GEAR™
Audio

USER Manual

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Notification

Each time you want to copy a CD or Audio tracks, make sure you are allowed to make a copy.

Many CD’s are protected by copyright laws. This usually means you cannot make a copy at all (as is the case with most audio CD’s, video CD’s and CD-I). If the CD contains software, you are allowed to make one backup copy for archival purposes only.

If the CD contents are not protected by any copyright law, you are free to make as many copies as you want. This manual refers to other GEAR products. Please contact your point of sale for additional information as to how to obtain these products if needed.

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GEAR Software

General Information

Welcome to GEAR

What is GEAR?

GEAR has powerful and comprehensive software solutions for the production of DVDs and CDs. It is available in several editions:

GEAR PRO is the well-established CD Pre-mastering and CD creation product. It offers you anything you may wish for in CD premastering software, but it does not support the new DVD technology. GEAR PRO is available for Windows 95/98 and NT 4.0 as well as many Unix platforms.

GEAR PRO for Windows with DVD is an advanced DVD/CD software package that allows you to premaster DVDs and CDs for Digital Audio, Video, Game titles, multimedia productions and much more. Also you will be able to write and erase CD-ReWriteable discs. GEAR DVD will be available for Windows 95/98 and NT 4.0 in the summer of 1999.

GEAR CD-R Suite is the best suite product on the market combining GEAR Data's Data/Archiving functions with GEAR Replicator (a simple replication program), GEAR Audio (an Audio CD creator) and GEAR Web Grabber the ultimate tool to record web content. These components are also available as stand-alone programs.

Use GEAR to

With GEAR products you can:

- format data files into a DVD-ROM image that conforms to the UDF standard;
- write a DVD/CD premaster tape in DLT format (the preferred format for DVD) or DDP format (for CD) on 8 mm Exabyte or 4mm DAT;
- erase a CD-RW to prepare it for re-use;
- format data into a CD-ROM image that conforms to the ISO 9660 standard;
- write a compact disc (visit our website at www.gearcdr.com for a full list of supported recorders).The CD-R discs produced with GEAR are fully compatible with normally mastered CDs;
- use a jukebox to write several CDs unattended.

Features overview

	GEAR DVD	GEAR PRO for Win 95/98/ NT 4.0	GEAR for Unix	GEAR CD-R Suite
Write DVD	v			
Write tape	v	optional	v	
Erase CD-RW	v	v	v	v
Jukebox control	v	optional	v	
Write CD-R	v	v	v	v

Supported standards & formats

GEAR's formatting engine supports the following standards:

- UDF (Universal Disc Format; GEAR DVD only)
- CD-ROM, ISO 9660
- CD-ROM Mixed Mode
- CD-ROM XA
- CD Plus (Blue Book)
- ISO 9660 with Rockridge extension (Unix version)
- Multi-session
- CD Digital Audio

In addition, GEAR supports recording of 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

You want to know more about DVD and CD technologies? The next chapter will provide you with all the information you need.

Made by GEAR Software

As a pioneer in the field of recordable disc technology, it has always been the goal of GEAR Software to make state-of-the-art CD-R technologies available to everyone in the form of advanced and user friendly desktop software. GEAR PRO with DVD provides new proof that GEAR Software continues to set the standard in DVD/CD recordable software.

Installing GEAR Audio

This chapter provides information about installing GEAR Audio in Windows 95/98 or NT 4.0. In this chapter, you can read about the following:

- Product Registration
- System requirements
- Configuring your hardware
- Installing the software

Product Registration

Registering your software is an important part of software ownership, as your registration provides essential information to software manufacturers. Most software developers, including GEAR Software, require that your software be registered in order to receive technical support. So, to make sure you can fully enjoy your new purchase, take a brief moment to register your product with us.

To register, simply email us at: registration@gearcdr.com

In your message, make sure you include

- your GEAR Software product name and it's version number
- your current mailing address and phone number

System Requirements

In this section the system requirements are listed for the various versions of GEAR.

Windows 95/98/NT4.0

To run GEAR Audio under Windows 95/98/NT4.0, you need the following configuration:

- A sound card or other audio capture/play equipment
- A 486 IBM-AT or compatible with at least 16 Mb of RAM
- Windows 95/98 or Windows NT 4.0 Workstation
- Any WinASPI32- or miniport-compatible SCSI card (SCSI recorders only)
- A minimum of 25 Mb free disk space
- A fast HDD (12 ms average access or less)

Configuring Your Hardware

This section includes information for configuring the necessary hardware for connecting a CD recorder or tape unit. Separate sections are included for Windows 95/98 and Windows NT.

Keep the following in mind when you start configuring you hardware:

- We recommend you connect the SCSI 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 unexpected error messages.
- It is 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.

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.*

Since Windows 95/98 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 for Adaptec cards and has been successfully tested with the Adaptec, Advansys, Buslogic, Initio, and Diamond adapters. Visit our website at www.gearcdr.com for an up-to-date list of supported adapters.

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 95/98 SCSI drivers, type 4 recorders currently cannot be mounted as CD readers. However, Windows 95/98 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.

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

If your recorder is a device type 5 recorder, Windows 95/98 installs a CD-ROM. For a full list of device type 5 recorders, visit our website at www.gearcdr.com .

To connect your CD recorder:

1. Shut down your system and connect your recorder to your SCSI host adapter.
2. Restart Windows 95/98 with your recorder turned on.
    - If your recorder is a device type 4 recorder, Windows 95/98 prompts you to install a device driver. Since Windows 95/98 does not 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 95/98 installs it automatically and does not prompt you.

Note: *The installation program will install a Gearcdr.vxd (device driver) that will disable the Auto Insert Notification of your CD Recorder while GEAR is running.*

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.*

To verify whether the installation was successful, reboot your machine and check the system properties. If Windows does not 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 GEAR Software Technical Support.

Windows NT 4.0

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, and Advansys 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.

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 .

We strongly recommend that you install the GEAR NT 4.0 reader driver. The default NT 4.0 CD_ROM reader driver automatically marks all type 5 devices (CD-ROM) as CD reader only and uses them exclusively. The GEAR NT 4.0 reader driver prevents this from happening. The installation program will offer you the option to install this driver automatically.

Note: *An alternative would be to install WINASPI but this does not come with Windows NT.*

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.*

Installing GEAR Audio

Windows 95/98/NT 4.0

1. Insert your GEAR CD into your CD reader. On Windows 95/98/NT systems with the Auto Insert Notification enabled, the installation program will start automatically. In all other cases:
2. Run Setup.exe. This program will guide you through the installation process.

Important: *We strongly advise you not to install GEAR on a server.*

We recommend you read the ReadMe files of each program you installed. They include important last minute information. You will find the readme.txt file for GEAR in the root directory of the GEAR CD.

Supported recorders

Gear supports most of the CD recorders in the market. Be up to date and visit our website at www.gearcdr.com for updated lists of recorders and drivers. At our website you will also find answers to frequently asked questions.

Getting Help

This chapter provides information about the user documentation and other forms of support on GEAR available to you. In this chapter, you can read about the following:

- The manual
- On-line help
- Technical support
- Addresses

The Manual

This manual is separated into multiple sections:

- A general section containing an explanation of the concepts involved in recordable disc technology and the installation instructions.
- Sections with specific information about the product.
- Appendices with additional information

Conventions

Special information is denoted as a **Note**, **Important** 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.*

On-line User Manual (Acrobat Reader)

In addition to the printed documentation we have included 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 to search, view, retrieve, and print the on-line user manual. Visit the website at www.adobe.com for more information on the Acrobat Reader.

Note: *The installation program will offer you the option to install the Acrobat Reader.*

Using the On-line Help

On-line help is available at any point in GEAR time to help you creating your CDs.

Windows 95/98/NT 4.0

To access help, do any of the following:

- Press F1 or choose Index from the Help menu to display the help Index.
- Choose Using Help from the Help menu for standard Windows 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.

Technical Support

For frequently asked questions on GEAR and other GEAR Software products, visit our website at www.gearcdr.com .

For support contact GEAR Software at:

GEAR Software Europe	GEAR Software USA
E-mail: gear.support@gearcdr.nl	E-mail: support@gearcdr.com
http://www.gearcdr.com	http://www.gearcdr.com

You can also contact GEAR Software at one of the addresses listed below.

GEAR Software addresses

GEAR Software Europe	GEAR Software USA
Millbank tower Millbank, London SW1P 4QP The United Kingdom	1061 E. Indiantown Road Suite 500 Jupiter, Florida 33477 United States of America
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Fax: +44 (0)171 931 9302	Fax: +1 (561) 575-3026
E-mail: sales.eu@gearcdr.com	E-mail: sales.us@gearcdr.com
http://www.gearcdr.com	http://www.gearcdr.com

GEAR Audio

for Windows 95/98/NT4.0

Working With Audio

This chapter provides detailed information about working with GEAR Audio, the easiest program to create music CDs from your audio files.

GEAR Audio

Welcome to GEAR Audio, a fun and easy to use program that lets you mix and match pre-recorded songs from your LPs, cassettes, CDs and .WAV files to create your own custom audio CD. The CDs you create with GEAR Audio can be played anywhere you play normal CDs-just like the ones you buy from a record store. This user manual contains complete instructions on the installation, usage, and properties of GEAR Software's GEAR Audio software.

Now, before you play maestro-there are a couple of facts, rules, and hints you NEED to know that'll make composing CDs with GEAR Audio a pleasant process indeed. So if you're itching to get started, please finish reading this short section of the manual before you jump ahead to the quick start guide.

GEAR Audio uses the term project to describe a song or group of songs you wish to record. When you select music to record you'll be constructing a project. GEAR Audio will create a record of this project including the settings and songs you select in a project file, this way you can return to work on the project again whenever you want to.

While constructing your project, GEAR Audio will temporarily store it on your computer hard drive until you record it to CD. Make sure that your computer has sufficient hard drive space before beginning to construct a GEAR Audio project. One minute of music consumes roughly 9 MB of storage, so recording a 63 minute CD will require 567 MB of available storage space (63 X 9 = 567). Use the formula 1 minute of music = 9 MB when computing necessary hard drive space.

When you've finished constructing a project in GEAR Audio and want to record it, keep in mind that once information is recorded to CD it can not be edited any further. So, before recording, ensure that the project is set up to your liking.

When recording, you must record to a CD-R disc (recordable compact disc). CD-R discs are available at most computer retailers. When purchasing CD-R's, expect price per unit to decrease with the more you buy (just like blank cassette tapes).

Currently there are four standard CD-R sizes commercially available:

- 18 minutes 181 MB
- 63 minutes 653 MB
- 74 minutes 746 MB
- 80 minutes 807 MB

A second GEAR Audio term you should understand is track. Every song, sound, or audio file you record in GEAR Audio is considered a track, and each track represents a single audio file. CD-R discs can hold a maximum of 99 audio tracks. With GEAR Audio you'll be able to edit and position tracks while they're temporarily stored on your hard drive before recording them to CD. When all selected tracks are arranged to your liking, you're ready to record them to CD-R.

GEAR Audio can record tracks from numerous formats including .WAV, AIFF, Red Book, and Sound Designer II. Tracks on your existing music CDs were recorded in Red Book so you won't have any problem recording them. Red Book is the standard format for commercial audio CDs developed by Phillips and Sony back in 1983. Discs which conform to the Red Book standard typically have "digital audio" printed below the compact disc logo. Tracks from LP and cassette will first need to be converted into a .WAV file format before they may be recorded to CD.

A final few tips Important tips to keep in mind when recording with GEAR Audio:

- We recommend that you disable the power save feature on your computer when writing to CD-R. If your computer enters into a power save mode during recording it may cause errors which can compromise the integrity of your recording session.

- A second tip that can enhance performance during CD recording is disabling the virus check on your computer. Often times a virus check program can slow down the rate of data transfer in your computer to the point that it creates a error during recording. Once you've finished your recording session with GEAR Audio, please be sure you turn your virus check back on.

Installing the de-click and de-scratch tools

The de-click and de-scratch tools do not automatically install during the GEAR Audio program installation. To install them, return to the GEAR Software CD icon, then:

- Double click on the GEAR Software CD icon.
- Double click on the Sound Laundry folder.
- Double click on setup.exe.
- Follow the instructions of the installer until installation is complete.

Note: *For documentation concerning the properties of the de-click and de-scratch filters, please refer to the electronic manual included on this CD located in the sound laundry folder.*

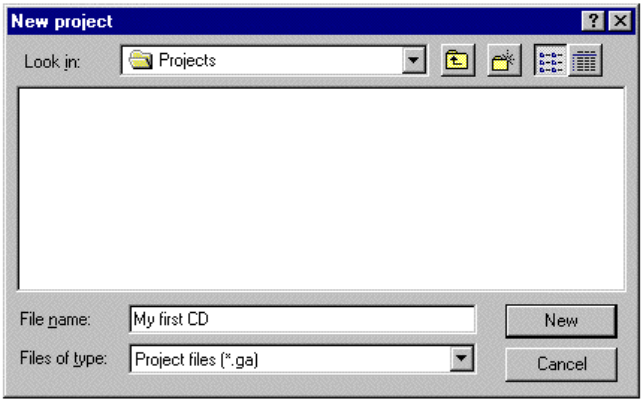
GEAR Audio Quick Start Guide

The following pages in this section will provide you with a graphically illustrated step by step set of instructions for creating your own mix CD. Please remember that you will need to restart your system after installing GEAR Audio before you can begin constructing your project.

First, click on the Create a new project icon:

After clicking on the new project icon you will be prompted with a dialogue box asking if you wish to create a directory to store your projects in, select yes

The new project window will then appear asking you to name your project as below:



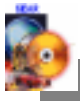
Enter the name of your choice in the File name field then press the return key.

The GEAR Audio workbench will then appear as below:

Note that the name of your current project will appear in the top left corner of the GEAR Audio window..

The default setting for CD-R length in GEAR Audio is 74 minutes. If you are recording to a CD of any other length, you must change the length setting. To do this, click on File, select General Preferences, then click on the Recorder tab. At the bottom right hand corner of the Recorder window, select the length of the CD you are recording to from the Disc Length drop down menu. Now you can begin adding music to your project.

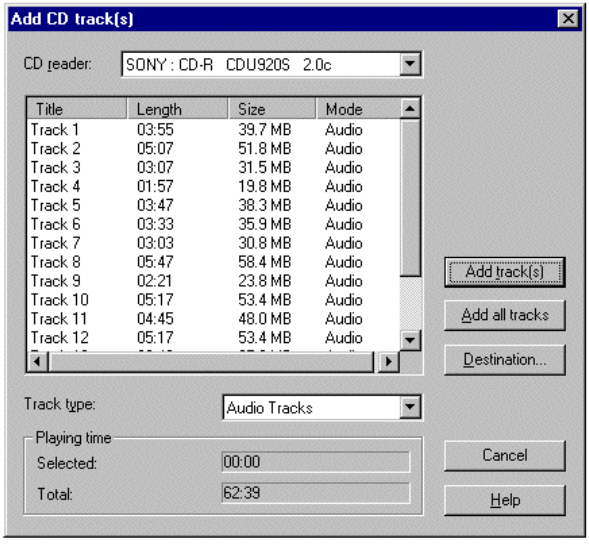
Adding Music to Your Project



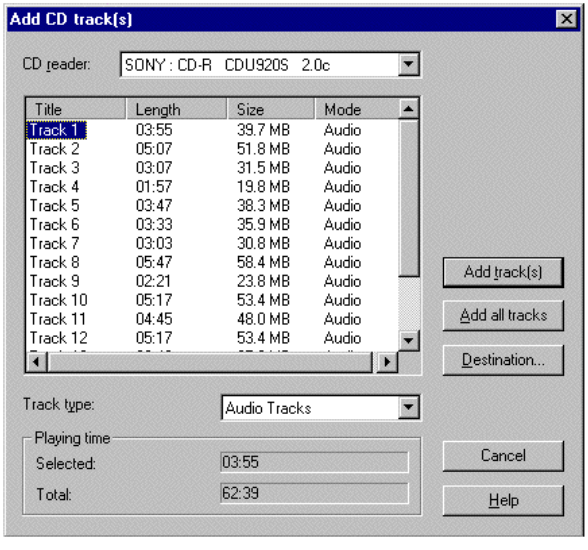
To begin adding tracks to your project, first insert a CD you wish to record from in your CD-R drive.

To begin selecting tracks to record, click on the CD icon: 

The Add CD Track(s) window will then appear listing all available tracks present on the CD in your CD-R drive. Tracks will display the following properties: Title, Length, Size (in MB) and Mode as shown in the next screen.



To select a track for recording, click on the track number where it is listed under the Title column in the Add CD Track(s) window as shown below:

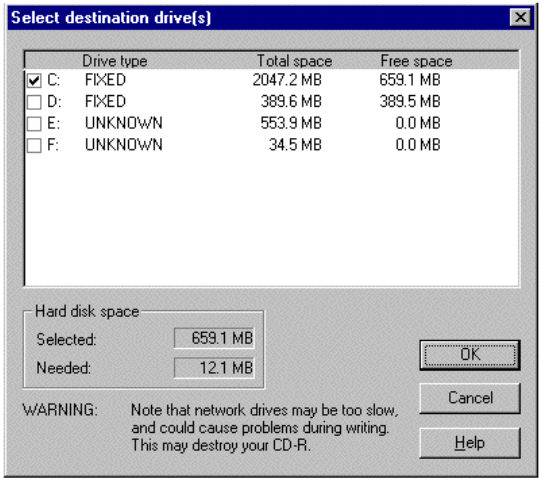


TIP: Don't worry about the order in which songs are stored on the computer hard drive, with GEAR Audio you can arrange songs in any order you choose before recording them to CD.

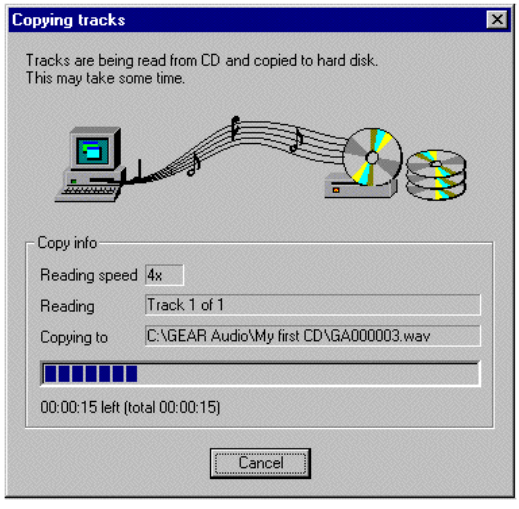
Once you highlight the track you want to record, click on the Add Track(s) button.

The select destination drive window will then appear. Be sure to choose a drive to store tracks on that has sufficient space to temporarily store your tracks, remember the formula 1 min. of music = 9 MB.

Additionally, make sure that you will have access to the drive you select when you decide to record your project. If the storage location of the tracks you plan to record with GEAR Audio is unavailable when you want to record, GEAR Audio will not be able to complete your project.

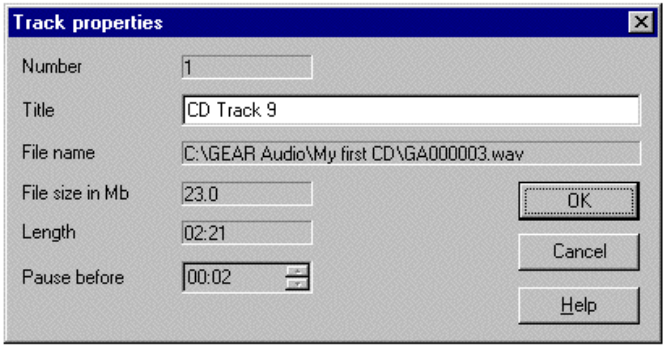


The Copying Track(s) window then appears to display the progress of your CD-R drive in reading the selected track to your hard drive. This window also lists recording speed and the directory where your selected track will be temporarily stored as seen next:



Once GEAR Audio is finished copying the selected track to your computer hard drive, the program will return to the main menu. The track just recorded will appear as below:

Once GEAR Audio returns to the main menu, you can name tracks by double clicking on the track, then enter the name of your choice in the Title field of the Track properties window shown below:



TIP: Naming tracks by artist and title as they are copied and added to your project is highly recommended. Naming will help avoid confusion later when you arrange tracks in the order you wish to record them. For faster naming, simply click once on the track, then after its highlighted, click once again-a text box will appear where you can enter the title for a track without having to open the Track properties window. Song titles entered here will also appear on your printed song index.

After naming the tracks selected for GEAR Audio to record, you may remove the original music CD from the computer CD-R drive.

To add more tracks to your project, simply insert the next disc you want to copy from in your CD-R drive and repeat the steps above after the sub-heading “Adding Music to Your Project”.

To add .WAV files to your project, click on the add .WAV file icon: 

Then locate the directory where the .WAV file(s) you wish to add to your project are located.

From this point you have two options for adding the .WAV file:

1. Click Create link(s) to link the file(s) to the project without actually copying them (this will save hard drive space)
2. Click Copy file(s) to create an actual physical copy of the file(s).

Note: *If you choose the first option above and create a link to selected .WAV file(s), the location of the .WAV file must be accessible by your computer or GEAR Audio will not be able to record your CD. You can name .WAV files the same way as naming CD tracks above.*

Editing Your Project

Once you've finished storing the tracks you wish to record on your hard drive, you can easily edit the order in which they'll be recorded. To arrange song order, select a track by clicking once on its name. This will highlight the track. Then use your mouse to drag and drop the track to the desired position as normally done in a windows environment.

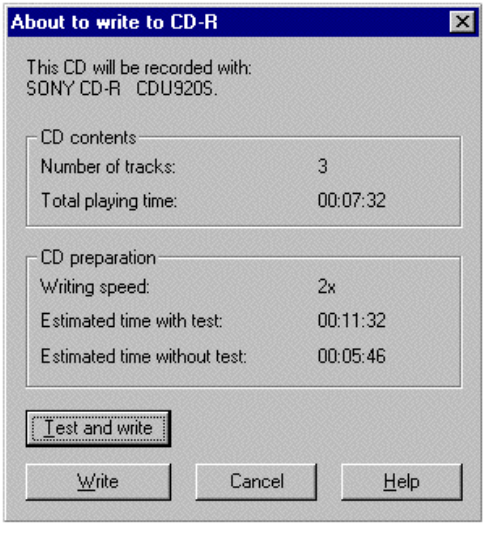
If your computer has a sound editor which can manipulate .wav files, you can use it to edit the tracks selected for recording with GEAR Audio. The capabilities of PC sound editors vary greatly, please reference your computer's documentation on how to use your particular sound editor. Click on the edit icon to locate your sound editor so GEAR Audio can access it:

Once the selected tracks are arranged to your satisfaction and you've completed any desired sound editing its time to record your CD.

Recording Your CD

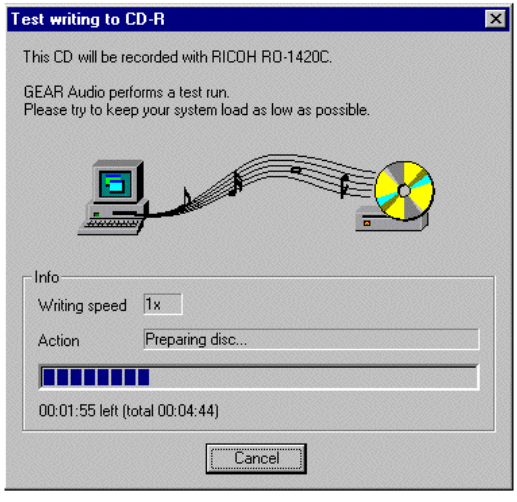
When finished arranging and editing your selected tracks, insert your blank CD in the CD-R drive. Be sure that disc length matches the recording length you specified with GEAR Audio earlier. To begin recording your selected tracks, click on the record icon located near the middle of the toolbar:

The About to write to CD-R screen will then appear.



If this is the first time recording to CD for the current hardware configuration, it is recommended that you choose the Test and write button to initiate the recording process. By allowing the computer to test data transfer before recording, you minimize the possibility of writing errors occurring during the recording process. After a few successful recording sessions you may want to try the Write only option for shorter recording times.

After clicking on the Test and Write button the Test Writing to CD-R screen will appear.



This screen will display the progress of GEAR Audio as it test records your selected songs. In the Action column, the track number GEAR Audio is currently recording appears, and the status bar below illustrates the recording time remaining for the current track.

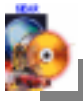
Following completion of the testing procedure, GEAR audio will eject your blank disc. At that time, reinsert the blank disc and press the return key.

GEAR Audio will then begin the recording process illustrated with a similar screen as above, and notify you when it is complete:

Printing Your CD Index

Following the recording of your CD, you can create and print an index of the recorded tracks including their titles.

To create the CD index, click on project, then select Create CD Index. Enter the name of your choice in the save index as field, then press return.



To print your index, click on file, then select Print CD Index. GEAR Audio will print the pre-formatted index of your songs. The index fits neatly into any CD jewel case for a clean presentation of your first CD.

If you have any questions regarding the functions of GEAR Audio, feel free to explore the program help function by clicking on the help icon:

How To ?

This section of the manual contains brief step by step descriptions on some of the most common operations you'll be performing with GEAR Audio. These how to sections are designed as quick reference outlines for maximum information, minimum verbiage.

How to make a mixed CD

Before you use the "how to make a mixed CD" you may want to check out the quick start guide just a few pages back from here if you haven't already done so.

- Click on the 'New project' icon.
- The 'New project' dialog box then appears, select a directory and specify a name for your project.
- Click on 'New' to open the new project.
- Add tracks to your project by clicking on the add CD track or add .WAV file icons.
- If desired, edit your project with sound or .WAV editors you have connected to GEAR Audio.
- To preview your project, click on the scan icon, and GEAR Audio will play the first few seconds of each track in the project.
- Record your project to CD-R by clicking on the record icon.

How to copy from LP and cassette into a project

In order to copy files from LP or cassette to your GEAR Audio project, these songs must first be converted to .WAV files.

The procedure for converting songs from these formats will vary greatly between users due to differences in audio equipment and sound cards. Outlined below are the general principles for creating .WAV files on your computer. However, we highly recommend that you reference the documentation for your sound card to facilitate this process.

- Via a stereo cable, connect the output jack of your stereo device (e.g.: record player or cassette player) to the input port of your computer sound card.
- Open the sound editing application present on your computer sound card.
- Open the recording settings for your computer sound editor and set it to save files as 16 bit Redbook files @ 44.1 Mhz.
- Set your computer sound editor to record then begin playing the track you wish to convert to a .WAV file on your stereo device.
- Once the track you wish to convert has finished playing, stop recording on your computer sound editor and save the file as a .WAV file in an accessible location where you can later add it to your GEAR Audio project.

NOTE: Depending upon the length of time between playing your selected track from an audio device and recording it on your computer sound editor, you may wish to use the sound editor further to control when the music in your newly created .WAV file begins.

How to copy .WAV files into a project

- Click on the Add .WAV file(s) icon and the add .WAV file dialog box will appear.
- Locate the directory where the .WAV file(s) you wish to add to your project are located.
- From this point you have two options for selecting the .WAV file:

  1) Click Create link(s) to link the file(s) to the project without actually copying them (this will save hard drive space).

  2) Click Copy file(s) to create an actual physical copy of the file(s).

Note: *If you choose the first option and create a link to selected .WAV file(s), the location of the .WAV file must be accessible by your computer or GEAR Audio will not be able to record your CD.*

How to link your external .WAV editor

Before you can edit tracks, you will need to link your external .WAV editor to GEAR Audio as follows:

- In the file menu, click on General preferences.
- Click on the Application tab.
- Enter the path and file name of your external .WAV editor.
- Click OK.

How to edit tracks

- Select a track in the Workbench Project view and click on the edit icon.
- This will open your sound editing application.

Note: *Sound editing applications may vary dramatically. For instruction on the capabilities of your sound editor, you must refer to its documentation. Look in the program folder of your editing application for documentation to assist you.*

- Once you've finished editing your track, exit your external .WAV editor.
- Your track will automatically reappear, in edited form, in the GEAR Audio workbench.

How to copy an entire CD

- Click on the open new project icon.
- The New project dialog appears.
- Select a directory for temporary storage and specify a name for your project.
- Click New to open your project.
- Click on the add tracks icon.
- The Add CD track(s) dialog appears.
- Click Add all tracks.
- If prompted, select additional free temporary storage space, keep in mind that 1 min. of music takes approximately 9 MB of space.
- The Copying CD track(s) dialog appears, displaying copying progress and information on the tracks you are copying. Once the copying process has been completed, the tracks appear in the GEAR Workbench Project view.

How to select a destination drive

- To select the temporary storage location for your tracks, click on the add tracks icon.
- Then click on the destination button.
- Choose your temporary storage location on this screen by clicking the check box next to the appropriate disk. This area displays the drives currently connected to your system, drive type, drive size, and the total space available on them.

Note: *Try to avoid selecting network drives as a storage location to prevent network availability or transmission speed problems from occurring when writing to CD-R. Differences in data transmission speeds between local and network drives may result in recording problems with your CD recorder . If network drives containing tracks for your project are disconnected when you write to CD-R, your project will not be written correctly.*

How to move tracks

- Select the track or tracks you wish to move from the Workbench by clicking once on it.
- Drag and drop the selected track to the desired insertion point, based on the position of the blue insertion line, which moves up and down in the Workbench Project view with the selected tracks as you move your cursor.

How to copy tracks

- Select the track or tracks you wish to copy from the Project view.
- Click on the copy icon to copy the selected tracks to the clipboard. Drag and drop the blue insertion line in the Project view to the desired insertion point.
- Click on the paste icon to paste the selected track back into your project.

How to add tracks from a CD

- Click on the add tracks icon. GEAR Audio will prompt you to wait while it retrieves information about the current CD.
- The Add CD track(s) dialog appears.
- Select the track or tracks you wish to copy into your project.
- Click Add tracks.

How to modify the space between tracks

- In the Workbench Project view, double-click the track you want to change the pause in front of. The track properties dialog will then be displayed.
- Enter a new value in the 'Pause before' field and click OK.

Note: *The pause before the first track is permanently set at 2 seconds because Audioplayers are designed to detect the beginning of the first track 2 seconds into the audio CD.*

How to listen to tracks

- Select the tracks you want to hear and click on the play icon
- To play all tracks, make sure that you have no track selected, then click on the play icon.
- To preview the first few seconds of each track, click on the scan button.

How to delete tracks

- Select the track you wish to delete from the Workbench.
- Click on the delete icon.
- The Delete .WAV file confirmation dialog appears.
- Select the appropriate option:

Yes to all will delete selected tracks from the Project view and delete all associated .WAV files from disk. Any other tracks in your project which may be based on deleted .WAV files will also be deleted.

No to all will delete selected tracks from the Project view and retain all associated .WAV files on disk.

Yes will delete a single track from the Project view and delete the associated .WAV file from disk. Other tracks in your project based on the deleted .WAV file will also be deleted.

No will delete a single track from the Project view and retain the associated .WAV file on disk.

Note: *As you can tell, the options 'Yes' and 'No' have different effect when are chosen in conjunction with multiple track selections. After selecting 'Yes' or 'No' for the first track in a multiple selection, GEAR Audio displays the name of each subsequent .WAV file in the Delete .WAV file dialog and prompts you to click 'Yes' if you wish to delete the file or 'No' if you wish to retain it before taking the corresponding action.*

How to remove scratches and clicks from tracks

.WAV files recorded from non-digital sources can contain irritating scratches and clicks. GEAR Audio contains a built-in declick and descratch utility which helps remedy this problem, by giving you the ability to create audio discs with higher, more consistent quality levels:

- Right-click on a .WAV file in the Workbench Project view.
- Select Declick track.
- Clicks and scratches will be automatically filtered out of your track.

How to write to CD

- Once you have finished editing and checking your project, you are ready to write your project to CD.
- Insert a recordable CD of the appropriate size in your CD recorder.
- GEAR Audio will automatically generate a warning if the inserted CD-R is not large enough to record your project.
- Click on the record icon, the About to write CD-R dialog appears.
- Click the 'Test and write' button to test your system, CD recorder, and CD-R prior to writing the project.
- Click 'Write' to immediately start writing your CD-R.

During testing and writing, a status dialog box appears to keep you informed of GEAR Audio's recording progress.

How to adjust reading speed

Select reading speeds from the drop-down menu located in the recorder general preferences tab of the file menu to optimize read performance. If your computer is unable to process information quickly enough at it's current speed setting, select a lower speed to alleviate this problem.

Use the Maximum buffer size scroll bar to adjust the size of the buffer used by Gear Audio. Buffer size has no impact on the speed at which Gear Audio writes to your CD-R, but does have an impact on reliability. The larger the buffer, the less risk you run of loosing valuable information.

TIPS:

- Select Lowest speed if Gear Audio encounters problems when reading at maximum speed.
- Select Highest speed to have your source CD read at maximum speed.
- Select Advanced to specify a specific reading speed in the dialog box that appears when you click Advanced settings.

How to adjust writing speed

Select writing speeds from the drop-down menu located in the recorder general preferences tab of the file menu to optimize read performance. If your computer is unable to process information quickly enough at it's current speed setting, select a lower speed to alleviate this problem.

TIPS:

- Select Lowest speed if Gear Audio encounters problems when writing at maximum speed.
- Select Highest speed to have your CD written at maximum speed.
- Select Advanced to specify a specific writing speed and the required buffer size. Always try to use as large a buffer as possible.
- Select as large a buffer as possible in order to prevent writing errors often caused by buffer under-runs, which kill the recording process.

How to improve GEAR Audio performance

You can improve the performance of GEAR Audio and resolve certain problems by:

- Closing other applications to make more memory available to GEAR Audio.
- Defragmenting your hard disk to maximize the space available for use by GEAR Audio.
- Disabling your screen saver to make more memory available for GEAR Audio functions.
- Disabling all applications which may be scheduled to start automatically before writing to CD-R, e.g. virus checkers, fax applications, Windows 95 System Agent, etc.
- Increasing the Total buffer size in the Advanced write settings screen.

Contact GEAR Software Technical Support if you encounter problems after improving system performance and recording speed.

How to print a CD index

GEAR Audio allows you to create a printable CD index, a list of all the tracks in your project (and on the CD-R you have created).

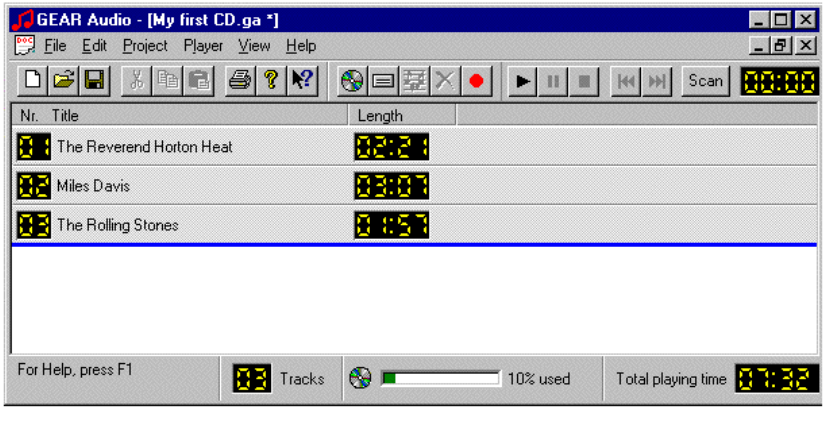
- Open the general preferences CD Index tab located in the file menu.
- Choose the information you wish to appear on your printed index.
- When finished, click on the print icon.

NOTE: Indexes can be printed on standard paper size format or in Inlay format for use in a standard CD jewel box.

GEAR Audio Tools

Now that you know some of the basics about GEAR Audio works, here's a look at the tools you'll be working with to build your projects:

The Workbench



The GEAR Audio Workbench is displayed when you open GEAR Audio. The sample above shows the work bench, and how your tracks will appear on it (above are some favorites of the author). The Workbench contains all the commands you'll use to copy tracks from source files for inclusion in your project. The

Workbench can also be configured to use an independent external sampling or .WAV editing application that has been installed on your computer. With the Workbench, you can also specify a number of default settings for your GEAR Audio projects as described in the following pages of this manual.

Button Bars

The Button bars provide access to the most common functions you'll need when using GEAR Audio. There are three button bars:

The Tool bar:

The Project bar:

The Player bar:

You can use your mouse to drag and drop these bars anywhere on your desktop. You can also use the view menu to show or hide these different bars.

Tool Bar Commands

Create new project: 

Open existing project: 

Save current project: 

Cut tracks: 

Copy Tracks: 

Paste Tracks: 

Print CD Index: 

About GEAR Audio: 

Project Bar Commands

Add track to project: 

Add .WAV file to project: 

Edit Track: 

Delete Track: 

Record to CD: 

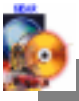
Player Bar Commands

Play selected track: 

Stop playing track: 

Skip back to previous track: 

Skip forward to next track: 



Pause play of current track: 

Play a sample of each song in the current project: 

Status Bar

This is the Gear Audio Status bar, it displays information on the current project. The Status bar can be displayed or hidden by using the Status bar option in the drop down View menu. The far left area of the status bar describes the action of individual menu items as you navigate through GEAR Audio menus. It will also describe the action of a toolbar button if you click once on it without releasing the mouse button.

The status bar also provides useful information regarding the amount of free space remaining in your project, what the total recording time is for your project, and the number of tracks presently included in the current project

Menu bar

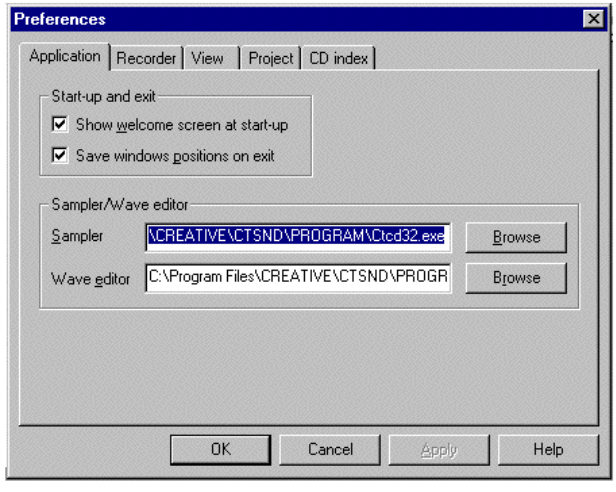
This is the GEAR Audio Menu bar, it provides access to all GEAR Audio functions via an intuitive drop down menu system. Menus are accessed by clicking on the respective menu title, or pressing the Alt key on your keyboard in combination with the underlined letter of menu you want to open. The commands contained in the various menus are illustrated and described in brief below.

FILE MENU

Use this menu to open, save, close or delete new and existing projects. In the file menu you can also specify default settings for GEAR Audio by accessing the general preferences sub-menus (described below). Additionally, you can use the file menu to sample tracks using your external sampler, print a CD index, specify print settings, listen to a sample from a selected track, or exit Gear Audio.

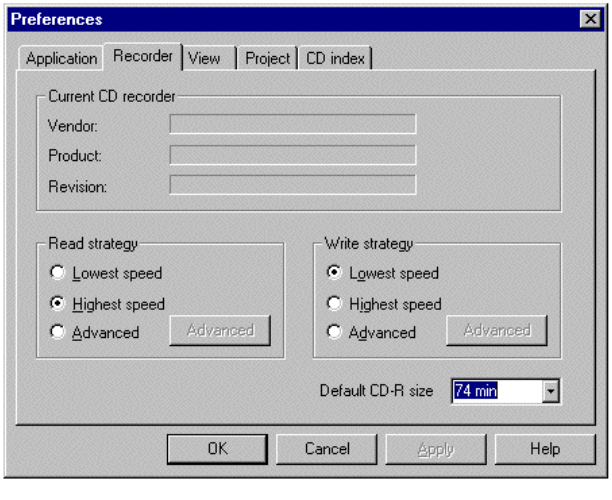
General Preferences-Application Tab

The General Preferences Application tab allows you to browse your computer for installed sound samplers or .WAV editors which can be used in conjunction with GEAR Audio. Also present on this tab are check boxes for setting basic start-up and exit preferences



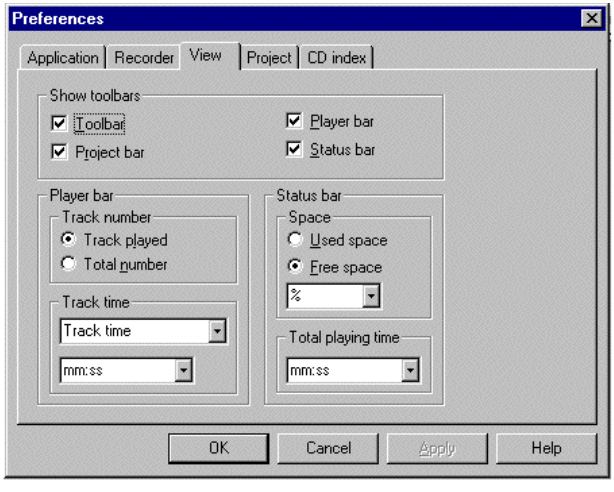
General Preferences-Recorder Tab

With the recorder tab you can set the reading and recording speeds for your CD-R drive. The low and high settings will assign the lowest or highest possible recording speeds respectively, while the advanced setting allows you to specify the exact speed for each function. A second important option of the recorder tab is the disc length field. Enter the appropriate disc size in this field to ensure your planned recording session does not exceed actual disc space. The most common CD sizes are: 18, 21, 63, 74, and 80 minutes.



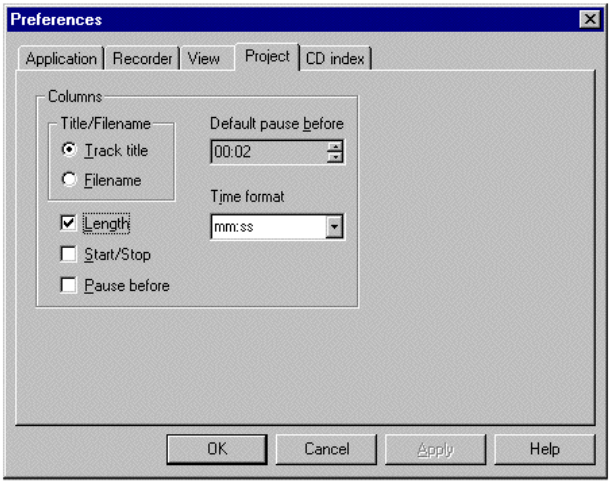
General Preferences-View Tab

Use the View check boxes to show or hide the Tool bar, Project bar, Player bar or Status bar. Additionally, you can modify the properties and data display formats of both the Player bar and Status bar.



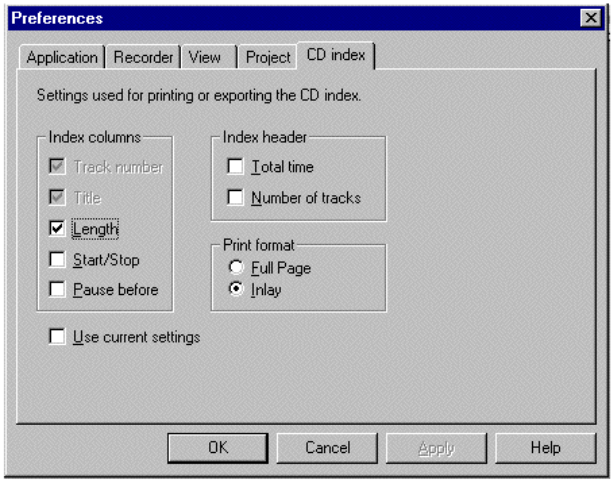
General Preferences-Project Tab

In the project tab you can determine the default pause length between tracks in your project. There are also check boxes to modify the display properties of your tracks as they appear on the GEAR Audio workbench: you can show the start/stop times, the pause length between each track, and choose to have tracks appear by either their title or file name.



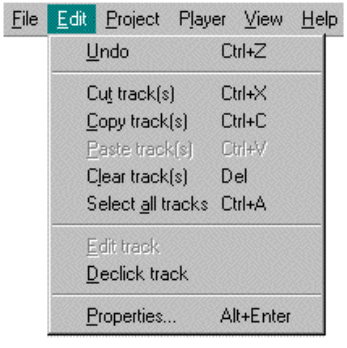
General Preferences-CD Index Tab

Use the CD index tab to select your desired settings for printing or exporting the CD index. You can choose to include track title, length, the start/stop times, and the pause before time. Be sure to also select from the index header and print format check boxes to ensure that the CD index will appear to your liking.



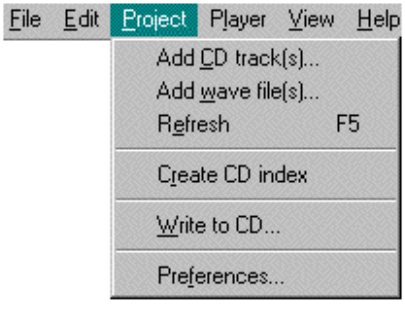
EDIT MENU

Use the edit menu to undo changes, cut, copy, paste, clear, or select tracks. This menu can be used to specify properties of selected tracks via the properties function. It can also access linked external .WAV editors or the de-click editor which is included on the GEAR Audio disc (please note that the declick editor requires a separate but simple installation as described earlier in this manual)



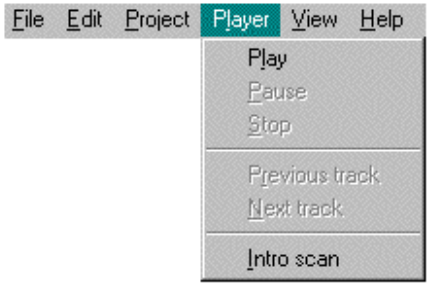
PROJECT MENU

Use this menu to copy tracks and .WAV files from CDs or your hard disk, create a your project track list, write your project to CD-R and specify settings for the currently active project. You can also use the refresh command to check the validity of your tracks. Please note that any project preferences specified via this menu will override the default settings present in the General preferences project tab located in the file menu.



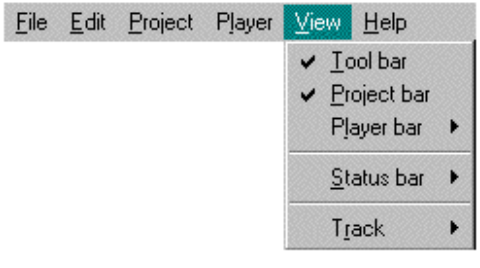
PLAYER MENU

With the player menu you can play, pause or stop tracks on your computer. This menu also has an intro scan option which will play the first few second of each track in a project to provide an audio preview of how the project sounds.



VIEW MENU

Use this menu to hide or display the tool and project bars or specify display settings for the player and status bars. Use the track sub menu to modify the appearance of your tracks as they appear in GEAR Audio.



HELP MENU

Use this menu to navigate the GEAR Audio help utility. Select Help topics to access the help index or perform keyword searches. To view the version and copyright information for your copy of GEAR Audio click on About GEAR Audio.

Recorders Supported

Please refer to the GEAR Software web site for a list of the CD recorders supported by this product. This list is being expanded constantly as new recorders are introduced. An up-to-date list can be found on the GEAR Software Web site at: http://www.gearcdr.com

Appendices

Glossary

General terms

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 multi-session 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 Disc, 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 operating system and the SCSI Manager. It makes it possible for your system 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	In computing one gigabyte generally equals 1024 x 1024 x 1024 bytes. According to ISO standard however one gigabyte equals 1000.000.000 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 computer 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 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-13346 The new ISO standard for optical media based on a file system for write-once and rewritable media using non-sequential recording.

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 In computing one kilobyte generally equals 1024 bytes. According to ISO standard however one kilobyte equals 1000 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 In computing one megabyte generally equals 1024 x 1024 bytes. According to ISO standard however one megabyte equals 1000.000 bytes.

Mb/s Megabytes 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 on-line 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.
multi-session	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.
multi-volume 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.
OSTA	Optical Storage Technical Association is a non profit corporation that is promoting the use of optical technology, optical drives, media and peripherals.
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.

UDF The Optical Storage Technology Association (OSTA) has defined the Universal Disk Format (UDF) as a subset of ISO13346 in order to maximize data interchange, creating a flexible format that is eminently suited for incremental write (see below). Although UDF is not an official standard, it has since become a de-facto standard for the industry.

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.
VTOC	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.

Troubleshooting

In this appendix you will find a checklist for common problems. In addition we advise you to visit our Website at www.gearcdr.com for:

- updated recorder lists and drivers
- answers to frequently asked questions not included here
- GEAR Software product information

Recording problems

Below you will find some general remarks on CD recorders, SCSI interfaces and buffers to help you solve problems related to the recording of your discs. More details are available at the GEAR Software Website www.gearcdr.com .

SCSI CD recorders

When installing your recorder and GEAR, please adhere to the following:

- Make sure the Termination Power (Term.Pwer) jumper is removed from your recorder.
- In Windows 95 Do NOT load SCSI and / or CDROM drivers in your CONFIG.SYS and AUTOEXEC.BAT. These are 16-bit drivers and can conflict with GEAR.
- Type Switchable recorders (Like Ricoh, Sony, etc.) can best be set as Type-5 recorders;
- Use the GEAR Software CD-Recorder driver (gearcdr.vxd). You can find this driver on the GEAR CD. If you have an older version of GEAR, please contact your local distributor or download it from www.gearcdr.com. This driver enables the use of the Miniport by GEAR and can be used in conjunction with other drivers (i.e. EZ-SCSI).

SCSI interfaces

If your SCSI-interface does not function properly, you can try the following:

- Install the Microsoft Windows 95 Service Pack(s). Do this before installing the SCSI-Card specific drivers. Preferred are Busmaster PCI SCSI Cards. These cards execute all SCSI commands themselves and therefore relieve the CPU workload. This way more CPU time is available for the CD-Recording program and “Buffer underrun”, “Buffer overrun” and “Buffer empty” errors are reduced or solved;
- When using a CD-Recorder in combination with a SCSI-Harddisk, it is recommended that the CD-recorder & the SCSI-Harddisk are on separate controllers;
- Check the Termination Power of the recorder or any other SCSI device. This must be deactivated!
- If a scanner is attached, deactivate the scanner & restart Windows before recording.
- Use the GEAR Software CD-Recorder driver. You can find this driver on the GEAR CD. If you have an older version of GEAR, then please contact your local distributor or download it from “www.gearcdr.com”. This driver enables the use of the Miniport by GEAR and can be used in conjunction with other drivers (i.e. EZ-SCSI).

Buffer settings

If you are faced with a buffer underrun, an empty buffer or a buffer overrun, this probably means that there is a problem with the data transfer rate. This could have any number of causes: the system board, the hard-disk, the SCSI-card, Windows, a conflicting driver or any active application or task. Below you will find a list of tips which might solve the problem.

- You must first check if your system recognizes and controls *all* devices correctly. *Every* device must be checked: modem, mouse, SCSI-Controller, etc. Every device influences your system in one way or the other, even those which seem not to have any affect on CD-Recording.
  You can check this by opening Control Panel > System Properties > Device manager. If there is an exclamation mark (!) something is wrong and you should solve this problem.
- Before writing, close all background tasks, schedulers & screen savers.
- If you dragged & dropped files from a CD-ROM player in your recorder-drive, the player might be too slow. This is not determined by speed of the drive, but by its access time. Even if you have a 20x CD-ROM player, if the access time is too slow, writing will not be successful. Therefore do not use drag & drop to copy from CD-ROM, but use Copy Track from the Disc info menu or generate a Physical image.

- Some hard disks have to re-calibrate periodically. During the re-calibration phase, the drive is inactive. This means the data-flow stops and the buffer cannot be filled or emptied resulting in an error. Use a hard disk that does not re-calibrate to store your GEAR image on.
- Try defragmenting the hard disk, preferably full-defragmentation.
- Try using a Physical Image. Select Convert to Physical and make sure Use Physical image is selected in the recorder settings.
- In Windows 95 add the following to the system.ini:
  [VCACHE]]
  MinFileCache=256
  MaxFileCache=2048
- Update your Windows 95 to the latest version with the Microsoft Windows 95 Service Pack(s). You find your current version number in the System properties dialog.
- Set the read-ahead optimization to None. In the System Properties you can find the Performance tab. Click on the File System button to display the File System Properties. Here you can adjust the Read-ahead-Cache.
- Select another drive for your Windows swap file. If the swap file and the files you want to write to CD are on the same drive, you lose performance. In the System Properties you can find the Performance tab. Click on the Virtual Memory button to display the Virtual Memory settings. Here you can specify your own settings.

Reference List

Useful references

1. ANSI X3.27-1987, File Structure and Labeling of Magnetic Tapes.
2. International Standard ISO-9660, First Edition 1988-04-15, Information Processing, Volume and File Structure of CD-ROM for Information Interchange.
3. System Description on CD-ROM XA, May 1991, Philips/Sony
4. Compact Disc Interactive, Full Functional Specification (Green Book), September, 1990, Philips/Sony.
5. International standard ISO/IEC 13346, First Edition 1995-12-15, Information Technology-Volume and file structure of write-once and rewritable media using non-sequential recording for information interchange, Part 1-5
6. Universal Disk Format Specification, Revision 1.50, 1997, Copyright Optical Storage Technology Association.

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