as Image type and click OK to close the External image dialog.

   You can now write your image to CD-R with a click on the Test or Write button in the Recording panel.



6

Creating an Audio CD (Windows 95)

This chapter teaches you how to create and open an audio CD project. You can read about the following:

- ❏ Creating a new audio project
- ❏ Copying an audio track from CD
- ❏ Loading audio tracks in a project
- ❏ Writing an audio project to CD-R
- ❏ Creating an audio CD in several sessions
- ❏ Using a Cue Sheet to create an Audio CD

For information about editing, project settings and labels, see Chapter 7.
For information about CD-ROM XA projects, see Chapter 5.

About Creating a New Audio CD

When you create an Audio project, you need hard disk files that represent audio. GEAR supports Red Book audio file formats, as well as the following formats:

- ❏ .wav
- ❏ AIFF
- ❏ Sound Designer II

Depending on the audio package you are using, the audio file may or may not contain a sound header, however, audio files should *not* contain sound headers. If sound headers are not removed or cleared, they will cause a sharp click in the resulting audio track on the CD. For .wav, AIFF, and Sound Designer II files, GEAR removes the header automatically. AIFF files are usually in MSB format.

Audio file requirements

The files must always fulfill the following requirements, which are specified in the Red Book:

- ❏ The sample frequency must be 44.1kHz.
- ❏ Audio must be stereo (one sample for the left channel and one sample for the right channel) sampled on 44.1kHz.
- ❏ Each sample must contain 16 bits.
- ❏ The byte order must be the same as the byte order used by your computer; if it is not, you can use the generic option MSBAudio (in gear.ini) to make GEAR swap the audio bytes for all tracks.

For example, LSB audio is the default on DOS and Windows. If you want GEAR to swap byte order, set MSBAudio=True in the gear.ini file.

Warning! *The Philips CDD522 reads audio in MSB format while the Yamaha CD-R100 reads audio in LSB format.*

You can load up to 99 audio tracks in your project. If audio tracks are combined on a disc with an ISO or XA track, you can create up to 98 tracks. The CD audio type is suited for CD Digital Audio.

Copying an Audio Track from CD-ROM

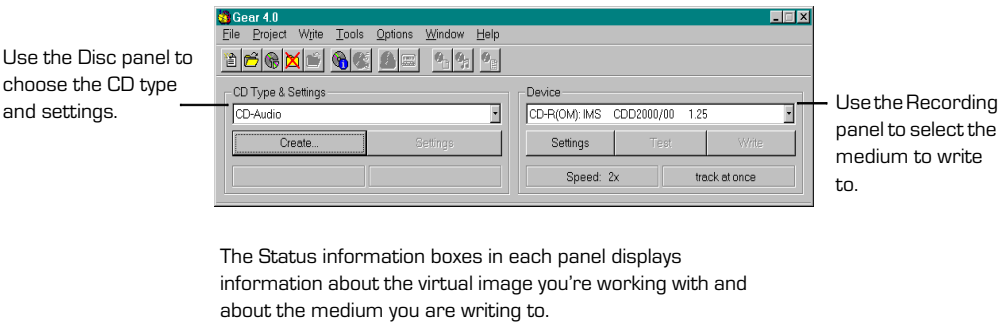
GEAR lets you extract tracks form a CD-ROM and store them on your hard disk for recording on a CD-R.

Note: *Not all recorders support copying digital audio tracks. For more information see chapter 2, Supported recorders.*

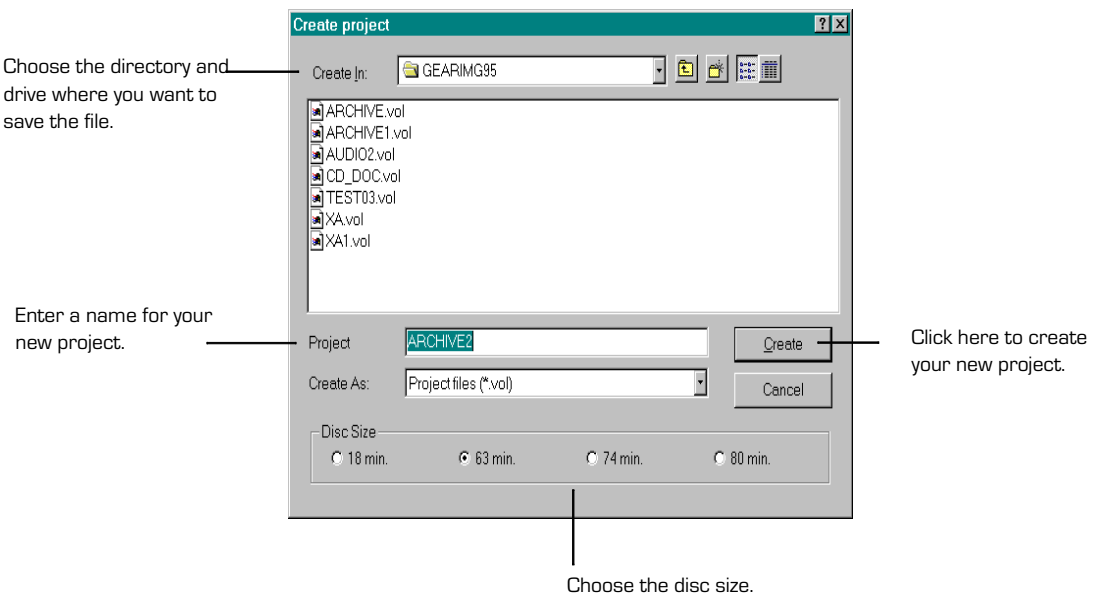
1. Insert an audio CD in your CD recorder.
2. In the Workbench window, click the View CD Info button to display a window containing information about the CD, such as the track types used.
3. Choose the track you want to copy and click the Copy button to copy the image to your hard disk.
4. In the GEAR dialog that appears, choose a name for the file and click OK. A GEAR information window displays the percentage of the track written to your hard disk.
5. Click OK to close the CD information window. You can now load the files in an audio project and write them to CD-R.

Creating a New Audio CD project

When you start GEAR, the Workbench appears where you can create a new project. The new project is saved in a *virtual image file*. A virtual image file is a file that contains all the information you need to create a CD.



1. Select the CD type you want to create in the Disc panel.
2. Click Create to create a new virtual image.
3. Enter a name for the new project. The project file name is provided automatically.



4. Choose the disc size.

Audio Image Data Capacity

Disc Size	CD Audio
18 min.	181MB
63 min.	653MB
74 min.	746MB
80 min.	807MB

5. Select the directory and drive where you want to save the new project file
6. Click Create to close the dialog and create the new audio CD project.
   If you choose a Non ISO name, GEAR prompts you to translate to ISO standards. A valid ISO name may consist of up to eight alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix D.

   Now you are ready to load the audio project contents.

Creating the Audio Project Contents

You can load an audio file for each track on an audio CD by selecting the audio file in the Drive window and dragging it to your CD-ROM window. It's that easy!

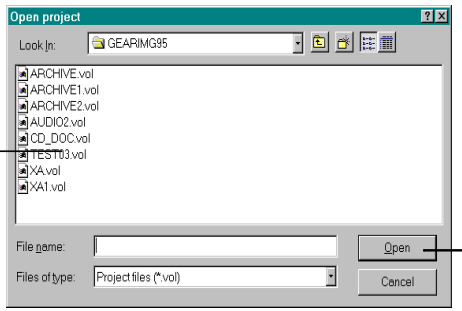
When you load files for a track, keep in mind the following points:

- ❏ Each file you load in the project represents a track
- ❏ You can not load directories

Loading an Audio Track

You can load the data for a virtual image by selecting files in Your Drive window and dragging them to your CD-ROM window. It is that easy!

1. Open the project you want to load files for. To do this:
   - ❏ Choose Virtual Image in the Disc panel and click the Open button or ...
   - ❏ Click the Open CD project button in the toolbar.

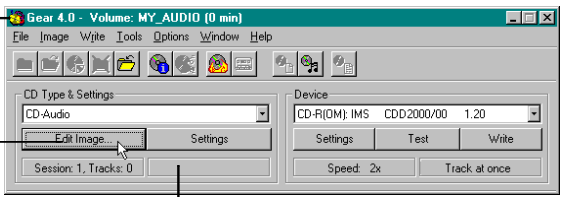


Locate and select the virtual volume you want to work with ....

... then click Open.

2. Locate and select the virtual image you want to open, then click Open. The workbench appears.

The name of the virtual image you open is displayed in the program title bar.



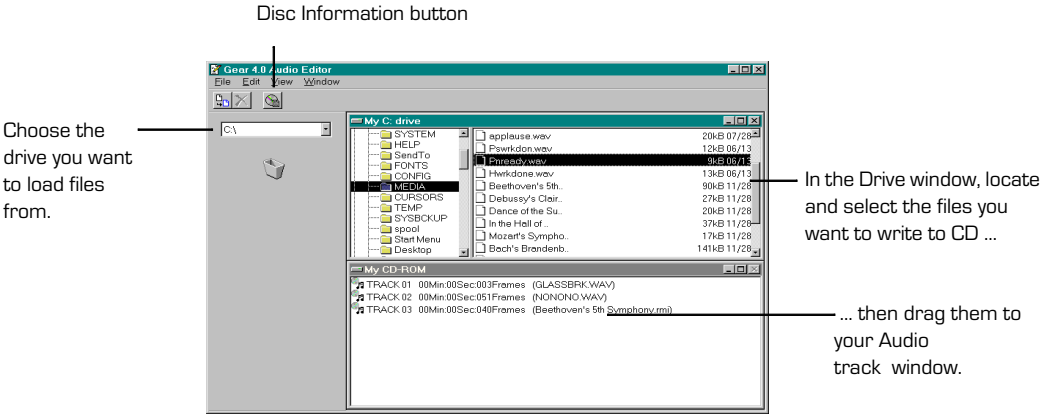
Click here to open the Data Editor where you can load files in your project.

The Status Information boxes displas the Session and track number and the free space in Mb.

3. Click Edit to open the Audio Editor. The Editor window appears.
4. In the Drive Window, locate and select the files you want to load, then drag them to the CD-ROM window. You will see that for each file you drag into your Track window a new Audio track is created automatically.

Note: *You can copy tracks from an audio CD directly in your project. To do this:*

- ❏ *First click the CD info button in the Editor toolbar. A CD information window appears with all the tracks of the audio CD.*
- ❏ *Then drag and drop the tracks you want to copy from the CD information window to your Audio project window. GEAR will create a physical image on your hard disk of all these tracks.*



You cannot drag directories to your Audio image.

In Windows 95, you can also drag files to the GEAR window from the Navigator window, desktop, shortcuts, or the GEAR File Manager window.

5. Continue to select and load files for the image until your Audio CD volume is finished.

Recording an Audio CD

Before you write to CD, we recommend you first select your Recording settings. You can specify the types of settings appropriate for your CD recorder using the Settings button in the Recording Panel. There are three types of settings:

- ❏ Common
- ❏ Advanced
- ❏ SCSI

Changing Recorder Settings

1. Click the Settings button in the Recording panel of Workbench to display the CD Recorder Setup dialog or choose CD Recorder Setup (Edit menu).
2. Choose the type of recording settings you want to change:
   - ❏ Common Recorder Settings lets you specify speed and multi session options.
   - ❏ Advanced Recorder Settings lets you enter the number of copies you want to record and lets you enable or disable the fixation of the disc.
   - ❏ SCSI Settings lets you specify the driver and buffer options.

For details about the recorder options, see chapter 10 ‘Writing and testing of Projects’.

3. When you have specified your recording settings, click OK.

Testing and writing to CD-R

Now you are ready to write data to your CD. We recommend that you test before writing your project to CD-R. If you want, you can start writing immediately after a successful test. GEAR makes things easier for you.

Note: *If you record the tracks in more than one recording session make sure the disc fixation is disabled until the last session.*

Testing

1. If necessary open the audio project you want to test. To do this:
   - ❏ Choose Virtual Image in the Disc panel and click the Open button or...
   - ❏ Click the Open CD project button in the toolbar.
2. Choose your CD recorder in the recording panel.
3. Click the Test button on the Recording Panel. A GEAR dialog appears asking you if you want to write the CD-R immediately after a successful test.
4. Click Yes if you want to write the project after a successful test. If the test fails, GEAR displays a warning and does not begin recording.

   GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the project are verified. Each file’s size and time stamp are compared to the file’s size and time stamp when it was loaded. Differences may occur if files are changed after they are loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

Note: *To improve system performance, you can either minimize the fragmentation on your hard disk with a disk optimization program or you can use the physical image file of the project. See Creating a Physical Image in Chapter 10 for more information.*

Writing

1. If necessary open the audio project you want to record. To do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button or ...
   - ❏ Click the Open CD project button in the toolbar
2. Choose your CD recorder from the pull-down menu in the recording panel.
3. Click the Write button in the recording panel.

As GEAR writes data to the CD-R, a buffer is filled with data to prevent a a shortage of data in the writing process. A shortage of data would cause a write failure and the loss of your CD-R. In the GEAR information window you can see the percentage of each track written to CD-R and the percentage of data remaining in the buffer.
When writing is complete, the disc is ejected automatically. Your disc is ready for reading in any Audio CD player!

Creating an Audio CD in several sessions

If you have not enough Megabytes left on your hard disk to hold all the audio files or if you have not prepared all your audio files for recording, you can load files in several recordings.
Audio CDs should be single-session discs because CD players are single-session readers. Therefore you cannot finalize an audio CD until you have loaded all the audio files for all the tracks.
You must therefore disable the multi-session and fixation options in the recording panel until the recording of the last track to CD-R. The disc must then be fixated for an Audio player to be able to read it.

1. Disable the multi-session and disc fixation options in the recorder settings.
2. Write the audio tracks to CD-R except for the last track.
3. Enable the disc fixation.
4. Write the last track.

Using a Cue sheet to create an Audio CD

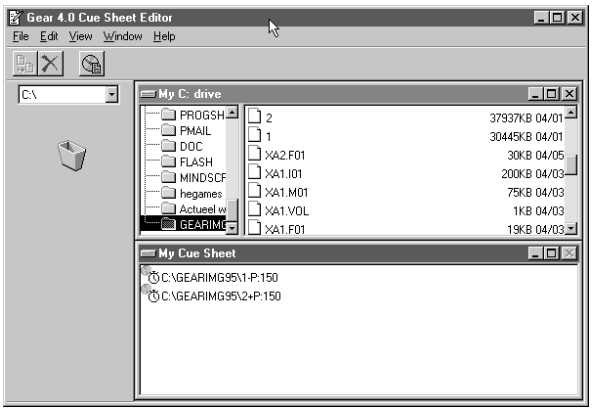
If you have a Disc at Once compatible recorder you can create a professional audio CD using a Cue sheet. The Cue sheet should contain all the tracks you want to record. You create the Cue sheet in the GEAR Cue sheet editor or in any plain ASCII editor.

The Cue sheet editor will contain a list of images that will be loaded into consecutive tracks on the disc. The image files can be loaded by a simple drag and drop from your Drive window to the Track list. For each file loaded you can specify the type of data enclosed. If a Disc at Once recorder is used to write the image you can also specify the pause between the tracks.

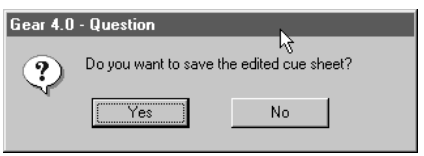
To create a CD-R using a Cue Sheet you must do the following:

1. Select Cue Sheet in the CD type pull down menu.

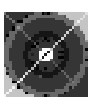
2. Click the Cue Sheet editor button in the toolbar.
   The Cue Sheet editor appears with a new Cue sheet.



3. Load the files representing the images from the Drive window into the Cue sheet window.
4. Double click the file names in the Cue sheet window to specify the track type and the pause after the track.
5. Close the Cue sheet editor after selecting all the files you want to write to CD-R.
   A GEAR dialog appears where you are prompted to save the Cue sheet.



6. Click Yes to save the Cue sheet. GEAR provides a name automatically. The workbench window reappears.
7. Click the write button in the recording panel to write the project to CD-R .



Working With Virtual Images (Windows 95)

This chapter provides information about working with virtual images that already contain data. In this chapter, you can read about the following:

- ❏ General information about virtual images
- ❏ Editing the contents of a virtual image
- ❏ Editing virtual images settings

For information about creating a virtual image and tracks and loading their contents, see Chapter 4. For information about working with external image files, see Chapter 9.

About Virtual Image Files

A *virtual image* is the minimal amount of information needed to create a CD. The opposite of the virtual image is a *physical image*, which is the entire CD stored on a hard drive before it is recorded.

When you create a new virtual image, the file is called a *volume administration file*. You *must* have more than 25MB of free disk space available to create a volume administration file.

Three administration files are created for each new track you create in the current working directory. The files are named using the first eight characters of the image name plus the following extensions (xx represents the track number):

- .mxx
- .ixx
- .fxx

You should never edit or delete these files manually; this results in a corrupt and useless image. Administration files are deleted automatically when you delete the associated image.

Working With an Existing Virtual Image

An existing virtual image can be one of the following:

- A GEAR project file
- An external image file

You can edit and write to GEAR virtual images, however, you can only write an external image file to a CD-R disc or tape. For information about writing to GEAR volumes, see Chapter 11.

Calculating Virtual Image Capacities

You can use the following formula to calculate the capacity of a virtual image:

virtual image capacity = sector data capacity (bytes) x length (minutes) x 60 (seconds) x 75 (number of sectors)

The following table shows the sector data capacities for each track type:

Track Type	Sector Data Capacity
ISO	2048 bytes
XA and CD-I	2336 bytes
CD Audio (DA)	2352 bytes

The following table shows the virtual image data capacity for each disc size and track type:

Virtual Image Data Capacity

Disc Size	ISO	XA and CD-I	CD Audio
18 min.	158 MB	180MB	181MB
63 min.	553MB	631MB	653MB
74 min.	650MB	741MB	746MB
80 min.	703MB	802MB	807MB

As you create your new image, you must keep the following in mind:

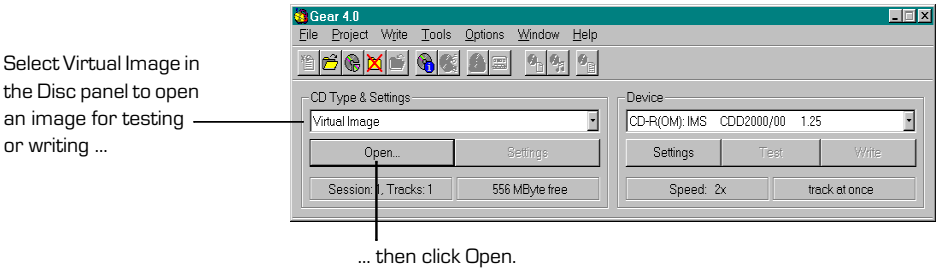
- ❏ The track number is assigned automatically and is relevant only for CD Audio. With the exception of CD Enhanced and CD Plus, ISO and XA tracks are *always* assigned to track number 1.
- ❏ A virtual image can have *only* one ISO *or* XA track; it may not have both types of tracks.
- ❏ A virtual image can contain up to 99 tracks.
- ❏ It is impossible to assign CD Audio to track number 1 if you create either an ISO or XA track on the virtual image .
- ❏ When you create a new track, it is automatically assigned the maximum available space on the virtual image.

Opening a Virtual Image for Editing

Before you open a virtual image, you must first close any image that is already open. The selected image is expanded to the size of the maximum free space available within the virtual image. This space is determined by:

- ❏ The maximum disc size you specified when you created the virtual image
- ❏ The amount of memory required by the other tracks within the same image

Warning! *You can edit images with a .vtl extension only in GEAR3.01 or earlier.*



1. To open an existing image you do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button, or
   - ❏ Click the Open CD project button in the toolbar.

   The Open project dialog appears.
2. Locate and double-click the virtual image you want to open.

Editing the contents of a virtual image

You can edit a selected virtual image in the following ways:

- ❏ Create a new directory on the track
- ❏ Rename a file or directory on the track
- ❏ Delete selected files and directories from the track

Tip: *To increase CD-ROM access time, limit the number of entries in a directory to 50.*

Note: *DOS recognizes file names of up to eight characters; file names can have a three-character extension. Other systems are not limited to this restriction.*

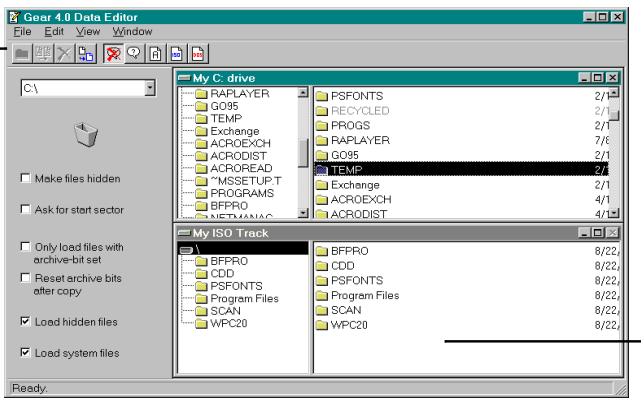
Selecting and Deselecting Files and Directories

You can select one file or directory or you can select multiple files and directories to rename or delete. When you use the Select and Deselect commands in the Files/Directories submenu of the Edit menu, you can enter standard DOS wildcard characters such as *.txt for all text files.

To do this...	Do this...
Select one file or directory	Click the file or directory to highlight it
Select multiple files and directories	Click the first file or directory, then Shift+click subsequent consecutive files or directories
	Choose Select from the Files/Directories submenu in the Edit menu, enter selection criteria, then click OK
Deselect selected files or directories	Choose Deselect from the Files/Directories submenu in the Edit menu, enter a selection specification, then click OK

Creating a New Directory

Click this button to create a new directory in the GEAR image window ...



... the new directory appears in your GEAR image window.

1. Open the image you want to edit.
2. Click Edit. The Data Editor appears.

3. Click on the New directory button in the Editor toolbar or select New directory in the Edit menu.
4. In the dialog that appears, enter a valid ISO name for the new directory.

   A valid name may consist of up to 30 uppercase, alphanumeric characters and underscores (_). (DOS can handle only up to eight characters.) For information about valid ISO-9660 file and directory naming, see Appendix D. If you enter an non-ISO name, GEAR prompts you to translate the name.

5. Do one of the following:
   - ❏ Click Yes to have GEAR translate the file name to valid characters.
   - ❏ Click No to load the file anyway.
6. Click OK.

   The new directory appears in the working window.

Renaming Files and Directories

1. In the Data editor select the files and directories you want to rename.
2. Click the Rename Files/Directories button on the toolbar or choose Rename from the Files/Directories submenu of the Edit menu.
3. In the dialog that appears, enter a new name for the specified file or directory, then click OK.
4. Repeat step 3 for each selected file or directory if you selected more than one in step 1.

Deleting Files and Directories

1. Select the files and directories you want to delete.
2. Click the Delete File/Directory button on the toolbar or choose Delete from the Files/Directories submenu in the Edit menu.
3. In the dialog that appears, confirm the deletion of the selected file.

   If you selected multiple files and directories in step 1, GEAR continues to prompt you until you have confirmed or cancelled the deletion of all selected files.

Loading Hidden Files.

1. Turn on the Load Hidden files check box in the Data Editor.
2. Select the files and directories you want to load and drag them to your GEAR image window.

   Hidden files will be loaded until you turn off the check box.

Editing Project Settings

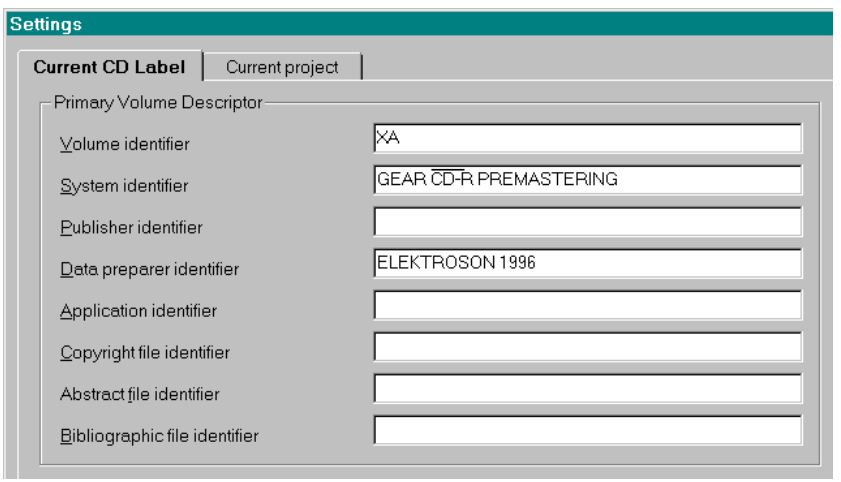
You can edit the settings for the currently-selected project. The default values are specified in the gear.ini file and can be changed using the Preferences command in the Options menu.

- ❏ You can edit the CD label for the currently selected project. The default values are specified in the GEAR preferences. The default CD label is the name the project received when created.
- ❏ You can edit the Current Project settings. The default values are specified in the the GEAR preferences.

Note: *Most of the current project settings can be set directly in the Data editor window. Only the maximum number of directories and the directory nesting must be set here.*

For detailed information about the settings, see the appendix ‘GEAR initialization/ preferences file’.

1. Click Settings in the Disc panel to display the Settings dialog.



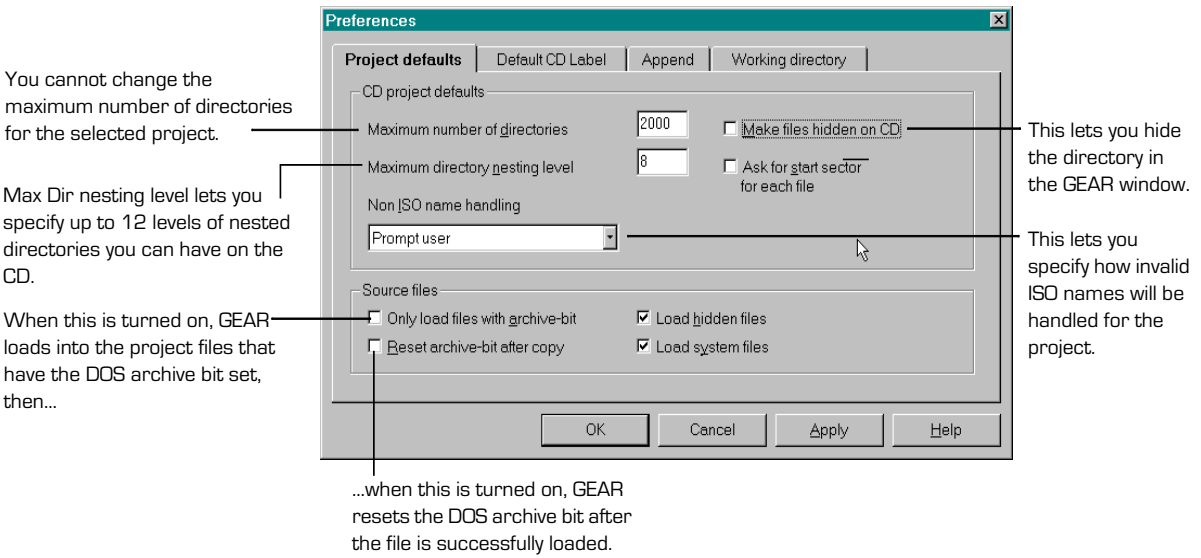
2. Enter the information you want to save with the project in the Current CD Label.
3. Select the settings for the loading of files in the Current Project. You can set all the options in the Data Editor as well.
4. Click OK to close the Settings dialog and return to the Workbench.

GEAR preferences

Note: *You can edit the current project settings with a click on the Settings button in the Disc panel.*

The GEAR preferences are saved in the gear.ine file. They will be the default values for each new project you will create. You can edit the following settings:

- ❏ Generator settings; settings used when loading files.
- ❏ CD label settings; project information that can be written to CD-R or Tape.
- ❏ Append settings; specifies the append options for a multi-session disc.
- ❏ Working directory; directory where the project file is saved.



1. Select preferences from the Options menu to display the Preferences dialog.
2. Make all the changes you want, then click OK to save the preferences to the gear.ini file.

   For detailed information about the settings, see the appendix ‘GEAR initialization/preferences file’.

8

Working With Multi-Session Discs (Windows 95)

GEAR lets you append a new session to any session that already exists on a multi-session disc. This chapter discusses adding additional data to a disc.

For information about creating projects and loading their contents, see Chapters 4, 5, 6, 7.

Appending a Multi-Session Disc

By appending a multi-session disc, you can do the following:

- ❏ Add additional data to the disc
- ❏ Recover data from older sessions
- ❏ Skip the last session if there are read errors
- ❏ Create CD Enhanced or CD Plus discs

One of the sessions on the disc you want to append is used as the basis of a new virtual image. The content of the virtual image is edited. Finally, the virtual image is written to the CD-R disc.

Append preferences

Before you start, you should select the append mode in the GEAR preferences. You can choose from the following modes:

- ❏ Automatic Append. GEAR uses the settings of the CD project you want to append to.
- ❏ Manual Append. You may select the track you want to append to and the type of track you want tro append.

  Note: *Incorrect combinations of track types may result in a non-standard CD that cannot be read.*

- ❏ New append. This mode will append an empty track. All previous sessions will become inaccessible. A disc lost due to a write failure can be used again after the writing of a new empty track.
- ❏ Multi volume Append. In this mode you will be able to create a multi volume disc. To enable the reading of the separate volumes, you will need special drivers for the CD player.

Changing the append mode

In order to change the append mode you must do the following:

1. Choose Preferences in the Options menu.
2. Select the Append tab in the Preferences dialog.
3. Select an Append mode and click OK. GEAR asks if you want to save the changes to the gear.ini file. If you want to use the settings in future sessions choose Yes.

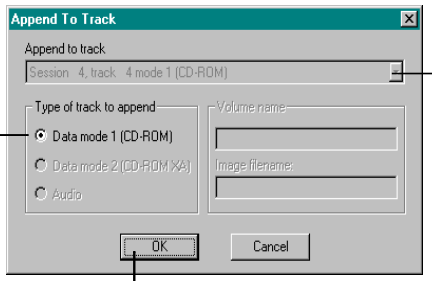
Appending to a multi-session CD-R

When you append a session to CD-R the selected session/track is read and a new virtual image is created. The virtual image contains the same directory/file structure as the session and is displayed in the project window.

Note: *In order to append a multi-session CD-R, your recorder must be turned on and a disc must be inserted in the CD drive.*

1. Click the Disc Info button. The Disc information window appears.
2. Select the session/track number you want to attach the next session to.

3. Click Append to display the Append To Track dialog.



If you selected an audio track, select a data format for the next session and ...

The track you selected in the Disc Information window is displayed here.

... then click OK to start appending.

If you have selected the manual append mode in the GEAR preferences you may now select the track type. If you selected an audio track, select a data format for the next session.

4. Click OK to create the new project and close the Append dialog. The GEAR information window displays the percentage that is retrieved.

Note: *GEAR uses the name of the volume on CD-R as the name for the new project. If a project with the same name already exists on your hard drive,* GEAR *prompts you to overwrite the existing Project.*

5. Edit the new Project content by adding or removing files.

6. Append the new session to the CD-R using the Write button in the Recording panel. Only changes will be written to the CD-R disc. Every time you write a new session, an additional 15MB is added to the CD-R disc. This is known as *overhead*.

9

Working With External Images (Windows 95)

This chapter provides information about working with virtual images that were created using an authoring or formatting package other than GEAR. In this chapter, you can read about the following:

- ❏ Opening an external image
- ❏ Choosing a predefined format

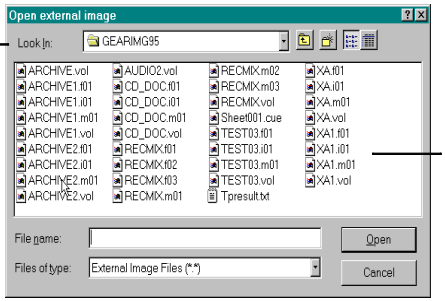
For information about virtual images you create with GEAR, see Chapters 4, 5, 6, and 7.

External Images

An *external image* refers to any image you have created using another authoring or formatting package, such as CD-I, 3DO, or VideoCD. You can not edit an external image in GEAR, however, you can use GEAR to write an external image to a CD-R disc or a premaster tape. Before you write an external image, you must select it and define its parameters.

1. Select External image as CD type in the Disc Panel.
2. Click the 'Open' button to display the Open External image dialog.

Select the drive and directory where the external files are located.

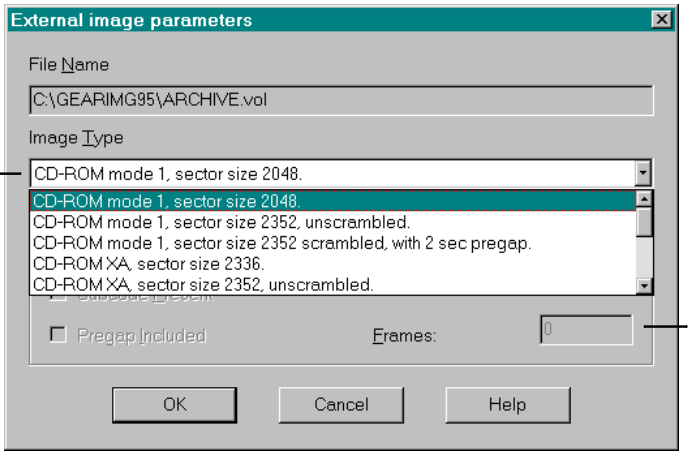


Select External image files here.

3. Locate the external image you want to open, then click Open.

   The External Image Parameters dialog appears.

Choose a predefined or user-defined format from this drop-down list.



Enter the values you want to use for a user-defined image type using these opions.

4. Choose a format from the Image Type drop-down list. For information about predefined formats, see the table under Choosing Predefined Formats, in the next section.

Note: *Choose User-defined image type from the Image Type drop-down list if you to adjust the values in the dialog.*

5. Click OK, when you are finished.

You can now write the external image to CD-R or tape.

Choosing Predefined Formats

You can choose any of the following predefined formats.

Type #	Image Type Format	External Volume Type
1	CD-ROM mode 1 (ISO etc.), sector size 2048	Standard ISO, HFS, or CDTV image
2	CD-ROM mode 1 (ISO etc.), sector size 2352	Standard ISO with EDC/ECC codes
3	CD-ROM mode 1 (ISO etc.), sector size 2352, scrambled sectors with 2 seconds pre-gap	ISO with EDC/ECC codes, pre-gap and scrambled
4	CD-ROM XA mode 2, sector size 2336	Standard XA or EB XA (e.g., images with Mammoth XA streams)
5	CD-ROM XA mode 2, sector size 2352	Standard XA with EDC/ECC codes
6	CD-ROM XA mode 2, sector size 2352, scrambled sectors with 2 seconds pre-gap	XA with EDC/ECC codes, pre-gap and scrambled
7	CD-I mode 2, sector size 2336	Standard CD-I without EDC/ECC codes
8	CD-I mode 2, sector size 2352	Standard CD-I with EDC/ECC codes
9	CD-I mode 2, sector size 2352 with 2 seconds pre-gap	Standard CD-I with pre-gap, EDC/ECC
10	CD-I mode 2, sector size 2352, scramble sectors with 2 seconds pre-gap	CD-I with EDC/ECC codes, pre-gap and scrambled; uses the same output format as that of most CD-I authoring tools
11	Standard CD digital audio	Red Book audio (44.1kHz, 16 bit, stereo)

Keep in mind the following points about image types:

- ❏ The size of the pre-gap should always be two seconds (150 sectors). Scrambled images must contain sync, header, and EDC/ECC code information.
- ❏ Unscrambled images can be accepted with a 2352 sector size without the sync, header, and EDC/ECC filled in.
- ❏ The byte order of audio files must be the same byte order used by the computer running the GEAR software. If this is not the case, you can use the generic option MSBAudio= in the gear.ini file to make GEAR swap the audio bytes for all tracks.

  With LSB audio default, if MSBAudio=True, each track will be swapped by GEAR. *Audio files should not contain any sound header*. If sound headers are not removed or cleared, they will cause a sharp click in the resulting audio track on the CD. Audio files should contain only 16-bit samples and must be stereo (one sample for the left channel and one sample for the right channel) sampled on 44.1kHz.

- ❏ The external image files option lets you select one file only. If the external volume consists of more than one file, you can choose Track list files (*.tlf) under List Files of Type in the Open imagefile dialog to specify more than one external file.

  The track list file contains one or more lines where each line specifies a track of the CD-ROM (you can use a full path). For example, to write a mixed-mode image—one that contains mode 1 or mode 2 data—you can specify the following lines in a track list file:

```
image.dat/1
audio.2/11
audio.3/11
```

track path name — image type number

Tip: *Be sure to leave a space between the track name/path and the image type.*

10

Testing and Writing a Virtual Image File (Windows 95)

This chapter provides information about verifying virtual images and writing them to CD-R or premaster tape. You can read about the following:

- ❏ General information on recording
- ❏ Creating a physical image
- ❏ Verifying a virtual image
- ❏ Recorder Settings
- ❏ Testing and Writing to CD-R
- ❏ Writing to a premaster tape

Data Transfer Rates

The system has to maintain a high data transfer rate to a CD recorder. If the transfer rate cannot be maintained, the writing of the CD-R will fail. CD-R discs can be written at single, double, or quadruple speeds. The data transfer rate is dependent on the speed of recording and the type of track written (ISO, CD-ROM XA, or CD digital audio). The following table shows the required transfer rates:

	1x	2x	4x	6x
ISO	153 KB/s	307 KB/s	614 KB/s	918 KB/s
CD-ROM XA	175 KB/s	350 KB/s	700 Kb/s	1050 KB/s
CD Digital Audio	176 KB/s	352 KB/s	705 KB/s	1056 KB/s

For external (foreign) images, the required transfer rate depends on the selected sector size. 2048 bytes/sector is comparable to ISO; 2336 bytes/sector is comparable to CD-ROM XA; 2352 bytes/sector is comparable to CD digital audio.

You can influence the Data transfer in the Recording settings. See below in the SCSI settings.

Improving System Performance

You can try any of the following to optimize your system's performance:

- ❏ Close any other software applications you are running in the background.
- ❏ Use a defragmentation utility to defragment your hard disk.
- ❏ Check to see whether your hard disk does recalibration.
- ❏ Check to see if your SCSI termination is correct. A incorrect SCSI termination can cause delays on the SCSI bus.
- ❏ Check your smart drive configuration. If you are using a physical image, disable smart drive for the drive on which the physical image files are located. If you are using a virtual image, enable smart drive for the drive where the image files are located.
- ❏ Use a physical image instead of a virtual image.
- ❏ Use a lower recording speed if one is available.

Important: *The performance of a system for writing a CD-R is better if the access time of your hard disk is lower. This is more important than a fast processor. A lot of hard disks regularly perform recalibration. This means that the hard disk verifies its read/write operation to prevent problems. If this happens during the writing of a CD-R disc, it may result in a data transfer problem. Refer to your hard disk documentation or speak with your supplier about whether your hard disk performs recalibration.*

Recommended Hard Disks

The best hard disks for writing CD-R discs are multimedia or AV (audio visual) hard disks. These types minimize recalibration time and guarantee a high sustained data rate.

Note: *Call us or check the Elektroson BBS or CompuServe forum for updated lists of recommended hard disks.*

Creating a Physical Image

A physical image is a sector-by-sector copy of the CD-ROM you are about to create. You should use a physical image for writing to CD-R when the transfer rate for recording has to be increased. Otherwise, you can usually write with a virtual image.

Before you create a physical image, GEAR verifies the virtual image. If the file is not up to date, the physical image is not created. You can update the virtual image by reloading the reported files.

Depending on your needs, you can make a track or an entire image physical. The sector sizes for the tracks are based on their type as follows:

Track Type	Sector Size
ISO	2048 bytes
CD-ROM XA	2336 bytes
DA	2352 bytes

The physical image you create contains the current contents of the virtual image. Subsequent changes you make to the virtual image do not affect the current physical image.

The physical image file names are <volume name>.pxx, where xx stands for the track number. These files are always written to the GEAR working directory.

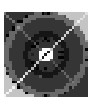
Converting the Image

1. Open the virtual image you want to create a physical image for.
2. Select ‘Convert to physical’ from the pull down menu in the Recording panel.
3. Click the Write button.

   As GEAR creates the physical image, the status is reported in the GEAR information window.

4. If physical files already exist for the image, you are prompted to overwrite them.

   GEAR displays a message when the physical image has been created successfully.



Verifying a Virtual Image

When you verify a virtual image, GEAR checks the size, date, and time stamp for each file in the track or image. If there are discrepancies, it usually means a file has been updated since it was loaded into the image and GEAR prompts you to update the image.

1. With the image you want to verify open, choose Verify from the Image menu.
2. Update the image by reloading the reported files and directories.

   As GEAR verifies the track or image, the status of the verification is reported in the GEAR information window.

Note: *If you selected 'Verify after write' in the Recorder Settings, GEAR automatically verifies the written image against the image on hard disk.*

Recorder Settings

You can specify the types of settings appropriate for your CD recorder using the Settings button in the Recording Panel. There are three types of settings:

- ❏ Common
- ❏ Advanced
- ❏ SCSI

Common Recorder Settings

In the Common Recorder Setup, you can do any of the following:

- ❏ Select a recording method: disc-at-once, track-at-once, or incremental, depending on your recorder model.

  Incremental lets you write in fixed packet size, which is determined by the recorder's buffer to eliminate or minimize buffer underrun.

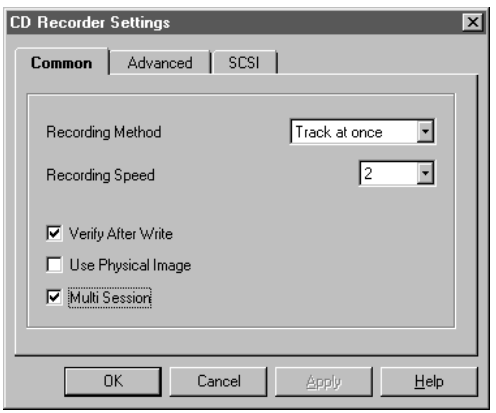
  Disc at once means your recorder writes the lead in, then the track data, then the lead out. This method is especially suited for Audio recording.

Important: *You cannot use disc at once recording to record a multi-session disc.*

Track at once means your recorder first writes the track data, then finalizes the disc by writing a lead in and lead out. This method is used in multi-session recording.

- ❏ Specify the speed at which you want to record: 1x, 2x, 4x, or 6x, depending on your recorder model.
- ❏ Verify the data after writing your image to CD-R.
- ❏ Use a physical image file for recording. If the test run fails, you can convert your virtual image to a physical image and use it by checking the box. If you did not create a physical image, GEAR prompts you to use the virtual image instead.
- ❏ Enable the Multi-session option. If you want to be able to append other sessions to your CD-R you will have to check this box.

Important: *Not all CD-ROM players support the reading of multi-session discs.*



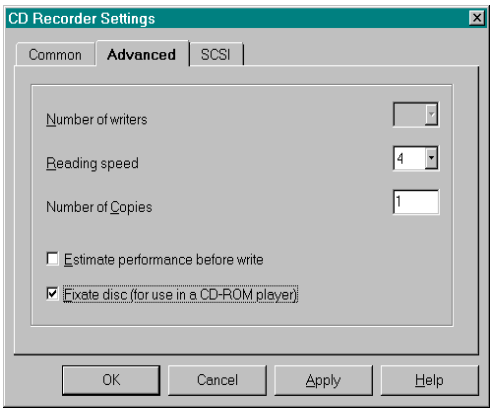
Advanced Recorder Settings

In the CD Recorder Setup dialog for Advanced Recorder Settings you can do any of the following:

- ❏ Specify the number of writers.
- ❏ Choose the Reading Speed of your recorder.
- ❏ Enable a software estimate before writing. A software estimate tests the rate at which data is transferred to the CD-R. This option is quicker than the Test option in the recording panel but it is a software estimate and not as accurate as a test run.
- ❏ Disable the fixation of a disc. Until you fixate the disc, you can only read it on a CD recorder. You can use this option to record multiple tracks on a CD without recording in multiple sessions.

You can also specify whether to fixate the disc after recording (that is, record the lead in or lead out).

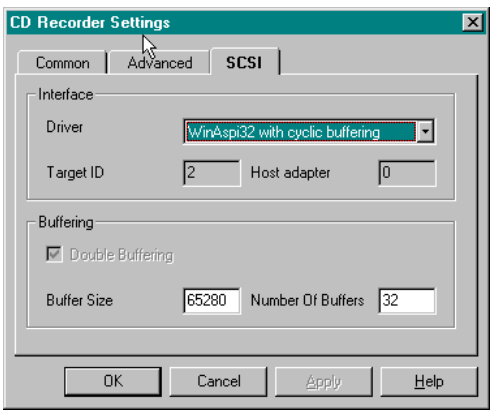
If you do not fixate the disc, you can specify a multi-session recording, that is, recording can occur over several different sessions on the same or different recorders.



SCSI Settings

In the CD Recorder Setup dialog for SCSI Settings, you can specify the driver and buffer settings.

Note: *A special feature of the GEAR windows 95 software is the use of Cyclic buffering during the recording. You can change the number of buffers and their size to ensure the flawless writing of your CD-R. The phenomena of buffer underrun belongs to the past due to this special GEAR feature.*

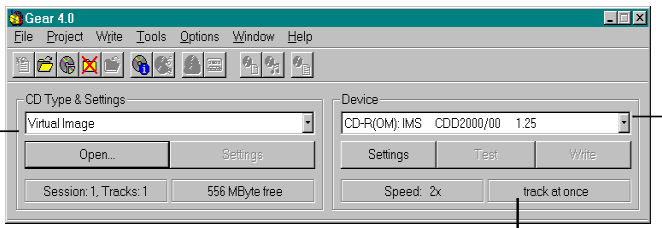


Changing Recorder Settings

1. Click the Settings button in the Recording panel of Workbench or choose CD Recorder Setup (Edit menu).
   The CD Recorder Setup dialog appears.
2. Select the recording settings you want to use.
3. Click OK to return to the Workbench.

Testing and writing to CD-R

Select Virtual Image in the Disc panel to open an image for testing or writing.



Use the Recording panel to choose the medium to write to and to select the Recorder Settings.

The status information boxes display information about the virtual image you are working with and about the medium you are writing to.

Now you are ready to write data to your CD. We recommend that you test before you write to CD-R. If you want, you can start writing immediately after a successful test. GEAR makes things easier for you.

Writing on the fly

GEAR creates the virtual image that is written to CD-R just before actually writing it. An interruption in the flow of data to your CD-recorder would cause a write failure and the loss of your CD-R. To ensure a steady flow of data GEAR fills buffers with data. As GEAR writes data to the CD-R, the GEAR information window provides you with information on the percentage of each track written to CD-R and the percentage of data remaining in the buffer. See SCSI recording settings for more information.

Testing

Note: *Test-mode recording takes the actual time that recording takes even though you are not recording a disc.*

1. If necessary open the virtual image you want to test. To do this:
   - ❏ Select Virtual Image in the Disc panel and click the Open button or...
   - ❏ Click the Open CD project button in the toolbar.

2. Choose your CD recorder in the recording panel.
3. Click the Test button on the Recording Panel. A GEAR dialog appears where you can choose to write the CD-R immediately after a successful test.
4. Click Yes if you want to write the image after a successful test. If the test fails, GEAR displays a warning and does not begin recording.

   GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the volume are verified. Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they're loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

Note: *To improve system performance, you can either minimize the fragmentation on our hard disk with a disk optimization program or you can use the physical image file of the volume. See Creating a Physical Volume in Chapter 9 for more information.*

Writing to CD-R

When you write to a CD-R disc, GEAR uses either the virtual image or the physical image files. When the virtual image is used, the physical image is created and written to disc immediately. You can use physical image files if data transfer rates to the recorder are not fast enough.

If the Estimate before write check box is turned on in the Advanced Recording Settings dialog, GEAR checks your system performance before writing the selected volume to CD-R. If the performance is sufficient, GEAR continues to write the disc. If the performance is insufficient, writing is aborted.

1. If necessary open the image you want to test. To do this:

   ❏ Select Virtual Image in the Disc panel and click the Open button or...

   ❏ Click the Open CD project button in the toolbar.
2. Choose your CD recorder from the pull-down menu in the recording panel.
3. Click the Write button in the recording panel.

   If you selected 'Use Physical image' in the Recorder Settings GEAR will look for the physical image first. If it is not available, GEAR prompts you to use the virtual image instead. Do one of the following:

   ❏ Click Yes to use the virtual image.

   ❏ Click No to cancel the writing.

   When writing is complete, the disc is ejected automatically. Your disc is ready for reading in any CD-ROM drive!

Files Created After Writing to CD-R

The CD-R command always creates the following files after you write a CD:

- ❏ wo_ident.txt
- ❏ woresult.txt.

The wo_ident.txt file contains the table of contents (TOC) and some customer information that's written to the CD recorder. The customer information is read from the gear.ini file. The woresult.txt file contains status information.

Writing to Disc Description Protocol Premaster Tape

If you are going to mass-duplicate your CD-R, you can write to premaster tape. The tape is written in ANSI (X3.27-1987) format. You can send the premaster tape to a replication company for mastering and duplication. The tape is used to create a glass master, which is used to create daughters. Daughters are used to stamp silver or production CDs.

Recommended Tape Drives

GEAR supports most tape units that provide a SCSI interface. The preferred configuration is with an EXABYTE tape unit, a Hewlett Packard DAT unit (HP35470A), or an M4 9 track.

Files Created After Writing to Tape

The following files are created after a project is written to tape:

- ❏ tp_ident.txt
- ❏ tpresult.txt
- ❏ DDPID
- ❏ DDPMS
- ❏ PQDESCR

The tp_ident.txt files contains the table of contents (TOC) of the project written to tape and some customer information. The DDPID, DDPMS, and PQDESCR files form the DDP information of the last project written to tape. You can write these files to tape by checking the corresponding boxes in the Common Settings as described below.

Tape recorder Settings

You can specify the types of settings appropriate for your tape recorder using the Settings button in the Recording Panel. There are five types of settings:

- ❏ Common
- ❏ Customer
- ❏ SCSI
- ❏ File strategy
- ❏ Advanced

For detailed information see the appendix ‘GEAR Initialization/Preferences file’.

Common Settings

In the Common Setup, you can do any of the following:

- ❏ Select the identification files you want to write to tape.
- ❏ Verify the data after writing your volume to Tape.
- ❏ Select the use of a physical image file for recording. If you did not create a physical image before clicking the Write button, GEAR prompts you to use the virtual image instead.

Customer Settings

In the Customer Setup, you can enter the information that is written to the tp_ident.txt file. Some premaster companies ask you to supply this information.

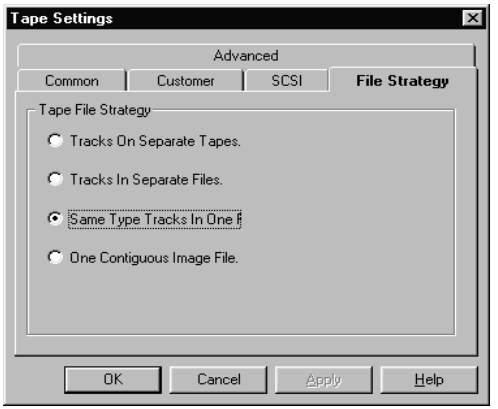
SCSI Settings

In the SCSI Settings, you can specify the driver and buffer settings.

Note: *A special feature of the GEAR windows 95 software is the use of Cyclic buffering during the recording. You can change the number of buffers and their size.*

File strategy Settings

In the File strategy settings, you specify the method of writing the tracks to tape.



When you check this box...	This happens...
Tracks on separate tapes	Each track is written to a separate tape file on a separate tape. It's impossible to write DDP information to tape when using this method.
Tracks in separate files	Each track is written to a separate tape file. All files are then written to one tape.
Same type tracks in one file	Tracks of the same type are combined into one tape file. The tape files are written to the same tape. This option is useful when the volume contains many small audio tracks. Using the previous methods would result in a large number of filemarks on the tape that could cause problems while mastering.
One contiguous image	All tracks are written to one file (contiguous image). Sector size, scrambling, blocking factor and gap/pause inclusion are set to mandatory values.

Advanced Settings

In the Advanced Settings you can do any of the following:

- ❏ Specify whether the sectors of ISO and XA tracks must be scrambled
- ❏ Specify the sector size to be used on tape for ISO, XA and DA tracks.
- ❏ Specify whether Gaps and Pauses are included in the files written to tape.
- ❏ Choose the tape blocking factor.

Changing Tape Settings

1. Select your tape drive in the recording panel.
2. Click the Settings button in the Recording panel of Workbench. The Tape Settings dialog appears.
3. Select the recording settings you want to use.
4. Click OK to return to the Workbench.

Writing a Volume to Tape

Select Virtual Image in the Disc panel to open an image for testing or writing.

Use the Recording panel to choose the medium to write to and to select

The status information boxes display information about the virtual image you are working with and about the tape recorder.

The process for premastering a tape is just like writing to CD. Make sure your tape unit is connected to your computer and turned on and that there is a tape in the unit before you start GEAR.

1. Open a Virtual image.
2. Select a tape drive in the recording panel
3. Click the Write button.
4. A dialog prompts you with instructions for preparing the tape unit for recording. When the unit is ready, click OK.

   Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they are loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

   As GEAR writes data to the tape, it reports in the GEAR Information window the percentage written for each track of the volume. When writing is complete, the tape is ejected automatically. Your tape is ready to send to a CD-ROM mastering plant!

GEAR for Windows Introduction

Chapter 11 *Getting Started With* GEAR helps you start and learn to use GEAR.

Chapter 12 *Creating and Opening Virtual Images* helps you create a new volume, create tracks on the volume, and open an existing volume and load track contents.

Chapter 13 *Creating a CD-ROM XA* shows you how to create an external architecture image and use manual- and pre-interleaving to record data.

Chapter 14 *Creating an Audio CD* shows you how to create and record a digital audio CD.

Chapter 15 *Working With Virtual Images* explains how to edit tracks on a volume that was created using an authoring package other than GEAR.

Chapter 16 *Working With Multi-Session Discs* explains how to append data to a disc.

Chapter 17 *Working With External (Foreign Image) Files* explains what an external volume is and how to edit it, and discusses different formats.

Chapter 18 *Log Files, Batch Files, and Commands* explains how to create and edit log files, and run batch files and commands.

Chapter 19 *Testing and Writing a CD Image File* shows you how to prepare for writing discs, estimate system performance, and write CD-R discs and premaster tapes.

Getting Started With GEAR for Windows and OS/2

This chapter helps you create your first CD in just minutes. You can read about the following:

- ❏ Starting GEAR
- ❏ Loading data
- ❏ Choosing CD-R settings
- ❏ Writing a CD-R
- ❏ Writing a master tape
- ❏ Using the online help

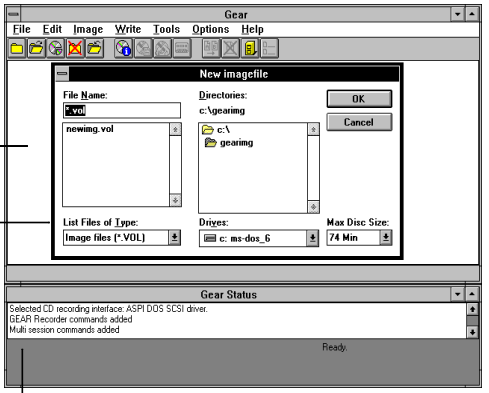
Starting GEAR in Windows and OS/2

Double-click to start GEAR

Before you start GEAR, make sure your recorder is turned on and recognized when you boot your system.

- ❏ In the GEAR program group, double-click the GEAR icon to start GEAR.

  When you start GEAR, the following two windows appear: the working window and the GEAR Status window. In addition, the New imagefile dialog is displayed so you can create a new *virtual image file.* A virtual image file is a file that contains all the information you need to create a CD.



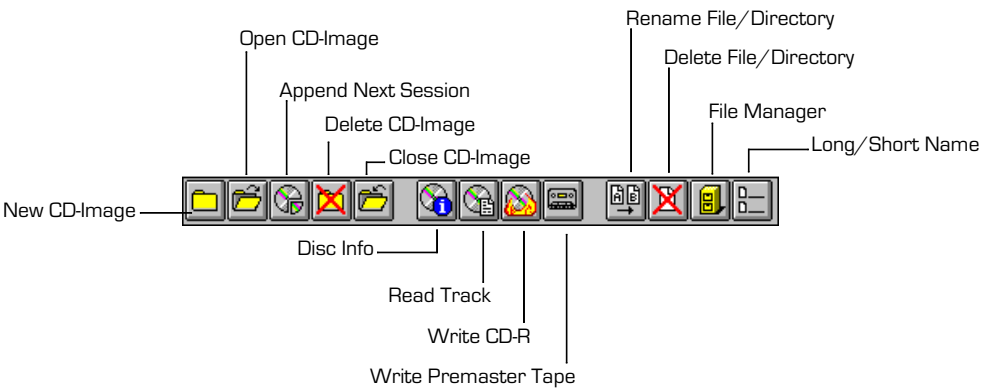
Working window

The New imagefile dialog lets you create a new virtual image file

The Status window displays information about the CD virtual image you're working with

The GEAR Toolbar

The toolbar contains the following buttons:



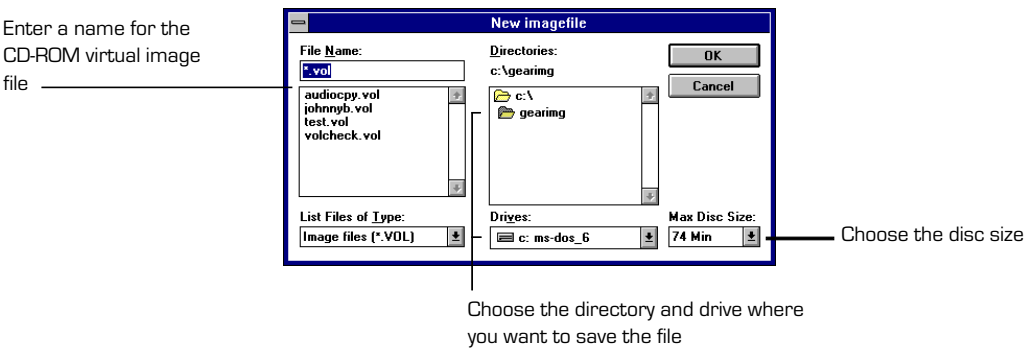
This toolbar button...	Lets you do this
New CD-Image	Create a new virtual image
Open CD-Image	Open an existing image

This toolbar button...	Lets you do this
Append Next Session	Add another session to CD-R
Delete CD-Image	Delete an existing image
Close CD-Image	Close the current image
Disc Info	Get disc information
Read Track	Copy the selected track from CD-R
Write to CD-R	Burn a disc
Write Premaster Tape	Write to tape
Rename File/Directory	Rename a selected file or directory
Delete File/Directory	Delete a selected file or directory
File Manager	Make the File Manager the active window
Long Name/Short Name	Long/short file description

Creating a New CD Image File

The New imagefile dialog lets you enter a name and choose a location for a new virtual image file. GEAR provides the .vol extension for you automatically.

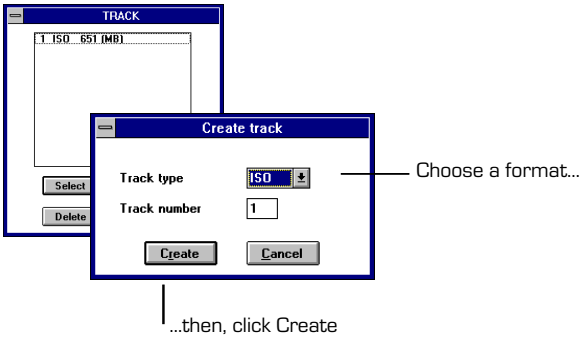
1. Under File Name, enter a name for the new virtual image file.



2. Choose the directory and drive where you want to save the new image file, then

click OK.

The Track and Create Track dialogs appear



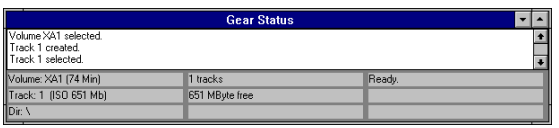
3. Choose ISO, XA, or Audio for the track format from the Track type drop-down menu.

Note: *The multi-format version supports all three formats. The standard version supports ISO and DA formats only.*

The track number is 1 by default.

4. Click Create to create the track.

The Status window shows that track 1 has been created and is selected.



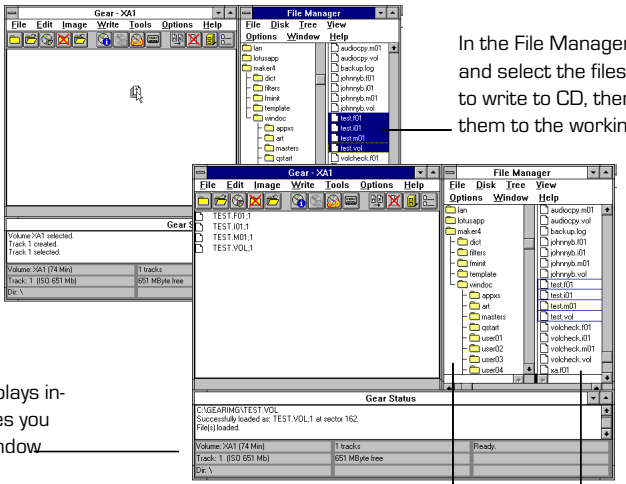
5. In the Track dialog, click Select to open the new track and close the dialog.

A new GEAR virtual image file window opens where you can load files and directories from the File Manager.

6. Click the File Manager button on the toolbar to display the File Manager window.

Tip: *You may want to resize the File Manager and the GEAR virtual image file window so it suits the way you like to work.*

7. Load the directories and files you want to write to CD.



An ISO directory or file name is limited to uppercase alphanumeric characters and underscores (_). If any of the files you load have invalid characters, GEAR warns you. For information about valid ISO-9660 file and directory naming, see Appendix A.

Note: *In Windows 95, you can also drag files to the* GEAR *window from the Navigator window, desktop, shortcuts, or the* GEAR *File Manager window.*

8. Do one of the following:

   ❏ Click Yes to have GEAR translate the file name to valid characters.

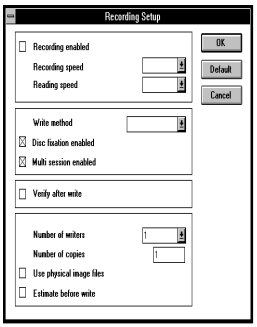
   ❏ Click No to load the file as is.

9. After you've loaded all the files you want to write to CD, check them by browsing through the file names as you do a directory tree in the File Manager.

   ❏ If you've loaded files by mistake, select them and press the Delete key to remove them from the image file.

Now you're ready to choose CD-R from the Settings submenu in the Options menu and write your image to CD-R disc and/or premaster tape.

Choosing CD-R Settings



Before you write to CD, we recommend you first choose your CD-R settings.

1. Choose CD-R from the Settings drop-down menu in the Options menu to display the Recording Setup dialog.
2. If the Recording Enabled check box is turned on, turn it off to run in test mode. Test mode will transfer data to the recorder but won't record on the disc.

   This is useful when you want to estimate your system throughput to the recorder to prevent wasting the disc if there are data transfer problems.

3. Choose any other options you want to use, then click OK. For additional information about recording settings, see CD-R in Chapter 18.

Writing to a CD-R

If you turned on the Estimate before write check box in the Recording Setup dialog (CD-R from the Settings submenu in the Options menu), GEAR checks the performance of your system before it writes. If it's sufficient, GEAR continues to write the disc. If system performance is insufficient, GEAR displays a warning and doesn't begin recording.

To improve system performance, you can either minimize the fragmentation on our hard disk with a disk optimization program or you can use the physical image file of the volume. See Creating a Physical Volume in Chapter 18 for more information.

Now you're ready to write data to your CD! It's as simple as the click of a button.

❑ Click the CD-R button on the toolbar or choose CD-R from the Write menu.

GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the volume are verified. Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they're loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

As GEAR writes data to the CD, it reports in the Status window the percentage written for each track of the volume. When writing is complete, the disc is ejected automatically. Your disc is ready for reading in any CD-ROM drive!

Premastering a Tape

As an alternative to writing to a CD, you can premaster a tape, then send it to a CD-ROM mastering plant where the data is written to CD. The tape, which is written in DDP format, is accepted as a standard at mastering plants. This tape is used to create a glass master, which is used to create daughters. Daughters are used to stamp silver or production CDs.

If you turned on the Verify before write check box in the Recording Settings dialog (CD-R in the Setting submenu of the Options menu), GEAR compares the contents of the tape with the actual volume. This means that the tape is read back and its data is checked against the contents of your virtual image. If there are differences, GEAR warns you.

The process for premastering a tape is just like writing to CD. Make sure your tape unit is connected to your computer and turned on and that there's a tape in the unit before you start GEAR.

- Click the Tape button on the toolbar or choose Premaster Tape from the Write menu.

  GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the volume are verified. Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they're loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

  As GEAR writes data to the tape, it reports in the Status window the percentage written for each track of the volume. When writing is complete, the tape is ejected automatically. Your tape is ready to send to a CD-ROM mastering plant!

Using the Online Help

Online help is available at any time if you don't understand how to use the software. To access help, do any of the following:

- Press Shift+F1 or choose Index from the Help menu to display the help Index.
- Choose Using Help from the Help menu for information about using an online help system.
- Choose About GEAR from the Help menu to display version and registration information about your copy of GEAR.

12

Creating a Virtual Image (Win & OS/2)

This chapter teaches you how to create and open virtual images. You can read about the following:

- ❏ Creating a new virtual image
- ❏ Creating tracks on a new virtual image
- ❏ Opening an existing image
- ❏ Loading track contents

For information about editing tracks and track contents, volume settings and descriptors, see Chapter 15. For information about creating Audio CDs and XA CDs, see Chapters 13 and 14, respectively. For information about external files, see Chapter 18.

About Creating a New Virtual Image File

A *virtual image* is the minimal amount of information needed to create a CD. The opposite of the virtual image is a *physical image*, which is the entire CD stored on a hard drive before it's recorded.

Before you begin to create a new virtual image file, you should review the following information about virtual image and its capacities.

When you create a new virtual image, the file is called a *volume administration file*. You *must* have more than 25MB of free disk space available to create a volume administration file.

Three administration files are created for each new track you create in the current working directory. The files are named using the first eight characters of the image name plus the following extensions (xx represents the track number):

- .mxx
- .ixx
- .fxx

You should never edit or delete these files manually; this results in a corrupt and useless image. Administration files are deleted automatically when you delete the associated image.

Track Types in GEAR

You can choose three track types in GEAR:

- *ISO* is a CD-ROM track type with extra error-checking capabilities. This is referred to as Mode 1 format. This format is suited for recording computer data and always consist of one track. ISO is suited for CD-ROM formats.
- *XA* is a track type for CD-ROM XA and CD-I. This format is used for multi-media applications and always consists of one track. XA is suited for the following formats: CD-ROM XA, CD-I, EB, MMCD, Photo CD, and VideoCD.
- *DA* is a track type for digital audio. This format allows up to 99 tracks. If audio tracks are combined on a disc with an ISO or XA track, up to 98 tracks can be used. DA is suited for CD Digital Audio (Red Book).

Calculating Virtual Image Capacities

You can use the following formula to calculate the capacity of a virtual image:

virtual image capacity = sector data capacity (bytes) x length (minutes) x 60 (seconds) x 75 (number of sectors)

The following table shows the sector data capacities for each track type:

Track Type	Sector Data Capacity
ISO	2048 bytes
XA and CD-I	2336 bytes
CD Audio (DA)	2352 bytes

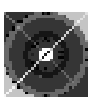
The following table shows the virtual image data capacity for each disc size and track type:

Virtual Image Data Capacity

Disc Size	ISO	XA and CD-I	CD Audio
18 min.	158 MB	180MB	181MB
63 min.	553MB	631MB	653MB
74 min.	650MB	741MB	746MB
80 min.	703MB	802MB	807MB

As you create tracks on your new image, keep in mind these points:

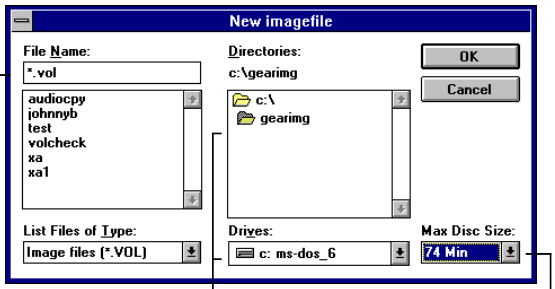
- ❏ The track number is assigned automatically and is relevant only for CD Audio. With the exception of CD Enhanced and CD Plus, ISO and XA tracks are *always* assigned to track number 1.
- ❏ A virtual image can have *only* one ISO *or* XA track; it may not have both types of tracks.
- ❏ A virtual image can contain up to 99 tracks.
- ❏ It is impossible to assign CD Audio to track number 1 if you create either an ISO or XA track on the virtual image .
- ❏ When you create a new track, it's automatically assigned the maximum available space on the virtual image.



Creating an Image With Tracks

The process to create a new image is very much like creating your first virtual image in Chapter 11.

1. Click the New button on the toolbar or choose New CD-Image from the File menu to display the New imagefile dialog.



2. Under File Name, enter a valid ISO name for the file.

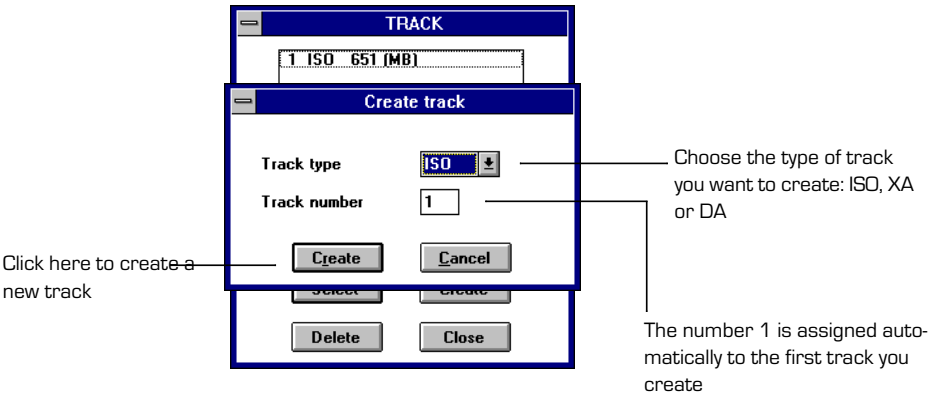
   A valid name may consist of up to eight alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix A.

3. Choose the drive and directory where you want to save the file.
4. From the Max Disc Size drop-down list, choose the length of the image.

   You may choose 80, 74, 63, or 18 minutes.

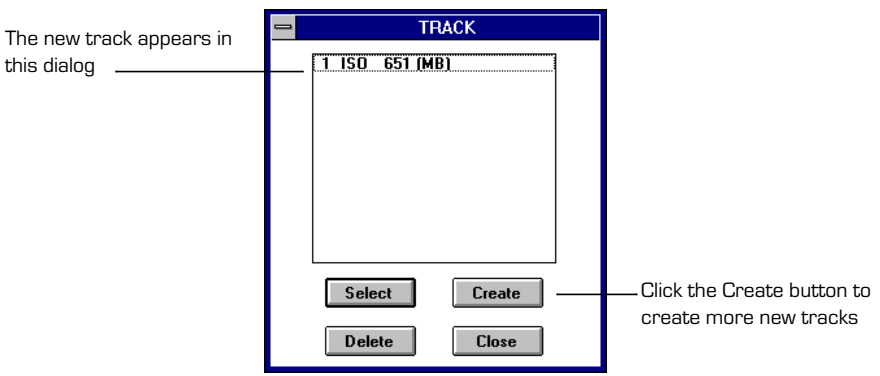
5. Click OK to close the dialog and create the new image.

The Track and Create track dialogs appear.



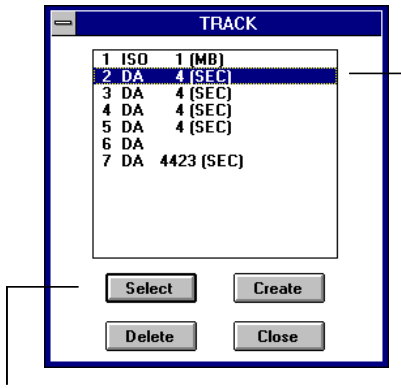
6. From the Track type drop-down list, choose ISO, XA, or Audio for the format of track you're creating.
7. Click Create to close the dialog.

   The new track appears in the Track dialog.



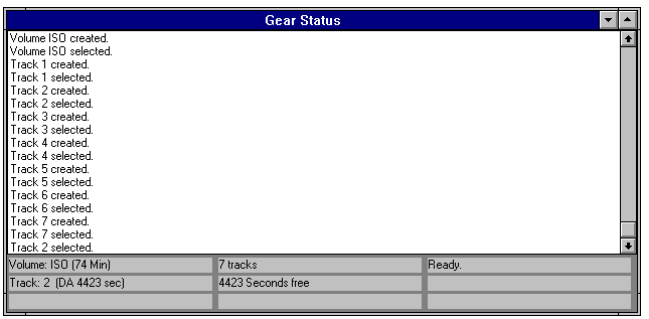
8. Click Create to create another track, then repeat steps 6 and 7.

9. When you've created all the tracks you need, select the track you want to load data for and click Select in the Track dialog.



The track dialog is closed and you're ready to begin loading data in the image window.

The status window displays the activity you've performed.



The new virtual Image file and each track is reported as you create and select them

Selecting an Audio Track

When you create digital audio (DA) tracks, you need hard disk files that represent audio. The files must always fulfill the following requirements, which are specified in the Red Book:

- ❏ The sample frequency must be 44.1KHz
- ❏ Audio must be stereo (one sample for the left channel and one sample for the right channel) sampled on 44.1kHz
- ❏ Each sample must contain 16 bits
- ❏ The byte order must be the same as the byte order used by your computer; if it isn't, you can use the generic option MSBAudio (in gear.ini) to make GEAR swap the audio bytes for all tracks

With LSB audio default, if MSBAudio=True, each track will be swapped by GEAR. *Audio files should not contain sound headers.* If sound headers are not removed or cleared, they will cause a sharp click in the resulting audio track on the CD.

Depending on the audio package you're using, the audio file may or may not contain a sound header. You can use the Read Track command in the Tools menu to copy a digital audio track from CD to a file on hard disk. This command operates on the Philips CDD522 and the Yamaha CDR100. The Read Track command creates no header so you can use the resulting file directly.

Warning! *The Philips CDD522 reads audio in MSB format while the Yamaha CDR100 reads audio in LSB format. The current version of GEAR supports the following Red Book audio files: WAV and AIFF. All files should fulfill the above requirements. For WAV and AIFF files, the header is removed automatically. AIFF files are usually in MSB format.*

For detailed information about creating Audio CDs, see Chapter 14.

CD-ROM XA

Use this command to specify multimedia files on a CD-ROM XA track. You must first select a CD-ROM XA track.

There are two types of interleaving in GEAR:

- ❏ Manual
- ❏ Pre Interleaved

Manual Interleave

This command lets you specify all the options to create your own interleaved files. You can find more information about the use of these parameters for CD-ROM XA applications in the CD-ROM XA specification.

In general, it's easier to use the dedicated CD-ROM XA interleaving tools, such as the Mammoth Tool Set, and the GEAR Pre-Interleaved command to create these files.

Pre-Interleaved

If you use this command, GEAR assumes that the specified files are pre-interleaved CD-ROM XA files, which are sometimes referred to as XA streams.

Important: *Make sure the files you are loading with this command are indeed pre-interleaved files. Non-pre-interleaved files you load this way are useless on the resulting CD-R disc. A pre-interleaved file must have a 2336 byte sector size with a subheader field filled in. This subheader field is copied, together with the other information, to the* GEAR *administration file. Normally the subheader is* ***not included in a file and the subheader information is generated by*** GEAR.

For detailed information about creating CD-ROM XA images, see Chapter 13.

Creating the Track Contents

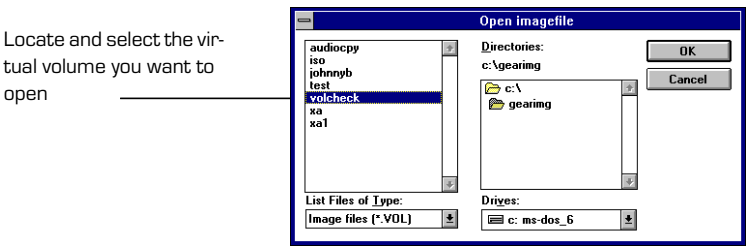
You can load the track contents—data—for a virtual image by selecting files in the File Manager and dragging them to the GEAR working window. It's that easy!

When you load files for a track, keep in mind the following points:

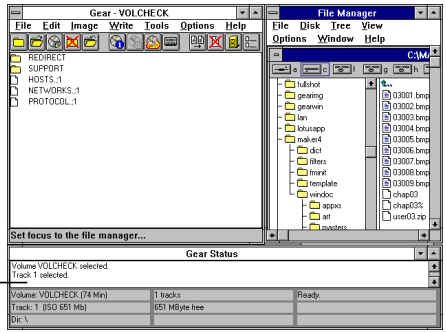
- ❏ You can load *only* files for Digital Audio (DA) tracks—you can't load directories.
- ❏ For data tracks only, the NonISONameHandling option in the Generator Setup dialog (Generation in the Settings submenu of the Options menu) determines how and when non-ISO file and directory names are translated.

Loading Files for a Track

1. If the virtual image containing the track you want to load data for isn't open, click the Open button on the toolbar to display the Open imagefile dialog or choose Open CD-Image from the File menu.



2. Locate and select the virtual image you want to open, then click OK.



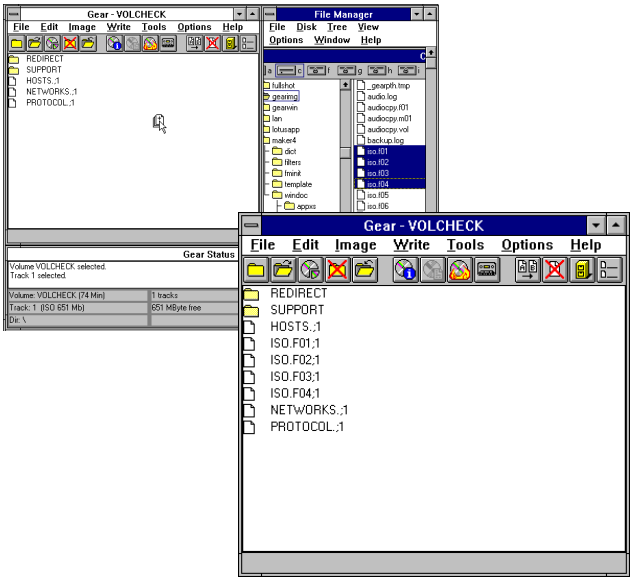
The name of the virtual image you open is displayed in the Status window; Track 1 is selected by default

3. If it isn't displayed, click the File Manager button on the toolbar to open the File Manager.

Tip: *You may want to resize the GEAR and File Manager windows so they suit the way you like to work.*

4. In the File Manager, locate and select the files you want to load, then drag them to the working window.

In the File Manager, locate and select the files you want to load, then drag them to the GEAR working window...



...the files are displayed in the GEAR window

Note: *In Windows 95, you can also drag files to the* GEAR *window from the Navigator window, desktop, shortcuts, or the* GEAR *File Manager window.*

5. Continue to select and load files for the track.
6. To load files for a different track, choose Tracks from the Edit menu.

7. In the Tracks dialog, click the track you want to load files for, then click the Select button, or click Create to create a new track.
8. Repeat steps 3–7 until you've loaded all the files you want for each track.

13

Creating a CD-ROM XA (Win & OS/2)

This chapter provides information about how to create a CD-ROM XA image. You can read about the following:

- ❏ Creating a new CD-ROM XA
- ❏ Creating tracks on a new CD-ROM XA
- ❏ Opening an existing CD-ROM XA
- ❏ Loading track contents

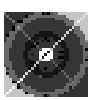
For general information about creating new images, see Chapter 12. For information about editing tracks and track contents, volume settings and descriptors, see Chapter 15. For information about Audio CD, see Chapter 14.

About Creating a New CD-ROM XA Image

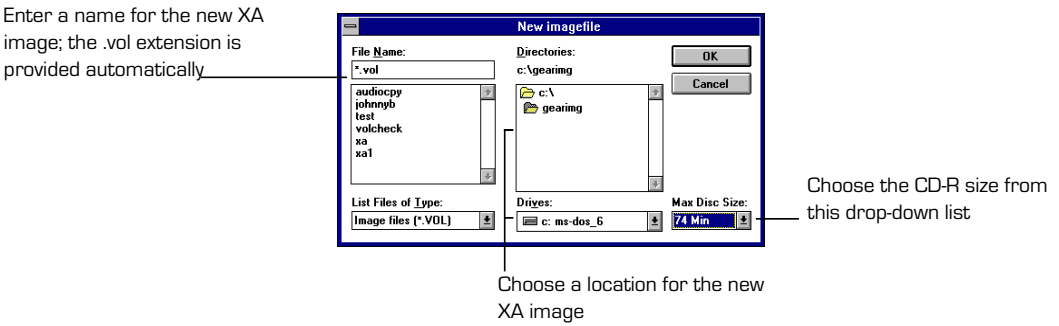
XA (eXtended Architecture) is a track type for CD-ROM XA and CD-I. This format is used for multi-media applications and consists of one track *only*. XA is suited for the following formats: CD-ROM XA, CD-I, EB, MMCD, Photo CD, and VideoCD.

Creating an XA Image

The process to create a new XA image is similar to creating your first virtual image in Chapter 11.



1. Click the New button on the toolbar or choose New CD-Image from the File menu to display the New imagefile dialog.



2. Under File Name, enter a valid ISO name for the file.

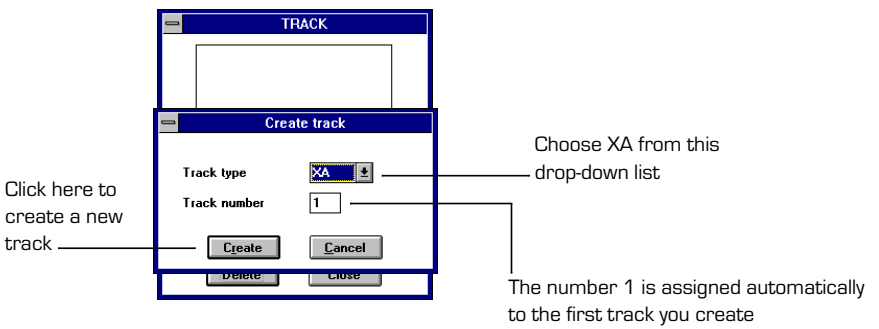
   A valid name may consist of up to eight alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix A.

3. Choose the drive and directory where you want to save the image.
4. From the Max Disc Size drop-down list, choose the length of the CD-R.

   You may choose 80, 74, 63, or 18 minutes.

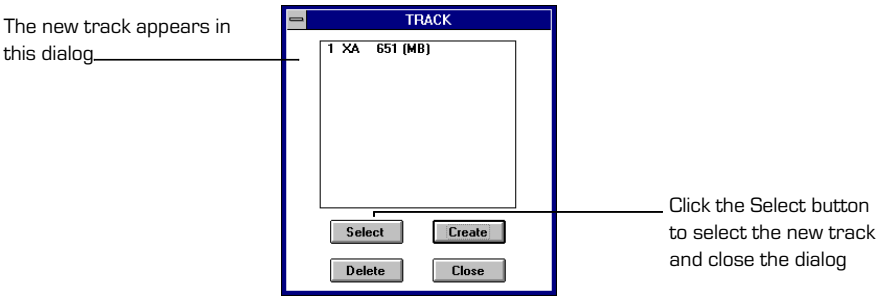
5. Click OK to close the dialog and create the new XA image.

   The Track and Create track dialogs appear.



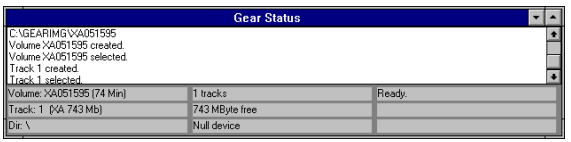
6. From the Track type drop-down list, choose XA for the format of track you're creating.
7. Click Create to close the dialog.

The new track appears in the Track dialog.



8. Click Select to select the new track and close the Tracks dialog.

   The status window displays the new image and the track you've created.



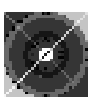
Creating the Track Contents

You can load files for the selected XA track by selecting the files in the File Manager and dragging them to the GEAR image window.

When you create an XA image, you must use *interleaved* files or allow GEAR to interleave files for you. This is useful when you have two or more different CD track types, such as audio or video, that must flow together in synchronization. These files must be interleaved with each other to optimize playback.

For example, with a mixed mode disc, the laser-reading head has to jump back and forth between widely separated tracks to play back audio and video data. This slows down the application significantly.

When you use interleaving, the laser-reading head can pick up video, then move smoothly to the next amount of audio and so on, providing real-time playback.



There are two types of XA interleaving in GEAR:

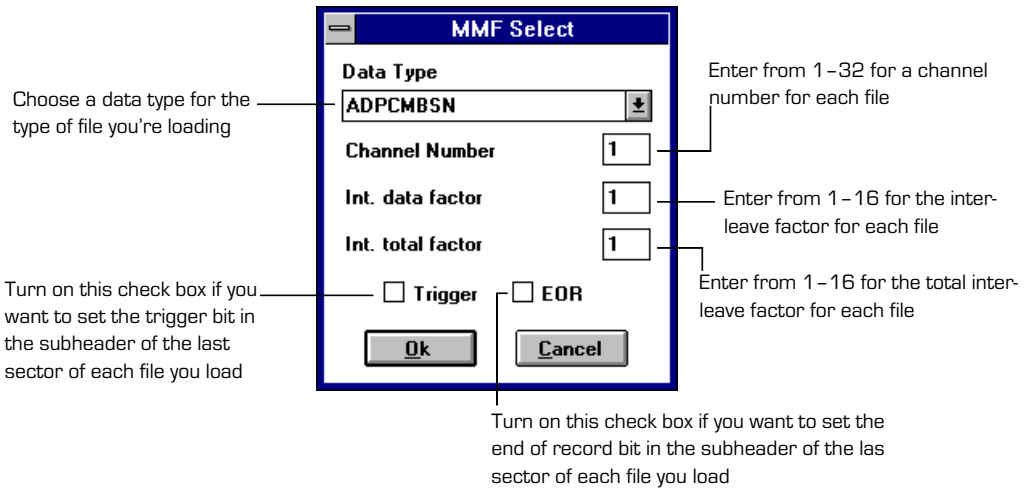
- ❏ Manual Interleaving
- ❏ Pre Interleaved

Manual Interleave

This command lets you specify all the options to create your own interleaved files. You can find more information about the use of these parameters for CD-ROM XA applications in the CD-ROM XA specification.

In general, it's easier to use the dedicated CD-ROM XA interleaving tools, such as the Mammoth Tool Set, and the GEAR Pre-Interleaved command to create these files.

1. Choose Manual Interleave from the CD-ROM XA submenu of the Options menu.



2. In the dialog that appears, choose a data type to specify the type of each file loaded.
   - ❏ ADPCMBSN is valid for ADPCM audio, level B stereo, no emphasis.
   - ❏ ADPCMCME is value for level C Mono with emphasis.
   - ❏ VIDEO2048 is used if each sector contains video data and EDC/ECC codes.
   - ❏ VIDEO2324 is used is each sector contains video data.

- ❏ Other valid choices include: ADPCMBSE; ADPCMBMN; ADPCMBME; ADPCMCSN; ADPCMCSE; ADPCMCMN; ADPCMCME; AND DATA2048.

3. Choose a channel number from 1to 32 for each file you want to load.
4. Choose an interleave data factor from 1 to 16 for each file you want to load.
5. Choose the total interleave factor from 1 to 16 for each file you want to load.

   This number, together with the interleave data factor in step 4, determines the interleaving of each file.

   Valid combinations for interleave data factor and total factor are: 1–4, 1–16, 1–8, 2–4, and so on.

   The combination 2–4 means that for each set of four sectors, the first two are occupied by the file.

   ADPCM B stereo files are interleaved 1–4, while ADPCM C stereo files are interleaved 1–8.

6. If you want the trigger or end of record bit set in the subheader of the last sector of each file, turn on the Trigger and EOR check boxes.

   You can specify one or both options.

Pre-Interleaved

If you use this command, GEAR assumes that the specified files are pre-interleaved CD-ROM XA files, which are sometimes referred to as XA streams.

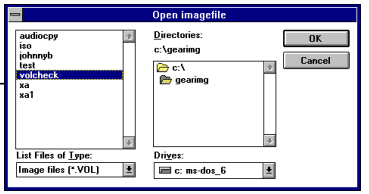
Important: *Make sure the files you are loading with this command are indeed pre-interleaved files. Non-pre-interleaved files you load this way are useless on the resulting CD-R disc. A pre-interleaved file must have a 2336 byte sector size with a subheader field filled in. This subheader field is copied, together with the other information, to the* GEAR *administration file. Normally the subheader is* ***not included in a file and the subheader information is generated by GEAR****.*

- ❏ Choose Pre-Interleaved from the CD-ROM XA submenu of the Options menu.

Loading Track Contents

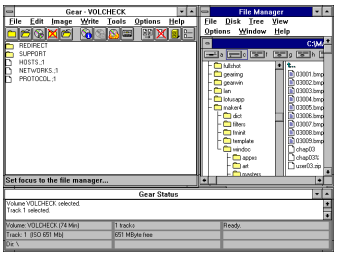
1. If the XA image isn't open, click the Open button on the toolbar to display the Open imagefile dialog or choose Open CD-Image from the File menu.

Locate and select the XA image you want to open



2. Locate and select the XA image you want to open, then click OK.

The name of the CD image you open is displayed in the Status window; Track 1 is selected by default

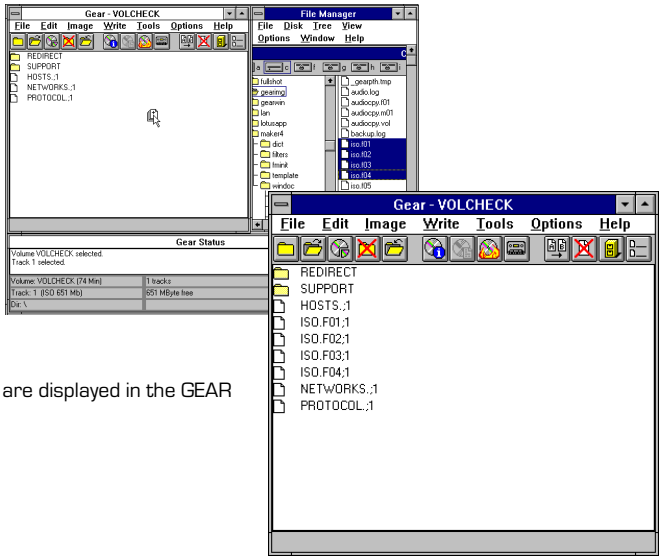


3. If it isn't displayed, click the File Manager button on the toolbar to open the File Manager.

Tip: *You may want to resize the GEAR and File Manager windows so they suit the way you like to work.*

4. In the File Manager, locate and select the files you want to load, then drag them to the image window.*/*

In the File Manager, locate and select the files you want to load, then drag them to the GEAR image window...



...the files are displayed in the GEAR window

Note: *n Windows 95, you can also drag files to the* GEAR *window from the Navigator window, desktop, shortcuts, or the* GEAR *File Manager window.*

Recording Tracks

1. If the XA image you want to record isn't open, click the Open button on the toolbar to open the XA image you want to record.
2. Click the Write CD-R button on the toolbar.

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Creating an Audio CD (Win & OS/2)

This chapter teaches you how to create and open an audio CD image. You can read about the following:

- Creating a new audio image
- Creating tracks on a new audio image
- Opening an existing audio image
- Loading track contents

For general information about creating virtual CD images, see Chapter 12. For information about editing tracks and track contents, volume settings and descriptors, see Chapter 15. For information about CD-ROM XA images, see Chapter 13.

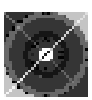
About Creating a New Audio CD

DA (Digital Audio) is a track type for audio CDs. This format allows you to create up to 99 tracks. If audio tracks are combined on a disc with an ISO or XA track, you can create up to 98 tracks. DA is suited for CD Digital Audio.

:GEAR supports Red Book audio file formats, as well as the following formats:

- .wav
- AIFF
- Sound Designer II

For .wav, AIFF, and Sound Designer II files, GEAR removes the header automatically. AIFF files are usually in MSB format.



When you create DA tracks, you need hard disk files that represent audio.
The files must always fulfill the following requirements, which are specified in the Red Book

- ❏ The sample frequency must be 44.1kHz
- ❏ Audio must be stereo (one sample for the left channel and one sample for the right channel) sampled on 44.1kHz
- ❏ Each sample must contain 16 bits
- ❏ The byte order must be the same as the byte order used by your computer; if it isn't, you can use the generic option MSBAudio (in gear.ini) to make GEAR swap the audio bytes for all tracks

For example, LSB audio is the default on DOS and Windows. If you want GEAR to swap byte order, set MSBAudio=True in the gear.ini file.

Warning! *The Philips CDD522 reads audio in MSB format while the Yamaha CDR100 reads audio in LSB format.*

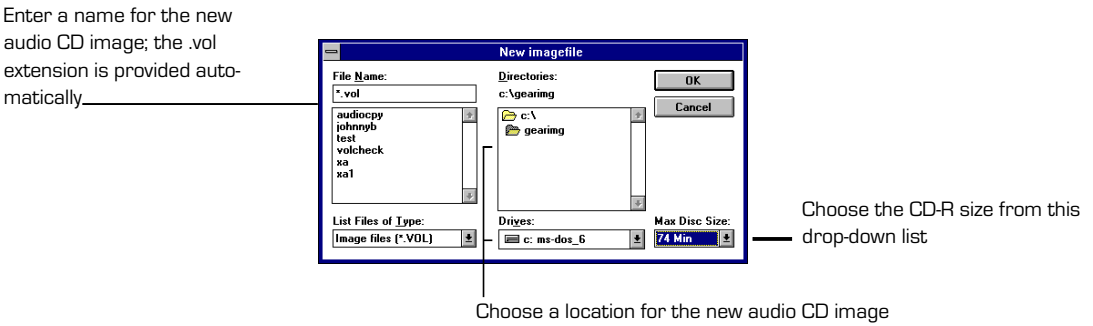
Depending on the audio package you're using, the audio file may or may not contain a sound header, however, audio files should *not* contain sound headers. If sound headers are not removed or cleared, they will cause a sharp click in the resulting audio track on the CD.

You can use the Read Track command in the Tools menu to copy a digital audio track from CD to a file on hard disk. This command operates on the Philips CDD522 and the Yamaha CDR100. The Read Track command creates no header so you can use the resulting file directly.

Creating an Audio Image With Tracks

The process to create a new audio CD is similar to creating your first virtual image in Chapter 11.

1. Click the New button on the toolbar or choose New CD-Image from the File menu to display the New imagefile dialog.



2. Under File Name, enter a valid ISO name for the file.

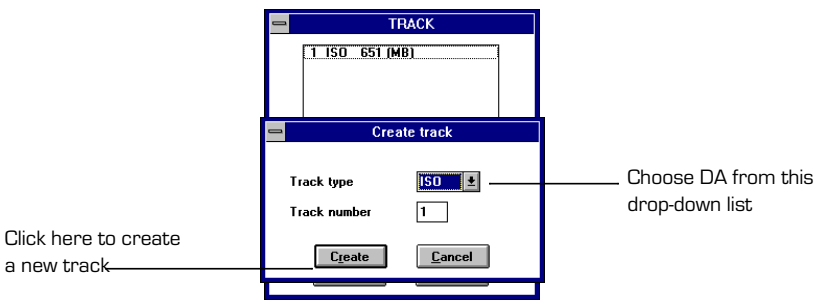
   A valid name may consist of up to eight alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix A.

3. Choose the drive and directory where you want to save the file.
4. From the Max Disc Size drop-down list, choose the length of the audio CD.

   You may choose 80, 74, 63, or 18 minutes.

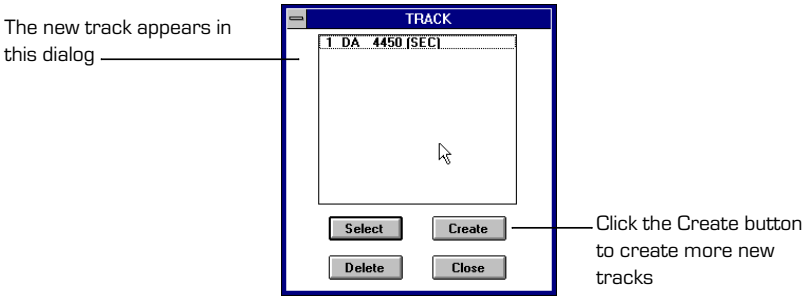
5. Click OK to close the dialog and create the new audio CD image.

   The Track and Create track dialogs appear.

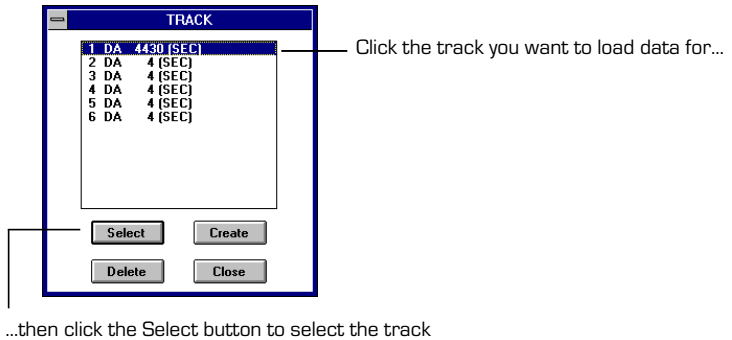


6. From the Track type drop-down list, choose DA for the format of track you're creating.
7. Click Create to close the dialog.

   The new track appears in the Track dialog.

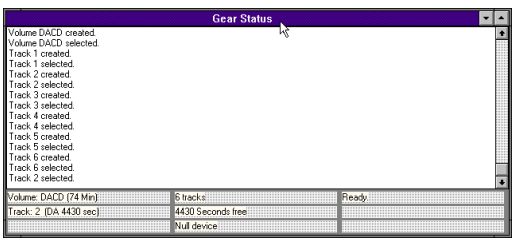


8. Click Create to create another track, then repeat steps 6 and 7.
9. When you've created all the tracks you need, select the track you want to load data for and click Select in the Track dialog.



The track dialog is closed and you're ready to begin loading audio files for each track in the image window.

The status window displays the tracks you've created.



The new audio CD and each track is reported

Creating the Track Contents

You can load one audio file for a selected track on an audio CD by selecting the audio file in the File Manager and dragging it to the GEAR image window. It's that easy!

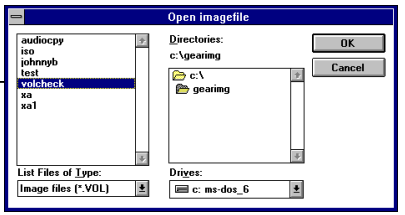
When you load files for a track, keep in mind the following points:

- ❏ You can load *only* one *file* per track; you can't load directories

Loading a File for a Track

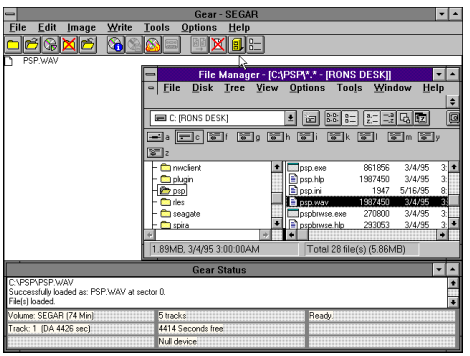
1. Click the Open button on the toolbar to display the Open imagefile dialog or choose Open CD-Image from the File menu.

Locate and select the virtual volume you want to open



2. Locate and select the audio CD image you want to open, then click OK.

The name of the CD image you open is displayed in the Status window; Track 1 is selected by default

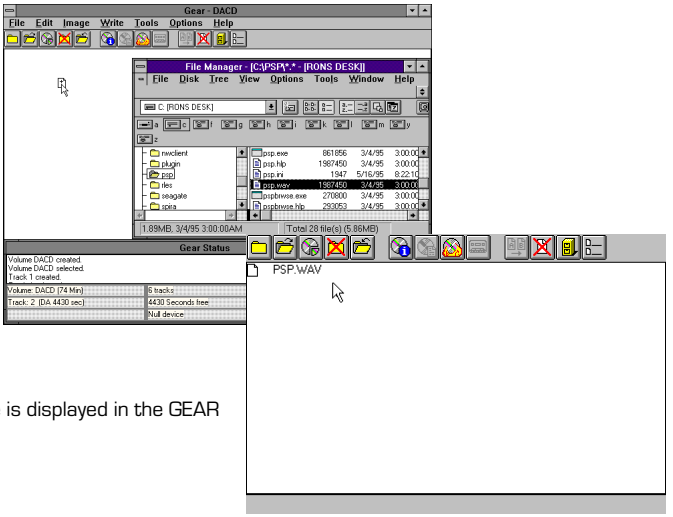


3. If it isn't displayed, click the File Manager button on the toolbar to open the File Manager.

Tip: *You may want to resize the GEAR and File Manager windows so they suit the way you like to work.*

4. In the File Manager, locate and select the file you want to load, then drag it to the image window.

In the File Manager, locate and select the file you want to load, then drag it to the GEAR image window...



...the file is displayed in the GEAR window

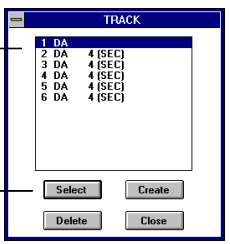
Note: *In Windows 95, you can also drag files to the* GEAR *window from the Navigator window, desktop, shortcuts, or the* GEAR *File Manager window.*

5. To load a file for another track on the audio CD, choose Tracks from the Edit menu.

6. In the Tracks dialog, click the track you want to load a file for, then click the Select button.

Click a track to highlight it...

...then click Select to select the track



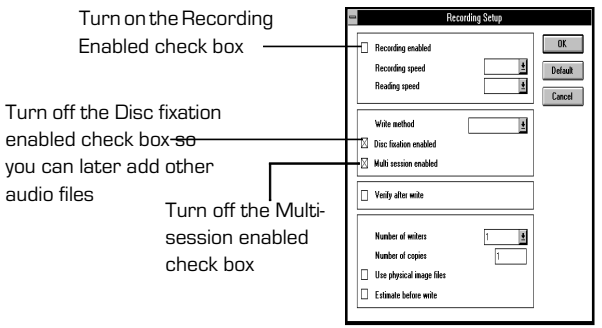
7. Repeat steps 4–6 until you've loaded all the audio files for the CD.

Writing Audio Tracks in Separate Recordings

Audio CDs should be single-session discs because CD players are single-session readers. You can't finalize an audio CD until you've loaded all the audio files for all the tracks. If your hard disk isn't large enough to hold all the audio files or you haven't prepared all your audio files for recording, you can load files over several recordings without making the disc multi-session.

Changing Recorder Settings

1. Choose CD-R from the Settings submenu of the Options menu to display the Recorder Setup dialog.



2. Turn on the Recording enabled check box.
3. Turn off the Disc fixation check box so the disc won't be fixated. This will let you add other audio files when they're ready for recording.
4. Turn off the Multi-session enabled check box.
5. Click OK to close the dialog.

Recording Tracks

1. Choose Tracks from the Edit menu.
2. Select the track you want to record, then click the Select button.
3. If you haven't loaded the audio file you want to record for the track, drag it from the File Manager to the image window.

4. Click the Write CD-R button on the toolbar.

Note: *Since you turned off the Disc fixation check box in the Recorder Settings dialog, the disc can't be read by any CD-ROM drive.*

5. When you're ready to finish recording tracks, choose CD-R from the Settings submenu in the Options menu.
6. Turn on the Disc fixation check box.

   This will write the Lead-In and Lead-Out areas required for your disc to be readable.
7. Click OK.
8. Repeat steps 1–4 to record the remaining tracks on your audio CD.

Reading an Audio Track

GEAR lets you extract tracks from an Audio CD and store them on your hard disk for recording on a CD-R. Check in chapter 2 if your recorder supports audio extraction.

1. Insert the audio CD you want to read in your CD recorder.
2. 
   Click the Read Track button on the toolbar to display the Read Track dialog.
3. In the dialog that appears, select the track you want to read.

   At the top of the dialog, GEAR displays a name to indicate a default file name for audio track on your hard disk.
4. To change the default file name, select the name and enter a new name.
5. Click OK to read the track and close the dialog.
6. Repeat steps1–5 to read additional CD tracks.

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Working With Virtual Images (Win & OS/2)

This chapter provides information about working with virtual images that already contain data. In this chapter, you can read about the following:

- ❏ Editing tracks in a virtual image
- ❏ Editing virtual images

For information about creating a virtual image and tracks and loading their contents, see Chapter 12. For information about working with foreign image files, see Chapter 17.

Working With an Existing Virtual Image

An existing virtual image can be one of the following:

- ❏ A GEAR image file
- ❏ A foreign image file

You can edit and write to GEAR virtual images, however, you can only write a foreign image file to a CD-R disc or tape. For information about writing to GEAR volumes, see Chapter 19.

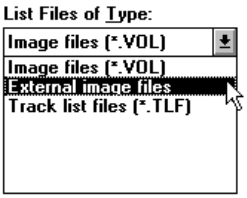
Opening an Existing Image for Editing

When you open an image, GEAR first closes any image that's already open. GEAR then opens the selected image and expands it to the size of the maximum free space available within the virtual image.

This space depends on the following:

- ❏ The maximum disc size you specified when you created the virtual image
- ❏ The amount of memory required by the other tracks within the same image

Warning! *You can edit volumes with a .vtl extension only in GEAR3.01 or earlier.*

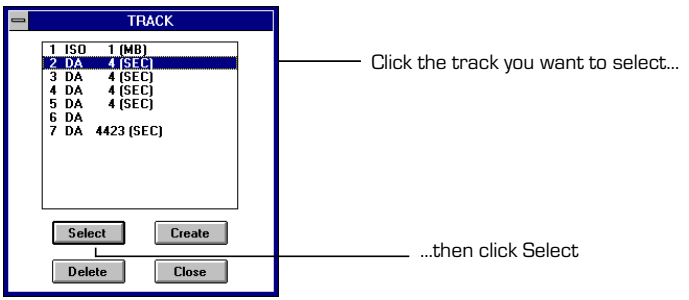


1. Click the Open button on the toolbar or choose Open CD-Image from the File menu to display the Open imagefile dialog.
2. Choose External image files from the List Files of Type drop--down list.
3. Locate and double-click the image you want to open.

   GEAR displays the volume information in the Status window.

Selecting a Track

1. Choose Tracks from the Edit menu to display the Track dialog.



2. Click the track you want to select, then click the Select button.

Now you're ready to edit the track!

Editing a Track

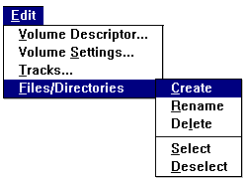
You can edit a selected track in the following ways:

- ❏ Create a new directory on the track
- ❏ Rename a file or directory on the track
- ❏ Delete selected files and directories from the track

Tip: *To increase CD-ROM access time, limit the number of entries in a directory to 50.*

Note: *DOS recognizes file names of up to eight characters; file names can have a three-character extension. Other systems are not limited to this restriction.*

Creating a New Directory on a Track



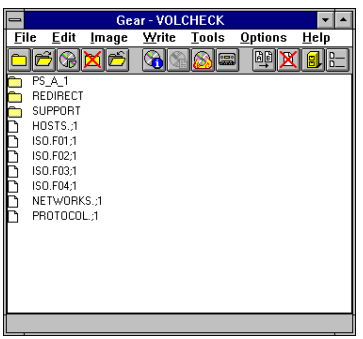
1. Choose Create from the Files/Directories submenu in the Edit menu.
2. In the dialog that appears, enter a valid ISO name for the new directory.

   A valid name may consist of up to 30 uppercase, alphanumeric characters and underscores (_). (DOS can handle only up to eight characters.) For information about valid ISO-9660 file and directory naming, see Appendix A.

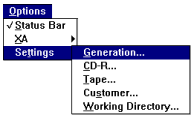
   If you enter an non-ISO name, GEAR prompts you to translate the name.
3. Do one of the following:
   - ❏ Click Yes to have GEAR translate the file name to valid characters.
   - ❏ Click No to load the file anyway.
4. Click OK.

   The new directory appears in the working window.

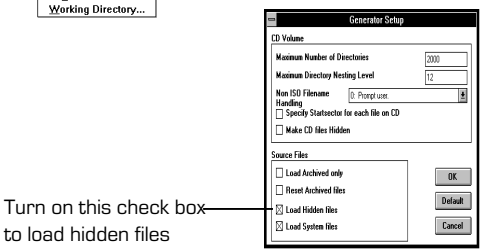
The new directory appears at the top of the window



Loading Hidden Files



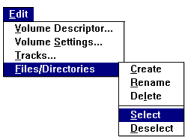
1. Choose Generation from the Settings submenu in the Options menu to display the Generation dialog.



2. Turn on the Load Hidden files check box then click OK.

   Hidden files will be loaded until you turn off the check box.

Selecting and Deselecting Files and Directories



You can select one file or directory or you can select multiple files and directories to rename or delete. When you use the Select and Deselect commands in the Files/Directories submenu of the Edit menu, you can enter standard DOS wildcard characters such as *.txt for all text files.

To do this...	Do this...
Select one file or directory	Click the file or directory to highlight it
Select multiple files and directories	Click the first file or directory, then Shift+click subsequent consecutive files or directories
	Choose Select from the Files/Directories submenu in the Edit menu, enter selection criteria, then click OK
Deselect selected files or directories	Choose Deselect from the Files/Directories submenu in the Edit menu, enter a selection specification, then click OK

Renaming Files and Directories

1. Select the files and directories you want to rename.
2. Click the Rename Files/Directories button on the toolbar or choose Rename from the Files/Directories submenu of the Edit menu.
3. In the dialog that appears, enter a new name for the specified file or directory, then click OK.
4. Repeat step 3 for each selected file or directory if you selected more than one in step 1.

Deleting Files and Directories

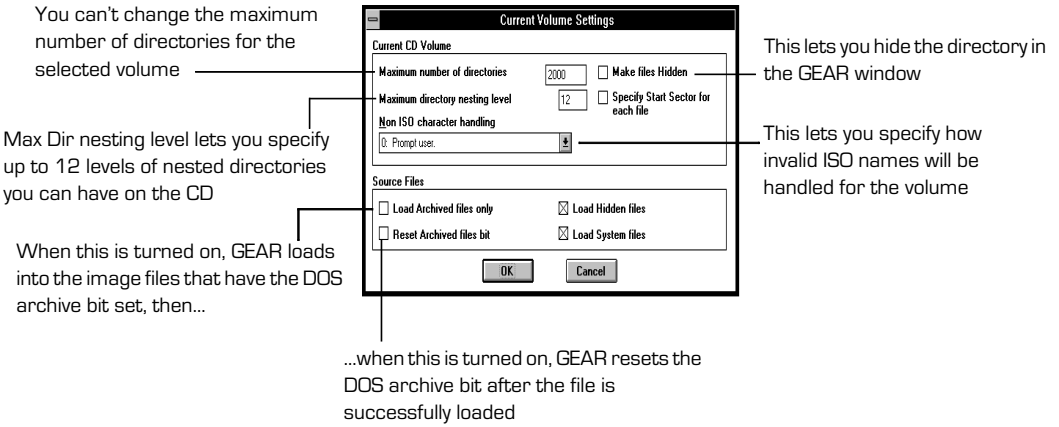
1. Select the files and directories you want to delete.
2. Click the Delete File/Directory button on the toolbar or choose Delete from the Files/Directories submenu in the Edit menu.
3. In the dialog that appears, confirm the deletion of the selected file.

   If you selected multiple files and directories in step 1, GEAR continues to prompt you until you have confirmed or cancelled the deletion of all selected files.

Editing Volume Settings

You can edit volume settings for the currently-selected volume. The default values are specified in the gear.ini file and can be changed using the Generator command in the Settings menu. For detailed information about the gear.ini file settings, see Appendix C.

1. Choose Volume Settings from the Edit menu to display the Volume Settings dialog.

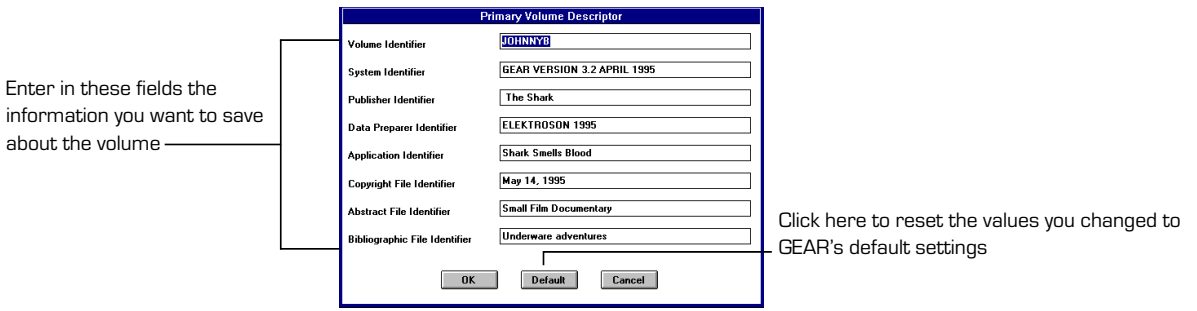


2. Choose the settings you want to use, then click OK.

Editing a Volume Descriptor

You can edit the volume descriptor for the currently-selected volume. The default values are specified in the gear.ini file and can be changed using the Generator command in the Settings menu. For detailed information about the gear.ini file settings, see Appendix C.

1. Choose Volume Descriptor from the Edit menu to display the Volume Settings dialog.



2. Enter the information you want to save, then click OK.

   ❑ To reset the information to GEAR's default values, click the Default button.

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Working With Multi-Session Discs (Win & OS/2)

GEAR lets you append a new session to any session that already exists on a multi-session disc. This chapter discusses adding additional data to a disc.

For information about creating a volume and tracks and loading their contents, see Chapter 12.

Appending a Multi-Session Disc

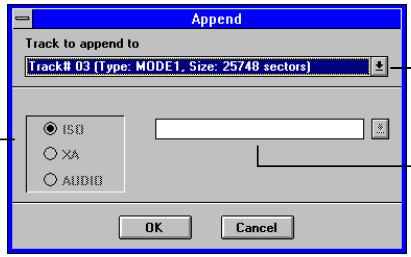
By appending a multi-session disc, you can do the following:

- ❏ Add additional data to the disc
- ❏ Recover data from older sessions
- ❏ Skip the last session if there are read errors
- ❏ Create CD Enhanced or CD Plus discs

One of the sessions on the disc you want to append is used as the basis of a new virtual image. The content of the virtual image is edited. Finally, the virtual image is written to the CD-R disc.

In order to append a multi-session CD-R, your recorder must be turned on and a disc must be inserted in the CD drive.

1. Choose Append Next Session from the file menu to display the Append Next Session dialog.



2. Select the session/track number you want to attach the next session to.

   ❏ If the session/track you select is an audio track, select ISO or XA for the data format for the next session and enter a name in the space provided.

   The selected session/track on the CD-R disc is read and the virtual image is created. The virtual image contains the same directory/file structure as the session and is displayed in the image window.

   If an image with the same name already exists on your hard drive, GEAR prompts you to overwrite the existing image or choose a different directory for the new image.

3. Do either of the following:

   ❏ To add files to the new image, drag them from the File Manager. Files you add are a different color form the existing files on the new image.

   ❏ To remove files from the new image, select them and press Delete.

You can append the new session to the CD-R using the Write menu commands. Only changes will be written to the CD-R disc. Every time you write a new session, an additional 15MB is added to the CD-R disc. This is known as *overhead*.

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Working With Foreign Image Files (Win & OS/2)

This chapter provides information about working with virtual images that were created using authoring or formatting package other than GEAR. In this chapter, you can read about the following:

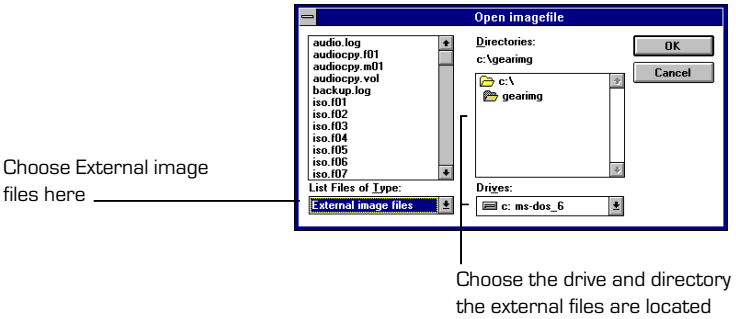
- ❏ Opening an external image
- ❏ Choosing a predefined format

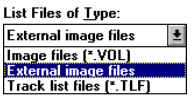
For information about virtual images you create in GEAR, see Chapters 12, 13, 14 and 15.

External Images

An *external image* refers to any image you've created using another authoring or formatting package, such as CD-I, 3DO, or VideoCD. You can't edit an external volume in GEAR, however, you can use GEAR to write an external volume to a CD-R disc or a premaster tape. Before you write an external volume, you must select it and define its parameters.

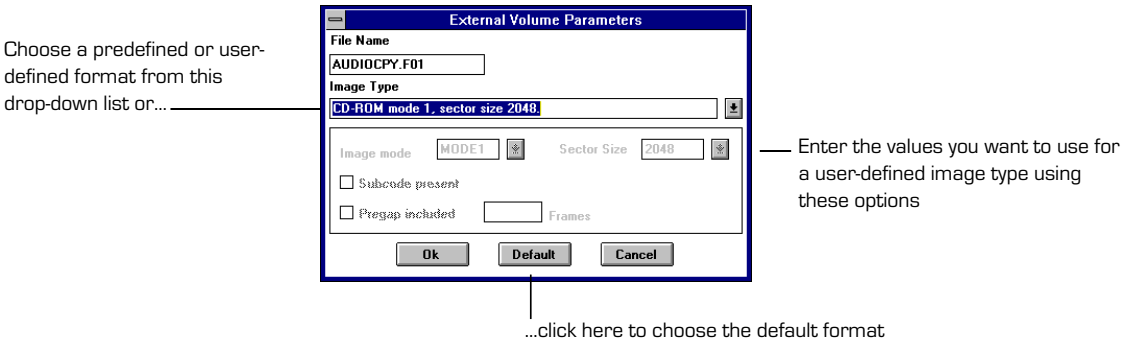
1. Click the Open button on the toolbar to display the Open imagefile dialog.





2. Choose External image files from the List Files of Type drop-down list.
3. Locate and select the external volume you want to open, then click OK.

   The External Volume Parameters dialog appears.



4. Do one of the following to choose a format:
   - ❏ Click the Default button to choose the default format.
   - ❏ Choose a predefined format from the Image Type drop-down list. For information about predefined formats, see the table under Choosing Predefined Formats, in the next section
   - ❏ Choose User-defined image type from the Image Type drop-down list, then enter the values you want to use at the bottom of the dialog.
5. Click OK, when you're finished.

Choosing Predefined Formats

You can choose any of the following predefined formats.

Type #	Image Type Format	External Volume Type
1	CD-ROM mode 1 (ISO etc.), sector size 2048	Standard ISO, HFS, or CDTV image
2	CD-ROM mode 1 (ISO etc.), sector size 2352	Standard ISO with EDC/ECC codes
3	CD-ROM mode 1 (ISO etc.), sector size 2352, scrambled sectors with 2 seconds pre-gap	ISO with EDC/ECC codes, pre-gap and scrambled
4	CD-ROM XA mode 2, sector size 2336	Standard XA or EB XA (e.g., images with Mammoth XA streams)
5	CD-ROM XA mode 2, sector size 2352	Standard XA with EDC/ECC codes
6	CD-ROM XA mode 2, sector size 2352, scrambled sectors with 2 seconds pre-gap	XA with EDC/ECC codes, pre-gap and scrambled
7	CD-I mode 2, sector size 2336	Standard CD-I without EDC/ECC codes
8	CD-I mode 2, sector size 2352	Standard CD-I with EDC/ECC codes
9	CD-I mode 2, sector size 2352 with 2 seconds pre-gap	Standard CD-I with pre-gap, EDC/ECC
10	CD-I mode 2, sector size 2352, scramble sectors with 2 seconds pre-gap	CD-I with EDC/ECC codes, pre-gap and scrambled; uses the same output format as that of most CD-I authoring tools
11	Standard CD digital audio	Red Book audio (44.1kHz, 16 bit, stereo)

Keep in mind the following points about image types:

- ❏ The size of the pre-gap should always be two seconds (150 sectors). Scrambled images must contain sync, header, and EDC/ECC code information.
- ❏ Unscrambled images can be accepted with a 2352 sector size without the sync, header, and EDC/ECC filled in.
- ❏ The byte order of audio files must be the same byte order used by the computer running the GEAR software. If this is not the case, you can use the generic option MSBAudio= in the gear.ini file to make GEAR swap the audio bytes for all tracks.

  With LSB audio default, if MSBAudio=True, each track will be swapped by GEAR. *Audio files should not contain any sound header*. If sound headers are not removed or cleared, they will cause a sharp click in the resulting audio track on the CD. Audio files should contain only 16-bit samples and must be stereo (one sample for the left channel and one sample for the right channel) sampled on 44.1kHz.

- ❏ The external image files option lets you select one file only. If the external volume consists of more than one file, you can choose Track list files (*.tlf) under List Files of Type in the Open imagefile dialog to specify more than one external file.

  The track list file contains one or more lines where each line specifies a track of the CD-ROM (you can use a full path). For example, to write a mixed-mode image—one that contains mode 1 or mode 2 data—you can specify the following lines in a track list file:

```
image.dat/1
audio.2/11
audio.3/11
```

track path name — image type number

Tip: *Be sure to leave a space between the track name/path and the image type.*

18

Log Files, Batch Files and Commands (Win & OS/2)

This chapter provides you with information about creating and using batch files. You can read about the following:

- ❏ Creating and editing a log file
- ❏ Running a GEAR batch file
- ❏ Running a command

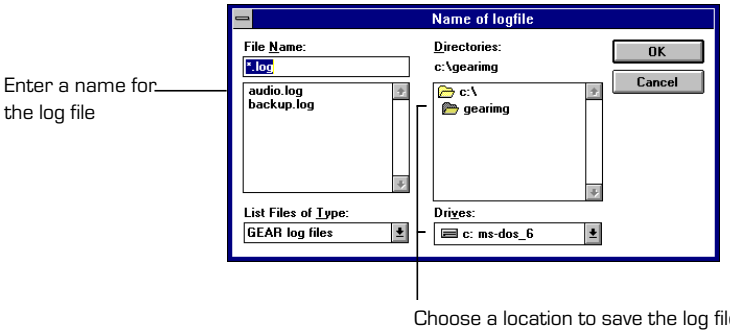
Creating and Editing a Log

GEAR's batch utility lets you run multiple GEAR commands automatically—without ongoing interaction from you. The easiest way to create a batch file is to use the Generate Log command in the File menu to create the image once. This is particularly useful for incremental backups or if you have to create the same image periodically with updated files, a CD that's updated quarterly, for example.

As you create the image, the commands you use are saved in a log file. You can use this log file as a batch file without any editing. You can also read the log file to check the image generation process.

Generating a Log File

1. Choose Generate Log from the File menu to display the Name of logfile dialog.



2. Enter a name for the log file or choose one under File Name.
3. Choose a location to save the file, then click OK.

   You'll notice that Logging started is displayed in the Status window.

4. Perform the actions you want to save in the log file.

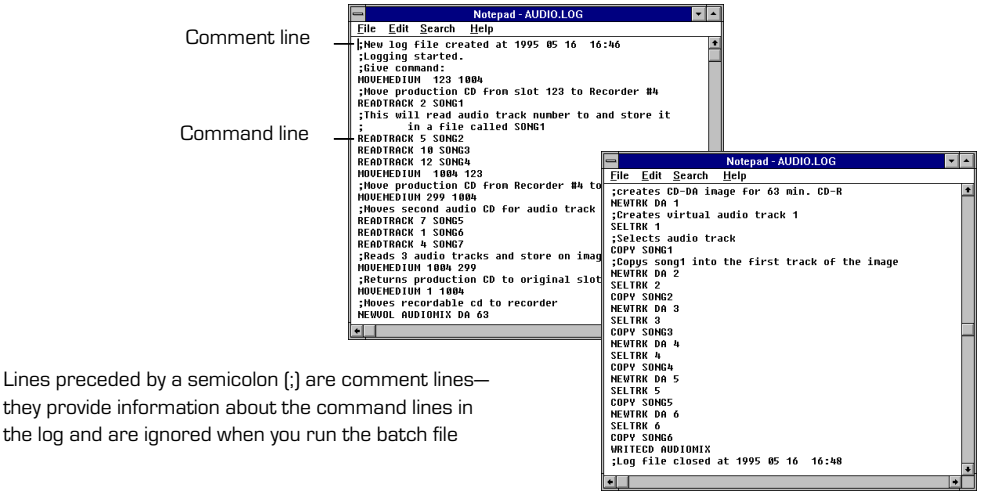
   Each action you perform is recorded in the Status window.

5. When you're finished, choose Generate Log from the File menu.

   Logging stopped is displayed in the Status window.

Editing a Log File

You can use a text editor such as Windows Notepad to look at the log file. All lines that are preceded by a semicolon are comment lines—these lines are ignored when you run the batch file.



Lines preceded by a semicolon (;) are comment lines—they provide information about the command lines in the log and are ignored when you run the batch file

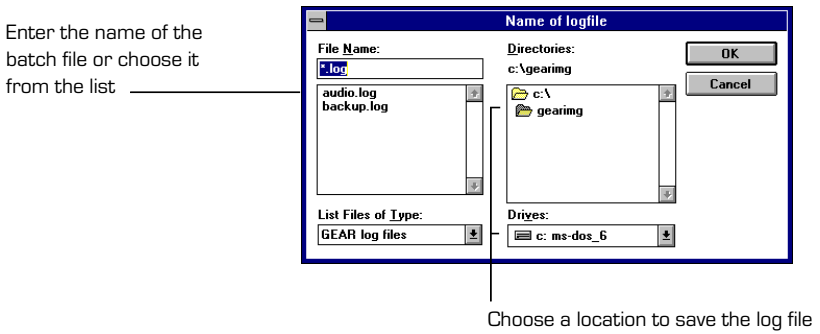
If you add comments to the log file, remember to start the line with a semicolon (;). You can also add any GEAR formatting commands to the batch file (these commands correspond to the GEAR for Windows commands available in the menus). For a detailed list of available commands, see Appendix B.

Running a Batch File

When you run a batch file, each command in the file is executed. You can use a log file you create using the Generate Log command in the file menu or you can use a log file you create manually in a text editor.

When you run a batch file, lines that begin with a semicolon or an unknown command will be ignored. If there are lines that have invalid or missing parameters, GEAR prompts you to provide the parameter.

1. Choose Run Batch from the File menu to display the Name of batchfile dialog.



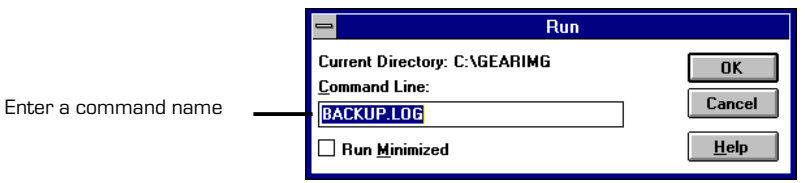
2. Locate and choose the log or batch file you want to use, then click OK.
3. GEAR prompts you to run the batch automatically using the default dialog values. Click Yes.

   As the batch file is processed, its status is displayed in the Status window.

Running a Command

You can execute a single batch command using the Run Command in the File menu.

1. Choose Run Command from the File menu.



2. In the dialog that appears, enter the command name with its parameter.
3. Click OK to execute the command.

   The command appears in the Status window as it's executed.

Tip: *At the DOS prompt, type* **help** *to see all of* GEAR*'s batch commands or type* **help <command>** *to see how to use the command you enter.*

19

Testing and Writing a Virtual Image File (Win & OS/2)

This chapter provides information about verifying virtual images and writing them to CD-R or premaster tape. You can read about the following:

- ❏ Verifying a virtual image
- ❏ Creating a physical image
- ❏ Estimating system performance
- ❏ Writing to CD-R
- ❏ Writing to a premaster tape

Verifying a Virtual Image

When you verify a virtual image, GEAR checks the size, date, and time stamp for each file in the track or image. If there are discrepancies, it usually means a file has been updated since it was loaded into the volume and GEAR prompts you to update the volume. You can update a track or image by reloading the reported files and directories.

1. With the volume you want to verify open, choose Verify from the Image menu.

   GEAR prompts you to verify a track or the volume.

2. Do one of the following:

   - ❏ Click Track to verify the selected track.
   - ❏ Click Volume to verify the entire volume.

As GEAR verifies the track or volume, the status of the verification is reported in the Status window.

Creating a Physical Volume

A physical volume is a sector-by-sector copy of the CD-ROM you're about to create. You should use a physical volume for writing to
CD-R when the transfer rate for recording has to be increased. Otherwise, you can usually write with a virtual volume.

Before you create a physical volume, GEAR verifies the virtual volume. If the file is not up to date, the physical volume isn't created. You can update the virtual volume by reloading the reported files.

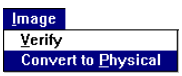
Depending on your needs, you can make a track or an entire volume physical. The sector sizes for the tracks are based on their type as follows:

Track Type	Sector Size
ISO	2048 bytes
CD-ROM XA	2336 bytes
DA	2352 bytes

The physical volume you create contains the current contents of the virtual volume. Subsequent changes you make to the virtual volume don't affect the current physical volume.

The physical volume file names are <volume name>.pxx where xx stands for the track number. These files are always written to the GEAR working directory.

Converting the Volume



1. Open the virtual volume you want to create a physical volume for by clicking the Open CD-Image button on the toolbar.
2. Choose Convert to Physical from the Image menu.

   GEAR prompts you to convert a track or the volume.
3. Do one of the following:

   ❑ Click Track to create a physical image of the selected track.

❏ Click Volume to create a physical image of the entire volume.

As GEAR creates the physical image, the status is reported in the Status window.

4. If physical files already exist for the track or volume, you are prompted to overwrite them.

When the track or physical image has been successfully created, it's reported.

Estimating System Performance

It's a good idea to check you system's performance before you write to CD-R. GEAR measures the time it needs to read all the information from the selected track or volume and transfer it to the CD recorder using the current speed settings.

Note: *This is a software estimate; it doesn't take into consideration multiple SCSI controllers. While estimating your system's performance is reliable, test-mode recording is accurate. See Using Recording Enabled later in this chapter.*

No data is transferred to the recorder during this process. If parts of the image can't be read fast enough, GEAR warns you. You can try any of the following to optimize your system's performance:

❏ Close any other software applications you're running in the background.

❏ Use a defragmentation utility to defragment your hard disk.

❏ Check to see whether your hard disk does recalibration.

❏ Check to see if your SCSI termination is correct. A incorrect SCSI termination can cause delays on the SCSI bus.

❏ Check to see if Windows has enough free memory. At the DOS prompt, type ***mem***. The largest executable program size should be 500K or more.

If Windows doesn't have enough free memory, it uses hard disk space, which slows down your system's performance significantly.

❏ Check your smart drive configuration. If you're using a physical volume, disable smart drive for the drive on which the volume files are located. If you're using a virtual image, enable smart drive for the drive where the volume files are located.

❏ Use a physical volume instead of a virtual image.

❏ Use a lower recording speed if one is available.

Important: *The performance of a system for writing a CD-R is better if the access time of your hard disk is lower. This is more important than a fast processor. A lot of hard disks regularly*

perform recalibration. This means that the hard disk verifies its read/write operation to prevent problems. If this happens during the writing of a CD-R disc, it may result in a data transfer problem. Refer to your hard disk documentation or speak with your supplier about whether your hard disk performs recalibration.

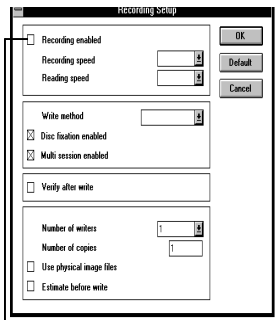
Estimating Performance

Important: *Due to the nature of an estimate, the Estimate command doesn't guarantee the disc will be successfully written later.*

1. With the virtual volume you want to do an estimate for open, choose Estimate from the Write menu.
2. If the physical volume isn't available, GEAR prompts you to use the virtual volume instead. Do one of the following:
   - ❏ Click Yes to use the virtual volume.
   - ❏ Click No to cancel the estimate.

   As the estimate is performed, its status is reported in the Status window.

Using Recording Enabled (Test Write)



Turn off this check box if your CD recorder supports a test or write disable mode

If the CD recorder supports a test mode or write disable mode, you can turn off the Recording Enabled check box in the Recording Settings dialog (CD-R from the Settings submenu of the Options menu). This way, GEAR will check to see if the image can be written to CD-R.

If the check box is turned off, all data is transferred to the CD recorder's buffer but the disc isn't actually written. Therefore, you can check system performance without recording a disc.

Note: *Test-mode recording takes the actual time that recording takes even though you're not recording a disc.*

Writing a CD Image to CD-R

When you write a CD image to a CD-R disc, GEAR uses either the virtual image or the physical image files. When the virtual image is used, the physical image is created and written to disc immediately. You can use physical image files if data transfer rates to the recorder are not fast enough.

If the Estimate before write check box is turned on in the Recording Settings dialog (CD-R from the Settings submenu in the Options menu), GEAR checks your system performance before writing the selected volume to CD-R. If the performance is sufficient, GEAR continues to write the disc. If the performance is insufficient, writing is aborted.

Data Transfer Rates

The system has to maintain a high data transfer rate to a CD recorder. If the transfer rate can't be maintained, the writing of the CD-R will fail. CD-R discs can be written at single, double, or quadruple speeds. The data transfer rate is dependent on the speed of recording and the type of track written (ISO, CD-ROM XA, or CD digital audio). The following table shows the required transfer rates:

	1x	2x	4x	6x
ISO	153 KB/s	307 KB/s	614 KB/s	918 KB/s
CD-ROM XA	175 KB/s	350 KB/s	700 Kb/s	1050 KB/s
CD Digital Audio	176 KB/s	352 KB/s	705 KB/s	1056 KB/s

For external (foreign) images, the required transfer rate depends on the selected sector size. 2048 bytes/sector is comparable to ISO; 2336 bytes/sector is comparable to CD-ROM XA; 2352 bytes/sector is comparable to CD digital audio.

Recommended Hard Disks

The best hard disks for writing CD-R discs are multimedia or AV (audio visual) hard disks. These types minimize recalibration time and guarantee a high sustained data rate.

Note: *Call us or check the Elektroson BBS or CompuServe forum for updated lists of recommended hard disks.*

Files Created After Writing to CD-R

The CD-R command always creates the following files after you write an image:

- ❏ wo_ident.txt
- ❏ woresult.txt.

The wo_ident.txt file contains the table of contents (TOC) and some customer information that's written to the CD recorder. The customer information is read from the gear.ini file. The woresult.txt file contains status information.

Writing to CD-R

1. With the virtual volume you want to write open, click the Write CD-R button on the toolbar.
2. If the physical volume isn't available, GEAR prompts you to use the virtual volume instead. Do one of the following:
   - ❏ Click Yes to use the virtual volume.
   - ❏ Click No to cancel the writing.

   As the volume is written, its status is reported in the Status window.

Writing to Disc Description Protocol Premaster Tape

If you're going to mass-duplicate your CD-R, you can write a volume to premaster tape. The tape is written in ANSI (X3.27-1987) format. GEAR uses either the virtual volume or the physical volume. When you choose the virtual volume, the physical volume is created and written to tape immediately. Writing from a physical volume is faster than writing from a virtual volume.

You can send the premaster tape to a replication company for mastering and duplication. If the Verify after write check box is turned on in the Tape Setup dialog (Tape from the Settings submenu in the Options menu), GEAR verifies the contents of the tape with the volume after writing to premaster tape.

Recommended Tape Drives

GEAR supports most tape units that provide a SCSI interface. The preferred configuration is with an EXABYTE tape unit, a Hewlett Packard DAT unit (HP35470A), or an M4 9 track.

Files Created After Writing to Tape

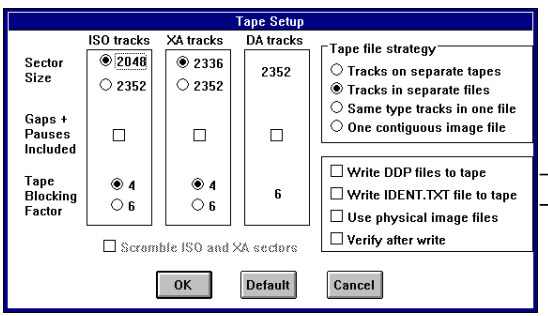
The following files are created after an image is written to tape:

- ❏ tp_ident.txt
- ❏ tpresult.txt
- ❏ DDPID
- ❏ DDPMS
- ❏ PQDESCR

The tp_ident.txt files contains the table of contents (TOC) of the image written to tape and some customer information. The DDPID, DDPMS, and PQDESCR files form the DDP information of the last image written to tape. You can also write these files to tape.

Writing GEAR-Created Files to Premaster Tape

1. Click the Write Premaster Tape button on the toolbar to display the Tape Setup dialog.



2. Turn on the Write DDP files to tape and Write IDENT.TXT file to tape check

boxes.

3. Click OK.

Writing a Volume to Tape

1. With the volume you want to write to tape open, choose Premaster Tape from the Write menu.
2. A dialog prompts you with instructions for preparing the tape unit for recording. When the unit is ready, click OK.

   As the volume is written, its status is reported in the Status window.

GEAR for Mac OS Introduction

Chapter 20 *Getting Started With* GEAR helps you start and learn to use GEAR.

Chapter 21 *Creating an ISO Images* helps you create a new ISO image, create tracks on the image, open an existing ISO image, and load track contents.

Chapter 22 *Creating a CD-ROM XA* shows you how to create an external architecture image and use manual- and pre-interleaving to record data.

Chapter 23 *Creating an Audio CD* shows you how to create and record a digital audio CD.

Chapter 24 *Creating HFS, Hybrid, or SCSI CD-ROMs* explains how to create and open HFS and hybrid images and how to perform a SCSI device dump.

Chapter 25 *Working With Multi-Session Discs* explains how to append data to a disc.

Chapter 26 *Working With External (Foreign Image) Files* explains what an external volume is and how to edit it, and discusses different formats.

Chapter 27 *Working With Virtual Images* explains how to edit tracks on a volume that was created using an authoring package other than GEAR.

Chapter 28 *Testing and Writing a Virtual Image File* shows you how to prepare for writing discs, estimate system performance, and write CD-R discs and premaster tapes.

20

Getting Started With GEAR for Mac OS

This chapter helps you create your first CD in just minutes. You can read about the following:

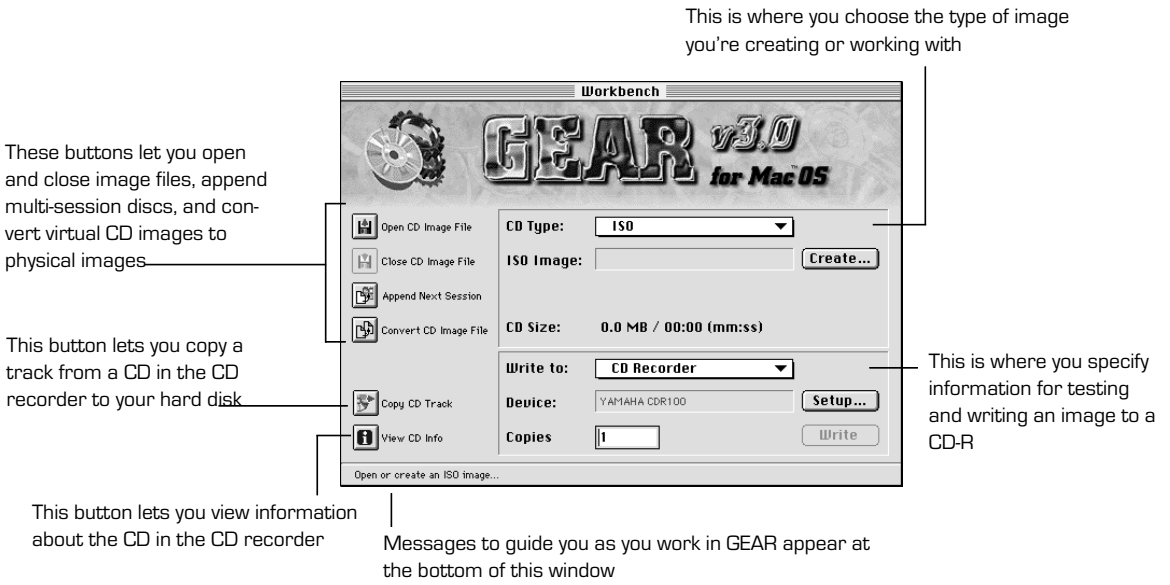
- ❏ Starting GEAR
- ❏ Creating a new ISO image
- ❏ Choosing CD recording settings
- ❏ Writing a CD-R
- ❏ Using the Apple Guide

Starting GEAR

Make sure your recorder is turned on before you start your Macintosh.

- ❏ Double-click the GEAR icon to start GEAR.

  When you start GEAR, the Workbench window appears where you can create a new *virtual image file*. A virtual image file is a file that contains all the information you need to create a CD.



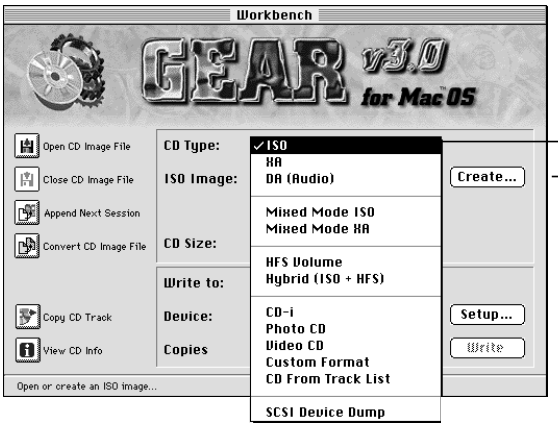
The GEAR Buttons

This button...	Lets you do this
Open CD Image File	Open an existing image
Close CD Image File	Close the current image
Append Next Session	Add another session to CD-R
Convert CD Image File	Converts a virtual image to a physical image
Copy CD Track	Copy a track from the CD in the CD recorder
View CD Info	Display information about the CD in the CD recorder

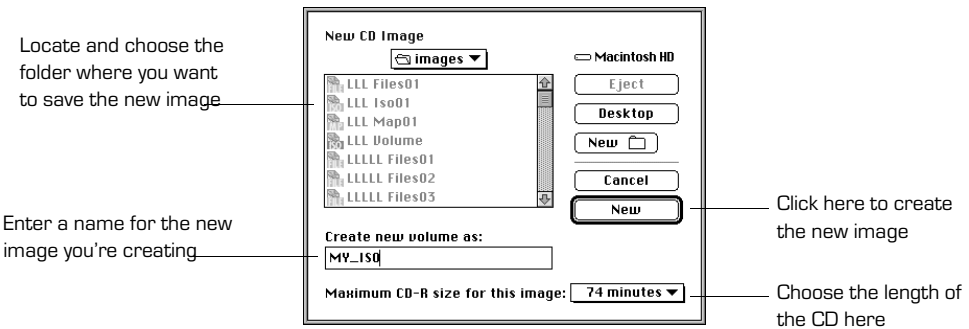
Creating a New CD Image File

The Workbench window is where you control the type of image you want to create and recording the CD.

1. Choose ISO from the CD Type pop-up menu, then click the Create button.



2. In the New CD Image dialog, open the folder where you want to put the new image.



3. Enter MY_ISO for the image name in the Create new volume as box.

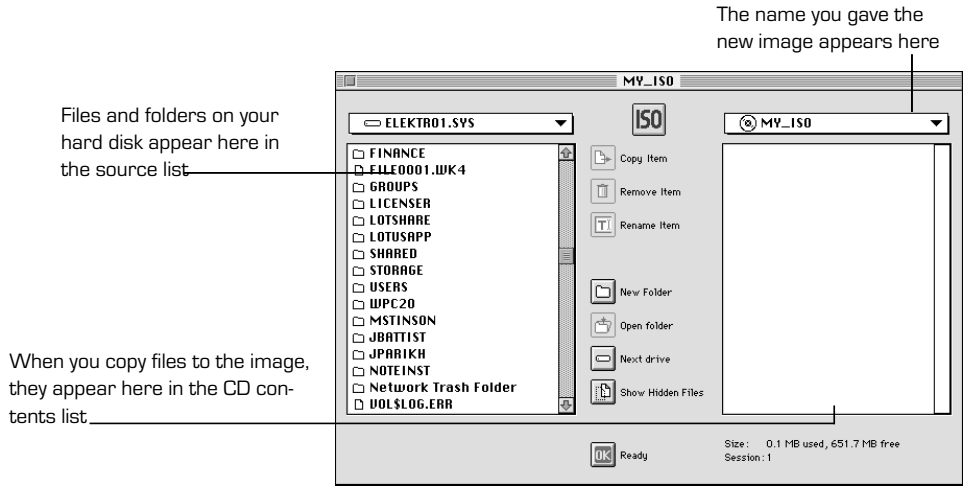
   (For information about valid ISO-9660 names, see Appendix D.)

4. From the Length of CD pop-up menu, choose the correct CD-R size for the CD you plan to record on.

   You can record up to this many minutes on the CD.

5. Click the New button.

   The Session window appears and you're ready to choose the contents for your CD.

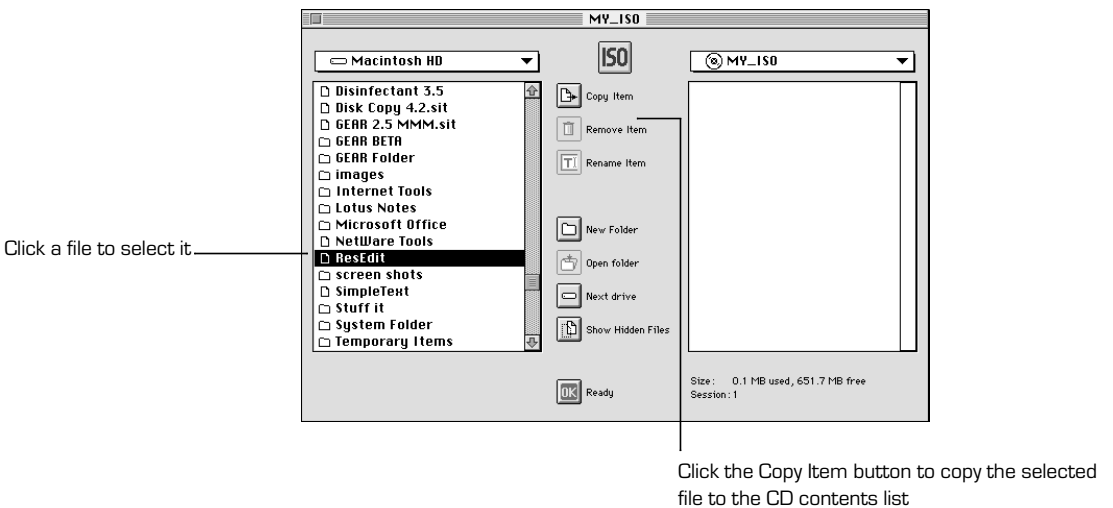


Session window

Loading the CD Contents

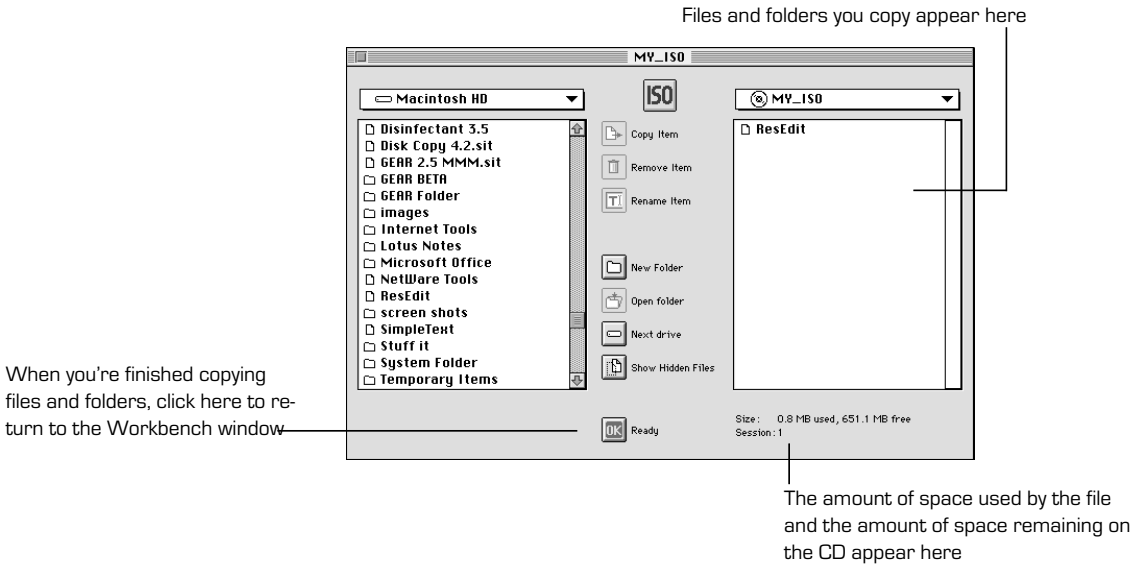
In the Session window, you can access the files and folders on your hard disk as well as any files and folders on network drives if you're connected to a network.

1. From the source list on the left of the Session window, select a file to load onto the CD.



2. Click the Copy button in the center of the dialog.

The file is added to the CD contents list on the right of the dialog.



Below the CD contents list, the amount of space used by the file you've loaded and the amount of space remaining on the CD are displayed.

Hint: *You can double-click a file to add it to the CD contents list.*

3. Repeat steps 1 and 2 to add more files and folders to the CD contents list.

Hint: *To copy multiple files at once, click the first file or folder, then Shift-click subsequent files and folders.*

4. When you're finished copying files and folders, click the Done button at the bottom center of the dialog.

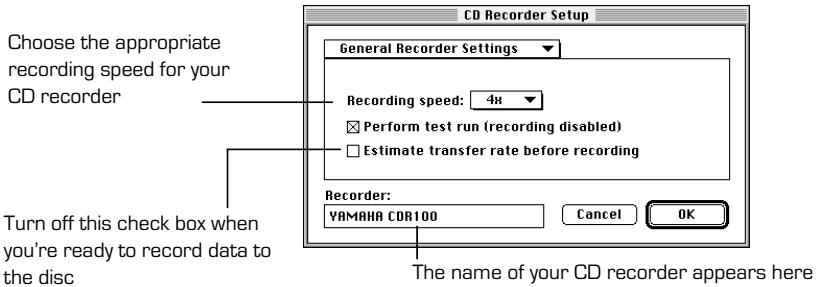
   This returns you to the Workbench window. Now you're ready to choose recording settings.

Choosing CD-R Settings

You can choose the settings you want to use for recording a CD in the CD Recorder Setup dialog. You can specify options like speed and performance testing, disc-at-once, track-at-once, or incremental writing, and medium changer options if you're using a jukebox or CD changer.

We're going to specify a speed and performance testing options in this section. For detailed information about other settings, see chapter 21.

1. Click the Setup button to display the CD Recorder Setup dialog
2. From the pop-up menu, choose General Recorder Settings.



3. In the dialog that appears, choose a speed from the available speeds in the Recording speed pop-up menu.
4. If the Performance test run check box is turned on (if it contains an x), click it to turn it off.

   This will let you record your CD.
5. Click OK to return to the Workbench window.

Writing to a CD Recorder

Now you're ready to write data to your CD! It's as simple as the click of a button.

1. Next to Copies in the Workbench window, enter the number of CD copies you want to record.
2. Click the Write button in the Workbench window.

GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the image are verified. Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differences may occur if files are changed after they're loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

When writing is complete, the disc is ejected automatically and it's ready for reading in any CD-ROM drive!

Premastering a Tape

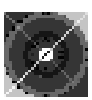
As an alternative to writing to a CD, you can premaster a tape, then send it to a CD-ROM mastering plant where the data is written to CD. The tape, which is written in DDP format, is accepted as a standard at mastering plants. This tape is used to create a glass master, which is used to create daughters. Daughters are used to stamp silver or production CDs.

If you chose to do a test run in the Tape Settings dialog, GEAR compares the contents of the tape with the actual volume. This means that the tape is read back and its data is checked against the contents of your virtual image. If there are differences, GEAR warns you.

The process for premastering a tape is just like writing to CD. Make sure your tape unit is connected to your computer and turned on and that there's a tape in the unit before you start GEAR.

❏ Choose Tape Recorder from the Write to pop-up menu in the Workbench window.

GEAR optimizes your virtual image by resizing it to the minimum size that can contain all the data. All files in the volume are verified. Each file's size and time stamp are compared to the file's size and time stamp when it was loaded. Differ-



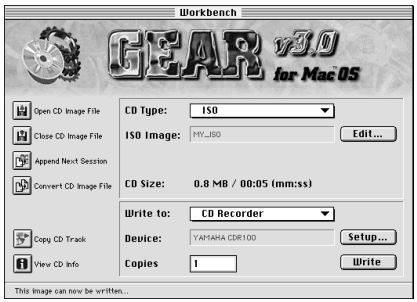
ences may occur if files are changed after they're loaded into the virtual image. If there are any differences, GEAR warns you and you can reload the files to update them.

When writing is complete, the tape is ejected automatically. Your tape is ready to send to a CD-ROM mastering plant!

Using the Online Help

Online help is available at any time if you don't understand how to use GEAR. To access help, do any of the following:

- ❏ Choose GEAR Guide from the Guide menu to display the help window.
- ❏ Choose a help command from the Apple Guide menu.
- ❏ As you use GEAR, messages are displayed at the bottom of the Workbench window to guide you.



Messages that guide you appear here

21

Creating an ISO Image (Mac OS)

This chapter teaches you how to create and open ISO images. You can read about the following:

- ❏ Creating a new ISO image file
- ❏ Creating tracks on an ISO image CD
- ❏ Opening an existing ISO image
- ❏ Loading track contents

In addition, this chapter discusses general information that is relevant for all CD types.

For information about editing tracks and track contents, volume settings and descriptors, see Chapter 24. For information about creating CD-ROM XA images and audio CDs, see Chapters 22 and 23, respectively. For information about external files (images created using a CD authoring package other than GEAR), see Chapter 26.

About Creating a New Virtual Image File

A *virtual image* is the minimal amount of information you need to create a CD. The opposite of the virtual image is a *physical image*, which is the entire CD stored on a hard drive before you record it.

Before you begin to create a new virtual image file, you should review the following information about virtual images and their capacities.

When you create a new virtual image, the file is called a *volume administration file*. You *must* have more than 25MB of free disk space available to create a volume administration file.

Administration files are created in the current working directory for each new track you create. The files are named using the CD-ROM name, the word Files, and the track number, for example:

- ❏ NEW_VOLUM Volume
- ❏ NEW_VOLUM Iso01
- ❏ NEW_VOLUM Files01
- ❏ NEW_VOLUM Map01
- ❏ NEW_VOLUM Phys01 (physical volumes)

You should never edit or delete these files manually; this results in a corrupt and useless image. Administration files are deleted automatically when you delete the associated image.

Track Types in GEAR

You can choose three track types in GEAR:

- ❏ *ISO* is a CD-ROM track type with error-checking capabilities. This is referred to as Mode 1 format (Yellow Book). This format is suited for recording computer data and always consists of one track. ISO is suited for CD-ROM formats. This chapter shows you how to create an ISO image.
- ❏ *XA* (eXtended Architecture) is a track type for CD-ROM XA and CD-I. This format is used for multi-media applications and always consists of one track. XA is suited for the following formats: CD-ROM XA, CD-I, EB, MMCD, Photo CD, and VideoCD. Chapter 22 shows you how to create an XA CD.
- ❏ *DA* is a track type for digital audio. This format allows up to 99 tracks. If audio tracks are combined on a disc with an ISO or XA track, up to 98 tracks can be used. DA is suited for CD Digital Audio (Red Book). Chapter 23 shows you how to create an audio CD.

Calculating Virtual Image Capacities

You can use the following formula to calculate the capacity of a virtual image:

virtual image capacity = sector data capacity (bytes) x length (minutes) x 60 (seconds) x 75 (number of sectors)

The sector data capacities for each track type are:

Track Type	Sector Data Capacity
ISO	2048 bytes
XA and CD-I	2336 bytes
CD Audio (DA)	2352 bytes

The virtual image data capacity for each disc size and track type are:

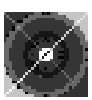
Virtual Image Data Capacity			
Disc Size	ISO	XA and CD-I	CD Audio
18 min.	158 MB	180MB	181MB
63 min.	553MB	631MB	635MB
74 min.	650MB	741MB	746MB
80 min.	703MB	802MB	807MB

As you create tracks on your new image, keep in mind these points:

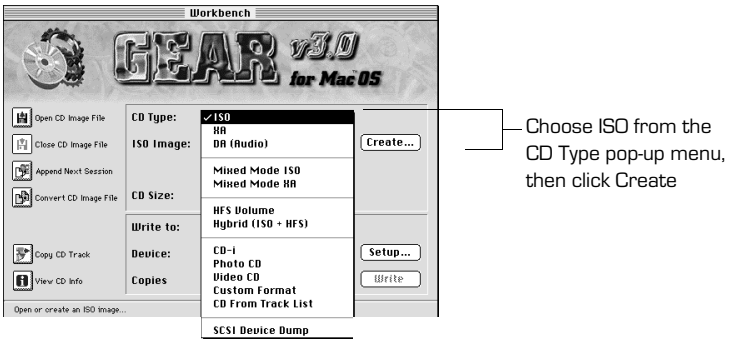
- ❏ The track number is assigned automatically and is relevant only for CD audio. With the exception of CD Enhanced or CD Plus, XA tracks are *always* assigned to track number 1.
- ❏ A virtual image can have *only* one ISO *or* XA track; it may not have both types of tracks.
- ❏ A virtual image can contain up to 99 tracks.
- ❏ It is impossible to have two separate CD formats in one track.
- ❏ When you create a new track, it's automatically assigned the maximum available space on the virtual image.

Creating an ISO Image

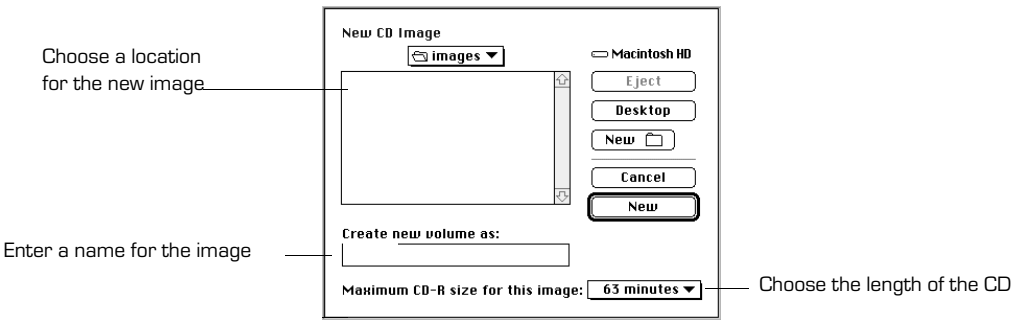
The process to create a new ISO image is just like creating your first virtual image in Chapter 20.



1. In the Workbench window, choose ISO from the CD Type pop-up menu, then click the Create button or press Cmd-N.



2. In the New Volume dialog, open the folder where you want to put the new ISO image.



3. Enter a name for the ISO image in the Create new volume as box.

   A valid name consists of uppercase, alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix A.

4. From the Length of CD pop-up menu, choose the correct CD-R size for the CD you plan to record on.

   You can record 18, 63, 74, or 80 minutes on a CD.

5. Click the New button.

   The Session window appears where you can choose the contents for your CD.

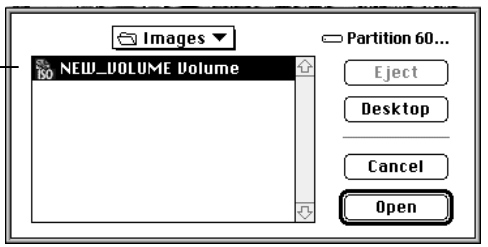
Creating the Track Contents

For data tracks only, you can indicate how non-ISO names an d folder names should be handled. Choose Volume Setup from the Edit menu, then choose Volume Attributes in the dialog that appears. The option you choose from the pop-up menu under When copying files with Mac names to an ISO image determines how and when non-ISO file and folder names are translated.

Loading Files for a Track

1. If the ISO image containing the track you want to load data for isn't open, click the Open CD Image File button in the Workbench window or press Cmd-O.

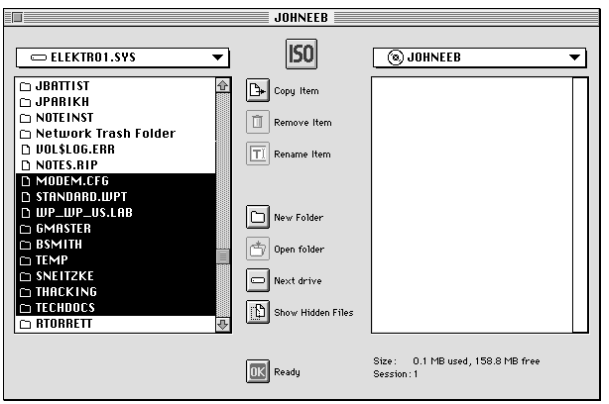
Locate and double-click the file you want to open



2. In the dialog that appears, locate and select the ISO image you want to open, then click Open.

   The Session window appears.

Locate and select in the source list the files you want to copy to the CD



3. From the source list, locate the folders and files you want to load.

- ❏ To load multiple contiguous items, click the first item, then Shift-click additional items.
- ❏ To load multiple non-contiguous items, click the first time, then Cmd-click additional items.
- ❏ To deselect selected items, Shift-click or Cmd-click them.
- ❏ To load items from a folder that appears in the source file list, select the folder, click the Open Folder button in the center of the window, then select the items.
- ❏ To load items from another drive or partition, click the Next Drive button in the center of the window, then select the items.

4. Do one of the following to add the selected items to the CD contents list:
   - ❏ Click the Copy Item button.
   - ❏ Double-click an individual file to copy it.

   GEAR displays the copied items in the CD contents list.
5. If you opened a folder in the source list, close it by choosing another folder or drive from the popup menu at the top of the source file list.
6. Repeat steps 3–5 to copy more items.

   The amount of space used by the items you've copied and the amount of space remaining are displayed at the bottom right of the Session window. The session number is also displayed.
7. In the CD contents list, do any of the following while you are copying items:
   - ❏ To organize items into folders, select the items, then click the New Folder button in the center of the window.
   - ❏ Select an item and click the Remove Item button to remove it from the list of copied items.
   - ❏ Select an item and click the Rename Item button to change its name.
8. When you're finished copying items, click the Done button to return to the Workbench window.

   The name of the ISO image and the size of the CD contents are displayed.

9. When you're finished with the ISO image file, click the Close CD Image File button in the Workbench window.

Recording ISO Tracks

You can specify the types of settings appropriate for your CD recorder using the Recorder Setup command in the Edit menu. There are three types of settings:

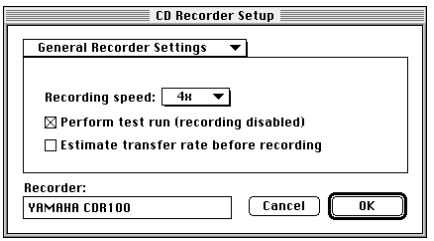
- ❏ General
- ❏ Advanced
- ❏ Medium changer

General Recorder Settings

In the CD Recorder Setup dialog for General Recorder Settings, you can specify the speed at which you want to record: 1x, 2x, 4x, or 6x, depending on your recorder model.

You can also specify whether to perform a test run. This simulation test disables recording and lets you verify that your system performance is sufficient to record the CD. A test run copies your entire CD image to the recorder at the specified recording speed.

Either you can do a software estimate or perform a test run. A software estimate tests the rate at which data is transferred to the CD-R. This option is quicker than the Perform test run option but isn't as accurate.



General recorder settings

Advanced Recorder Settings

In the CD Recorder Setup dialog for Advanced Recorder Settings, you can select a recording method: disc-at-once, track-at-once, or incremental, depending on your recorder model.

Incremental lets you write in fixed packet size, which is determined by the recorder's buffer to eliminate or minimize buffer underrun.

Disc at once means your recorder writes the lead in, then the track data, then the lead out.

Note: *You can't use disc at once recording to record a multi-session disc.*

Track at once means your recorder first writes the track data, then finalizes the disc by writing a lead in and lead out. This method is used in multi-session recording.

Until you fixate the disc, you can only read it on a CD recorder. You can use this option to record multiple tracks on a CD without recoding in multiple sessions.

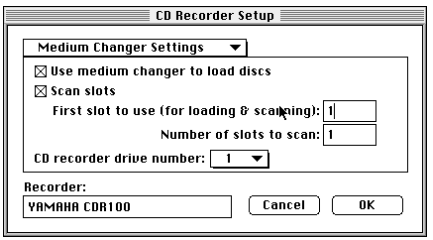
You can also specify whether to fixate the disc after recording (that is, record the lead in or lead out).

If you don't fixate the disc, you can specify a multi-session recording, that is, recording can occur over several different sessions on the same or different recorders.

Advanced recorder settings

Medium Changer Settings

In the CD Recorder Setup dialog for Medium Changer Settings, you can specify whether to use a CD changer or jukebox to load CDs for recording. You can also indicate whether to scan slots in the medium changer: the first slot to use for loading and scanning, and the number of slots to scan. In addition, you can choose the drive number or the CD recorder to use.



Medium changer settings

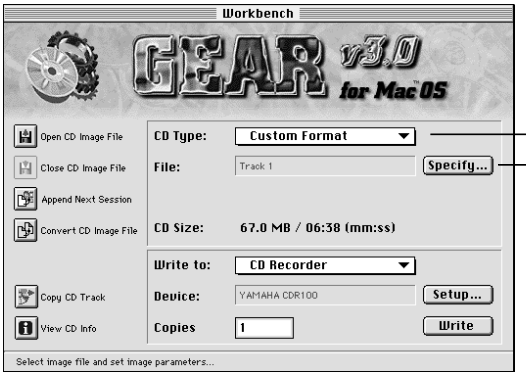
Changing Recorder Settings

1. Click the Setup button in the Workbench window to display the CD Recorder Setup dialog or choose CD Recorder Setup (Edit menu).
2. Choose the type of recording settings you want to use:
   - ❏ General Recorder Settings lets you specify speed and performance testing options.
   - ❏ Advanced Recorder Settings lets you specify a recording method (that is, disc at once, track at once or incremental).
   - ❏ Medium Changer Settings let you specify options for a jukebox or CD changer.

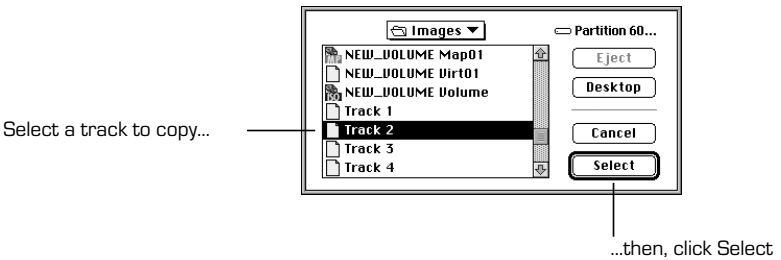
   (For details about these options, see “Recording ISO Tracks,” earlier in this chapter.)
3. When you’ve specified your recording settings, click OK.
4. In the Workbench window, enter the number of copies you want to record.
5. Click the Write button to write the tracks to CD.

Copying a Track from CD-ROM

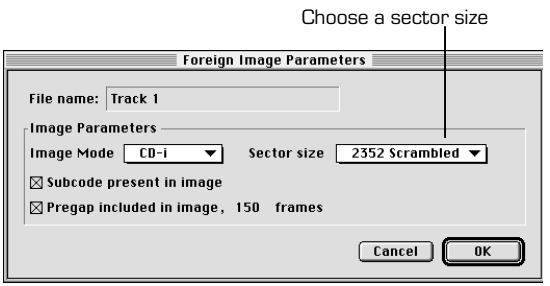
1. Insert a CD-ROM ISO CD in your CD recorder.
2. In the Workbench window, click the View CD Info button to display a window containing information such as the track types on the CD.
3. Click the Copy CD Track button to copy the image to your hard disk.
4. In the Workbench window, choose Custom Format from the CD Type pop-up menu.
5. Click the Specify button.



6. In the dialog that appears, select the track you want to copy to CD and click the Select button.



The Foreign Image Parameters dialog appears.



7. Choose an ISO type from the Image Mode pop-up menu.

   The Sector Size defaults to a common setting.

8. Usually the displayed value is appropriate, however, you can choose another size from the Sector Size pop-up menu.

Warning! *If you choose an incorrect setting, your disc will be unreadable.*

9. Click OK to copy the image to CD.

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Creating a CD-ROM XA (Mac OS)

This chapter provides information about how to create a CD-ROM XA image. You can read about the following:

- Creating a new CD-ROM XA
- Creating tracks on a new CD-ROM XA
- Opening an existing CD-ROM XA
- Loading track contents

For general information about creating virtual ISO CD images, see Chapter 21. For information about editing tracks and track contents, volume settings and descriptors, see Chapter 24. For information about audio CD images, see Chapter 23.

About Creating a New CD-ROM XA

XA (eXtended Architecture) is a track type for CD-ROM XA and CD-I. This format is used for multi-media applications and consists of one track *only*. XA is suited for the following formats:

- CD-ROM XA
- CD-I
- EB
- MMCD
- Photo CD
- VideoCD

When you load files for an XA image, you can choose non-interleaved or pre-interleaved files, or you can manually interleave the files you load.

Interleaving

When you create an XA image, you must use *interleaved* files or allow GEAR to interleave files for you. This is useful when you have two or more different CD track types, such as audio or video, that must flow together in synchronization. These files must be interleaved with each other to optimize playback.

For example, with a mixed mode disc, the laser-reading head has to jump back and forth between widely separated tracks to play back audio and video data. This slows down the application significantly.

When you use interleaving, the laser-reading head can pick up video, then move smoothly to the next amount of audio and so on, providing real-time playback.

Note: *Playing XA interleaved files requires an XA decoder card.*

There are two types of XA interleaving in GEAR:

Manual interleave
Pre interleaved

Set Manually

Manual interleaving lets you specify all the options to create your own interleaved files. You can find more information about the use of these parameters for CD-ROM XA applications in the book, *System Description on CD-ROM XA*.

In general, it's easier to use the dedicated CD-ROM XA interleaving tools, such as the Mammoth Tool Set, and the Pre-interleaved files option to create these files.

Pre-interleaved files

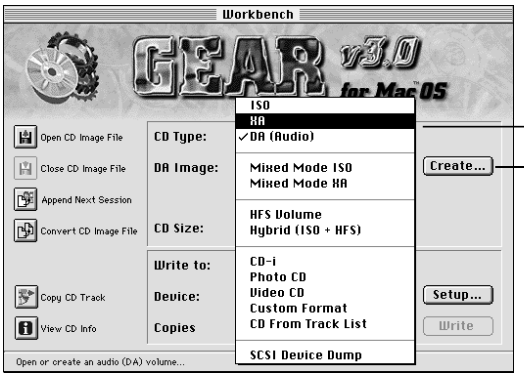
If you use this option, GEAR assumes that the selected files are pre-interleaved CD-ROM XA files, which are sometimes referred to as XA streams.

Important: *Make sure the files you are loading are pre-interleaved files. Non-pre-interleaved files you load this way are useless on the resulting CD-R disc. A pre-interleaved file must have a 2336 byte sector size with a subheader field filled in. This subheader field is copied, together with other information, to the* GEAR *administration file. Normally the subheader is not included in a file and the subheader information is generated by GEAR.*

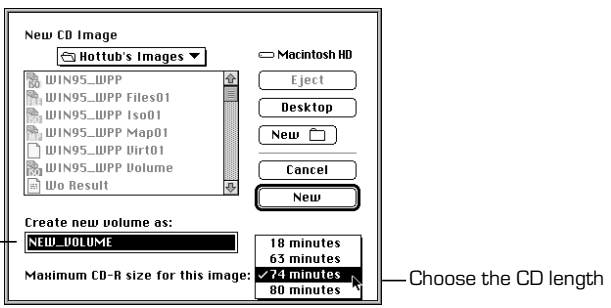
Creating an XA Image

The process to create a new XA image is similar to creating your first virtual image in Chapter 20.

1. In the Workbench window, choose XA from the CD Type pop-up menu, then click the Create button.



2. In the New Volume dialog, open or create the folder where you want to put the new image.

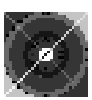


3. Type a name for the image in the Create new volume as box.

   A valid name consists of uppercase, alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix D.

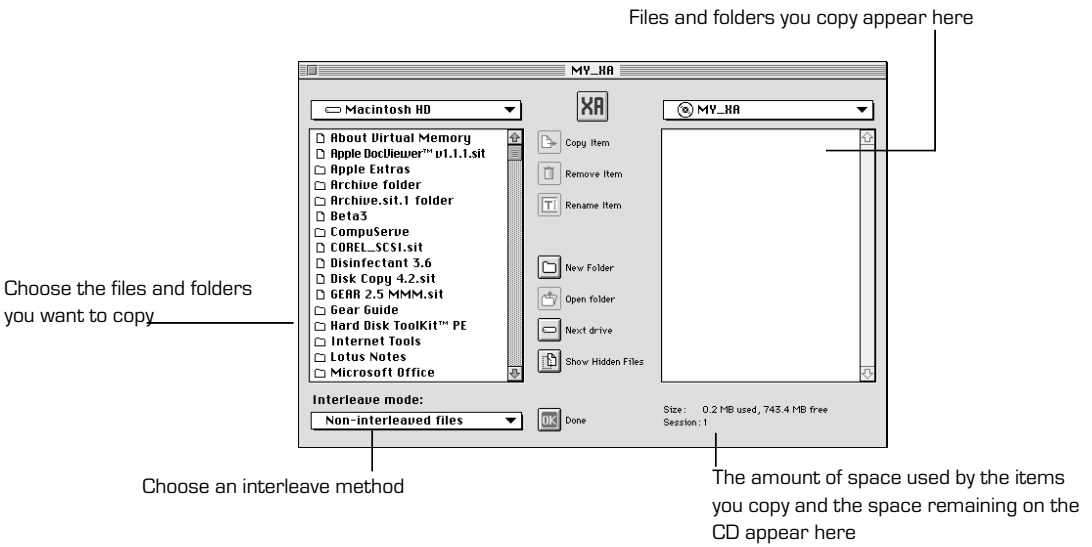
4. From the Length of CD pop-up menu, choose the correct CD-R size for the CD you plan to record on.

   You can record 18, 63, 74, or 80 minutes on a CD.



5. Click the New button to create the CD image.

   The Session window appears.

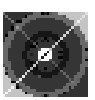


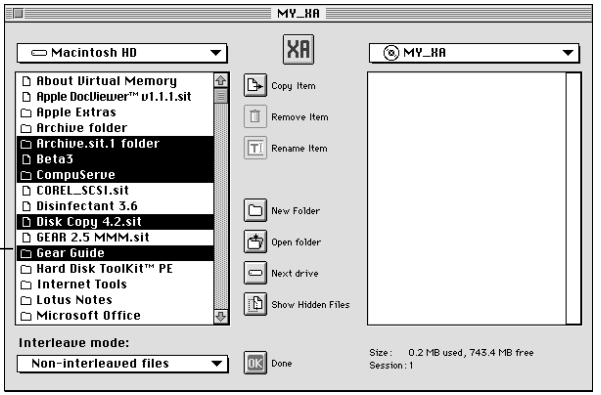
6. To control the display of hidden files in the source list, click the Hidden Files button in the center of the Session window.

7. From the Interleave pop-up menu, choose the type of interleaving for the files you're going to copy. (For information about the Manual Interleave dialog, see "Choosing Manual Interleave Parameters," later in this chapter.)

8. From the source list, locate the folders and files you want to copy.

   - ❏ To copy multiple contiguous items, click the first item, then Shift-click additional items.
   - ❏ To copy multiple non-contiguous items, click the first item, then Cmd-click additional items.
   - ❏ To deselect selected items, Shift-click or Cmd-click them.
   - ❏ To copy files from a folder that appears in the source list, select the folder, click the Open Folder button in the center of the window, then select the files.





To select non-contiguous files and folders, Click one file, then Cmd-click additional files

9. Do one of the following to copy selected items to the CD contents list:

   ❏ Click the Copy Item button.

   ❏ Double-click an individual file to copy it.

   GEAR displays the copied items in the CD contents list.

10. If you opened a folder in the source list, close it by choosing another folder or drive from the pop-up menu at the top of the source list.

11. Repeat steps 8–10 to copy more items.

    The amount of space used by the items you've copied and the amount of space remaining are displayed at the bottom right of the Session window. The session number is also displayed.

12. In the CD contents list, do any of the following while you're copying items:

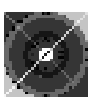
    ❏ Select an item and click the Remove Item button to remove the item from the list of copied items.

    ❏ Select an item and click the Rename Item button to change the item's name.

13. When you're finished copying files, click the Done button.

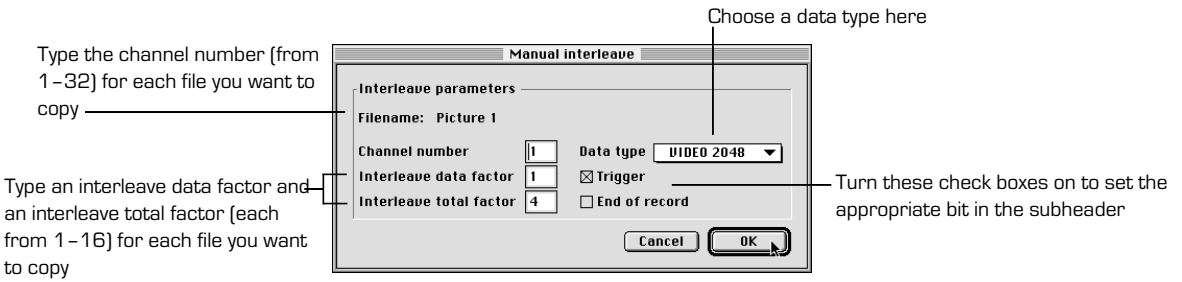
Choosing Manual Interleave Parameters

When you choose Set manually from the Interleave pop-up menu in the Session window, you can specify all the options to create your own interleaved files. You can find more information about the use of these parameters for CD-ROM XA applications in the book, *System Description on CD-ROM XA*.



In general, it's easier to use the dedicated CD-ROM XA interleaving tools, such as Mammoth Tool Set, and the Pre-interleaved files option in the Interleave pop-up menu to create these files.

1. Choose Set manually from the Interleave pop-up menu in the Session window.
2. The Manual Interleave dialog appears.



3. Choose a channel number from 1–32 for each file you want to load.
4. Choose an interleave data factor from 1–16 for each file you want to load.
5. Choose an interleave total factor from 1–16 for each file you want to load. This number, together with the interleave data factor in step 4 determines the interleaving of each file.

   Valid combinations for interleave data factor and total factor are: 1–4, 1–16, 1–8, and 2–4, and so on.

   The combination 2–4 means that for each set of four sectors, the first two are occupied by the file.

   ADPCM B stereo files are interleaved 1–4, while ADPCM C stereo files are interleaved 1–8.

6. Choose a data type from the Data type pop-up menu.
   - ❏ ADPCMBSN is valid for ADPCM audio, level B stereo, no emphasis.
   - ❏ ADPCMCME is value for level C Mono with emphasis.
   - ❏ VIDEO 2048 is used if each sector contains video data and EDC/ECC codes.
   - ❏ VIDEO 2324 is used if each sector contains video data.
   - ❏ Other valid choices include: ADPCMBSE; ADPCMBMN; ADPCMBME; ADPCMCSN; ADPCMCSE; ADPCMCMN; ADPCMCME; AND DATA2048.

7. If you want the trigger or end of record bit set in the subheader of the last sector of each file, turn on the Trigger and End of record check boxes.

   You can specify one or both options.

8. Click OK to close the dialog. The item you copied appears in the CD contents list.

Pre-Interleaved Files

If you choose this option from the Interleave pop-up menu in the Session window, GEAR assumes that the specified files are pre-interleaved CD-ROM XA files, which are sometimes referred to as XA streams.

Important: *Make sure the files you are copying with this option are indeed pre-interleaved files. Non-pre-interleaved files you copy this way are useless on the resulting CD-R disc. A pre-interleaved file must have a 2336 byte sector size with a subheader field filled in. This subheader field is copied, together with the other information, to the* GEAR *administration file. Normally the subheader is not included in a file and the subheader information is generated by GEAR.*

❏ Choose Pre-Interleaved from the CD-ROM XA submenu of the Options menu.

Recording XA Tracks

You can specify the types of settings appropriate for your CD recorder using the Recorder Setup command in the Edit menu. There are three types of settings:

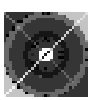
❏ General
❏ Advanced
❏ Medium changer

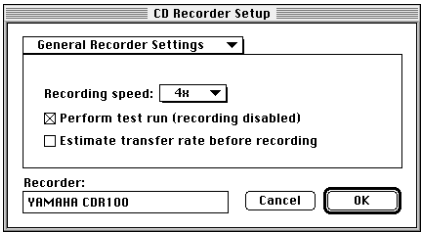
General Recorder Settings

In the CD Recorder Setup dialog for General Recorder Settings, you can specify the speed at which you want to record: 1x, 2x, 4x, or 6x, depending on your recorder model.

You can also specify whether to perform a test run. This simulation test disables recording and lets you verify that your system performance is sufficient to record the CD. A test run copies your entire CD image to the recorder at the specified recording speed.

Either you can do a software estimate or perform a test run. A software estimate tests the rate at which data is transferred to the CD-R. This option is quicker than the Perform test run option but isn't as accurate.





General recorder settings

Advanced Recorder Settings

In the CD Recorder Setup dialog for Advanced Recorder Settings, you can select a recording method: disc-at-once, track-at-once, or incremental, depending on your recorder model.

Incremental lets you write in fixed packet size, which is determined by the recorder's buffer to eliminate or minimize buffer underrun.

Disc at once means your recorder writes the lead in, then the track data, then the lead out.

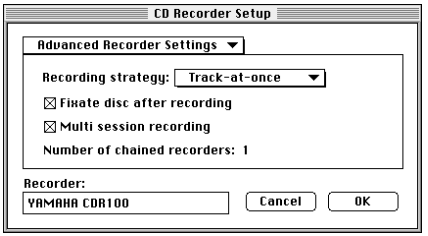
Note: *You can't use disc at once recording to record a multi-session disc.*

Track at once means your recorder first writes the track data, then finalizes the disc by writing a lead in and lead out. This method is used in multi-session recording.

Until you fixate the disc, you can only read it on a CD recorder. You can use this option to record multiple tracks on a CD without recoding in multiple sessions.

You can also specify whether to fixate the disc after recording (that is, record the lead in or lead out).

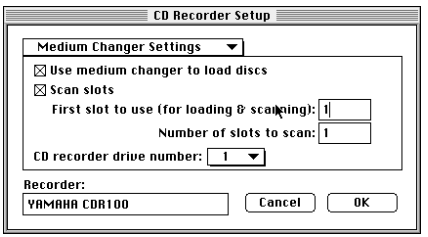
If you don't fixate the disc, you can specify a multi-session recording, that is, recording can occur over several different sessions on the same or different recorders.



Advanced recorder settings

Medium Changer Settings

In the CD Recorder Setup dialog for Medium Changer Settings, you can specify whether to use a CD changer or jukebox to load CDs for recording. You can also indicate whether to scan slots in the medium changer: the first slot to use for loading and scanning, and the number of slots to scan. In addition, you can choose the drive number or the CD recorder to use.



Medium changer settings

Changing Recorder Settings

1. Click the Setup button in the Workbench window to display the CD Recorder Setup dialog or choose CD Recorder Setup (Edit menu).
2. Choose the type of recording settings you want to use:
   - ❏ General Recorder Settings lets you specify speed and performance testing options.
   - ❏ Advanced Recorder Settings lets you specify a recording method (that is, disc at once, track at once or incremental).
   - ❏ Medium Changer Settings let you specify options for a jukebox or CD changer.

(For details about these options, see “Recording XA Tracks,” earlier in this chapter.)

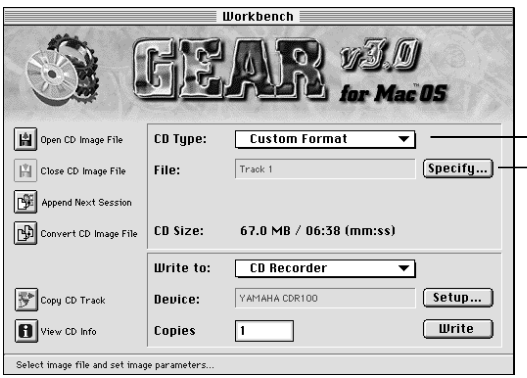
3. When you’ve specified your recording settings, click OK.
4. In the Workbench window, enter the number of copies you want to record.
5. Click the Write button to write the tracks to CD.

Copying an XA Track from CD-ROM

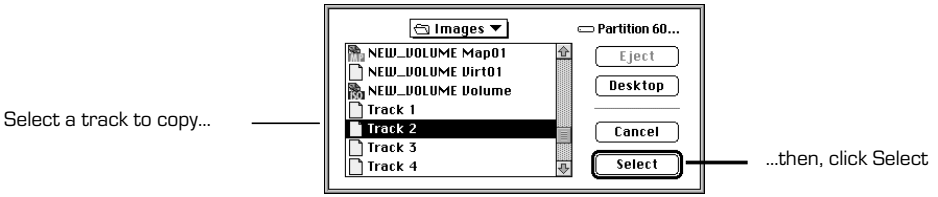
Note: *Not all recorders support copying CD-ROM XA tracks.*

1. Insert a CD-ROM XA CD in your CD recorder.
2. In the Workbench window, click the View CD Info button to display a window containing information such as the track types on the CD.

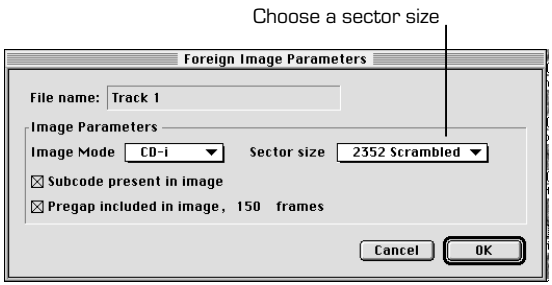
3. Click the Copy CD Track button to copy the image to your hard disk.
4. In the Workbench window, choose Custom Format from the CD Type pop-up menu.
5. Click the Specify button.



6. In the dialog that appears, select the track you want to copy to CD and click the Select button.



The Foreign Image Parameters dialog appears.



7. Choose an XA type from the Image Mode pop-up menu.

   The Sector Size defaults to a common setting.

8. Usually the displayed value is appropriate, however, you can choose another size from the Sector Size pop-up menu.

Warning! *If you choose an incorrect setting, your disc will be unreadable.*

9. Click OK to copy the image to CD.

23

Creating an Audio CD (Mac OS)

This chapter teaches you how to create and open an audio CD image. You can read about the following:

- Creating a new audio image
- Creating tracks on a new audio image
- Opening an existing audio image
- Loading track contents

For general information about creating virtual CD images, see Chapter 21. For information about editing tracks and track contents, volume settings and descriptors, see Chapter 24. For information about CD-ROM XA images, see Chapter 22.

About Creating a New Audio CD

DA (Digital Audio) is a track type for audio CDs. This format allows you to create up to 99 tracks. If audio tracks are combined on a disc with an ISO or XA track, you can create up to 98 tracks.

GEAR supports Red Book audio file formats, as well as the following formats:

- wav
- AIFF
- SoundDesigner II

For wav, AIFF, and SoundDesigner II files, GEAR removes the header automatically. AIFF files are usually in MSB format.

When you create DA tracks, you need hard disk files that represent audio. The files must always fulfill the following requirements, which are specified in the Red Book:

- ❏ Audio files hould *not* have a header
- ❏ The sample frequency must be 44.1kHz
- ❏ Audio must be stereo (one sample for the left channel and one sample for the right channel) sampled on 44.1kHz
- ❏ Each sample must contain 16 bits
- ❏ The byte order must be the same as the byte order used by your computer; if it isn't, you can use the generic option MSBAudio (in the Gear Preferences file) to make GEAR swap the audio bytes for all tracks

For example, MSB audio is the default for Macintosh. If you want GEAR to swap byte order, set MSBAudio=FALSE in the GEAR preferences file.

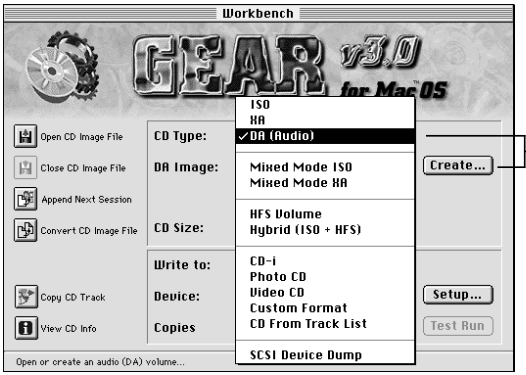
Depending on the audio package you're using, the audio file may or may not contain a sound header, however, audio files should *not* contain sound headers. If sound headers are not removed or cleared, they will cause a sharp click in the resulting audio track on the CD. GEAR removes sound headers when loading files.

You can use the Copy CD Track button in the Workbench window to copy a digital audio track from CD to a file on hard disk. This command operates on the Philips CDD522, Sony 920, and Yamaha CDR100. The Read CD Track command creates no header so you can use the resulting file directly.

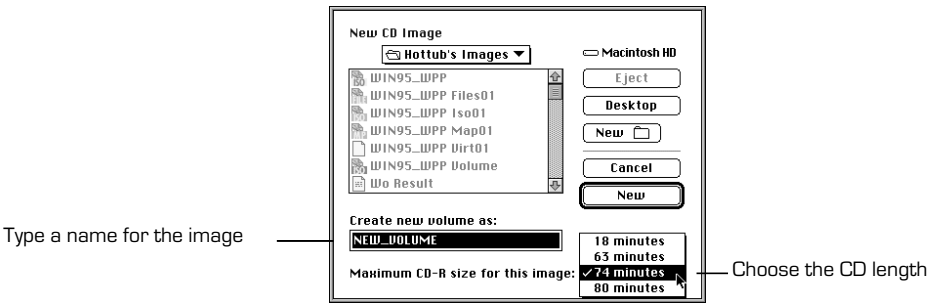
Creating an Audio Image With Tracks

The process to create a new audio CD is similar to creating your first virtual image in Chapter 20.

1. In the Workbench window, choose DA (Audio) Image from the CD Type pop-up menu, then click the Create button.



2. In the New Volume dialog, open or create the folder where you want to put the new image.



3. Type a name for the image in the Create new volume as box.

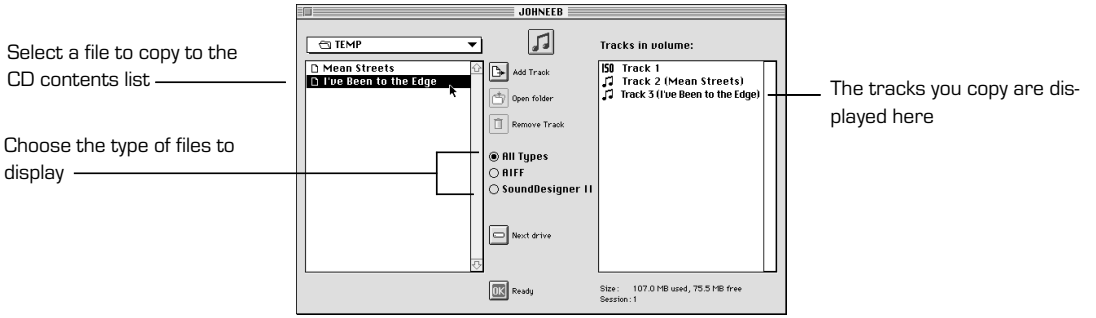
   A valid name consists of uppercase, alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see Appendix A.

4. From the Length of CD pop-up menu, choose the correct CD-R size for the CD you plan to record on.

   You can record 18, 63, 74, or 80 minutes on a CD.

5. Click the New button to create the CD image.

   The Session window appears.



6. To change the type of files displayed in the source list, turn on the appropriate button in the center of the window.
7. From the source list, locate the audio file you want to add.
8. Do one of the following to add the selected file to the CD contents list:
   - ❏ Double-click the file name.
   - ❏ Click the Add File button.

   GEAR assigns the track number automatically
9. Repeat steps 6–8 to add more tracks.

   The amount of space used by the tracks you've loaded and the amount of space remaining are displayed at the bottom right of the Session window.
10. When you're finished loading files, click the Done button.

Copying an Audio Track from CD-ROM

GEAR lets you extract tracks form a CD-ROM and store them on your hard disk for recording on a CD-R. You can use any of the following four recorders to read audio through the SCSI bus:

- ❏ Kodak PCD225
- ❏ Philips CDD522
- ❏ Sony 920S
- ❏ Yamaha CDE/CDR-100

Note: *Not all recorders support copying digital audio tracks.*

1. Insert an audio CD in your CD recorder.
2. In the Workbench window, click the View CD Info button to display a window containing information such as the track types on the CD.

3. Click the Copy CD Track button to copy the image to your hard disk.

See “Creating an Audio Image With Tracks” for information about recording the selected files to a CD. You can locate these files in the source list in the session window and add them to the CD contents list to record.

Writing an Audio CD

You can specify the types of settings appropriate for your CD recorder in the CD Recorder Setup dialog. There are three types of settings:

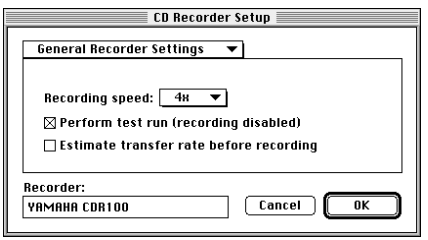
- ❏ General
- ❏ Advanced
- ❏ Medium changer

General Recorder Settings

In the CD Recorder Setup dialog for General Recorder Settings, you can specify the speed at which you want to record: 1x, 2x, 4x, or 6x, depending on your recorder model.

You can also specify whether to perform a test run. This simulation test disables recording and lets you verify that your system performance is sufficient to record the CD. A test run copies your entire CD image to the recorder at the specified recording speed.

Either you can do a software estimate or perform a test run. A software estimate tests the rate at which data is transferred to the CD-R. This option is quicker than the Perform test run option but isn’t as accurate.



General recorder settings

Advanced Recorder Settings

In the CD Recorder Setup dialog for Advanced Recorder Settings, you can select a recording method: disc-at-once, track-at-once, or incremental, depending on your recorder model.

Incremental lets you write in fixed packet size, which is determined by the recorder's buffer to eliminate or minimize buffer underrun.

Disc at once means your recorder writes the lead in, then the track data, then the lead out.

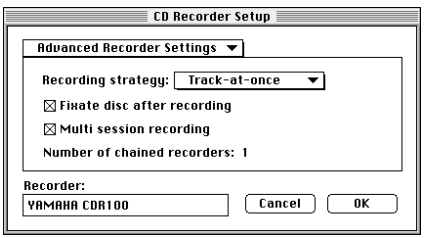
Note: *You can't use disc at once recording to record a multi-session disc.*

Track at once means your recorder first writes the track data, then finalizes the disc by writing a lead in and lead out. This method is used in multi-session recording.

Until you fixate the disc, you can only read it on a CD recorder. You can use this option to record multiple tracks on a CD without recoding in multiple sessions.

Before you record your last track, turn on fixation so the lead in and lead out will be written.

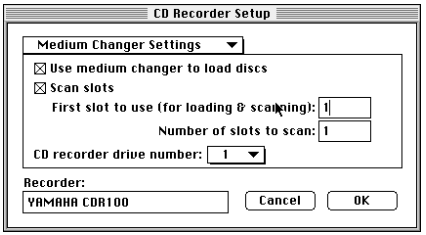
If you don't fixate the disc, you can specify a multi-session recording, that is, recording can occur over several different sessions on the same or different recorders.



Advanced recorder settings

Medium Changer Settings

In the CD Recorder Setup dialog for Medium Changer Settings, you can specify whether to use a CD changer or jukebox to load CDs for recording. You can also indicate whether to scan slots in the medium changer: the first slot to use for loading and scanning, and the number of slots to scan. In addition, you can choose the drive number or the CD recorder to use.



Medium changer settings

Changing Recorder Settings

1. Click the Setup button in the Workbench window to display the CD Recorder Setup dialog or choose CD Recorder Setup (Edit menu).
2. Choose the type of recording settings you want to use:
   - ❏ General Recorder Settings lets you specify speed and performance testing options.
   - ❏ Advanced Recorder Settings lets you specify a recording method (that is, disc at once, track at once or incremental).

Note: *Be sure to turn on the Fixate disc after recording check box so the disc will be fixated.*

   - ❏ Medium Changer Settings let you specify options for a jukebox or CD changer.

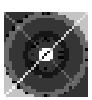
   (For details about these options, see “Recording Audio Tracks,” earlier in this chapter.)

3. When you’ve specified your recording settings, click OK.
4. In the Workbench window, enter the number of copies you want to record.
5. Click the Write button to write the tracks to CD.

Writing Audio Tracks in Separate Recordings

Audio CDs should be single-session discs because audio-only CD players are single-session readers. You can’t finalize an audio CD until you’ve loaded all the audio files for all the tracks. If your hard disk isn’t large enough to hold all the audio files or you haven’t prepared all your audio files for recording, you can load files over several recordings without making the disc multi-session.

Note: *Be sure to turn off the Fixate disc after recording check box so the disc won’t be fixated. This will let you add other audio files when they’re ready for recording.*



24

Creating HFS, Hybrid, or SCSI CD-ROMs (Mac OS)

This chapter teaches you how to create and open HFS and hybrid images. You can read about the following:

- ❏ Selecting a new HFS
- ❏ Creating a shared hybrid
- ❏ Performing a SCSI device dump

For information about editing tracks and track contents, volume settings and descriptors, see Chapter 28. For information about creating ISO, CD-ROM XA, and audio images, see Chapters 21–24.

About Creating HFS Images

GEAR lets you copy to CD an *HFS* (Hierarchical File System) image from your Macintosh system or partition. When you copy that image from CD onto another system, it duplicates the structure of your desktop. Icon positions, folder and file names and structures, and so on will look exactly the same as the system from which they were copied.

About Creating Hybrid Images

You can also create a multi-platform CD image. This is known as a *hybrid CD*. For example, if you have an application that runs on more than one platform—Microsoft® Word™, for example—you can copy the platform-specific application and common data files to a CD.

When you load the CD contents on the Macintosh, your system sees the Macintosh-specific files and the files that are shared by the two platforms. Likewise, when you load the CD contents on your PC, your system sees the PC-specific files and the shared files, but not the Macintosh-specific files.

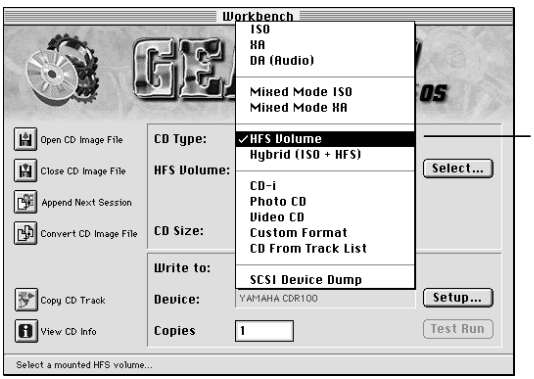
When you create a hybrid image that contains both HFS and ISO information, it appears as a standard Macintosh HFS image on a Macintosh and as a standard ISO image on a PC or Unix platform.

About Creating SCSI Device Images

GEAR also lets you create a CD-ROM from of any SCSI device that fits on a CD. This is useful when you want to back up information to CD from another CD or any SCSI device capable of keeping up the *sustained data transfer rate* to the CD recorder.

Creating an HFS or SCSI CD

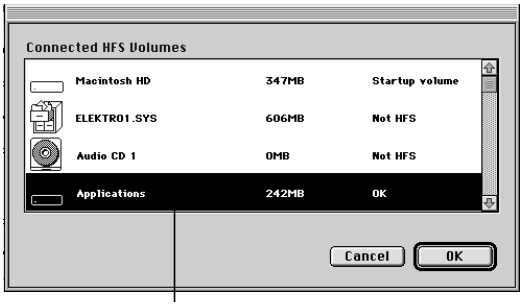
1. In the Workbench window, choose one of the following from the CD Type pop-up menu:
   - ❏ Choose HFS Volume to record a Macintosh partition.
   - ❏ Choose SCSI Device Dump to create an image of any SCSI device that'll fit on a CD recordable.



Choose HFS Volume or SCSI Device Dump from the CD Type pop-up menu, then click Select

2. Click the Select button.
3. In the dialog that appears, choose the partition you want to copy.

Note: *The partition you choose must say OK.*

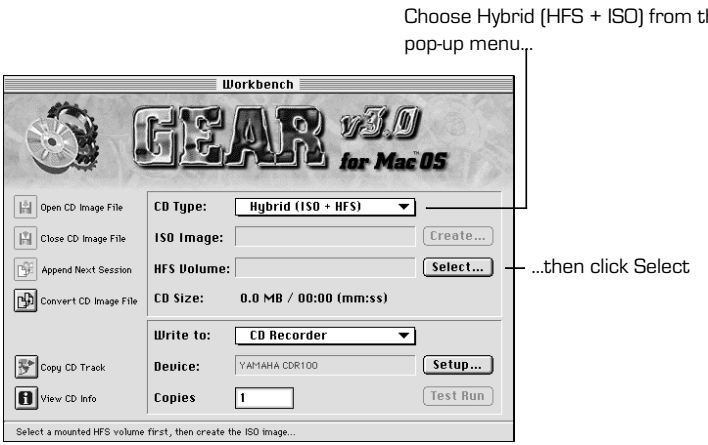


Locate and double-click the partition you want to copy; the list indicates partitions that can't be copied to HFS, as well as partitions that are currently in use (Files open)

4. In the Workbench window, click the Setup button to choose recorder settings. (See "Choosing Recorder Settings," later in this chapter.)

Creating a Hybrid Image

1. In the Workbench window, choose Hybrid (HFS + ISO) from the CD type pop-up.

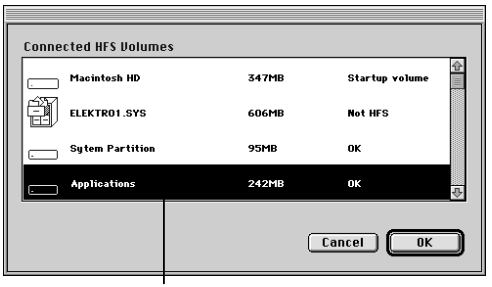


2. Click the Select button.
3. In the dialog that appears, choose the partition you want to copy.

Note: *The file you want to share must exist on this partition.*

Note: *If you want to share files on this partition, the partition must be formatted into allocation-block sizes of 2048 bytes or multiples of 2048 bytes.*

Note: *The partition you choose must say OK.*



Locate and double-click the partition you want to copy; the list indicates partitions that can't be copied to Hybrid, as well as partitions that are currently in use (Files open)

In the Workbench window, click the Setup button to choose recorder settings. (See "Choosing Recorder Settings," later in this chapter.)

Choosing Recording Settings

You can specify the types of settings appropriate for your CD recorder in the CD Recorder Setup dialog. There are three types of settings:

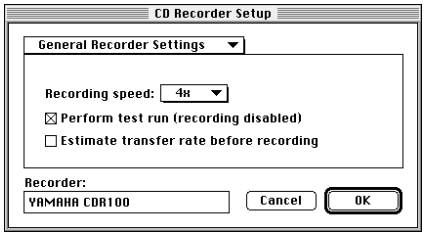
- ❏ General
- ❏ Advanced
- ❏ Medium changer

General Recorder Settings

In the CD Recorder Setup dialog for General Recorder Settings, you can specify the speed at which you want to record: 1x, 2x, 4x, or 6x, depending on your recorder model.

You can also specify whether to perform a test run. This simulation test disables recording and lets you verify that your system performance is sufficient to record the CD. A test run copies your entire CD image to the recorder at the specified recording speed.

Either you can do a software estimate or perform a test run. A software estimate tests the rate at which data is transferred to the CD-R. This option is quicker than the Perform test run option but isn't as accurate.



General recorder settings

Advanced Recorder Settings

In the CD Recorder Setup dialog for Advanced Recorder Settings, you can select a recording method: disc-at-once, track-at-once, or incremental, depending on your recorder model.

Incremental lets you write in fixed packet size, which is determined by the recorder's buffer to eliminate or minimize buffer underrun.

Disc at once means your recorder writes the lead in, then the track data, then the lead out.

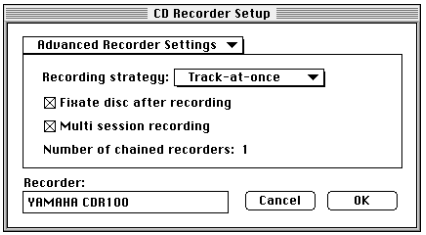
Note: *You can't use disc at once recording to record a multi-session disc.*

Track at once means your recorder first writes the track data, then finalizes the disc by writing a lead in and lead out. This method is used in multi-session recording.

Until you fixate the disc, you can only read it on a CD recorder. You can use this option to record multiple tracks on a CD without recording in multiple sessions.

You can also specify whether to fixate the disc after recording (that is, record the lead in or lead out).

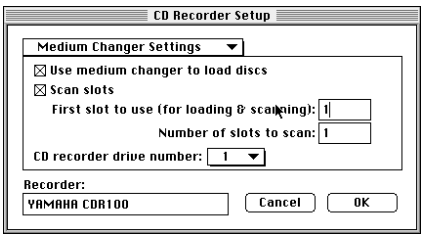
If you don't fixate the disc, you can specify a multi-session recording, that is, recording can occur over several different sessions on the same or different recorders.



Advanced recorder settings

Medium Changer Settings

In the CD Recorder Setup dialog for Medium Changer Settings, you can specify whether to use a CD changer or jukebox to load CDs for recording. You can also indicate whether to scan slots in the medium changer: the first slot to use for loading and scanning, and the number of slots to scan. In addition, you can choose the drive number or the CD recorder to use.



Medium changer settings

Changing Recorder Settings

1. Click the Setup button in the Workbench window to display the CD Recorder Setup dialog or choose CD Recorder Setup (Edit menu).
2. Choose the type of recording settings you want to use:
   - ❏ General Recorder Settings lets you specify speed and performance testing options.
   - ❏ Advanced Recorder Settings lets you specify a recording method (that is, disc at once, track at once or incremental).
   - ❏ Medium Changer Settings let you specify options for a jukebox or CD changer.

   (For details about these options, see “Recording XA Tracks,” earlier in this chapter.)

3. When you've specified your recording settings, click OK.
4. In the Workbench window, enter the number of copies you want to record.
5. Click the Write button to write the tracks to CD.

25

Working With Multi-Session Discs (Mac OS)

GEAR lets you append a new session to any session that already exists on a multi-session disc. This chapter discusses adding additional data to a disc and creating CD-Plus discs.

For information about creating images, see Chapters 21–24.

Multi-Session Discs

By appending a multi-session disc, you can do the following:

- ❏ Add data to the disc
- ❏ Recover data from older sessions
- ❏ Skip the last session if there are read errors
- ❏ Create CD Enhanced or CD Plus discs

One of the sessions on the previously-recorded disc is used as the basis for a new image. The contents of the image is edited and finally, the image is written to the CD-R disc. The virtual image contains the same folder/file structure as the session and is displayed in the image window.

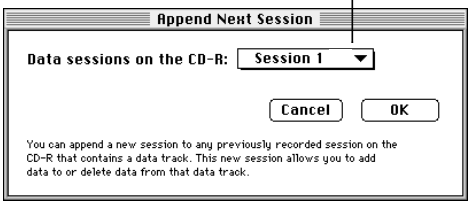
Appending a Multi-Session Disc

To append a multi-session CD-R, your recorder must be turned on and a disc must be inserted in the CD recorder.

1. To view the contents of the CD-R you want to append, click the View CD Info button in the Workbench window.
2. Click the Append Next Session button in the Workbench window or choose Append Next Session from the File menu.

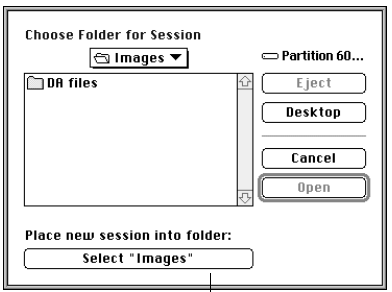
Click this button...

...then, choose the session you want to append



3. In the Append Next Session dialog, choose the session you want to append the next session to and click OK.
4. In the dialog that appears, choose a location for the new image (admin) files, then click the Select button at the bottom of the dialog.

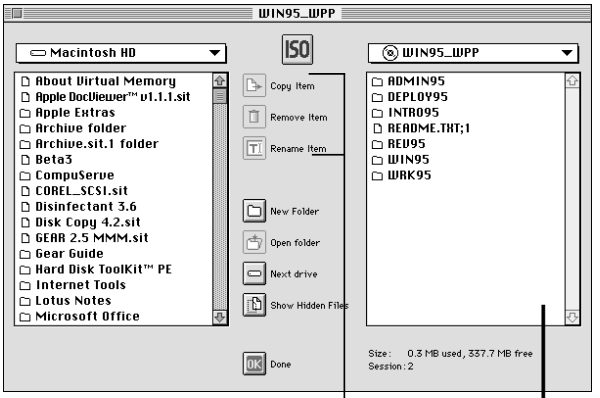
Locate and choose the folder where you want to save the image files...



...then, click this button

The Session window appears.

Choose files and folders you want to append to the multi-session disc



Use these buttons to add items to or remove them from the CD contents list or to rename items in the contents list

Files and folders already on the CD are displayed here; the amount of space they take and the space remaining are also displayed

Note: *If you're creating a CD-Plus disc, the first session would contain audio tracks and a single XA track in the second session.*

The selected session on the CD-R disc is read and the virtual image is created.

If the original image files are still on your hard drive where you want to append the session, GEAR prompts you to overwrite the existing image or choose a different folder for the new image.

5. From the source list, locate the folders and files you want to copy:
   - ❏ To copy multiple contiguous items, click the first item, then Shift-click additional items.
   - ❏ To copy multiple non-contiguous items, click the first item, then Cmd-click additional items.
   - ❏ To deselect selected items, Shift-click or Cmd-click them.
   - ❏ To copy items from a folder that appears in the source list, select the folder, click the Open Folder button in the center of the window, then select the items.
6. To append files to the image, select them in the source list, then click the Copy Item button to add them to the CD contents list.
7. In the CD contents list, do any of the following:

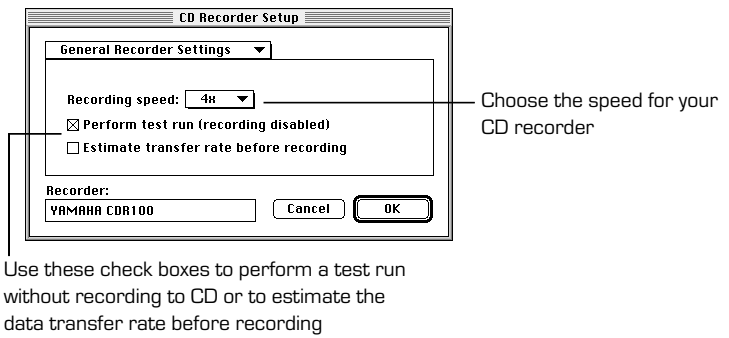
- ❏ Select an item and click the Remove Item button to remove the item from the list.
- ❏ Select an item and click the Rename Item button to change the item's name.

8. When you're finished, click the Done button.

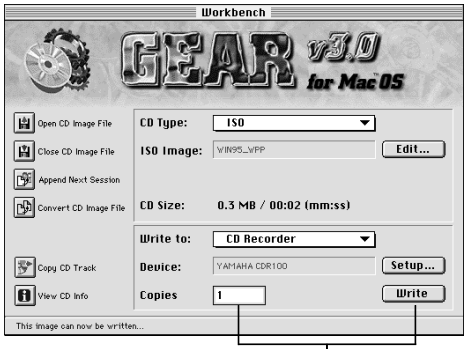
Writing to CD

When you write the new session to CD, only changes will be written. Every time you write a new session, an additional 15 MB is added to the CD-R disc. This is known as *overhead*.

1. Click the Setup button in the Workbench window.
2. In the CD Recorder Setup dialog, choose a recording speed from the pop-up menu.



3. Do one of the following:
   - ❏ To perform a hardware estimate, turn on the check box next to Perform test run (recording disabled). (If this check box is turned off, you can write your image to CD.)
   - ❏ To perform a software estimate, turn on the check box next to Estimate transfer rate before recording.
4. Click OK to return to the Workbench window.



Enter the number of copies to make and click the Write button; GEAR uses the recording settings to test or append the CD

One of the following happens:

- If you turned on the Test check box to perform a hardware estimate, data is transferred from your hard disk to the recorder but the data isn't written to the CD-R. This is a test run. If errors occur, your disc won't be destroyed; you can resolve the errors and try again.
- If you click the Write button, data is written to the CD-R. When writing is complete, the CD is ejected from the CD recorder.

26

Working With Foreign Image Files (Mac OS)

This chapter provides information about working with images that were created using authoring or formatting packages other than GEAR. In this chapter, you can read about the following:

- ❏ Opening an external image
- ❏ Choosing a predefined format
- ❏ Choosing a custom format
- ❏ Recording a CD using track list

For information about virtual images you create in GEAR, see Chapters 21-24.

External Images

An *external image* refers to any image you've created using another authoring or formatting package, such as CD-I, 3DO, or VideoCD. You can't edit an external image in GEAR, however, you can use GEAR to write an external image to a CD-R disc or a premaster tape. Before you write an external image, you must select it and define its parameters.

CD-I Images

Most CD-I authoring tools generate a complete CD-I image, including EDC/ECC pregap and scrambling (GEAR type 10). This is done because these tools need to emulate the CD-I image. The second best optimal format is CD-I mode 2 with sector size 2336 (GEAR type 7).

For information about writing the CD image, see “Writing Predefined Formats,” later in this chapter.

Photo CD Images

Photo CD images are always in XA format—CD-ROM XA mode 2 size 2336 (GEAR type 4) for external photo CD images.

For information about writing the CD image, see “Writing Predefined Formats,” later in this chapter.

Video CD Images

Video CD images are always in XA format—CD-ROM XA mode 2 size 2336 (GEAR type 4). Video CD and PhotoCD are both Bridge discs. Seep Appendix E for details.

For information about writing the CD image, see “Writing Predefined Formats,” later in this chapter.

Track List Images

A track list contains one or more lines where each line specifies a track on the CD-ROM. Each line should contain a file specification followed by a caret (^) and a track type specification.

Writing a Predefined Image

1. In the Workbench window, choose PhotoCD, CD-I, or VideoCD from the CD Type pop-up menu.
2. Click the Select button.
3. In the dialog that appears, choose the external image you want to write, then click the Select button.
4. In the Workbench window, click Record.
5. After you have recorded the image, click the Write button in the Workbench window to write the external image to CD.

   When the CD is written, it’s ejected from the CD record.

Writing a Custom Image

1. In the Workbench window, choose PhotoCD, CD-I, or VideoCD from the CD Type pop-up menu.
2. Click the Select button.
3. In the dialog that appears, choose the external image you want to write, then click the Select button.
4. In the Foreign Images dialog, choose the options you want to use, then click OK.
5. In the Workbench window, click Record.
6. After you have recorded the image, click the Write button in the Workbench window to write the external image to CD.

   When the CD is written, it's ejected from the CD record.

Writing a Track List

1. Use a text editor (SimpleText, for example) to create a track list.
2. Type thetrack filename followed by the caret (^) and the track type number.

   (See the table of predefined formats on the next page for track type numbers.)

3. Continue to type each track name on a single line until you have entered all tracks, then save the file.
4. In the Workbench window, choose Track List from the CD Type pop-up menu.
5. In the dialog that appears, choose the track list file you want to write, then click the Select button.
6. In the Workbench window, click Record.
7. After you have recorded the image, click the Write button in the Workbench window to write the external image to CD.

   When the CD is written, it's ejected from the CD recorder.

You can choose any of the following predefined formats

Type #	Image Type Format	External Volume Type
1	CD-ROM Mode 1 (ISO etc.), sector size 2048	Standard ISO, HFS, or CDTV image

Type #	Image Type Format (Continued)	External Volume Type
2	CD-ROM Mode 1 (ISO etc.), sector size 2352	Standard ISO with EDC/ECC codes
3	CD-ROM Mode 1 (ISO etc.), sector size 2352, scrambled sectors with 2 seconds pre-gap	ISO with EDC/ECC codes, pre-gap, and scrambled
4	CD-ROM XA Mode 2, sector size 2336	Standard XA or EB XA (e.g., images with Mammoth XA streams)
5	CD-ROM XA Mode 2, sector size 2352	Standard XA with EDC/ECC codes
6	CD-ROM XA Mode 2, sector size 2352, scrambled sectors with 2 seconds pre-gap	XA with EDC/ECC codes, pre-gap, and scrambled
7	CD-I Mode 2, sector size 2336	Standard CD-I without EDC/ECC codes
8	CD-I Mode 2, sector size 2352	Standard CD-I with EDC/ECC codes
9	CD-I Mode 2, sector size 2352 with 2 seconds pre-gap	Standard CD-I with pre-gap, and EDC/ECC
10	CD-I Mode 2, sector size 2352, scramble sectors with 2 seconds pre-gap	CD-I with EDC/ECC codes, pre-gap and scrambled; uses the same output format as that of most CD-I authoring tools
11	Standard CD digital audio	Red Book audio (44.1kHz, 16 bit, stereo)

Things to Remember

Keep in mind the following about image types:

- ❏ The size of the pre-gap should always be two seconds (150 sectors). Scrambled images must contain sync, header, and EDC/ECC code information.
- ❏ Unscrambled images can be accepted with a 2,352 sector size without the sync, header, and EDC/ECC filled in.

- The byte order of audio files must be the same byte order used by the computer running the GEAR software. If this is not the case, you can use the generic option MSBAudio= in the Gear Preferences file to make GEAR swap the audio bytes for all tracks.

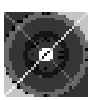
  With LSB audio default, if MSBAudio=TRUE, each track will be swapped by GEAR. *Audio files should not contain any sound header*. If sound headers are not removed or cleared, they will cause a sharp click in the resulting audio track on the CD. Audio files should contain only 16-bit samples and must be stereo (one sample for the left channel and one sample for the right channel) sampled on 44.1kHz.

- The external image files option lets you select one file only. If the external volume consists of more than one file, use track list files.

  The track list file contains one or more lines where each line specifies a track of the CD-ROM (you can use a full path). For example, to write a mixed-mode image—one that contains mode 1 or mode 2 data—you can specify the following lines in a track list file

```
VIDEOTRACK^1/1
AUDIO1^/11
AUDIO2^/11
      |    |
track name path    image type number
```

Note: *Place the track list and track contents in the same folder. Be sure to place a caret [^] with no space between the track name and image type.*



17 Working With Virtual Images (Mac OS)

This chapter provides information about working with virtual images that already contain data. In this chapter, you can read about the following:

- Editing tracks in a virtual image
- Editing virtual images

For information about creating a virtual image and tracks and loading their contents, see Chapters 21-24. For information about working with foreign image files, see Chapter 26.

Working With an Existing Virtual Image

You can edit and write to GEAR virtual images, however, you can only write a foreign image file to a CD-R disc or tape. For information about writing GEAR images, see Chapter 28.

Opening an Existing Image for Editing

When you open an image, you must first close any image that's already open. GEAR then opens the selected image

Editing a Track

You can edit a selected image in the following ways:

- ❏ Add new folders or files
- ❏ Rename a folder or file
- ❏ Delete selected folders and files

Tip: *To increase CD-ROM access time, limit the number of entries in a folder to 50 and limit the folder nesting to two or three folders.*

Creating a New Folder In An Image

1. With the CD Image open, click Edit in the Workbench window.
2. In the dialog that appears, locate and choose the image.
3. In the Session window, click the New Folder button.
4. In the dialog that appears, enter a name for the new folder and click OK.

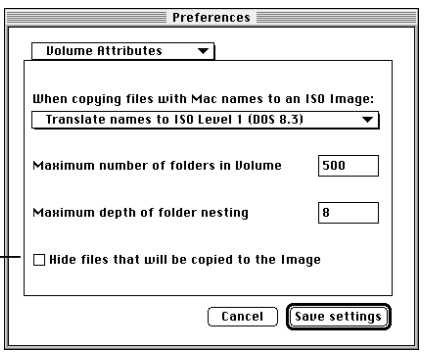
   A valid name may consist of up to 30 uppercase, alphanumeric characters and underscores (_). For information about valid ISO-9660 file and directory naming, see Appendix E.

   The new folder appears in the CD contents list in the Session window.

Creating Hidden Files

1. Choose Volume Setup from the Edit menu to display the Volume Setup dialog box.

Turn on this check box to hide new folders and files you create



2. From the pop-up menu, choose Volume Attributes.

3. Turn on the check box next to Hide files that will be copied to the Image.
4. Click the Save Settings button.

Selecting and Deselecting Files and Folders

You can select one file or folder to rename or delete. You can also select multiple files and folders to delete.

To...	Do this...
Select one file or folder	Click the file or folder name to highlight it
Select multiple contiguous files and folders	Click the first file or folder name, then Shift-click the last file or folder name
	Drag a group of file and folder names to highlight them
Select multiple non-contiguous files and folders	Click the first file or folder, then Cmd-click additional files or folders
Deselect selected contiguous files or folders	Shift-click one of the highlighted file names
Deselect selected non-contiguous files or folders	Cmd-click each highlighted file name

Renaming Files and Folders

1. Select a file or folder you want to rename.
2. Click the Rename Item button in the center of the Session window.
3. In the dialog that appears, enter a new name for the specified file or folder, then click OK.

   This changes the name of the file or folder in the CD contents list *only*. The name of the file or folder on your hard disk doesn't change.
4. Repeat steps 1–3 for additional files and folders.

Deleting Files and Folders

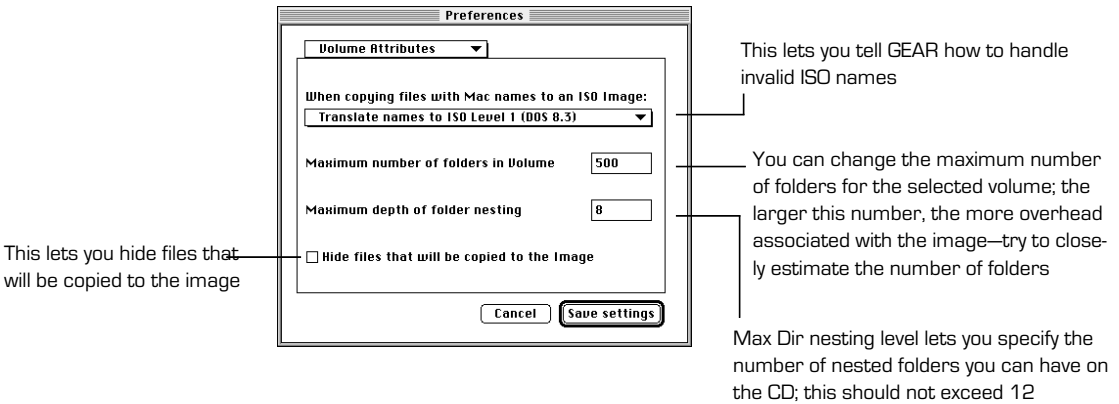
1. Select the files and folders you want to delete.
2. Click the Remove Item button in the center of the Session window.

3. In the dialog box that appears, confirm the deletion of the selected files and folders.

Editing Image Settings

You can edit image settings for the currently-selected image. The default values are specified in the GEAR preferences file. You can change these values using the Preferences command in the Edit menu. For detailed information about the GEAR preferences file, see Appendix C.

1. Choose Preferences from the Edit menu to display the Preferences dialog.
2. Choose Volume Attributes from the pop-up menu.

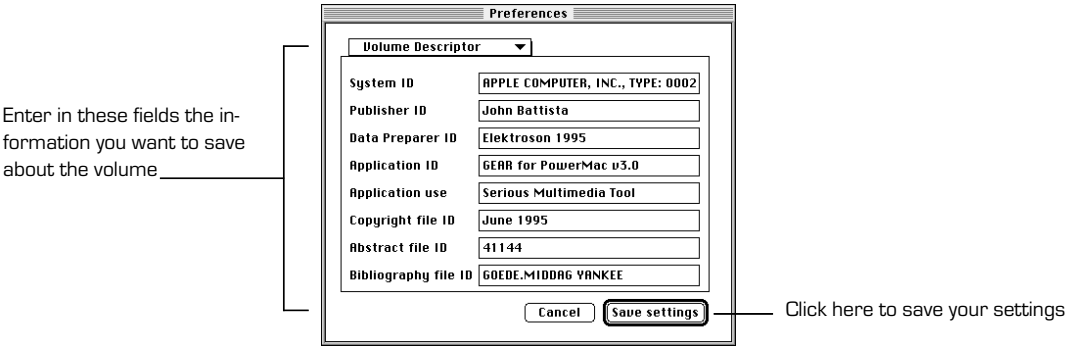


3. Choose the settings you want to use, then click the Save Settings button.

Editing a Volume Descriptor

You can edit the volume descriptor for the currently-selected volume. The default values are specified in the GEAR preferences file. You can change these values using the Preferences command in the Edit menu. For detailed information about the Gear Preferences file settings, see Appendix C.

1. Choose Preferences from the Edit menu.
2. Choose Volume Descriptor from the pop-up menu.



3. Enter the information you want to save, then click Save Settings.

Closing an Open Image

You can work with one image file only. In order to work with a different image file, you must close the open image.

1. If you're in the Session window, click the Done button to return to the Workbench window.
2. To close the open image, click the Close CD Image File button in the Workbench window.

28

Testing and Writing a Virtual Image File (Mac OS)

This chapter provides information about verifying virtual images and writing them to CD-R or premaster tape. You can read about the following:

- ❏ Verifying a virtual image
- ❏ Creating a physical image
- ❏ Estimating system performance
- ❏ Writing to CD-R
- ❏ Writing to a premaster tape

Verifying a Virtual Image

When you verify a virtual image, GEAR checks the size, date, and time stamp for each file in the track or image. If there are discrepancies, it usually means a file has been updated since it was loaded into the image and GEAR prompts you to update the image. You can update a track or image by reloading the reported files and folders.

1. Choose Verify CD-Image from the Options menu.
2. In the window that appears, choose the image you want to verify, then click the Verify button.

Estimating System Performance

It's a good idea to check your system's performance before you write to CD-R. GEAR measures the time it needs to read all the information from the selected track or image and transfer it to the CD recorder using the current speed settings.

Note: *This is a software estimate; it doesn't take into consideration multiple SCSI controllers. While estimating your system's performance is reliable, test-mode recording is accurate. See "Using Recording Enabled," later in this chapter.*

No data is transferred to the recorder during this process. If parts of the image can't be read fast enough, GEAR warns you. You can try any of the following to optimize your system's performance:

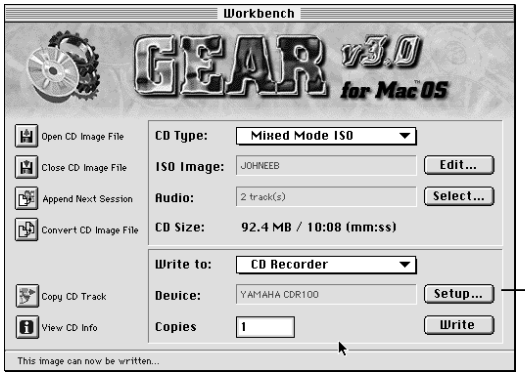
- ❏ Close any other software applications you're running in the background.
- ❏ Use a defragmentation utility to defragment your hard disk.
- ❏ Check to see whether your hard disk does recalibration.
- ❏ Check to see if your SCSI termination is correct. An incorrect SCSI termination can cause delays on the SCSI bus.
- ❏ Use a physical image instead of a virtual image.
- ❏ Use a lower recording speed if one is available.

Important: *The performance of a system for writing a CD-R is better if the access time of your hard disk is lower. This is more important than a fast processor. A lot of hard disks regularly perform recalibration. This means that the hard disk verifies its read/write operation to prevent problems. If this happens during the writing of a CD-R disc, it may result in a data transfer problem. Refer to your hard disk documentation or speak with your supplier about whether your hard disk performs recalibration.*

Estimating Performance

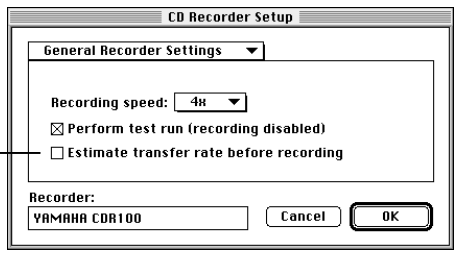
Important: *Due to the nature of an estimate, the Estimate command doesn't guarantee the disc will be successfully written later.*

1. In the Workbench window, click the Setup button.



Click Setup to display the CD Recorder Settings dialog

2. In the CD Recorder Settings dialog, choose General Settings from the pop-up menu at the top of the dialog.



Turn on this check box to estimate hardware performance

3. Turn on the check box next to Estimate transfer rate before recording, then click OK.
4. In the Workbench window, click the Test button.

   GEAR performs the estimate. When the estimate is finished, GEAR reports whether the data transfer rate is fast enough.

Using Test Run Option In the CD Recorder Setup Dialog

If the CD recorder supports a test mode or write disable mode, you can turn on the check box next to Perform test run (recording disabled) in the CD-Recorder Settings dialog. This way, GEAR will check to see if the image can be written to CD-R.

If the check box is turned off, all data is transferred to the CD recorder's buffer but the disc isn't actually written. Therefore, you can check system performance without recording a disc.

Note: *Test-mode recording takes the actual time that recording takes even though you're not recording a disc.*

Creating a Physical Image

A physical image is a sector-by-sector copy of the CD-ROM you're about to create. You should use a physical image for writing to
CD-R when the transfer rate for recording has to be increased. Otherwise, you can usually write with a virtual image.

Before you create a physical image, GEAR verifies the virtual image. If the file is not up to date, the physical image isn't created. You can update the virtual image by reloading the reported files.

Depending on your needs, you can make a virtual image or an entire hard drive a physical image. The sector sizes for the tracks are based on their type as follows:

Track Type	Sector Size
ISO	2048 bytes
CD-ROM XA	2336 bytes
DA	2352 bytes

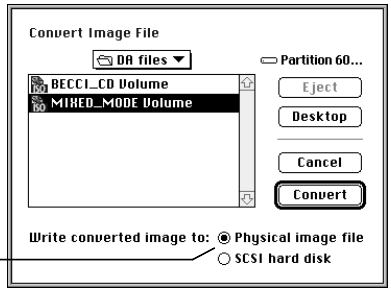
The physical image you create contains the current contents of the virtual image. Subsequent changes you make to the virtual image don't affect the current physical image.

The physical image file names are <image name>.pxx where xx stands for the track number. These files are always written to the GEAR working directory.

Converting the Image

Warning! *If you choose the SCSI hard disk option in the Convert Image File dialog (see step 2, below), GEAR will reformat your hard disk into a physical image. You should do this* ***only*** *if you intend to use your entire hard disk as a physical image.*

1. In the Workbench window, click the Convert CD Image File button.
2. In the dialog that appears, click the Physical image file button, then click Convert.



Click the Physical image file button to convert the virtual image to a physical image, then click the Convert button

3. If physical files already exist for the track or image, you are prompted to overwrite them.

   When the track or physical image has been successfully created, it's reported.

Writing a CD Image to CD-R Disc

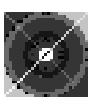
When you write a CD image to a CD-R disc, GEAR uses either the virtual image or the physical image files. When the virtual image is used, the physical image is created as required and written to disc immediately. You can use physical image files if data transfer rates to the recorder are not fast enough.

If the Estimate before write check box is turned on in the Recording Settings dialog (CD-R from the Settings submenu in the Options menu), GEAR checks your system performance before writing the selected image to CD-R. If the performance is sufficient, GEAR continues to write the disc. If the performance is insufficient, writing is aborted.

Data Transfer Rates

The system has to maintain a high data transfer rate to a CD recorder. If the transfer rate can't be maintained, the writing of the CD-R will fail. CD-R discs can be written at single, double, or quadruple speeds. The data transfer rate is dependent on the speed of recording and the type of track written (ISO, CD-ROM XA, or CD digital audio). The following table shows the required transfer rates:

	1x	2x	4x	6x
ISO	153 KB/s	307 KB/s	614 KB/s	918 KB/s
CD-ROM XA	175 KB/s	350 KB/s	700 Kb/s	1050 KB/s



	1x	2x	4x	6x
CD Digital Audio	176 KB/s	352 KB/s	705 KB/s	1056 KB/s

For external (foreign) images, the required transfer rate depends on the selected sector size. 2048 bytes/sector is comparable to ISO; 2336 bytes/sector is comparable to CD-ROM XA; 2352 bytes/sector is comparable to CD digital audio.

Recommended Hard Disks

The best hard disks for writing CD-R discs are multimedia or AV (audio visual) hard disks. These types minimize recalibration time and guarantee a high sustained data rate.

Note: *Call us or check the Elektroson BBS or CompuServe forum for updated lists of recommended hard disks.*

Files Created After Writing to CD-R

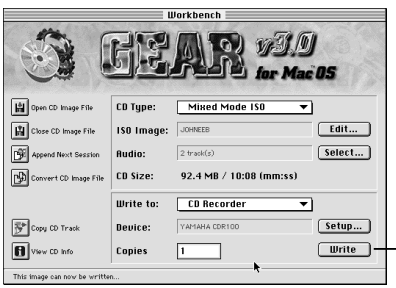
The CD-R command always creates the following files after you write an image:

- ❏ wo_ident.txt
- ❏ woresult.txt.

The wo_ident.txt file contains the table of contents (TOC) and some customer information that's written to the CD recorder. The customer information is read from the Gear preferences file. The woresult.txt file contains status information.

Writing to CD-R

1. With the virtual image you want to write open, click Write in the Workbench window.



Click here to write the image to CD-R

2. If the physical image is available, GEAR uses the physical image by default.

   If the physical image is unavailable, GEAR uses the virtual image.

Writing to Premaster Tape

If you're going to mass-duplicate your CD-R, you can write an image to premaster tape. The tape is written in ANSI (X3.27-1987) format. GEAR uses either the virtual image or the physical image. When you choose the virtual image, the physical image is created and written to tape immediately. Writing from a physical image is faster than writing from a virtual image.

You can send the premaster tape to a replication company for mastering and duplication. If the check box next to Verify tape after writing is turned on in the Tape Recording Setup dialog, GEAR verifies the contents of the tape with the image after writing to premaster tape.

Recommended Tape Drives

GEAR supports most tape units that provide a SCSI interface. The preferred configuration is with an EXABYTE tape unit, a Hewlett Packard DAT unit (HP35470A), or an M4 9 track.

Files Created After Writing to Tape

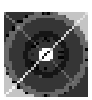
The following files are created after an image is written to tape:

- ❏ tp_ident.txt
- ❏ tpresult.txt
- ❏ DDPID
- ❏ DDPMS
- ❏ PQDESCR

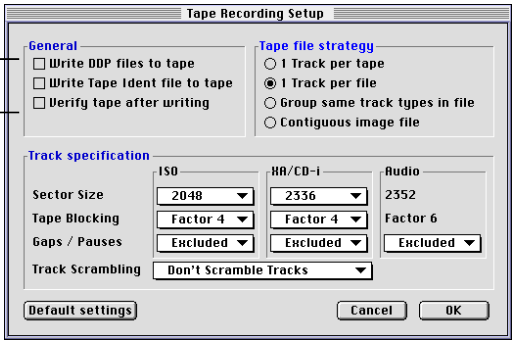
The tp_ident.txt files contains the table of contents (TOC) of the image written to tape and some customer information. The DDPID, DDPMS, and PQDESCR files form the DDP information of the last image written to tape. You can also write these files to tape.

Writing GEAR-Created Files to Premaster Tape

1. In the Workbench window, choose Tape Recorder from the Write to pop-up menu.



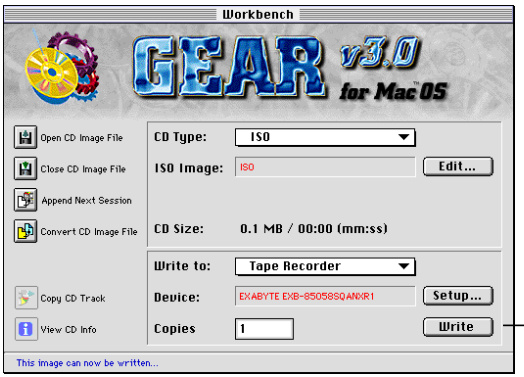
Turn on these check boxes to write the indicated files to tape



2. Turn on the Write DDP files to tape and Write Tape Ident file to tape check boxes.
3. Click OK.

Writing an Image to Tape

1. With the image you want to write to tape open, click the Write button.



Click this button to write images to tape

2. A dialog prompts you with instructions for preparing the tape unit for recording.

   When the unit is ready, click OK.

Glossary

3DO A CD-ROM-based system in the same market segment as CD-I. Based on a RISC processor for optimum graphical performance.

access time The time a CD-ROM drive or hard disk needs to read and transfer data from disc to the target computer.

ActiveAudio™ A type of Enhanced CD. ActiveAudio is one of the approaches developers have taken to solve the problems that occur when you combine digital and audio data on one CD-ROM. ActiveAudio information is organized in this way:

- ❏ Digital data occupies the silence preceding track 1 (so called track 0)
- ❏ Audio data occupies track 1 and up

address The ID number of a device on the SCSI bus, or the location of a block of data in storage.

ADPCM Adaptive Differential Pulse Code Modulation. A method of compressed audio data storage. Instead of storing the signal, the difference between signals is stored. This means that only four bits per sample rather than 16 bits per sample are needed.

For CD-I, levels A, B, and C are recognized. B and C are also used in CD-ROM XA. The sample frequencies used to measure the audio signals are 37.8 kHz and 18.9 kHz for levels B and C, respectively. This brings the band width (the maximum frequency to be reproduced) to 17 kHz and 8.5 kHz. For level A, these figures are 44.1 kHz and 20kHz. Using ADPCM, a 16-fold reduction in storage requirements can be achieved (level C, mono).

AIFF Audio Interchange File Format. It is a full-featured audio file specification that allows many programs on multiple platforms to share standards for audio storage. Electronic Arts published the AIFF specification in 1985. It started as a digital music instrument specification. Over the years it has been enhanced to provide compressed digital sound (AIFC).

alias records The stored information that tracks the locations of a file and its alias as well as the pointers to those locations.

ANSI American National Standards Institute. ANSI is a private, nonprofit membership organization that performs two functions:

- ❏ Coordinates the United States' voluntary consensus standards system
- ❏ Approves American National Standards

If you wish to contact ANSI, write or call: ANSI, 1430 Broadway, New York, NY 10018; (212) 354-3300.

ASCII American Standard Code for Information Interchange. A coding scheme that represents characters numerically. Almost every manufacturer uses the same coding for the first 128 symbols in the ASCII table. Different tables exist for ASCII numbers 128 through 255.

authoring Working method for modeling information. Examples of authoring systems include word processors and spreadsheets on a PC, and multimedia workstations for combining sound, video, images and text for real-time audiovisual presentations.

average seek time The average time it takes to locate data and position the drive head to that location. Average seek time is measured in milliseconds.

AVI Format for audio/video files defined by Microsoft for use under Windows. The limited compression means a fast computer system with a fast storage medium is required. AVI is not well suited for use with CD-ROM.

BER Bit Error Rate. Defined as the number of correctly processed bytes before an erroneous bit is detected. For CD-ROM, the bit error rate is 10^{-12}.

bit The smallest unit of information. (Bit is a contraction of binary and digit.) A binary digit has a value of 0 or 1.

BLER Block Error Rate. Compares the number of blocks with at least one error against the total number of blocks measured.

block The smallest "chunk" of memory accessed or transferred by a disk drive. Usually 512 bytes in size, it can be larger in multiples of 512. The number of bytes in a block is the same as block size.

blown session A CD-ROM recording session that is disrupted such that the recorder literally loses track, rendering the recording medium, a writable compact disc, unusable.

buffer A temporary storage area for data being transferred from one place in the computer system to another.

byte A symbol or character that consists of eight bits.

cache A temporary storage area for information used frequently by your system. You can set up cache in RAM or on your hard disk. Using cache speeds up system response by reducing the time it takes to locate requested information.

caching Used to store recently-requested information. On the next request for the same information, the system retrieves it from fast cache memory rather than from the slower medium.

CD Compact Disc. A non-magnetic, polished metal disk with a protective plastic coating. Used to store digital information, which can be read by an optical scanning device that uses a high-intensity light source—a laser—and mirrors.

CD-I Compact Disc Interactive. A system for presenting information such as text, images, and video, on a television screen. The standard is defined by Philips and Sony and described in the Green Book.

CD Plus A type of Enhanced CD. CD Plus is one of the approaches developers have taken to solve the problems that occur when you combine digital and audio data on one CD-ROM. CD Plus takes a multisession approach:

- ❏ Audio data occupies session 1
- ❏ Digital data occupies session 2

CD Recorder These drives, along with specialized mastering software, allow users to make their own compact discs.

CD-ROM Compact Disk, Read-Only Memory. Data is stored as pits on a disc surface, which are read by a laser in the CD-ROM drive. The data can be read and copied; data cannot be erased; new data cannot be added.

CD-ROM XA Compact Disc Read Only Memory Extended Architecture. The standard for CD-ROM to which a number of options from CD-I have been added. These include audio compression (ADPCM), multi-channel audio, file interleaving, user data (2336 bytes/sector), image compression, and so on.

A CD-ROM XA disc is a Mode 2 disc in which the data in located in Form 1 (2048 bytes/sector) or Form 2 (2336 bytes/sector).

CD standards The physical aspects of different CD types defined by Philips and Sony. The logical file format used on CDs is described in the ISO-9660 standard. See Green Book, ISO-9660, Orange Book, Red Book, White Book, Yellow Book.

CDTcache

A feature of CDT that allows you to set cache values and other options for an individual CD, as opposed to an entire CD-ROM drive. CDTcache Setup values override the values set in Drive Setup.

central processing unit (CPU) The brains or “central switching station” of any computer.

DAT Digital Audio Tape. A 4mm tape format used for data storage.

data capture A method of converting data from non-electronic data carriers—paper, microfiche, artwork, and so on—into a form that allows processing by computer.

data compression A technique for removing unnecessary information from data. For example, a repeating sequence can be stored as a value and the number of times it’s repeated.

data error Any discrepancy between the data recorded and the data read back.

data transfer rate A measure of how quickly data is supplied to the computer from the CD-ROM drive.

DDP Disc Description Protocol. A CD sector level protocol designed to adequately describe a compact disc. A CD described using DDP can be reliably mastered. Some mastering and replication companies prefer the premaster tape with DDP.

device driver The software program that translates commands between the Macintosh's operating system and the Macintosh's SCSI Manager. It makes it possible for your Macintosh to talk to the devices attached to it.

directory, folder A file that contains information (name and location) about the files on a disk. Used in almost every storage medium (floppy, hard disk, CD-ROM).

disc at once A method by which a disc is written. A CD recorder first writes the lead in, then the tack data, then the lead out. Link blocks are not inserted. Useful for audio-only discs that must be an exact copy of an image. Compare track at once.

drive, CD drive The physical components necessary to read data from a CD.

drive, hard disk A data storage device that employs one or more rigid disks as the medium of storage.

DVI Digital Video Interactive. A technology, developed by RCA and sold by Intel, that makes it possible to store compressed real-time audio and video, then play it back decompressed at the correct speed.

dynamic Marked by continuous change or activity. The data held in dynamic RAM cache is swapped out as new data is accessed. It is marked by continuous change and activity.

dynamic RAM cache A RAM cache that grabs and holds information as it is read by a computer. When full, dynamic RAM swaps out the oldest data with the newest data.

ECC/EDC Error Correction Code/Error Detection Code. Information used by the drive hardware to detect and correct data errors caused by scratches or dirt on a disc. Optimizes data integrity.

CD-ROM uses only 2048 bytes of a sector of 2352 bytes for data storage. Header and synchronization information uses 12 and four bytes, respectively. The remaining 288 bytes are used for ECC and EDC information.

electronic publishing Publishing process in which electronic media such as CD-ROM, floppy disk, and so on, are used rather than printing on paper.

encryption A complex reordering of information so that it becomes illegible. Encryption and decryption are used together. some of the algorithms used are symmetrical, which means that double encryption restores the data to its original state.

enhanced CD-ROM Compact discs that combine digital and audio data on a single disc in a way that allows trouble-free use of the same disc on both an audio CD player and a CD-ROM drive.

extensions The files containing operations required for setting a device to a starting state before using data or implementing a process. The old name for this is "Inits."

firmware An often-used microprogram or instruction stored in ROM. Usually refers to the ROM-based software that controls a drive.

Form 1 A subformat of Mode 2. Defines the structure of a CD-ROM sector as follows: sync (12 bytes); header (4 bytes); subheader (8 bytes); data (2048 bytes); EDC (4 bytes); ECC (276 bytes).

This subformat is used for normal data files including Photo CD and Electronic Book.

Form 2 A subformat of Mode 2. Defines the structure of a CD-ROM sector as follows: sync (12 bytes); header (4 bytes); subheader (8 bytes); data (2324 bytes); EDC (4 bytes).

This subformat is used for files where error correction is impossible due to real-time characters, that is, compressed audio or moving images.

fragmentation With use over time, the sectors of a file are written in different areas across the storage surface. This slows access time because the drive head must move to non-contiguous locations to read the contents of a file.

GB Gigabyte. 1024 MB = 1024 x 1024 x 1024 = 1,073,741,824 bytes

Green Book Defines the physical aspects of CD interactive (CD-I). See also standards.

hard disk A permanent storage medium for computer data based on a rotating disk with a magnetically sensitive layer. Information can be written on this and read again using a read/write head. Information can also be deleted.

HFS Hierarchical File System. Used by Apple for floppy and hard disk and for CD-ROM. Apple also supports the ISO-9660 standard.

High Sierra The predecessor of the ISO-9660 standard. Published by the CD-ROM Ad Hoc Advisory Committee, also known as the High Sierra Group, on May 28, 1986. Use of this standard is no longer recommended. ISO-9660 is preferred.

inits Short for initialization. The operations required for setting a device to a starting state before using data or implementing a process. This is the old name for Extensions.

input/output (I/O) The communication flow between a Mac and the devices attached to it.

intelligent Refers to a device capable of processing commands on its own.

interface The go-between that provides a common basis for communication between two otherwise incompatible devices.

image A virtual copy of the future CD-ROM disc stored on the hard disk. It is used for debugging and simulation sessions and for writing the final premaster tape and/or CD-R disc.

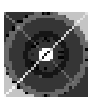
index A separate list of words or keys, sorted alphabetically or numerically along with a reference to their location in the text or the data base.

interactive media Media with which you interact to find information.

interface The point of contact between two systems. Interfaces can be items of equipment (e.g., SCSI interface between computer and CD-ROM player) or software modules (user interface).

ISO-9660 The international standard defining the CD-ROM data format. The aims of the standard are to achieve interchangeability of discs and to optimize performance. It is the official standard to which all CD-ROM applications should conform.

JPEG Joint Photographic Experts Group.



KB Kilobytes. 1024 bytes.

kb/s Kilobytes per second.

LaserVision Video disc system.

latency The time, in milliseconds, it takes for the spinning disk platter to bring around the desired sector to where the read/write head can access it. Does not include head positioning time. Contributes to access time. (See Interleaving.)

mastering The process in which a glass master is produced for production of the stampers which are in turn used for replication of the CDs. The glass master contains photosensitive lacquer that's illuminated on a laser beam recorder (LBR). The data for mastering comes from a premaster tape.

MB Megabyte. 1024 x 1024 bytes.

Mb/s Megabytes per second, equal to 1,048,576 bytes per second, or 131,072 bytes per second.

media Another term for the CD platter, but more specifically the surface of the platter that holds the data.

megabyte One million bytes (actually 1,048,576).

MMF Multimedia file.

Mode 1 Defines the structure of the CD-ROM sector as follows: sync (12bytes); header (4 bytes); data (2084 bytes); reserved (8 bytes); ECC (276 bytes); and EDC (4 bytes).

Mode 2 Defines the structure of the CD-ROM sector as follows: sync (12 bytes); header (4 bytes); subheader (8 bytes); remainder (2312 bytes) dependent on whether Form 1 or Form 2.

mount To appear on the Desktop. To show an icon on-screen.

MouseHelp A form of online help in CDT, available only in Setup. Turn MouseHelp on by selecting it from the Help menu in the menu bar. Point at something within the Setup window you want to know more about, and relevant information appears in a box in the lower portion of the application screen.

MPC Multimedia PC with a CD-ROM drive. Defined by Microsoft. An MPC application will work on an MPC computer.

MPEG Motion Picture Experts Group. A standard compression method for motion video. The ISO standard used by Philips in their CD-I players. The algorithm used (discrete cosine transform) makes an extremely high rate of compression possible (200:1). MPEG video and audio encoding form the basis for video-CD.

multisession An ISO standard CD-ROM format often referred to as "Orange book" that allows additional information to be added to a writable CD-ROM disc that has already been written to once.

multivolume CD-ROM A CD-ROM with more than one mountable volume on it. In the instance where some of the volumes are in formats other than Apple's HFS, using the Mounting feature in CDT will allow you to see the icons of all mountable volumes.

OEM Original Equipment Manufacturer. A company that manufactures a piece of hardware or software that is modified or reconfigured by a value-added reseller and sold (usually) under the reseller's brand name.

Orange Book Specifies the physical aspects of CD-recordable media. The first part of the book describes CD-MO (magneto optical) system and the second part describes CD-WO (write once) system. The CD recorders and CD-R media are all based on the CD-WO standard. See also standards.

overhead The incidental command processing time that is necessary to complete a task.

partition A portion of a storage area allocated to a particular use or user.

PCM Pulse Code Modulation. A technique for converting analog audio into CD digital audio.

peripheral A device that is attached to the computer, either directly or via the bus.

physical image The actual bit-to-bit copy of the future CD-ROM disc, without ECC and EDC information. Usually a physical image can be as large as 600MB and will demand a lot of hard disk space (all data will be present in the original files and once more in the image file).

If an image consists of multiple tracks, a separate image file is created for each track. However, GEAR allows you to make an application without the need for so much hard disk space by using a virtual image, which is just an administration of the image structure.

platter The rigid disk that is used for storing data on hard disk drives.

premaster tape The tape that CD manufacturers use to create the CD-ROM master, which is used to make the actual CD-ROMs. The premaster tape is written from the image in the format as specified by the CD-ROM manufacturer (possibly in DDP format).

proprietary Vendor-unique technology or devices that are incompatible with other products in the industry.

QuickTime An Extension of the Macintosh system software that provides facilities for managing time-based data.

read ahead Similar to buffering, except Read Ahead can read ahead to the next expected data. This prepares data for the CPU's next request, speeding up access time.

Red Book A book (with a red binder) that defines the physical aspects of digital audio CDs (CD-DA). See also Green Book, Orange Book, standards, White Book, and Yellow Book.

replication The process of producing identical copies of a CD-ROM from a stamper or matrix.

retrieval Term for locating information in databases. Retrieval takes place on the basis of indexes present.

SCSI ID A device's unique address on the SCSI bus, referred to as its ID, or identification.

SCSI interface Small Computer Standard Interface. (Pronounced scuzzi.) An industry standard for the interface between computers and peripherals.

SCSI manager The SCSI Manager is part of the Macintosh Operating System that provides the interface between a program, such as a driver or formatter, and the actual hardware SCSI port.

sector A piece of data (a number of bytes) on disc. The size is 2352 bytes. CD-ROM uses 2048 bytes for data storage. Header and synchronization information uses 12 and 4 bytes, respectively. The remaining 288 bytes are used for ECC and EDC information.

The 2 KB of data in every sector can be divided into logical blocks of 512, 1024, or 2048 bytes. Every sector on a CD-ROM disc has a unique address by which it can be accessed.

seek time The time it takes the read/write head to move back and forth in search of the appropriate track. Seek time does not include latency or command overhead. (See Access Time.)

session One contiguous, spiraling string of data written to, or stamped into, a disc. There may be more than one session on a disc. A track is a portion, possibly all, of a session. A session may contain many tracks, but a track may not contain a session.

SGML Standardized General Markup Language. An ISO standard that uses tags to add structure to information, usually text. Various structural components are indicated within the information, e.g., title, subtitles, paragraphs, footnotes, and cross references.

single-session Refers to standard CD-ROM discs where multisession format is not present.

stamping Manufacturing data into a disc (as opposed as writing data to a writable disc).

standards ***Green Book:*** The CD-I, CD interactive, standard. Operating system and playback hardware specifications for mixed mode CD-ROMs.

Orange Book: Standard for write-once (multisession) CD. A Sony/Philips collaboration that details physical and optical characteristics of Compact Disc Write Once media, and hybrid ROM/WO discs, which have read-only and write once areas on the same disc. This technology is becoming increasingly cost effective. Discs for recording use gold as a substrate metal instead of the aluminum employed by mass-market stamped discs, but may employ both.

Red Book: Standard for normal audio CD. Refers to the specifications for the compact audio disc format developed by Philips and Sony. It is the standard format of commercial audio CDs. When a disc conforms to the Red Book standard, it will usually have "digital audio" printed beneath the disc logo.

In 1983 a consortium of Philips (N.V.) and Sony drafted a comprehensive document to thoroughly define the Compact Disc Digital Audio standard. This document, named for the color of its cover, describes the physical dimensions, optical characteristics, and logical organization, including the table of contents, track, and audio stream formats of a compact disc. This is the seminal compact disc document, from which all subsequent standards are derived.

White Book: Standard for Video CD. JVC, Matsushita, Sony, and Philips coauthored this specification, also known as the "Video CD Standard." This remains a nascent technology, waiting for CD-ROM technology and the right marketing approach.

Yellow Book: Standard for CD-ROM. A standards document that builds on the Red Book Standard allowing for the presence of data tracks on a CD. The Yellow Book standard specifies that CD-ROM must encode the first track as data. In addition to the two layers of error correction outlined in the Red Book, data is further protected by a third layer of error detection and correction for added security.

When a disc conforms to Yellow Book standard, it usually will say “data storage” beneath the disc logo.

static Having no motion. Being at rest. The data held in Static RAM cache is the first data accessed up to the limit of the cache. It does not change as new information is accessed. It has no motion. It is at rest.

subcode Information (time, text, graphical, or MIDI) stored together with audio on a CD and spread across eight channels (PQRSTUVW). P and Q contain the time information shown on the display of an audio CD player.

thermal recalibration The process of recalculating the positions of data on a hard disk platter as those positions shift due to the platters expansion under the heat of operation.

track A CD-ROM disc can contain more than one track. Tracks are implemented sequentially (like a CD audio disc). If a CD-ROM contains multiple tracks, the data part is always stored in the first track and the audio parts (in the case of a mixed mode CD-ROM) are stored in the following tracks.

track 1 problem An audio player, when given digital data on track 1, might do a number of things:

- ❏ Skip it
- ❏ Refuse to play it
- ❏ Play silence
- ❏ Play the data (sounds like static)

When you attempt to play data on your audio equipment, you are likely to damage your speakers

transfer rate The speed at which information can be transferred. Usually expressed in terms of KB per second. A standard CD-ROM drive is rated at 150KB/second. A double speed player can handle 300KB/second.

unicode Coding of character sets making use of 2 bytes. ASCII is a subset of unicode.

virtual image Making a CD-ROM image usually requires an exceptional amount of hard disk space; all data is present in the original files and duplicated in the CD-ROM image. GEAR lets you make an application, without the need for so much hard disk space by producing a virtual image that is just an administration of the image structure.

The software keeps a record of the files to be included in the final application. Simulation and writing of the final premaster tape or CD-R is done using this volume administration, thereby eliminating the need for a lot of expensive hard disk capacity.

A CD-ROM can contain multiple tracks in which case multiple virtual tracks are created; an administration is kept for every track of the CD-ROM.

virtual track See virtual image.

volume The CD-ROM term for a complete CD-ROM disc. In case of very large databases, multiple discs can be issued forming a volume set. When a mixed-mode disc is made, a volume will contain multiple tracks.

VATIC Volume Table of Contents. This is the portion of the CD-ROM disc that contains basic information about the disc, such as its name, copyright information, pointers to various blocks of data, whether the disc is a member of a multi-volume set, dates, version, numbers, etc.

White Book Specifies the physical aspects of video CDs. See also standards.

Yellow Book Defines the physical aspects of CD-ROM. A special extension of this book describes CD-ROM XA (compact disc extended architecture). See also standards.

B

GEAR Commands

Using GEAR Commands in Windows

You can insert GEAR commands in batch files or you can use them as a single command line. When you use commands, you must enter them as follows:

```
command_name <y|n> <parameter> [optional]
```

A parameter that's enclosed in angular brackets (< and >) is a required parameter. A parameter that's enclosed in square brackets ([and]) is an optional parameter. A bar (|) between two parameters indicates that a selection between two or more parameters has to be made.

Special keys, such as Escape and Carriage Return, are abbreviated and enclosed in angular brackets—<ESC>, <RETURN>.

When you don't specify a parameter, GEAR prompts you for the missing parameter. The default value is displayed between brackets. You can select it by pressing <ENTER>.

The same holds true when extra information is required. You can interrupt a command by pressing <ESC>. GEAR may take a short time to stop executing the command because commands must release system resources they're no longer using.

General Commands

The following are general commands you can use.

BATCH <file_name>

Starts executing commands from the specified batch file.

EXIT

Ends the current GEAR session.

HELP [<cmd>]

Provides information about the command. Entering an invalid command name or no command name displays a list of all available commands.

LOG <file_name>

Starts or stops the logging of session information in a specified file. When you start logging for the first time, you have to enter the name of the file where you want to store the information.

VDIR

An overview of all current volumes contains the following:

- ❏ Volume name and size
- ❏ Session number
- ❏ Number of tracks in the volume
- ❏ Type of volume
- ❏ Status of volume
- ❏ Date and time stamp for the volume

For an ISO-9660 volume, the number of tracks is always 1 and the type is always ISO. Multimedia volumes let you create additional tracks of different types. The session number is always 1 for volumes you create with the NEWVOL command. Only volumes you create with the SESSION command can have a session number greater than 1.

The status of a volume can be either Selected or Closed. A volume is selected if it's currently used. Otherwise, the status of a volume is closed.

The date and time stamp of the volume is determined using the time zone (TZ) environment variable. If you don't specify this variable, the data and time is shown for the Pacific time zone.

TDIR

An overview of all tracks that are present in the currently-selected volume is displayed. The overview consists of the following:

- ❏ Track number and size
- ❏ Type and status of track
- ❏ Data and time stamp for the volume

The type of track can be XA, DA, or ISO. That status of a track can be either Selected or Closed. A track is selected if it's open for copying data to it. Otherwise the status is closed.

The date and time stamp of the track is determined using the time zone (TZ) environment variable. If you don't specify this variable, the data and time is shown for the Pacific time zone.

Formatting Commands

You can use the formatting commands to format CD-ROM files. A variety of commands is available to generate an empty image and to add, delete, or change files and directories in it. In addition, the following commands are valid:

- ❏ Volume-related commands
- ❏ Track-related commands
- ❏ Directory- and file-related commands
- ❏ Multimedia-related commands
- ❏ Miscellaneous commands

Volume-Related Commands

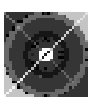
The following are volume-related commands.

NEWVOL <vol_name> <80|74|63|18>

Creates a new empty virtual volume with the name you specify. The new volume is selected automatically. The name may contain up to eight alphanumeric characters and underscores. To give your volume a longer name, use the PRIMVD command to rename the volume identifier.

SELVOL <vol_name>

Selects an existing volume for use. If a volume is already selected, it's closed. You must select a volume before you can edit its contents.



SESSION <session_nr>

Used to append data to a multi-session disc.

PRIMVD

Lets you edit settings in the volume descriptor. You can change the following:

- ❏ VolumeIdentifier
- ❏ SystemIdentifier
- ❏ PublisherIdentifier
- ❏ DataPreparerIdentifier
- ❏ ApplicationIdentifier
- ❏ ApplicationUse
- ❏ CopyRightIdentifier
- ❏ AbstractFieldIdentifier
- ❏ BibliographicIdentifier

You can change the default values in the gear.ini file using the EDITPREFS command.

EDITVOL

Lets you edit the generator setup settings used to create a volume. You can change the following:

- ❏ NonIsoNameHandling
- ❏ Hidden option
- ❏ StartSector option
- ❏ Archive option
- ❏ Maximum directory nesting level

You can change the default values in the gear.ini file using the EDITPREFS command.

PHYSVOL

Creates the physical image files for the selected volume. For the entire CD, a physical image is created. You can also use the PHYSTRK command to create physical image of individual tracks.

VERVOL

Verifies the virtual image of the selected volume.

DELVOL<vol_name>

Deletes the specified virtual volume.

Track-Related Commands

The following are track-related commands:

SELTRK <track_nr>

Selects an existing track for use. The previously selected track is minimized and closed and the specified track is selected.

NEWTRK<ISO|XA|DA> [<track_nr>]

Creates a new empty virtual volume of the specified type. The new track is automatically selected.

PHYSTRK[<file_name>]

Creates a physical image file of the selected track. If the optional parameter, <file_name>, is specified, the image will be written to this directory and not the working directory, for example, using PHYSTRK D:\IMAGES\IMAGE1. GEAR automatically finds the physical image when necessary, for example, when using the physical image for the WRITE command).

VERTRK

Verifies the virtual image of the selected track.

DELTRK<track_nr>

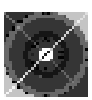
Deletes the specified virtual track.

Directory and File Related Commands

The following are directory- and file-related commands:

CD<dir_name>

Changes from the current directory to the specified directory of the virtual image. The command recognizes DOS commands such as, CD .., CD\, and CD\SUB1. You can also specify a path name for a new directory.



NEWDIR<dir_name>

Creates a new directory on the virtual image. You can create hidden directories by changing the HIDDEN option to TRUE before you create the new directory. See the EDITPREFS command.

DELDIR<dir_name>

Deletes the specified directory in the virtual image. Wildcards are disallowed. A directory must be empty before you can delete it. You can delete complete directories using the DELTREE command.

COPY<file_spec>

Copies the specified files to the virtual image. Wildcards are allowed.

You can specify the exact location (sector number) for the files by specifying TRUE for the SECTOR command. GEAR prompts you for the start location of each file to load.

You can also hide files by changing the HIDDEN option to TRUE before you copy the files. You can't change the HIDDEN option afterwards; you must delete the files, reset the HIDDEN option, then reload the files. See the EDITPREFS command.

COPYTREE<os_dir_tree>[<cd_dir>]

Copies a directory tree to the virtual image. All files and subdirectories of the tree you specify are loaded automatically. Subdirectories are created in the image if necessary.

After completion, the virtual image contains and exact copy of the tree. The target directory specifies where in the virtual image the OS directory will be loaded. GEAR creates as much space as necessary for each directory in the tree. You can nest up to eight directories s under ISO.

RENAME<old_name><new_name>

Renames a directory or file in the virtual volume to the new name. Wildcards are disallowed.

DELETE<file_spec>

Deletes the file you specify from the virtual image. You can specify files by their full name, including the version number. Wildcards are allowed, for example, *.*;* deletes all files in the current directory. If files with non-ISO names have been loaded, you can omit the version number.

DELTREE<dir_tree>

Deletes the ISO tree form the virtual image. The directory you specify and its subdirectories are deleted. Wildcards are disallowed.

Multi-media Related Commands

The following are multimedia-related commands. You can use these commands only when you select an XA track.

COPYMMF<file_spec><mmtype><chnr><int_fac><tot_fac>[<EOR|TRG>]

Copies the multimedia files you specify to the virtual XA track. You must specify the following parameters:

Parameter	For each file that's loaded
mmtype	Type
chnr	Channel number
int_fac	Interleave factor (see also tot_fac)
tot_fac	Total interleave factor; This number, together with int_fac determines the interleaving of each file.
EOR	End of record bit should be set in the subheader of the last sector of each file that's loaded. Can specify together with TRG (see below).
TRG	Specifies whether the trigger bit should be set in the subheader of the last sector of each file that's loaded. Can specify together with EOR (see above).

You can obtain more information about the use of the parameters for CD-ROM XA applications in the CD-ROM XA specification [4].

Usually it's easier to use the dedicated CD-ROM XA interleaver tools, such as the Mammoth Tool Set, for creating these files and use the GEAR COPYXA command to load pre-interleaved multimedia files.

COPYXA<file_spec>

Copies the files you specify as pre-interleaved files to the image.

Miscellaneous Commands

EDITPREFS

Use this command to change the generator settings. You can also change some of these settings with the PRIMVD command. The difference is that the EDITPREFS command changes the contents of the gear.ini file while the PRIMVD command changes the settings for the selected volume only. Settings in the gear.ini file are used for each new volume.

FREE

Displays the amount of free space (bytes) on the selected virtual volume. This command can take some time if you have a large volume with a lot of empty space.

DIR[<dir_name>][/P][/S]

Displays all the files and directories in the specified directory of the track you select. If dir_name is unspecified, the current directory is displayed. for each entry, the following is displayed:

- ❏ Name
- ❏ Directory (<DIR>) if it's a directory
- ❏ Hidden (H) or normal (n) entry
- ❏ Startsector of the file
- ❏ Date and time stamp
- ❏ Size in bytes

The /S option displays the contents of the subdirectories. The /P option is used to generate a printout. the total number of files listed is displayed at the end of the printout.

CD-R COMMANDS

You can use the following commands when you write a volume to CD-R disc.

MOVEMEDIUM<src_address><dest_address>

Moves a caddy/disc from one location (address) to another in the jukebox. Storage slots are number form location 1 to 1000. Drivers (CD recorders and CD readers) are numbered from location 1001 to 2000. the mailbox of the jukebox has location number 2001. The grippers—the device that actually moves the medium—are numbered 3001 and 3002.

WRITECD<volume_name>[<nrofcopies>]

Writes a GEAR volume to disc. You can use the number of copies parameter to write multiple discs of the same volume. If a medium changer (supported by GEAR) is connected to the same SCSI bus as the CD recorder, GEAR uses the medium changer to change the discs. otherwise, you are prompted to perform the medium change.

WRITECD<foreign_image_name|track_list_file_name> [<nrofcopies>][X][<type>]

Used when you work with external volumes. The optional character X indicates that the specified name should be interpreted as a foreign image or track list file.

ESTIMATE<volume_name>

Checks the performance of your system for writing the external volume to CD-R disc.

ESTIMATE<foreign_image_name|track_list_file_name> [X][<type>]

Checks the performance of your system for writing the external volume to CD-R disc. The optional character X indicates that the specified name should be interpreted as a foreign image or track list file.

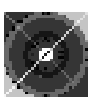
DISCINFO

Displays information about the disc in the CD recorder.

SETUPCD

Defines the settings used when you write the CD-R disc and/or while estimating the performance. You can specify the following:

To do this...	Specify...
Use the physical image	Yes or No
Write a multi-session CD-R	Yes or No
Use the CD recorder's test mode	Yes or No
Write a CD-R disc with 1x, 2x, or 4x speed	1, 2, or 4
Fixate the CD-R after writing	Yes or No
Linear velocity to use for writing	1, 2, or 3



To do this... (Continued)	Specify...
Number of CD recorders to be addressed	1 to 32

This information is saved in gear.ini. You can either edit gear.ini using a text editor or use the SETUP command to change the settings.

FIXATION

Checks the currently-loaded disc. Fixates the disc if it isn't already. You can use this command with track-at-once CD-Rs. All tracks are written separately to the CD-R with the fixation entry in the gear.ini file set to False. You can then fixate the tracks using this command after all tracks have been written.

Warning! *If an image isn't fixated, you can't read it on a CD-ROM player.*

READTRACK<nr><file>

Reads all the sectors of the specified track from the CD-R disc then saves them in the specified file. The amount of information read depends on the track type. This command will determine automatically the track type, size, and start position, then start copying.

For ISO tracks (mode 1), 2048 bytes are read per sector. For CD-ROM XA and CD-I (mode 2), 2336 bytes are read per sector. For CD digital audio, 2352 bytes are read per sector. Not all CD recorders support the reading of CD digital audio and/or CD-I tracks.

Files you create with this command can be written to a CD-R disc again as external image files.

LISTCD

Displays the selected setup settings used for estimating and writing.

Premaster Tape Commands

The following are premaster-tape related commands:

WRITETP<volume_name>

Writes the GEAR volume to premaster tape.

WRITETP<foreign_image_name|track_list_file_name> [X][<type>]

Used to write external volumes. the optional X character indicates that the specified name should be interpreted as a foreign image or track list file.

VERIFY<volume_name>

Verifies the volume by comparing it to the volume on tape. Before the verification, GEAR prompts you to use the current setup values. These values determine whether the virtual volume or the physical image file is used for verification. The setup values must be the same as those you use for writing the tape.

VERIFY<foreign_image_name|track_list_file_name> [X][<type>]

Used to verify an external volume. the optional X character indicates the specified name should be interpreted as a foreign image or track list field. All setup values are used except for the value that determines whether the virtual image or the physical image file is used. The file is interpreted as a physical CD-ROM image file or as a track list file, which specifies multiple image files. See the WRITE command.

SETUPTP

Defines the setup values that are used while writing or verifying the premaster tape.

In general, it's sufficient to use the default values specified in the gear.ini file. You can edit the gear.ini file in a text editor or you can us the SETUP command to change theses values.

LISTTP

Displays the selected setup values that are used for verification and writing.

Using GEAR Commands in Mac/OS

The following sections discuss the commands available in GEAR's File, Edit, and Options menus.

File Menu Commands

The following sections describe the Tools menu commands.

New CD Image, Cmd-N

Creates a new CD image. You can create the following types of images:

- ISO
- XA
- DA (Audio)
- Mixed Mode ISO or XA
- HFS Volume
- Hybrid (HFS + ISO)
- Foreign (CD-I, Photo CD, Video CD, Custom Format, CD From Track List)
- SCSI Device Dump

Open CD Image, Cmd-O

Opens an existing CD image.

Close CD Image

Closes the open image without quitting GEAR.

Append Next Session

Adds files to an existing multi-session image.

Test Run/Write

Performs a test run before you write to CD-R to verify the data transfer rate.

Delete CD Image, Cmd-D

Deletes the selected virtual image and its administration files.

Start Log, Cmd-L

Opens a log window that tracks the activities you perform.

Quit, Cmd-Q

Exits GEAR.

Edit Menu Commands

Use these commands to edit images, choose setup volume, CD recorder, and tape recorder options, and to change preferences.

Undo, Cmd-Z

Reverses the last action you performed.

Cut, Cmd-X

Removes a selected item and places it on the Clipboard.

Copy, Cmd-C

Places a copy of a selected item on the Clipboard.

Paste, Cmd-V

Places cut or copied items from the Clipboard where you click.

Clear, Cmd-K

Removes a selected item without placing it on the Clipboard.

Volume Setup

Lets you choose options such as volume attributes, and a volume descriptor.

CD Recorder Setup

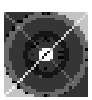
Lets you choose general, advanced, and medium changer options before you write to a CD-R.

Tape Setup

Lets you choose general, strategy, and track specification options before you write to premaster tape.

Preferences, Cmd-Y

Lets you change and save settings in the Gear Preferences file.



Options Menu Commands

These commands let you verify and convert CD images, copy CD tracks, view CD info, and choose jukebox settings.

Verify CD-Image

Lets you check the size, date, and time stamp for each file in a track or image. If there are discrepancies, it usually means a file has been updated since it was loaded into the image. GEAR prompts you to update the image by reloading the reported files and folders.

Convert CD-Image

Lets you convert a virtual image to a physical image or a hard drive. A physical image is a sector-by-sector copy of the CD-ROM you're about to create and contains the current contents of the virtual image.

Copy CD Track

Lets you copy a CD track on a CD-R to a virtual image on your hard disk.

View CD Info, Cmd-I

Lets you view the contents of a CD in a CD recorder.

Jukebox Control

Controls jukeboxes that GEAR supports.

Keep in mind the following:

- ❏ Currently, GEAR supports the ASM, K&S, and Pioneer jukeboxes, and the Kodak Disc Transporter.
- ❏ If you want to use a jukebox to write several CD-Rs unattended, make sure they're loaded consecutively beginning in slot 1.

C

The GEAR Initialization/ Preferences File

The gear.ini File in Windows

The gear.ini file contains information used by GEAR. You can edit the gear.ini file with any text editor. It's a good idea—before you begin to edit the file—to make a backup copy of it with a different name.

During startup, GEAR tries to locate the gear.ini file in the current working directory. If the file isn't in the current working directory, the GEARDIR environment variable is used to locate it. Without the information in gear.ini, GEAR can't run properly and will notify you if it can't find the gear.ini file.

The following are parts of the gear.ini file.

```
; GEAR.INI file
;
;
[generic]
;
WorkingDirectory=C:\GEARIMG
DefaultDiscSize=74
DefaultTrackType=ISO
MSBAudio=FALSE
GearGeometry=65532,65532,644,484
StatGeometry=65535,304,639,478
FileGeometry=320,66,640,413
; Customer information:
CustomerName=
CustomerContact=
CustomerPhone=
MasterIDCode=
ReferenceCode=
UPCEANCode=
DiscTitle=
;
;
```

Generic information

```
[generator]
;
SystemIdf=GEAR VERSION 3.2 FEB 1995
PublisherIdf=
DataPreparerIdf=ELEKTROSON 1995
ApplicationIdf=
ApplicationUse=
CopyRightFileIdf=
AbstractFileIdf=
BibliographicFileIdf=
MaxNrDirsInVolume=500
MaxDirNestingLevel=8
; NonIsoNameHandling the determines how the software handles non-ISO9660 names
;   Possible values are:
;   0) Dialog appears for each non-ISO9660 name
;   1) Ignore non-ISO9660 names
;   2) Translate non-ISO9660 names to upper case only
;   3) Translate non-ISO9660 names completely
;   4) Translate non-ISO9660 names completely to DOS compliant names (8+3)
NonIsoNameHandling=0
ArchiveOnly=FALSE
ArchiveReset=TRUE
;
;
```

Generator information

```
[tape]
;
; Parameters for premaster tape output:
DDPFormatTape=FALSE
; FileOption determines how tracks are written in tape files
;   Possible values are:
;   1) Separate files on separate tapes for each track
;   2) Separate files for each track on the same tape
;   3) Tracks of the same type are combined in one tape file
;   4) One contiguous image tape file including all tracks
FileOption=2
ISOTrackSectorSize=2048
ISOTrackBlockingFactor=4
ISOTrackWithPregapPostgap=FALSE
XATrackSectorSize=2336
XATrackBlockingFactor=4
XATrackWithPregapPostgap=FALSE
DATrackWithPause=FALSE
ScramblingFor2352Sectors=FALSE
WriteIdentTxtOnTape=FALSE
UsePhysicalImageFiles=FALSE
VerifyAfterWrite=FALSE
; Selection of tape interface used:
;   0) Null device
;   1) Adaptec AHA-154XX SCSI board (direct to hardware)
;   2) ASPI DOS SCSI driver (DOS or Windows 3.1 through DPMI)
;   3) WINASPI.DLL interface (Windows 3.1 only)
;   4) Future Domain CAM SCSI driver (DOS or Windows 3.1)
TapeInterface=0
; IO address of Adaptec AHA-154XX board (for TapeInterface 1):
AdaptecIOAddress=230h
; Host adapter number (0-2) to use (for TapeInterface 2, 3 and 4):
HostAdapterNumber=1
; SCSI ID of tape unit (only valid in case of multiple units):
TargetID=4
;
```

Tape information

```
[cdrecording]
;
; Parameters for CD-Recording:
UsePhysicalImageFiles=FALSE
WriteEnable=FALSE
NrOfWriters=1
Speed=1
Fixation=TRUE
MultiSession=TRUE
DiscAtOnce=FALSE
VerifyImage=TRUE
EstimateBeforeWrite=FALSE
; Selection of CD-R interface used:
;   0) Null device
;   1) Adaptec AHA-154XX SCSI board (direct to hardware)
;   2) ASPI DOS SCSI driver (DOS or Windows 3.1 through DPMI)
;   3) WINASPI.DLL interface (Windows 3.1 only)
;   4) Future Domain CAM SCSI driver (DOS or Windows 3.1)
CDRInterface=2
; IO address of Adaptec AHA-154XX board (for CDRInterface 1):
AdaptecIOAddress=230h
; Host adapter number (0-3) to use (for CDRInterface 2, 3 and 4):
HostAdapterNumber=1
; SCSI ID of CD-R unit (only valid in case of multiple units):
TargetID=5
; Recorder type to use by software for unknown or 'OEM' recorders
; (1=Philips/Kodak type, 2=Yamaha type, 3=Ricoh type, 4=JVC type):
UnknownRecorderType=1
; Settings for medium changer device (jukebox):
UseMediumChanger=TRUE
InitializeMediumChanger=FALSE
DriveNrInMediumChanger=1
;
```

CD recording information

```
[harddisk]
;
; Selection of disk interface used (for raw SCSI hard disks):
;   0) Null device
;   1) Adaptec AHA-154XX SCSI board (direct to hardware)
;   2) ASPI DOS SCSI driver (DOS or Windows 3.1 through DPMI)
;   3) WINASPI.DLL interface (Windows 3.1 only)
;   4) Future Domain CAM SCSI driver (DOS or Windows 3.1)
DiskInterface=3
; IO address of Adaptec AHA-154XX board (for DiskInterface 1):
AdaptecIOAddress=230h
; Host adapter number (0-2) to use (for DiskInterface 2, 3 and 4):
HostAdapterNumber=0
; SCSI ID of disk device (only valid in case of multiple units):
TargetID=6
;
;end of GEAR.INI
```

Hard disk information

You can change the information in the gear.ini file with a standard text editor like Windows Notepad, however, we recommend you use the commands available in the GEAR menus. For details, see Chapter 8 and Appendix B.

As you look at the gear.ini file, keep in mind the following points:

- ❏ Lines that start with a semicolon are treated as comments—information that doesn't affect how GEAR performs.
- ❏ You must enter parameters immediately after the = sign; parameters are interpreted beginning with the first character that follows the = sign.
- ❏ All parameters are case sensitive.

Generic Information

The first part of the gear.ini files contains the information described in the following sections.

Working Directory

This parameter—under generic—specifies the directory in which GEAR looks for the volume administration files during startup. If this parameter is not specified, GEAR uses the directory specified as the working directory in the program Properties dialog in the GEAR program group.

```
WorkingDirectory=C:\GEARIMG
```

MSBAudio

This parameter—under generic—specifies whether the audio for all tracks is MSB (most significant byte first). The default value is False. This is an optional parameter. Valid values are True or False.

```
MSBAUDIO=False
```

Warning! *If you don't verify this parameter is set correctly, writing might fail. This is most common when a file has been changed unexpectedly. Use this option with care.*

Display Parameters

These parameters—under generic—store the dimensions of the three main windows that are displayed when you run GEAR: working window, Status window, and the File Manager window. GEAR uses this information to position and size these windows on your screen when you first start the program.

Warning! *Do not change these values manually.*

Customer Information

The first three customer information parameters—under generic—can be the same for all your CD-ROM titles.

```
CustomerName=your own name
CustomerContact=your contact person
CustomerPhone=your telephone number
```

The last three fields are usually different for each CD-ROM title.

```
MasterIDCode=your mastering code
ReferenceCode=your reference code
DiscTitle=your new CD title
```

This information is written to the tp_ident.txt and wo_ident.txt files when you write to a premaster tape or CD-R disc. Some premaster companies ask you to supply this information on premaster tape and/or paper.

Generation Information

The following sections describe the information in the generation part of the gear.ini file. This information is used when you create a new volume. Afterwards, you can change the information for a selected volume using the Volume Descriptor command in the Edit menu in GEAR. All identifiers must conform to the ISO standard for interchange level 1. For information, see Appendix A. GEAR uses the default values if the parameters aren't specified.

SystemIdf

Identifies the system. The default value is an empty string.

PublisherIdf

Identifies the person who specified the content of the volume set for this volume. If the first character is an underscore (_), the rest of the parameter specifies an identifier for a file that contains the publisher identification. This file has to be loaded in the root directory. The default value is an empty string.

If the name begins with an underscore, an extension and/or version number may be omitted.

DatePreparerIdf

Identifies the person or other entity that controls the preparation of the data to be recorded on the volume. If the first character is an underscore, the rest of the field specifies an identifier for the file that contains the data preparer identification. This file has to be loaded in the root directory. The default value is an empty string.

ApplicationIdf

Identifies the specification of how the data is recorded on the volume set that this volume belongs to. If the first character is an underscore, the rest of the parameter specifies an identifier for the file that contains the application identification. This file has to be loaded in the root directory. The default value is an empty string.

ApplicationUse

Identifies the language for an EB (XA) disc. The default value is an empty string.

CopyRightFileIdf

Specifies the identification for a file that contains the copyright statement for the volume set. The file is loaded in the root directory. The default value is an empty string.

AbstractFileIdf

Identifies for the file that contains the abstract statement for the volume set. This file is loaded in the root directory. The default value is an empty string.

BibliographicFileIdf

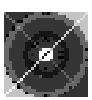
Identifies for a file that contains bibliographic records interpreted according to standards that are the subject of an agreement between the originator and the recipient of the volume. This file is loaded in the root directory. The default value is an empty string.

MaxDirNestingLevel

Identifies the maximum nesting levels for directories on the CD. The root level is 1. ISO allows directory nesting up to eight levels. GEAR allows a directory nesting up to 12 levels. The default value is 8.

MaxNrDirsInVolume

Specifies the maximum number of directories in the volume in order to calculate the number of blocks needed for the path tables. This number may not be larger than 65535. The default value is 500.



ArchivesOnly

DOS uses this parameter to determine if a file has to be backed up. Tape archiving software usually only archives files that have the archive bit set. This information is reset when the file is written to tape.

GEAR offers you the same functionality for CD-R writing. When the Archives Only check box is turned on in the Volume Settings dialog (Edit menu), GEAR loads into the image only files with the archive bit set. The archive bit is reset when the file is successfully loaded into the GEAR image. Valid values are True and False. The default value is False.

NonISONameHandling

Specifies how non-ISO names for files and directories are handled. Valid values are:

When the value is...	This happens...
0 (default)	For each non-ISO name encountered, a dialog prompts you to translate to an ISO-compliant name or skip the name.
1	Non-ISO names are ignored; files are loaded with their original names.
2	Lowercase characters are translated to uppercase characters. For names that still contain non-ISO characters, a dialog prompts you to translate to an ISO-compliant name or skip the name. This value is especially useful in a UNIX environment.
3	All non-ISO names are translated to ISO-compliant names. Non-ISO characters are replaced by an underscore (_). A warning appears if duplicate names are generated.
4	All non-ISO names are translated to ISO level 1-compliant names.
5	All non-ISO names are translated to ISO level 1-compliant names. The Rock Ridge-specific information is specified in the proposed IEEE standards P1281 and P1282; it is specifically meant for UNIX systems. A value of 5 should be used on UNIX systems *only*.

CD-R Information

You can change the following parameters using the CD-R command in the Settings submenu of the Options menu. All fields must be specified. The values as specified in the default gear.ini file are usually used.

UsePhysicalImageFiles

Specifies whether the physical image is used to write to the CD-recordable. Sometimes if may be necessary to use a physical image file to meet the data transfer rate requirements; in general, writing with the physical image is faster. Valid values are True and False. The default value is False.

MultiSession

Specifies whether the CD-R disc is recorded so that you can append new sessions (data) to the disc in the future. If a CD-R is written with this parameter set to False, you can never use the disc for recording new sessions. If the CD recorder doesn't support this mode, the parameter is ignored. Valid values are True and False. The default value is False.

WriteEnable

Specifies whether the CD recorder actually writes the image file to the CD-R. Some CD recorders can be set to a test mode during which the data is not actually written to CD-R disc. You can use this mode to test whether the computer system meets the data transfer requirements for the CD recorder for a specific CD-ROM image file. If the CD recorder doesn't support this mode, the parameter is ignored. Valid values are True and False. The default value is True.

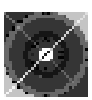
On some recorders, such as Sony, you have to set a switch on the unit rather than setting this mode.

Speed

Specifies the recording speed of the CD recorder. A value of 1 means real-time recording (150KB/s). If the recorder doesn't support this parameter, it's ignored. Valid values are 1, 2, 4, and 6. The default value is 2.

Fixation

Specifies whether the CD recorder fixates the CD-ROM after the image file has been written to the CD-R. If the CD recorder doesn't support this mode, the parameter is ignored.



You can use this parameter to write track at once; the last track must be written with fixation set to True and all the previous tracks must be written with fixation set to False. Valid values are True and False. The default value is True.

Warning! *Only a fixated image can be read on a CD-ROM player.*

LinearVelocityLevel

For the Yamaha PDS301 only, specifies the linear velocity level used by the CD recorder for writing the image file to the CD-R. The lower the linear velocity level, the more data that can be written to the CD-R. See your Yamaha documentation. Valid values are 1, 2, or 3. The default value is 2.

NrOfWriters

For the Yamaha PDS301 and Sony CDW900E only, specifies the number of writers used by the CD recorder while writing the image file to the CD-R. Valid values are 1 to 14 for the Yamaha, and 1 to 32 for the Sony. The default value is 1.

Warning! *If you use multiple writers for the Yamaha, the writers must have successive numbers (refer to your Yamaha documentation).*

EstimateBeforeWrite

Specifies whether GEAR does a performance check before it writes the data to CD-R. Valid values are True and False. The default value is False.

IncrementalWrite

For the RICOH RS9200, specifies whether GEAR uses incremental write while writing a data source to CD-R. All other recorders ignore this parameter. Valid values are True and False. The default value is false.

CDRInterface

Specifies the CD-R interface as indicated in the following table:

When the value is...	The device is...
0	Null
1	Adaptec AHA-1540/AHA-1542 board drive (SCSI)
2 (default)	ASPI for DOS driver (ASPI4DOS.SYS)

When the value is...	The device is...
3	ASPI for Windows driver (WINASPI.DLL)
4	Future Domain CAM driver

AdaptecIOAddress

Specifies the IO address where GEAR searches for the Adaptec card. If you change this address, don't forget to change the settings on the card. Refer to the Adaptec installation guide for valid addresses and how to change the address on the card.

This parameter must be specified if you've chosen the Elektroson driver (CDInterface=1). If you're using the ASPI interface or CAM interface (CDRInterface=2, 3 or 4), this parameter is ignored. The default value is 230h.

DiscatOnce

For the Philips CDD522/Kodak PCD225, Sony 920, and Yamaha CDR-100, specifies whether the disc should be written in disc-at-once mode. These recorders, by default, write track at once. If this parameter is set to True, the disc is written disc at once instead of track at once. Valid values are True and False. The default value is False.

Warning! *You can't add data to a disc that is written disc at once.*

AspiHostAdapterNumber

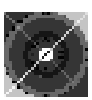
When CDInterface=2, specifies the ASPI host adapter number that's used. If you're using the ASPI manager as the device interface for multiple controllers and your CD recorder is recognized by ASPI but not by GEAR, you probably have to change the AspiHostAdapterNumber. The default value is 0. Valid values are 0, 1, and 2.

CDRTargetID

This ID can range from 0 to 6; a value of 7 is normally used by the Adaptec controller. If only one CD-R unit is connected, the software automatically finds the unit, regardless of its ID. If you use multiple units, the unit with the specified CDRTargetID is used. If no value is specified, the unit with the highest number is used. The default value is 4.

UseMediumChanger

Specifies whether the GEAR software looks for a medium changer for loading and unloading CD-R discs. Currently, GEAR supports the ASM jukebox, the Pioneer juke-



box, and the Kodak disc transporter. Valid values are True and False. The default value is True.

BufferSize

Specifies in bytes the buffer size allocated by GEAR for writing CD-R discs. The buffer size must be between 2352 and 65000. A larger buffer size may be useful when the data transfer rate has some unexpected "dip." If the average transfer rate is too low, a large buffer size doesn't always help. The default value is 64000.

NrOfBuffers

Specifies whether GEAR should use two buffers concurrently for writing the CD-R disc (sometimes referred to as QuickDMA). When using one controller for both CD recorder and hard disk drive, it may be necessary to set NrOfBuffers to 0. Valid values are 0 for one buffer and 1 for two buffers in parallel. The default value is 1.

DriveNrInMediumChanger

Specifies the jukebox drive that's the CD recorder. Currently, there is no other way for GEAR to get this information. Valid values depend on the number of the driver in the jukebox. The default value is 1 (first drive in the jukebox).

VerifyImage

Specifies whether the GEAR image should be verified before it is converted to a physical image, written to CD-R, or written to premaster tape. For each file in each track in the virtual image, a verify will check the time, date, and size at loading against the current time, date, and size of the file. If any file has been changed, a message is displayed.

Premaster Tape Information

You can change the following parameters using the Tape command in the Settings submenu of the Options menu. These parameters, which specify CD-ROM XA related information, are ignored in the ISO only version. You must specify a vale for each parameter. Usually the default values specified in the gear.ini file are used.

DDPFormatTape

Specifies whether the DDP files (DDPID, DDPMS, AND PQDESCR) are written to the premaster tape. The DDP files are also written to hard disk. Valid values are True and False. The default value is False.

FileOption

When the value is...	This happens...
1	Each track is written to a separate tape file on a separate tape. It's impossible to write DDP information to tape when using this method.
2 (default)	Each track is written to a separate tape file. All files are then written to one tape.
3	Tracks of the same type are combined into one tape file. The tape files are written to the same tape. This option is useful when there are many small audio tracks in the volume. Using the previous methods would result in a large number of filemarks on the tape that could cause problems while mastering.
4	All tracks are written to one file (contiguous image). Sector size, scrambling, blocking factor and gap/pause inclusion are set to mandatory values.

ISOTrackSectorSize

Specifies the sector size to be used on tape for an ISO track. Valid values are 2048 and 2352 (EDC/ECC is added for sector size 2352). The default value is 2048.

ISOTrackWithPregapPostgap

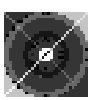
Specifies whether the pregap and postgap are written to tape for an ISO track. Valid values are True and False. The default value is False.

XATrackBlockingFactor

Specifies the tape blocking factor for a CD-ROM XA track. Valid values are 4 and 6. The default value is 6.

XATrackSectorSize

Specifies the sector size to use on premaster tape for a CD-ROM XA track. Valid values are 2336 and 2352 (EDC/ECC is added for sector size 2352). The default value is 2336.



XATrackWithPregapPostgap

Specifies whether the pregap and postgap are written to premaster tape for a CD-ROM XA track. Valid values are True and False. The default value is False.

DATrackWithPause

Specifies whether the pause of CD digital audio tracks is written to premaster tape. Valid values are True and False. The default value is False.

ScramblingFor2352Sectors

Specifies whether the 2352 sectors must be scrambled before they are written to premaster tape. This parameter is used only if the sector size of the track written to tape is 2352. Valid values are True and False. The default value is False.

WriteIdentTxtOnTape

Specifies whether the tp_ident.txt file is written to tape. Valid values are True and False. The default value is False.

UsePhysicalImageFiles

Specifies whether a physical image file is used for writing to premaster tape. In general, writing using the physical image is faster. Valid values are True and False. The default value is False.

VerifyAfterWrite

Specifies whether GEAR verifies data after it has written the data source to premaster tape. Valid values are True and False. The default value is False.

TapeInterface

Specifies the tape interface to be used.

When the value is...	The device is...
0	Null
1	Adaptec AHA-1540/AHA-1542 board driver (SCSI)
2 (default)	ASPI for DOS driver (ASPI4DOS.SYS)

When the value is...	The device is...
3	ASPI for Windows (WINASPI.DLL)
4	Future Domain CAM driver

AdaptecIOAddress

Specifies the IO address where GEAR searches for the Adaptec card. If you change this address, don't forget to change the settings on the card, accordingly. Refer to your Adaptec documentation for valid addresses and how to change the address on the card.

This field must be specified if you've chosen the Elektroson driver (TapeInterface=1). If you're using the ASPI interface (TapeInterface=2), this parameter is ignored. The default is 230h.

AspiHostAdapterNumber

Specifies the ASPI host adapter number used. This parameter is used only when TapeInterface=2. If you're using the ASPI manager as the device interface for multiple controllers and your tape unit is recognized by ASPI but not by GEAR, you probably have to change the AspiHostAdapterNumber. Valid values are 0, 1, and 2. The default value is 0.

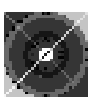
TapeTargetID

This ID can range from 0 to 6; a value of 7 is normally used by the SCSI controller. If only one tape unit is connected, the software automatically finds the unit, regardless of its ID. If you use multiple units, the unit with the specified TapeTargetID is used. If no value is specified for TapeTargetID, the unit with the highest number is used. The default value is 4.

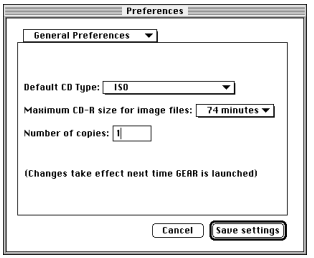
The Gear Preferences File in Mac O/S

The Gear Preferences file contains information used by GEAR. You can edit the Gear Preferences file with any text editor. It's a good idea—before you begin to edit the file—to make a backup copy of it with a different name.

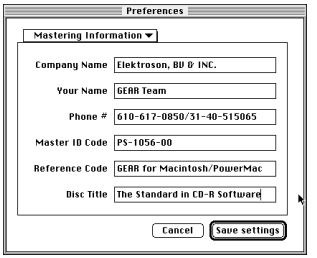
During startup, GEAR tries to locate the Gear Preferences file in the Preferences Folder. If the file isn't in the Preferences Folder, GEAR creates a new one. Without the information in the Gear Preferences file, GEAR can't run properly and will notify you if it can't find the file.



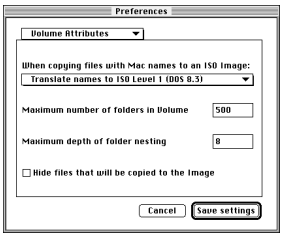
The following are the dialogs you use to choose Gear Preferences.



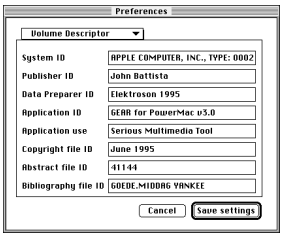
General preferences include the default CD type and number of copies that appear in the Workbench window and the maximum CD-R size that appears in the New CD Image dialog



Mastering information is saved with an image and written to the tp_ident and wo_ident files when you premaster and write to a tape recorder



Volume attributes let you specify how GEAR should handle invalid ISO names, the maximum number of folders you can have in an image, the maximum number of nested folders you can have, and whether to hide files that you'll copy to an image



Volume descriptor settings include identification information that's saved in the administration files for each image you create

You can change the information in the Gear Preferences file with a standard text editor like SimpleText, however, we recommend you use the commands available in the GEAR menus. For details, see Chapter 8 and Appendix B.

As you look at the Gear Preferences file, keep in mind the following points:

- ❏ Lines that start with a semicolon are treated as comments—information that doesn't affect how GEAR performs.
- ❏ You must enter parameters immediately after the = sign; parameters are interpreted beginning with the first character that follows the = sign.
- ❏ All parameters are case sensitive.

General Preferences

General preferences include the default CD type and number of copies that appear in the Workbench window and the maximum size CD-R size that appears in the New CD Image dialog.

Default CD Type

The default type of CD that appears next to CD Type in the Workbench window when you launch GEAR.

Maximum CD-R size for image files

They default size that appears in the dialog when you create a new CD image.

Number of copies

The default value that appears in the Workbench window next to Copies.

Mastering Information

Saved with an image and written to the tp_ident and wo_ident files when you premaster and write to a tape recorder.

Company Name

Written to the tp_ident file when you write to premaster tape or CD-R disc.

Your Name

Written to the tp_ident file when you write to premaster tape or CD-R disc.

Phone

Written to the tp_ident file when you write to premaster tape or CD-R disc.

Master ID Code

Written to the tp_ident and wo_ident files when you write to premaster tape or CD-R disc.

Reference Code

Written to the tp_ident and wo_ident files when you write to premaster tape or CD-R disc.

Disc Title

Written to the tp_ident and wo_ident files when you write to premaster tape or CD-R disc.

Volume Attributes

Volume attributes let you specify how GEAR should handle invalid ISO names, the maximum number of folders you can have in an image, the maximum number of nested folders you can have, and whether to hide files that you'll copy to an image.

When copying files with Mac names to an ISO Image

Specifies how non-ISO names for files and directories are handled. Valid values are:

When the value is...	This happens...
0 (default)	For each non-ISO name encountered, a dialog prompts you to translate to an ISO-compliant name or skip the name.
1	Non-ISO names are ignored; files are loaded with their original names.
2	Lowercase characters are translated to uppercase characters. For names that still contain non-ISO characters, a dialog prompts you to translate to an ISO-compliant name or skip the name. This value is especially useful in a UNIX environment.
3	All non-ISO names are translated to ISO-compliant names. Non-ISO characters are replaced by an underscore (_). A warning appears if duplicate names are generated.
4	All non-ISO names are translated to ISO level 1-compliant names.
5	All non-ISO names are translated to ISO level 1-compliant names. The Rock Ridge-specific information is specified in the proposed IEEE standards P1281 and P1282; it is specifically meant for UNIX systems. A value of 5 should be used on UNIX systems *only*.

Maximum number of folders in volume

Specifies the maximum number of directories in the volume in order to calculate the number of blocks needed for the path tables. This number may not be larger than 65535. The default value is 500.

Maximum depth of folder nesting

Identifies the maximum nesting levels for folders on the CD. The root level is 1. ISO allows folder nesting up to eight levels. GEAR allows a folder nesting up to 12 levels. The default value is 8.

Hide files that will be copied to the Image

Indicates whether files you create are to be hidden in the Session window.

Volume Descriptor Information

These settings include identification information that's saved in the administration files for each image you create.

System ID

Identifies the system. The default value is an empty string.

Publisher ID

Identifies the person who specified the content of the volume set for this volume. If the first character is an underscore (_), the rest of the parameter specifies an identifier for a file that contains the publisher identification. This file has to be loaded in the root folder. The default value is an empty string.

If the name begins with an underscore, an extension and/or version number may be omitted.

Data Preparer ID

Identifies the person or other entity that controls the preparation of the data to be recorded on the volume. If the first character is an underscore, the rest of the field specifies an identifier for the file that contains the data preparer identification. This file has to be loaded in the root folder. The default value is an empty string.

Application ID

Identifies the specification of how the data is recorded on the volume set that this volume belongs to. If the first character is an underscore, the rest of the parameter specifies an identifier for the file that contains the application identification. This file has to be loaded in the root folder. The default value is an empty string.

Application use

Identifies the language for an EB (XA) disc. The default value is an empty string.

Copyright file ID

Specifies the identification for a file that contains the copyright statement for the volume set. The file is loaded in the root folder. The default value is an empty string.

Abstract file ID

Identifies for the file that contains the abstract statement for the volume set. This file is loaded in the root folder. The default value is an empty string.

Bibliography file ID

Identifies for a file that contains bibliographic records interpreted according to standards that are the subject of an agreement between the originator and the recipient of the volume. This file is loaded in the root folder. The default value is an empty string.

Error Sense Codes During Writing of CD-R

Sense Codes

The following are hardware errors you may encounter as you're writing to CD-R and what they mean. They are arranged alphanumerically.

02H NO SEEK COMPLETE

03H CADDY OUT

The drive's caddy is not loaded.

04H DRIVE NOT READY

The drive is temporarily unable to perform the selected operation.

06H NO INITIAL POSITION

08H COMMUNICATION FAILURE

A communication error between the SCSI controller and the servo controller prevented the command from being performed (hardware error).

09H TRACK FOLLOWING ERROR

Focusing or radical tracking didn't succeed (hardware error).

11H UNRECOVERED READ ERROR

Previous read command failed, probably due to a flaw in the disc (medium error).

12H MODE 0 ERROR

Medium error.

14H BLOCK NOT FOUND

Medium error.

15H POSITIONING ERROR

Seek to a requested location on disc failed (hardware error).

17H RECOVERED READ DATA WITH RETRIES

Previous read command required data recovery that was accomplished by additional read operations (recovered error).

18H RECOVERED READ DATA WITH ECC CORRECTION

Previous read command required data recovery that was accomplished using Error Correction Code (ECC) correction (recovered error).

1AH PARAMETER LIST LENGTH ERROR

20h INVALID COMMAND

Previous SCSI command is not supported by the device.

21H INVALID BLOCK ADDRESS

One or more of the block addresses requested by the last read, write, seek, or verify command extends beyond the end of the disc.

22H ILLEGAL FUNCTION

24H ILLEGAL FIELD IN COMMAND DESCRIPTOR

One or more of the reserved bits in the command descriptor was set, or an option was selected that isn't supported by the unit.

25H INVALID LUN

Logical unit field of the command descriptor wasn't zero.

26H INVALID FIELD PARAMETER LIST

Parameter list contained one or more of the reserved bits set to 1, or an option was selected that isn't supported by the unit.

28H MEDIUM CHANGED

Disc may have been changed since the last command issued by this initiator.

29H POWER-ON RESET OR BUS-RESET OCCURRED

Power reset or bus reset has occurred since the last command issued by this initiator.

2AH MODE SELECT PARAMETER CHANGED

2CH COMMAND SEQUENCE ERROR

Previous command is not allowed in the sequence.

31H MEDIUM FORMAT CORRUPTED

Drive couldn't read/write the requested information from/to disc due to a corrupted or unknown format.

32H WRITE DATA ERROR WITH CU

CU (uncorrectable) error occurred in the recorded data and was detected by monitoring the data writing operation through the red level decoder (hardware error).

33H MONITOR ATIP ERROR

Drive couldn't read the ATIP code from the disc, probably because of dust or shock (medium error).

34H ABSORPTION CONTOL ERROR

Error may have occurred while recording the data due to laser power clipping (medium error).

3AH MEDIUM NOT PRESENT

No disc is mounted in the drive.

3DH INVALID BITS IN IDENTIFY MESSAGE

Identify message is corrupt.

40H DIAGNOSTIC FAILURE

Device self test failed (hardware error).

42H POWER-ON OR SELF TEST FAILURE

Power-on or self test sequence failed (hardware error).

44H INTERNAL CONTROLLER ERROR

Controller detected an error that couldn't be otherwise explained (hardware error).

47H SCSI PARITY ERROR

Controller detected a parity error.

48H INITIATOR DETECT ERROR

Initiator detected an error.

50H WRITE APPEND ERROR

An append by a write command during writing failed.

53H MEDIUM LOAD OR EJECT FAILED

Loading or unloading of the disc failed (hardware error).

57H UNABLE TO READ TOC, PMA, OR SUBCODE

Drive was unable to read the table of contents, PMA, or subcode of the currently-loaded disc (medium error).

5AH OPERATOR MEDIUM REMOVAL REQUEST

The operator requested to unload the disc.

63H END OF USER AREA ENCOUNTERED ON THIS TRACK

Requested block exceeds the current track.

64H ILLEGAL MODE FOR THIS TRACK

Data on the track doesn't comply with the mode that's requested by the command.

65H VERIFY FAILED

Verification was unsuccessful.

80H PROM ERROR

Controller detected a PROM error.

81H ILLEGAL TRACK

Track being accessed doesn't exist.

82H COMMAND NOT VALID NOW

Command isn't valid for the current host.

83H MEDIUM REMOVAL IS PREVENTED

A0H STOPPED ON NON DATA BLOCK

Data transfer stopped during reading because you attempted to read a block that isn't a data block.

A1H INVALID START ADDRESS

A2H ATTEMPT TO CROSS TRACK BOUNDARY

Transfer length created by a write track command doesn't match the free space length in the track.

A3H ILLEGAL MEDIUM

Medium isn't a write once disc.

A4H DISC WRITE PROTECTED

A5H APPLICATION CODE CONFLICT

Disc application code doesn't match the host application code.

A6H ILLEGAL BLOCK SIZE FOR COMMAND

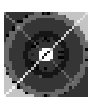
Selected block size isn't allowed for this command.

A7H BLOCK SIZE CONFLICT

Selected block size caused a mode conflict.

A8H ILLEGAL TRANSFER LENGTH

Transfer length in the command descriptor block would cause an overflow of the write buffer.



A9H REQUEST FOR FIXATION FAILED

Fixation failed due to existing blank areas on disc.

AAH END OF MEDIUM REACHED

During writing, the end of the medium was detected, the number of tracks reached the limit of 99, the OPC area is full, or the PMA is full.

ABH ILLEGAL TRACK NUMBER

An invalid track number is in the command descriptor block.

ACH DATA TRACK LENGTH ERROR

Track length is invalid because not enough blocks were sent to the unit to meet the minimum track length of 300 blocks.

ADH BUFFER UNDER RUN

The write action stopped because the cache buffer emptied.

AEH ILLEGAL TRACK MODE

Selected track mode is not valid.

AFH OPTIMUM POWER CALIBRATION OPC ERROR

Power calibration failed. Could indicate a bad medium, laser failure, or drive failure.

B0H CALIBRATION AREA ALMOST FULL.

Only a few optimum power calibration areas are left.

B1H CURRENT PROGRAM AREA EMPTY

Command couldn't be executed due to an empty program area.

B2H NO EFM AT SEARCH ADDRESS

During reading or play back, no request to EFM was present.

B3H LINK AREA ENCOUNTERED

During reading, the link area was encountered.

B4H CALIBRATION AREA FULL

Calibration area is full. No more information can be written to the disc.

B5H DUMMY BLOCKS ADDED

During writing, dummy blocks were added to meet the disc specification.

B6H BLOCK SIZE FORMAT CONFLICT

During writing, a block with a subheader was received and a conflict was detected between the form bit of the header and the block size.

B7H CURRENT COMMAND ABORTED

The current command has been aborted due to an abort command received.

C1H BARCODE READING ERROR

An error occurred during barcode reading (medium error).

D0H RECOVERY NEEDED

During power-up, the unit detected that the device was writing during the last power-down. The medium format may be corrupted.

D1H CAN'T RECOVER FROM TRACK

The recovery of a corrupted track failed (medium error).

D2H CAN'T RECOVER FROM PROGRAM MEMORY AREA

The recovery of a corrupted program memory failed (medium error).

D3H CAN'T RECOVER FROM LEADIN AREA

The recovery of a corrupted leadin area failed (medium error).

D4H CAN'T RECOVER FROM LEADOUT AREA

The recovery of a corrupted leadout area failed (medium error).

D5H CAN'T RECOVER FROM OPTICAL POWER CALIBRATION AREA

The recovery of a corrupted optical power calibration area failed (medium error).

D6H EEPROM FAILURE

The non-volatile memory failed (hardware error).

ISO-9660 File and Directory/Folder Naming

File Names

Each file name consists of three components:

- Name
- Extension
- Version Number

These components are formatted as follows:

```
<name>.<extension>;<version>
```

Keep in mind the following points:

- A name or extension can consist of zero or more alphanumeric characters and underscores (_).
- The version number can range from 1 to 32767.
- The name and extension together must consist of at least one character, for example .000;1 is a valid ISO-9660 file name.

Levels of Interchange

ISO-9660 defines three levels of interchange:

Level 1 restricts the number of characters in the name to eight and the number of the characters in the extension to three.

Levels 2 and 3 restrict the total length of the name *and* extension to 30 characters, excluding the dot and semicolon. Within GEAR, the file name length is restricted to 30.

Order of Files in a Directory/Folder

Files are sorted in alphabetical order. If two file names don't have the same number of characters, the shorter name is treated as if it's extended with extra spaces. This rule applies to both the name and the extension.

If two files have identical names, the file with the higher version number is sorted first, for example, AA.;2 is sorted before AA.;1.

Directory/Folder Names

Keep in mind the following points:

- ❏ A directory name consists of up to 31 uppercase, alphanumeric characters and underscores (_).
- ❏ With the root level being level one, the maximum nesting level of directories is eight.
- ❏ The total number of characters that specify a file within a directory or path must be fewer than 256.
- ❏ Directory names are sorted alphabetically.

Sorting Order

The sorting order of characters is defined by ISO-646.

- ❏ 0 through 9 are sorted first
- ❏ A through Z are sorted next
- ❏ Underscores are sorted last

GEAR for CD-Bridge and Electronic Book

Developing a CD-Bridge or Electronic Book Application

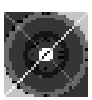
GEAR lets you develop your CD-Bridge or Electronic Book application at your site. GEAR lets you generate a CD-Bridge or Electronic Book (EB) image and write it to CD-R or premaster tape.

Generating a CD-Bridge Image

This section describes how to generate a CD-Bridge image with GEAR.

1. Choose a name for your CD-I application, for example CDI_APPL.
2. Choose the name of the subdirectory where you want to save your CD-I application, for example, CDI.
3. Edit the following gear.ini entries:
   - ❏ SystemIdentifier=CD-RTOS CD-Bridge
   - ❏ ApplicationIdentifier=CDI/CDI_APPL
4. Use GEAR to create a volume with a CD-ROM XA track.
5. Create the subdirectory for your CD-I application and load your CD-I application file in this directory.

   Be sure the names of your directory and CD-I application match those specified in the gear.ini file.



The CD-Bridge-specific part of the image generation process is now complete. You can continue the image generation process as for any other application (don't use the CD-I directory again).

Generating an Electronic Book Image

This section describes how to generate an Electronic Book image with GEAR.

1. Edit the following entry in your gear.ini file:

   ❏ ApplicationUse=EB*xxx*

   where *xxx* stands for the language that will be used when the EB application starts. EB111 for English is most commonly used.

2. Use GEAR to create a volume with a CD-ROM XA track.

3. Load all the files and directories associated with your EB application.

   You can continue the image process as you do for any other CD-ROM XA image.

Elektroson can help you with Electronic Book-specific indexing. Contact us for more information about our EB services.

Troubleshooting

The following are common questions you may have. If you still have trouble after reviewing these questions and answers, call Elektroson's customer service at 610-617-0850.

Q. When I open GEAR, I get the error "no CD-Recording Units found." What do I do?

A. First, exit GEAR, then reboot your computer. As your system comes up watch for the recorder's name and revision number to appear. Watch carefully because the window scrolls quickly. Note the recorder name and firmware—this will be helpful if you need technical support.

If your computer doesn't see your CD recorder when you reboot, GEAR won't see the recorder. Check the SCSI connections to make sure the controller card is configured properly.

Q. Why can't my computer see my recorder?

A. There can be several reasons your computer may not see your connected SCSI devices. These include:

- ❏ Improper termination of the SCSI chain
- ❏ A SCSI device in the chain isn't turned on
- ❏ Your System Folder doesn't contain the proper extensions to mount the device

If you check all these and your computer still can't see your connected SCSI devices, contact Elektroson Technical Support.

Q. My computer sees my CD-R but when GEAR starts it states "Cannot initialize CD recording device." What am I doing wrong?

A. You probably aren't doing anything wrong in this case. This error usually occurs when you use the DOS ASPI Manager and you don't have enough conventional memory.

You'll need to check the following.In the Main program group in Windows, double-click the DOS prompt icon. When the DOS prompt appears, type "MEM /C". Check to see how much conventional memory is free.

Some systems require you have at least 540MB of conventional memory available. If you don't have enough memory, you'll have to free up more memory. You can do this by loading as much into higher memory as possible. You can also run programs like "memmaker," which tries to load drivers into higher memory locations.

Your other alternatives are to use Windows ASPI or Future Domain's controller with CAM. These drivers use memory above the DOS limited 640KB.

Q. GEAR came back with the error "Not Enough Real Mode Memory." What does that mean?

A. This is a common problem that relates to conventional memory. You'll need to check two things. First, the largest executable program size must be at a minimum of 500KB. Some systems however, will require 540KB or more.

You can check this with the "MEM /C" command. You must execute this command in Windows using the DOS prompt in the Main program group. If you don't have enough free conventional memory, you'll have to move as many drivers to high memory as possible.

You can also run Windows ASPI, which uses memory above the 640KB DOS memory limitation.

Second, make sure that you're running only GEAR and that no other programs are taking up memory while you're in Windows.

Q. I created a multi-session disc and I can see only the first session.

A. There are two things you need to read multi-session. One is an Orange Book Multi-session Reader Driver and the other is an Orange Book Multi-session CD-ROM drive.

First, place the CD-R in the recorder. Click the DiscInfo button on the GEAR toolbar. DiscInfo will display the disc contents. It should show that there are at least two sessions on the disc with a start time, track type and size for each session.

If all this information is there, then you should verify that your driver (e.g., ASPICD, CUN_ASPI, CAMCD, etc.) and CD-ROM drive are Orange Book Multi-Session compatible. Some readers are Photo Multi-session readers. This doesn't mean they're Orange Book Multi-Session Readers. Check with your manufacturer.

(NEC 3x and 4x are Photo Multi-session only! CD-Rs should be written in XA Multi-Session to support these readers, not ISO Multi-Session.)

Q. When reading my CD-R, I receive no error messages, however when I try to read the disc in my CD-ROM drive, I can see directories but no files in the directories, What causes this?

A. This is usually due to one of two reasons:

1) If the disc is a multi-session disc and the files in the directories were recorded on the second session, it may be that your CD-ROM drive isn't multi-session compatible or you don't have the proper multi-session reader driver installed.

Some readers support only the Kodak Photo Multi-Session (CD-XA Multi-Session) standard. Refer to your CD-ROM drive manual to determine proper compatibility.

2) If the disc must be read on a DOS platform, the file name must not be larger than eight characters separated by a period (.) and a three-digit extension. This naming convention is similar to ISO 9660 Level 1. ISO- 9660 Level 3 allows 30 characters in the entire name which is too large for the DOS naming convention.

Q. When using the READTRACK option in GEAR to extract digital audio from my CD recorder, I receive the error message 26H Invalid Field Parameter List or 2CH Command Sequence Error. What does this mean?

A. This error occurs when you're trying to extract digital audio through the SCSI bus of a recorder that doesn't allow for this option. As of this writing, the only recorders that allow for digital audio extraction through the SCSI bus are the Yamaha CDR(E)-100, the Philips CDD-522, and the Kodak PCD-225 and 600. Check with GEAR technical support for an updated list of supported recorders.

Q. When recording a CD, I receive the following error: 34H Absorption Control Error. What causes this?

A. The absorption control error is a media error caused by the laser not being able to etch the media properly. If this error occurs during the recording process but doesn't stop the recording, the disc should be readable. This error is caused by old firmware in the recorder.

If this occurs and the recording halts, the problem is usually caused by the media. Reset your recorder and replace the media. You can record another CD-R. If the problem continues, contact the media supplier, recorder manufacturer, or GEAR technical support.

Q. During recording, I received 50H error. What happened?

A. This error is sometimes generated by the recorder to report a buffer underrun. Unfortunately, there is nothing you can do with this CD-R. Be sure to reset your recorder and eject the disc!

First, defragment you hard drive or try making your virtual image a physical image if you have the hard drive space. If this isn't possible, you'll have to slow down your transfer speed.

Q. I received a buffer underrun. What should I do and how can I avoid them in the future?

A. A buffer underrun is the result of data flow to the recorder's buffer being too slow and the buffer going "dry." If this occurs, the recorder can't recover like a tape or disk drive—the disc is unreadable. You can avoid this by making sure your hard drive is a non-thermal recalibrating hard drive or that it doesn't thermal-recalibrate during the transfer of data. Also, your hard drive should have access times under 12 ms and be able to transfer data at a rate of 300KB/sec for 2x, 600KB for 4x, and 900KB for 6x.

Q. A SCSI Bus time out occurred. What happened?

A. A time out occurs when the signal sent from the host (SCSI controller) to peripheral is not received in time. This is usually caused by improper termination or the SCSI cable quality or length.

Both ends of the SCSI chain must be terminated. The cable length should not exceed 1 meter (three feet) between devices and the cable must be a shielded SCSI cable. It is recommended you attach the recorder as close to the SCSI controller as possible, regardless of the SCSI ID.

Q. I get the error, "cannot open the volume/track administration file."

A. Not being able to open a virtual image is a result of one or all of the following reasons:

- ❏ Not all the associated image files are present
- ❏ The virtual image was created with an earlier version of GEAR
- ❏ One of the associated image files has been corrupted

Q. Why can't I write at higher speeds?

A. If you're experiencing buffer underruns during writing, GEAR can't retrieve the data fast enough for a particular image. GEAR uses, in most cases, a virtual image. This means that during writing, the virtual image is converted into a stream of data and then written to the recorder. Sometimes this can take too much time and a buffer underrun occurs.

The main reasons for the time lag are:

- ❏ File fragmentation
- ❏ A high number of small files and folders
- ❏ Hard disk thermal recalibration
- ❏ Slow access time on hard disk
- ❏ Other programs running in the background

Reference List

[1]*AHA-1540/1542 Installation Guide*, Adaptec.

[2]ANSI X3.27-1987, *File Structure and Labeling of Magnetic Tapes.*

[3]*International Standard ISO-9660*, First Edition 1988-04-15, *Information Processing, Volume and File Structure of CD-ROM for Information Interchange.*

[4]*System Description on CD-ROM XA*, May 1991, Philips/Sony

[5]*Compact Disc Interactive, Full Functional Specification (Green Book)*, September, 1990, Philips/Sony.

[6*]Sony Electronic Book System, Data Format Technical Specification, version 2.1*, June, 1993, Sony.

[7]*Studio XA 2.0 Manual*, Mammoth Micro Tools, 1993.

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